



zonAction 2000



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A newsletter dedicated to the protection of the ozone layer and implementation of the Montreal Protocol

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View point

The road to recovery?



Professor Mario J. Molina, winner of the 1995 Nobel Prize for Chemistry

Professor Molina was one of the scientists who first alerted the world to the dangers of ozone depletion by CFCs. He is currently an Institute Professor at the Massachusetts Institute of Technology, USA.

The scientific case linking CFCs and halons to ozone depletion, already very strong in the early 1980s, has been further strengthened in recent years by measurements and analysis of data related to the budget of halogen species in the stratosphere, by monitoring the concentration of other chemical compounds involved in the ozone balance, by further elucidating the role of polar stratospheric clouds in the destruction of ozone, and by monitoring the trends in the increasing levels of UV radiation at ground level, etc.

While we might have to wait several decades to clearly observe the recovery of the ozone layer and the disappearance of the ozone hole, the declining growth in the amount of ozone-depleting substances (ODS) in the atmosphere is a very strong indication of the success of the Montreal Protocol and its Amendments. In particular, the atmospheric concentration of methyl chloroform has declined very strikingly, as expected from its relatively short atmospheric lifetime—about five years. On the other hand, the concentration of CFC-12 is still rising, albeit more slowly than in past decades. This rise is presumably a consequence of the continued production in developing countries, and of the slow release of the large bank in old refrigerators and automobile air conditioners.

Perhaps most worrisome is the observed increase in the atmosphere of the amount of bromine-containing compounds of industrial origin, such as halon-1211 (CBrClF₂). This observation indicates that a relatively small-scale industrial activity can contribute significantly to the atmospheric burden of

Contents

View point	1
ExCom to analyse global needs for long-term strategic business plans	1
News from the international agencies	2
Industry and technology 2000	3
Success stories	7
11th Meeting of the Parties—maintaining momentum in a challenging context	8
The National Ozone Unit Interview	10
Forthcoming meetings	10
Status of Ratification	10

ODS. Fortunately, UNEP is facilitating the accelerated phase out of this halon in developing countries.

But we should not be complacent. The Parties to the Montreal Protocol, the industrial sector, environmental organizations and the scientific community need to continue to work together aggressively under the leadership of UNEP to ensure successful recovery of the ozone layer in coming decades.



Freeze on halons and methyl bromide: 24 months to go

50 per cent reduction in Annex A CFCs: 60 months to go

85 per cent reduction in Annex A CFCs: 84 months to go

ExCom to analyse global needs for long-term strategic business plans

At its 29th Meeting, held 24–26 November 1999 in Beijing, the ExCom recognized the need for an in-depth and broad ranging debate focussing on: the sectoral aspects of ODS phase out; the status of all Article 5 countries with regard to meeting their Montreal Protocol commitments; an analysis of global needs to reach ODS phase-out targets; and a strategic plan to ensure global coverage by the Multilateral Fund. It was decided that this debate should form part of the 30th

ExCom Meeting. The decision came in response to concern expressed by representatives as to the limited number of countries covered by the draft business plans submitted by the implementing agencies. In the ensuing exchange of views, the Meeting's attention was drawn to the call for a global needs analysis and for a strategic plan to ensure global coverage.

Project financing was also discussed, with the Meeting clearing for approval projects worth around US\$83.6 million;

these would phase out around 9,500 ODP tonnes. Approval was also given for US\$82 million for a project to phase out 22,588 MT of CFC production in India.

In addition to the above, the Meeting also:

- decided that agencies should return unspent balances from completed projects;
- reviewed draft business plans for the year 2000;

continued on page 10 ...

News from the international agencies



Fund Secretariat

1999 was a challenging year for the ExCom, the Fund Secretariat and the implementing agencies.

Agreements were reached between China and India and the ExCom to close down CFC production facilities in those countries. In the consumption sector, over 700 technical assistance and investment projects were submitted for the ExCom's approval. These efforts resulted in total funding in 1999 of US\$183 million to phase out consumption of 19,800 ODP tonnes and production of 28,600 ODP tonnes. In addition, monitoring and evaluation of 28 refrigeration and 17 institutional strengthening projects were completed.

The Secretariat is hopeful that active coordination of the Fund's activities and cooperation with the bilateral and implementing agencies will ensure success of the plans for the 2000-2002 triennium.

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UNEP DTIE OzonAction Programme

At the end of 1999, UNEP had assisted 90 countries with their country programmes, was continuing to implement institutional strengthening projects for 75 countries, had assisted in the development of 19 refrigerant management plans (RMP), was operating eight regional networks of more than 100 National Ozone Units, and was continuing to provide targeted information as part of its mandate to act as an information clearinghouse.

Non-investment projects will continue to play a crucial role in helping Article 5 countries to achieve their reduction targets and freeze goals. To assist them in this, UNEP's work in 2000 will focus on: undertaking specific actions to assist methyl bromide phase out; assisting SMEs; providing training on good practices in refrigeration and for customs services, as part of RMPs; policy assistance; continuing information exchange activities; and devising better and more effective ways of communicating and disseminating information.

