Success in Limiting Ozone-Depleting Substances Is also Helping to Mitigate Climate Change

The eight Millennium Development Goals (MDGs) – which range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by the target date of 2015 – form a blueprint agreed to by all the world’s countries and all the world’s leading development institutions. Goal 7 is «Ensure environmental sustainability», which encompasses actions to protect the ozone layer and comply with the Montreal Protocol.

Excerpt from the United Nations Millennium Development Goals 2008 Report

Consumption of all ozone depleting substances (ODSs) and chlorofluorocarbons (CFCs), 1986-2006 (Thousands of metric tons of ozone-depleting potential)

The Montreal Protocol has resulted in the phasing out of over 96 per cent of all ozone-depleting substances (ODSs). This quantitative success in the protection of the ozone layer has also achieved important climate benefits because many ozone depleting substances controlled under the Protocol are also potent greenhouse gases. It is estimated that, without the worldwide effort to protect the ozone layer, the greenhouse effect of global ODS emissions would have equalled carbon dioxide emissions, currently the greenhouse gas contributing most significantly to climate change. In September 2007, the 20th anniversary of the Montreal Protocol, governments acknowledged the dual benefit to both ozone protection and climate change by agreeing to advance by up to 10 years the final phaseout date for hydrochlorofluorocarbons (HCFCs), currently the most widely used ozone-depleting substance. They also agreed to provide sufficient and stable funding to developing countries to achieve the accelerated phase out.

Source: www.un.org/millenniumgoals
Tackling the Second Montreal Protocol

Last September in the treaty’s birthplace, and at the conclusion of a session stretching late into the night, the Parties to the Montreal Protocol took a remarkable decision: namely to accelerate the freeze and the phase-out of hydrofluorocarbons (HCFCs). It was a decision not just in favour of the repair of the ozone layer, but also, and perhaps more significantly, in favour of combating climate change as a result of new and emerging science that underlines these substances’ potent greenhouse effect.

Now, in the dawn of what many have likened to a “second” Montreal Protocol, the same Parties have the opportunity to help set the scene for a fresh round of climate change talks scheduled for conclusion at the crucial UN climate convention meeting in Copenhagen, Denmark, in late 2009.

The efforts and ingenuity of the Parties to the Montreal Protocol have, over 20 years, translated scientific realities into political decisions leading to concrete action on the ground.

The experience of this Protocol can act as both guide and inspiring example of the multilateral system at its best, and in turn should help build confidence and consensus in the run up to Copenhagen.

That confidence will be given an even bigger boost if Article 5 countries under the Montreal Protocol take quick and early action down the path to ending HCFC consumption and production.

This can be signalled by quick-starting the preparation of their HCFC Phase-out Management Plans and establishing their consumption baselines.

Only then will the countries understand the exact magnitude of the challenge and be able to clearly identify their needs to achieve agreed goals.

The Protocol’s Multilateral Fund has provided the guidance and finances to start the process. Implementing Agencies – UNDP, UNIDO the World Bank, and my institution, UNEP – are assisting too.

National Ozone Units must now organise the work, make decision makers aware of the issue, and get national stakeholders on board.

Developed countries that have already made the transition away from HCFCs must show the way by sharing experience, expertise and technologies to replace HCFCs.

All of these actions, however, must be taken in the spirit of a new era in which the world embraces the absolute need for ‘green growth’ – growth that casts off the ‘business as usual’ approach and accelerates us down the path to low-carbon, resource-efficient economies where intelligent management of natural and nature-based assets becomes the norm, not the exception.

Indeed, the accelerated action on HCFCs will achieve maximum benefits in terms of ozone and climate if the phase-out is accompanied by serious improvements in areas such as energy efficiency and the adoption of alternate technologies.

This also needs to include an honest evaluation of the merits and demerits of both fluorinated and natural refrigerants. The world has an unparalleled opportunity to simultaneously eliminate these ozone depleting substances, reap climate benefits, improve energy efficiency and stimulate growth in green jobs. The harvest is not only environmental, but also social and economic.

As the UN agency which is focussed exclusively on protecting Earth’s environment, UNEP sincerely hopes that all Parties seize this golden opportunity to simultaneously protect the ozone layer and assist in curbing greenhouse gas emissions viewed through the lens of long-term sustainability. This is because we do not have the luxury of a “third” Montreal Protocol.

As we look forward to the Twentieth Meeting of the Parties to the Montreal Protocol, which will take place in Doha, Qatar, from 16 – 20 November, I wish the Parties success with implementing their historic HCFC decision, and also in ensuring that all Article 5 countries successfully complete the equally historic phase-out of CFCs by 2010.

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Successful ODS Phase-out in Sweden: Contemporary Elements for Success

The problem of depletion of the stratospheric ozone layer has been in focus since the 1970s when Sweden along with USA, Canada and Norway banned the use of CFCs in aerosol applications. However, despite awareness of the detrimental effect of CFCs, global CFC consumption continued to increase. In 1987, the Montreal Protocol was signed and since then, additional ODS have been regulated by amendments and adjustments to the Protocol. The latest adjustment was in September 2007, whereby Parties agreed to advance the HCFC phase-out, including the production and consumption sectors.

Phase-out of ODS
Sweden pioneered regulation of ODS by proposing an ambitious phase-out programme for the domestic market. A proposal was adopted by the Parliament in May 1988 and an Ordinance was issued mandating a complete phase-out. As use of HCFCs was considered as an alternative to CFCs within virtually all sectors, an unlimited growth of HCFC would have defeated the very purpose of the ODS phase-out. Sweden thereby mandated a ban on CFC and HCFC uses, after 31 December 1993, in a number of areas including aerosols, packaging and constructional materials (foams), sterilisation, and general solvent uses. The bans were combined with prohibition of imports of equivalent products. The CFC and HCFC phase-out, in effect, encompassed eight application areas and went well beyond targets laid down in the Montreal Protocol. Figures 1 and 2 depict the phase-out of HCFC and development of F-gas, in terms of CO2-equivalent.

Post phase-out situation and evaluation
The Swedish Environmental Protection Agency (SEPA) implemented the programme in close co-operation with the industry. Today we can look back at a successful phase-out programme. What the industry regarded as almost impossible to achieve in 1988 is viewed today as a closed chapter. A harmful group of ODS have been removed from widespread use in Sweden without the need to close companies.

The keys to success
The success of the