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UNEP Ozone Secretariat

In 1999, the Ozone Secretariat supported and cooperated with all of its

Montreal Protocol partners in key areas including synthesis of the Scientific, Environmental Effects and Economic Assessment panel reports, and the Technology and Economic Assessment Panel's study on replenishment of the Multilateral Fund for the 2000-2002 period. It also provided support to the Parties, the Multilateral Fund and Global Environment Facility in bringing about the freeze on production and consumption of CFCs in developing countries (as of 1 July 1999).

There are remaining challenges and the Secretariat will be focussing on the key issues of ratification of all amendments to the Montreal Protocol by the Parties; resolving of outstanding issues in CEIT countries; and cross-cutting issues between the Kyoto and Montreal protocols.

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UNDP

The 29th ExCom Meeting, in

November 1999 in Beijing, approved 90 UNDP projects totalling US\$18 million which will eliminate 2,264 ODP tonnes in the aerosols, foam, halons, refrigeration and methyl bromide sectors in 19 countries. UNDP/UNEP collaboration under the GEF continued, with UNEP finalizing the country programmes and UNDP the investment projects for Estonia, Kazakhstan and Tajikistan. These three programmes, amounting to US\$7.3 million in total, are to be reviewed by the GEF Council for approval by mid-2000.

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UNIDO

During 1999, the MLF approved 132 projects for implementation by

UNIDO. With a value of US\$36.6 million and located in 37 countries, the projects will eliminate 4,230 (ODP) tonnes.

UNIDO maintained its leading role in the elimination of use of methyl bromide in 1999. At the end of the year, there were 27 UNIDO projects in 26 countries, covering phase out of methyl bromide and demonstration of alternative technologies. Africa continued to receive particular attention, with one-third of UNIDO's efforts in the sector addressing the concerns and needs of the region.

At the end of 1999 UNIDO was implementing 557 projects in 59 countries with an approximate value of US\$197 million. In the year 2000, it will continue to assist Article 5 countries in meeting and maintaining their CFC freeze obligations.

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World Bank

At its meeting in November 1999, the ExCom approved, in

principle, a total of US\$82 million for a World Bank project which will lead to the complete phase out of production of CFCs in India. A full description of the project can be found on the Bank's web site (see below).

In addition to the approval of the India Production Sector project, the ExCom also approved US\$16.9 million to support investment projects in nine countries. This amount includes US\$10.6 million for the China halon sector work programme.

The total World Bank portfolio for 1999 reached US\$60.8 million. Investment projects approved in 1999 will eliminate 7,540 ODP tonnes of CFCs and 9,730 ODP tonnes of halons. To date World Bank approvals equal US\$351.68 million.

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Industry and technology 2000: views from experts, industry and NGOs

For this first issue of the year 2000, the OzonAction Newsletter is presenting a round-up of expert views on the current state of development of the technologies which normally figure in these pages, together with some reflections on the remaining challenges.

Refrigeration and air conditioning: the state of the art

Dr Lambert Kuijpers, Co-Chair UNEP's Refrigeration Technical Options Committee, gives an overview of the state of the art in the refrigeration sector, with an emphasis on the future challenges for Article 5 countries.

Worldwide, there has been a change to HFC-134a and isobutane as refrigerants in new domestic refrigeration products. Nevertheless, challenges still remain in servicing and repair of appliances, with CFC-12 continuing to dominate after-market demand. This problem is particularly acute in Article 5 countries.

In new commercial refrigeration equipment, use of direct HFC systems or indirect systems has replaced the use of HCFCs in the developed countries. An important question now is whether Article 5 countries will—in addition to limiting their emissions of refrigerants—be able to leapfrog use of HCFCs altogether and

adopt non-ozone-depleting alternatives.

Virtually all existing unitary air conditioning equipment produced so far relies on HCFCs. It may be desirable to switch to a single HFC alternative, R-410A, globally, with propane being an adequate choice for smaller units. In Article 5 countries, HCFC-22 is likely to continue to be the refrigerant of choice in the near future.

For chiller air conditioning, new equipment uses non-CFC alternatives, mainly HFC-134a and HCFC-123, as well as ammonia. The question to be resolved for Article 5 countries is: which should be the leading substitute?

Similar outstanding issues remain in transport, industrial refrigeration and in the cold storage sector, where ammonia is often already the refrigerant of choice.

For mobile air conditioning, all newly manufactured systems currently use HFC-134a. With the rapidly increasing number of new cars in the developing countries, the choice of HFC-134a also seems logical here. Ongoing developments

regarding non-HFC alternatives may be important for Article 5 countries. However, this will be in the mid to long-term. Contamination of refrigerants during servicing is also a problem.

In summary, the most important issues for the developing countries are decisions on non-ODS replacements to be used in the production of new equipment, reliance on HCFCs, and particularly problems of servicing, repair and retrofit in many refrigeration and A/C sectors. Development of energy efficiency is an issue common to all sectors which also needs to be further addressed. This is very much related to the Kyoto Protocol controls, particularly for the developed countries. A more than challenging job still lies ahead.

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Further reading from UNEP DTIE:
Avoiding a double phase out; Study on the potential for hydrocarbons; Chillers/ refrigerant management manual

Methyl bromide: viable alternatives and outstanding challenges

Dr Tom Batchelor, Co-Chair of UNEP's Methyl Bromide Technical Options Committee, presents alternatives to ozone-depleting methyl bromide and analyses some of the challenges to their introduction.

In its 1998 Assessment, the Methyl Bromide Technical Options Committee (MBTOC) could not identify a single crop that required a soil application of methyl bromide for its successful production. This was a significant finding since methyl bromide used to control soil pests and

weeds accounts for about 76 per cent of its global consumption for agriculture.

However, increased investment in research and technology transfer will be necessary to further implement alternatives to methyl bromide for soil treatments worldwide.

The most acceptable alternatives to methyl bromide for soil treatments were considered to be those based on Integrated Pest Management (IPM) which combines various pest control measures such as:

- cultural practices (e.g. crop rotation, organic amendments, biofumigation, mulching and sanitation);
- biological control (e.g. resistant plant varieties, grafting of resistant root stocks);
- physical methods (e.g. steam, solarization); and

- strategic applications of pest-specific pesticides.

Disinfestation of pests in durable commodities (e.g. grains and dried fruit) and structures (e.g. flour mills) consumes about 15 per cent of methyl bromide globally. MBTOC again identified an IPM system as the most promising alternative to methyl bromide for structural treatments. The principal alternatives are phosphine, heat, cold and contact pesticides for durable commodities, and sulphuryl fluoride and heat for structural treatments. Other measures acceptable for pest control in specific circumstances are irradiation, diatomaceous earth and controlled atmospheres (CA).

MILESTONES IN THE FIGHT TO SAVE THE OZONE LAYER

● 1974: Sounding the alarm

Scientific evidence, revealed in an article by Professors Mario J. Molina and F. Sherwood Rowland, suggests that CFCs released into the atmosphere will diffuse to the upper atmosphere and break down to release chlorine atoms which can catalytically destroy ozone.



Hans Kaack

Production of grafted tomato seedlings in Morocco

Approximately 9 per cent of the global methyl bromide is used for disinfection of perishable commodities (e.g. fresh fruit, vegetables, cut flowers, root crops, bulbs), with about half of this used for quarantine purposes. Successful alternatives to methyl bromide were based on a combination of preharvest treatments to reduce pests in the field combined with a number of postharvest treatments such as inspection followed by, for example, separate applications of heat, cold, CA, chemical treatment and irradiation.

Commercialization of a treatment depends on proven treatment efficacy, commodity tolerance, equipment design and commercial availability, cost competitiveness,

regulatory approval, logistical capability, availability of and agreement on the scientific research required for regulatory approval, and technology adoption.

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The 1998 Assessment is available at <http://www.TEAP.org>. An update to the 1998 Assessment is due for publication in April 2000.

Further reading from UNEP DTIE:
Towards methyl bromide phase out;
Global compilation of regulations for methyl bromide phase out;
Methyl bromide case studies.

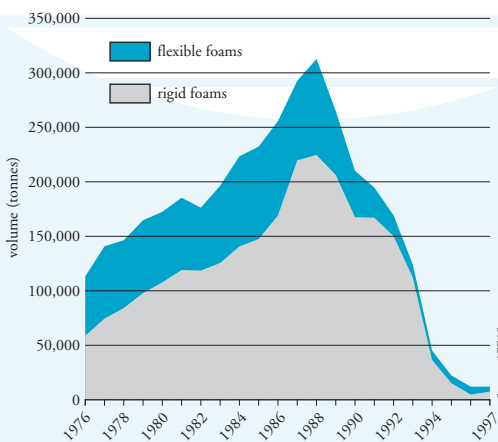
The challenge of remaining CFC use in the foam sector

Mr Paul Ashford, Co-Chair of UNEP's Foams Technical Options Committee, traces progress so far in the foams sector and looks at future challenges.

In the past 20 years the global foam industry has been through one of the most turbulent periods in its history. From the moment that the link between CFCs and ozone depletion was established, it was clear that much would need to change ... and indeed it has!

The figure below shows how the global consumption of CFCs has changed in the foam sector since 1976. The figures are

Use of CFCs in foams (1976–97)



Source: AFEAS

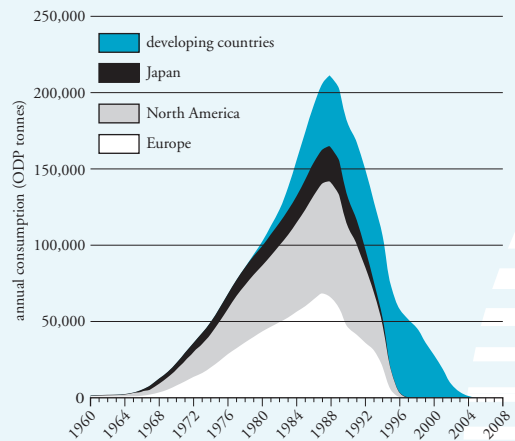
based on AFEAS declarations and do not therefore cover production in most Article 5 countries.

Phase out of CFC use in the flexible foam sector has proved rather more straightforward than in the rigid insulation foam sector because CFCs were largely used only as auxiliary blowing agents for density control. However, the achievements of the flexible foam industry should not be understated, since it has successfully managed the transfer of a variety of technologies based on methylene chloride, acetone and, more recently, carbon dioxide (both liquid and gaseous).

For rigid foams the story has been more complex, as replacement technologies have sought to reproduce the performance of their CFC predecessors, yet to be matched by alternatives. The technical challenge has therefore been to offset any drawbacks in alternative systems. The industry has been reasonably successful and the figure on the right illustrates the regional phase-out progress made.

The remaining CFC use in Article 5 countries through until 2005 and beyond represents a severe challenge to the global rigid foam industry and, indeed, to the Multilateral Fund. With many of the remaining applications focused in small commercial operations, the challenge of finding cost-effective solutions will only increase. Over 80 per cent of ozone depleting potential from new

Phase out of CFC blowing agents in rigid foams



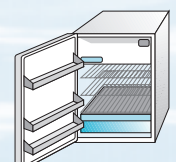
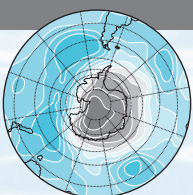
consumption in the rigid foam sector is due to continued use of CFCs in Article 5 countries. It is therefore of the utmost importance to reach rapid decisions on phase out. Protracted debates on the best replacement options could result in unnecessary delays and additional damage to the ozone layer. Arguing the environmental and technical merits of the replacement options on a 'case by case' basis may do more damage than we imagine.

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Further reading from UNEP DTIE:
Sourcebook on foam technologies;
Case studies on the foam sector.

● 1985: A 'hole' in the ozone layer and a Convention in Vienna

Severe seasonal depletion of ozone is detected over Antarctica—the expression 'ozone hole' enters the language. In Vienna, 41 countries adopt the **Convention for the Protection of the Ozone Layer**. No restrictions are imposed on ozone-depleting substances but allowance is made for future restrictions.



Hydrocarbons offer the best available long-term alternatives to CFCs in refrigeration

John Maté, Director of Greenpeace International's Greenfreeze and Ozone projects, examines the long-term alternatives for domestic and small-scale commercial refrigeration.

Ozone depletion and climate change, brought about by the impact of human technology upon the atmosphere, demonstrate that we endanger our own survival if we do not use environmentally sustainable technologies.

Fortunately in the cooling and refrigeration sectors there are environmentally safe technologies. These technologies use natural fluids such as hydrocarbons, ammonia, CO₂, air and water instead of synthetic substances such as HCFCs and HFCs. HCFCs and HFCs are dangerous for the environment. HFCs are among the six global warming gases whose combined emissions must be significantly reduced under the Kyoto Protocol to prevent dangerous climate change. HCFCs are not only potent greenhouse gases, but are also powerful ozone-depleting substances and must be phased out under the terms of the Montreal Protocol.



John Maté

State of the art hydrocarbon refrigerators, featuring variable multi-compartment cooling, displayed by Kelon Company, China's largest refrigerator manufacturer, at the 11th Meeting of the Parties to the Montreal Protocol, Beijing, November 1999.

In 1992, Greenpeace developed the first modern day prototype for hydrocarbon domestic refrigeration technology, called 'Greenfreeze'. 'Greenfreeze' refrigerators use hydrocarbons for both the insulation foam blowing and for the refrigerant circuit. Hydrocarbons, as used in refrigeration, are

environmentally relatively benign. They also offer significant technological and commercial benefits.

With more than 40 million 'Greenfreeze' refrigerators in the world today, hydrocarbons offer the most readily available, commercially and technologically proven long-term alternatives to CFCs.

'Greenfreeze' refrigerators are now produced throughout Europe by all the major manufacturers. They are also produced by the largest factories in China, and Indonesia and Cuba started to produce hydrocarbon refrigerators in 1999. 'Greenfreeze' is also slated to be in production in India, Argentina and Japan in the near future.

Hydrocarbon technology in refrigeration offers many benefits to developing countries, including: supply of non-patented foaming agents and refrigerants; lower operating costs; significantly better efficiency and easier maintenance than with HFC-134a.

'Greenfreeze' technology is also applicable to commercial cooling and refrigeration, and automobile air-conditioning

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Methyl bromide: future challenges for implementing alternatives

Anne Schonfield, Pesticide Action Network North America (PANNA), looks at some of the challenges in implementing alternatives to methyl bromide, especially chemical alternatives which may be hazardous for the environment and to human health.

Everyday there is new information about existing and future alternatives to methyl bromide. In 1998, the Methyl Bromide Technical Options Committee (MBTOC) concluded that *'there are existing alternatives for more than 95 per cent of the current tonnage of methyl bromide,*

excluding quarantine and pre-shipment uses.' However, NGOs are concerned about some of the chemical alternatives to methyl bromide as they are harmful to human health and to the environment. While the intent of the Montreal Protocol is to phase out ozone-depleting substances, it makes little sense to create new environmental and health problems from chemical replacements.

Unfortunately many countries are promoting Telone, Dazomet and other chemicals known to be toxic to humans and dangerous for the environment. In 1986, for example, Telone (1,3 dichloropropene) was placed under Special Review by the US EPA due to cancer concerns for workers, groundwater

contamination and dietary risks. California banned all uses of Telone in 1990 when monitoring tests showed very high cancer risks in air samples near schools. Dazomet (Basamid) is not registered for food crops in the United States because of environmental and health concerns. Given the wide range of non-chemical alternatives, environmental NGOs urge Parties to the Montreal Protocol not to replace methyl bromide with these highly toxic substitutes.

In its 1998 report, the MBTOC also noted that, *'significant effort must now be undertaken to transfer alternatives to as many locations as possible and optimize the conditions under which they will be most effective.'* In spite of this, the Montreal

● 1987: Bringing in controls—The Montreal Protocol



Governments recognize the need for controls to reduce production and consumption of ODS. **The Montreal Protocol** is adopted introducing controls on eight substances. A 10-year grace period is granted to developing countries.



Protocol's Multilateral Fund has approved 40 methyl bromide demonstration projects but only two investment projects.¹ Given the growing number of alternatives to methyl bromide and the fast approaching 2002 freeze on methyl bromide in Article 5 countries, it is imperative that the Parties to the Montreal Protocol shift their focus from projects that merely demonstrate

alternatives (which may take many years to transfer from the laboratory to the field) to actual investment and training projects that directly eliminate methyl bromide and benefit farmers and other users.

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¹ According to the Fund's Meeting of Experts on Methyl Bromide Alternative Technologies.

HFCs must be controlled to stem global warming and ozone depletion

Jessica Vallette Revere, Atmosphere Campaign Director, Friends of the Earth, United States, discusses the emerging evidence of links between ozone depletion and global warming, and indicates some of the resulting challenges for Parties to the Montreal and Kyoto protocols.

Industry's continuing and increasing reliance on fluorocarbons is resulting in a global atmospheric crisis that can no longer be ignored. Two consecutive years of record-breaking ozone depletion over Antarctica (1998 and 1999) and the second appearance of an ozone hole over northern Europe (1999) should spur action to eliminate fluorocarbons. There is also increasing evidence that global warming may be aggravating ozone depletion and that ozone depletion is masking global warming. Global warming and ozone depletion are two of the most serious crises ever faced by humankind. The links between them indicate the acute need for new strategies to combat them simultaneously.

One example of these links is the inclusion of HFCs and PFCs in the basket of greenhouse gases (GHGs) to be controlled under the Kyoto Protocol. While the 5th Conference of Parties to the Montreal Protocol chose not to act on HFCs and PFCs, this does not preclude introduction of control measures in the future. Consequently, phase outs under the

Montreal Protocol must not encourage the adoption of substitutes which—like HFCs and others—are GHGs. Such actions could undermine efforts to combat climate change and the Kyoto Protocol.

Non-HFC alternatives to CFCs and halons are now available in almost all sectors of industry. The Parties to the Montreal Protocol can help stem the adoption of GHG chemicals by ensuring that they are used only where there are no technologically feasible and environmentally sensible alternatives.

The focus on reducing emissions of HFCs does not address the need to stop the adoption of these short-term ODS alternatives. There is also little information available on the future economic cost of HFC use which, according to ICI Klea,¹ is likely to increase as demand continues to rise. More information is needed on what technologies may be available within the next 5, 10 or 15 years. Such forecasts are made regularly in the business community.

Industry too should take it upon itself to stop pursuing HFC alternatives and develop additional non-global warming, non-ozone-depleting technologies. Such research and development will ensure that companies are engaging in activities that will guarantee their long-term future viability. It is time that industry rose to the challenge of developing and commercializing additional ozone- and climate-friendly technologies and stopped

¹ *OzonAction Newsletter* Number 30, April 1999, page 5 "ICI warns that high demand for HFCs will lead to higher price"



Volker Hase

Solarization sheets being laid over irrigation pipes in Jordan

promoting outmoded fluorocarbons.

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New book on climate change

In *The Kyoto Protocol—International Climate Policy for the 21st Century*, a new book in the International and European Environment Policy Series, two experts on the political and legal dimensions of the international environmental negotiations present a comprehensive and concise commentary on the Kyoto Protocol and the prospects for international climate policy.

The book describes the intricacies of the treaty negotiations, explains the provisions of the Protocol itself and draws important lessons from the Kyoto process. It also presents a careful evaluation of the Protocol and sketches a picture of the political landscape after the treaty's adoption.

The co-authors, Sebastian Oberthur, from Ecologic, and Herman E. Ott, from the Wuppertal Institute for Climate, Environment and Energy, have been closely involved in the negotiation process of the Kyoto Protocol. They have also written extensively on policy-related and legal aspects of the emerging climate regime.

The book can be ordered from:

**Springer-Verlag, Postfach 14 02 01,
D-14302 Berlin, Germany**

fax: +49 30 827 87 301,

e-mail: orders@springer.de

or go to: <http://www.kyotoprotocol.de>

● 1990: The Multilateral Fund

*At their 1990 Meeting in London, the Parties create the **Multilateral Fund (MLF)** to assist developing countries that have ratified the Montreal Protocol and its Amendments with their phase-out efforts.*



In 1991, the MLF receives its first budget: US\$240 million for three years.

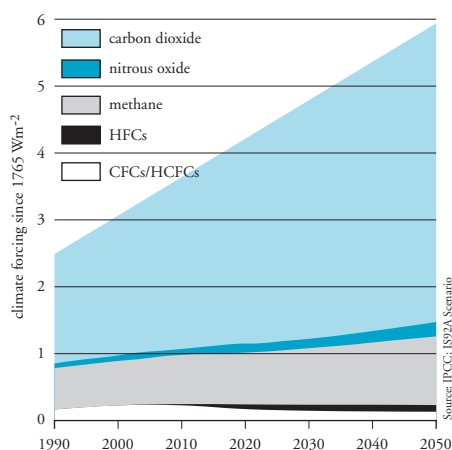
HFCs and HCFCs: working alternatives to ODS

This article is from the Alliance for Responsible Atmospheric Policy, a leading industry coalition on ozone protection. The article discusses the international acceptability of HCFCs and HFCs as alternatives to ozone-depleting CFCs in both developing and developed countries, with the ultimate objective of protecting the environment through their responsible use and through respecting globally agreed protocols.

In addition to being environmentally acceptable, alternatives to ODS, particularly CFCs, must be functional, economically viable, and available. Hydrofluorocarbons (HFCs) and hydrochlorofluorocarbons (HCFCs) are alternatives that meet these criteria. They are energy-efficient and cost effective, have low toxicity and can be used safely.

HFCs are viable and proven solutions to CFCs in both the refrigeration and foam sectors. Analyses have also indicated that HFCs reduce energy consumption in many applications. For example, HFC

Relative projected contributions of greenhouse gases

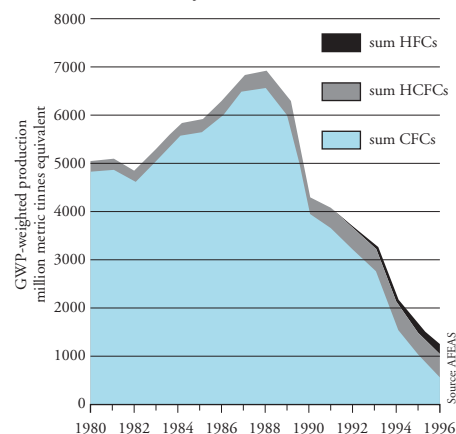


blown foam would provide energy savings of up to 15 per cent.

HCFCs are also enabling the phase out of CFCs. These substances are up to 98 per cent less ozone depleting than the CFCs they replace, and their atmospheric lifetime is around 80 per cent shorter.

It is economic viability that will

GWP-weighted fluorocarbon production, 1980–96 (not included in the Kyoto Protocol)



ultimately decide the acceptability of substitutes for ODS. The widespread acceptance of HCFCs signifies their applicability to many different markets.

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Success stories

The stories below demonstrate how two developing countries have used original and effective methods to achieve phase out of ODS. They also describe how UNEP-managed networks facilitated their successes so far.

India: combining legislation with fiscal incentives



India became a Party to the Montreal Protocol in 1992 and prepared its detailed Country Programme (CP), the backbone of its phase-out mechanism, in

1993. Since then, the country has been a very active participant in the Montreal Protocol 'movement', introducing policy measures—both legislative and fiscal—to

encourage adoption of non-ODS technologies. As a result, consumption of ODS in India has remained more or less constant over the past three years, and the country was able to meet its commitment to the first freeze in consumption, which came into effect on 1 July 1999.

India's success is largely due to policy measures which are a judicious blend of regulations and fiscal exemptions, including: certification of ODS consumption in phase-out projects; licensing of export and import of ODS; ban on export of ODS to non-Article 5 countries; and a system of duty and tax exemptions on goods required for non-ODS projects approved by the Multilateral Fund.

Malaysia: reconciling industrial growth and ODS reduction

When Malaysia became a Party to the Montreal Protocol in 1989, CFCs and



halons were vital imports for the country's vibrant and growing economy. With export-oriented industries expanding, per capita consumption of CFCs and halons

was at 0.29 kg, just within the 0.3 kg limit for qualification as an Article 5 country. However, mindful of the potentially disastrous effects of unchecked ozone depletion, the Government of Malaysia took a proactive approach to ODS reduction and introduced an effective six-step process to restrict and limit these controlled substances. By 1998, per capita consumption of ODS had fallen to 0.12 kg. Malaysia is now in the process of ratifying the Montreal Amendment.

1992: The Copenhagen Amendment—extending control

Meeting in Copenhagen, the Parties agree to controls on HCFCs and HBFCs for developed countries and to speed up phase out of substances already controlled.

1997: The Montreal Amendment—controlling methyl bromide



The 9th Meeting of the Parties, in Montreal, introduces controls for the widely-used ozone-depleting substance methyl bromide, for both developed and developing countries.



11TH MEETING OF THE PARTIES— maintaining momentum in a challenging context

Additional funding to assist Article 5 developing countries in phasing out ODS, new controls on HCFCs, on new ODS, and on methyl bromide were among the major decisions made at the 11th Meeting of the Parties to the Montreal Protocol, in Beijing, 29 November–3 December 1999.

It was against a background of disquieting scientific findings about the continued threat to the ozone layer that the Parties reached decisions that will maintain momentum towards full recovery of the ozone layer. On 30 November, the European Space Agency announced detection of abnormally low ozone levels over north-west Europe. In the southern hemisphere, measurements of ultra-violet (UV) intensities during the summer in New Zealand in 1998/99 showed increases in DNA- and plant-damaging UV radiation. Global concern has also recently grown about links between climate change and ozone depletion.

● Funding

The Parties agreed on a package of US\$440 million to replenish the Protocol's Multilateral Fund. This, combined with US\$35.7 million carried over from the previous period, will give the Fund a total budget of US\$475.4 million for the 2000–2002 period. This is the fourth replenishment of the Fund and is an addition to the US\$1 billion already spent since 1991 in assisting production and consumption of ODS in more than 110 developing countries.

● HCFCs

Prior to the Beijing Meeting, the European Union expressed concern

about increasing use of HCFCs in developing countries. At present, HCFCs are subject to controls only on consumption and, at the Meeting, the EU suggested an early freeze on production with phase out in developed countries by 2025, followed by later phase out in Article 5 nations. In the event, the Parties decided on a production freeze only, coming into effect in 2004 for developed countries and in 2016 for developing ones. This measure was backed up by a new ban on trade in HCFCs with countries that have not yet ratified the Protocol's Copenhagen Amendment. This will provide an incentive to countries to ratify as soon as possible.

● Methyl bromide

Under the Copenhagen Amendment, the widely used fumigant methyl bromide is already scheduled to be phased out in both developed and developing countries. However, uses for quarantine and pre-shipment (QPS) requirements are exempt from control at present. A report from the Technology and Economic Assessment Panel (TEAP) estimates that around 22 per cent of methyl bromide used throughout the world is used for QPS applications, and that this use is increasing in some countries. In response to this situation, the Parties introduced an obligation on all Parties to report their QPS use to UNEP and gave a clear definition of pre-shipment as: *'non-quarantine applications applied within 14 days prior to export to meet the official requirements of the importing countries or existing official requirements of the exporting country.'* The Meeting also asked the TEAP to evaluate the technical and economic

feasibility of alternative treatments and procedures that can replace methyl bromide for QPS applications, and to estimate the amount of methyl bromide that such alternatives would replace, per commodity and/or application.

● New ODS

The chemical industry is constantly creating new products and there are fears that new ODS could be produced and marketed in the future. The Meeting therefore asked the Scientific Assessment Panel and the Economic Assessment Panel to develop criteria for assessing the ozone-depleting potential of new chemicals and to explore mechanisms to facilitate cooperation with the private sector on such assessment. The Parties also agreed on controls on one new ODS: from January 2002 the Parties' consumption and production of bromochloromethane is to be frozen. Essential uses, however, are not covered by the freeze.

● Associated events and future meetings

The Beijing Meeting took place during a week of events including preparatory talks to the Meeting, the Meeting itself and the 5th Conference of the Parties to the Vienna Convention, attended by around 700 participants from governments and observer organizations. An International Exhibition on Ozone Friendly Technology and Products was staged during the same period.

The 12th Meeting of the Parties will be held in Ouagadougou, Burkina Faso, 11–15 December 2000.

● 1999: First year of freeze on CFCs for developing countries

Developing countries must start phasing out CFCs, halons and carbon tetrachloride from July 1999. Many of them meet their targets, often thanks to assistance from the MLF.



The Beijing Meeting of the Parties, held in December 1999, agrees on MLF replenishment of US\$440 million for the 2000–2002 period.

BEIJING IN PICTURES



UNEP exhibition booth at the International Exhibition on Ozone Friendly Technology and Products



Students visit the UNEP exhibition booth. The overhead image is one of the winning entries to the Children's Painting Competition held by UNEP in 1998.



Mr Wen Jiabao, China's Vice Prime Minister (far right) discussing the day's events at the conference with (right to left) Mr Xie Zhenhua, Minister of SEPA, Mr Zhang, Director General of SEPA, and Mr Rajendra Shende, UNEP DTIE.



Mr Jukka Uosukainen, Co-chair of the OEWG, presenting a scroll to Mr Sarma, UNEP Ozone Secretariat, during the farewell party held on the occasion of his retirement.

THE BEIJING DECLARATION

The 11th Meeting of the Parties concluded with the adoption of the Beijing Declaration in which the Parties reaffirm their commitment to phase out substances that deplete the ozone layer. Extracts from the Declaration are reproduced below.

"We, the Ministers of the Environment and Heads of Delegations from the Parties to the Vienna Convention for the Protection of Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer, declare:

That we are pleased to note that major progress has been achieved in the implementation of the Montreal Protocol in the past decade ...

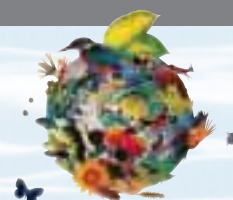
That we are keenly aware that the Parties will face new challenges, as we have now entered a new period of substantive reduction of ozone-depleting substances from 1 July 1999 and, therefore, must ensure the continuation and development of our significant financial and technical cooperation ...

That we appeal to the relevant Parties to take all appropriate measures to address illegal trade in ozone-depleting substances and to safeguard the achievements attained to date.

That we further appeal to the international community to demonstrate more concern for the issues of ozone layer protection and for the protection of the global atmosphere in general, taking into account the need to promote social and economic development in all countries."

● 2000 → Recovery by 2050?

Scientists predict that ozone depletion will reach its peak during the next few years, and then gradually decline until the ozone layer returns to normal around 2050, **provided that the Montreal Protocol is implemented in full. Challenges remain, our efforts must continue ...**



The National Ozone Unit Interview

This is one of a series of articles featuring the views of national ODS Officers



Mr Jamel Eksail
National Ozone
Officer, Bahrain

What have been the major achievements of the National Ozone Office over the past two years?
The National Ozone Office

(NOO) has achieved much in the past two years, including:

- A training and public awareness programme for the public, refrigeration and air conditioning engineers, educational institutions, and public and private enterprises.
- Preparation and implementation of an R/R project and setting up of two recycling stations for refrigerant R-12. This is intended to reduce consumption of R-12 by 20.5 tonnes/year.
- Preparation and implementation of an RMP project comprising two programmes: training the trainers, and training for customs officers. The project target is to reduce 25 tonnes ODP of CFCs.
- Preparation of two projects for the commercial refrigeration sub-sector. Implementation will start in the first quarter of 2000 and the project should reduce 18 tonnes ODP of CFCs.
- Preparation of a Halon Bank Project, to be submitted to the ExCom for approval.
- Issue of a new comprehensive Ministerial Order (in 1999) on Control of Ozone Depleting Substances.

Which factors were most helpful in meeting your responsibilities?

There were several contributing factors. Among these, a high level of awareness on the part of the public, companies, technicians and engineers in the refrigeration and air-conditioning sectors facilitated implementation. Publications, reporting formats, and guidelines prepared by and received from the MLF and UNEP have provided effective support. Quick response by the implementing agencies in providing financial and technical assistance for project preparation has also helped. And a new regulation, issued in February 1999, contains 16 comprehensive articles to monitor and control the consumption of ODS.

How would you define the major challenges facing West Asia countries?

I think there are several major challenges we will have to face:

- Dumping on our markets of new or second-hand ODS-based equipment.
- Achieving the country's ODS phase-out goals with limited staff (one or two ozone officers per country) and a limited budget for the NOO.
- Reaching all the workshops, technicians and engineers working in the refrigeration and air-conditioning sectors via the R/R project, or good practice in servicing training programmes.
- New legislation and regulations to control ODSs within a limited time and with limited resources.
- Retrofitting of old equipment.

Do you feel you have learned lessons as an ODS Officer that could help other developing countries in meeting Protocol targets?

In my opinion, developing countries should start drafting their own legislation and regulations on ozone protection. This is a milestone in achieving full control. It helps NOOs by giving them the legal powers to control ODS. Also, before finalizing draft legislation or regulations, NOOs should consult all the parties concerned (customs, statistics departments, trade, companies, manufacturers, importers) to get their comments and incorporate them in the final draft. NOOs should also investigate the main uses of ODSs in their countries and should start asking implementing agencies and governments to prepare investment and non-investment projects to achieve targets.

continued from page 1 ...

- approved projects for Chad, Dominican Republic and Nigeria, which have not ratified the London Amendment, on the understanding that a letter would be sent urging them to ratify as soon as possible;
- approved bilateral projects submitted by Canada, Finland, France, Germany, Japan and Sweden;
- debated links between chemical prices and incremental operating costs;
- approved the country programmes of Belize, Madagascar and Myanmar;
- continued its discussions on refrigerant management plans (RMP) and methyl bromide guidelines.

Contact: Secretariat of the Multilateral Fund
(see page 2)

Forthcoming meetings

Montreal Protocol 20th Open-ended Working Group Meeting, Geneva, Switzerland, 10–14 July

HIDECOR Planning Workshop for the Refrigeration Servicing Sector, Manesar, India, 17–18 April

Status of Ratification

(as at March 2000)

The Vienna Convention
173 Parties; no new Parties*

The Montreal Protocol
172 Parties; no new Parties*

The London Amendment
138 Parties; 2 new Parties:* Nicaragua, Syrian Arab Republic

The Copenhagen Amendment
104 Parties; 3 new Parties:* Nicaragua, Syrian Arab Republic, Uganda

The Montreal Amendment
37 Parties; 11 new Parties:* Antigua and Barbuda, Bulgaria, Czech Republic, Iceland, Netherlands, Poland, Slovakia, Slovenia, Syrian Arab Republic, Uganda, Uruguay

*since the last issue of the *OzonAction Newsletter*

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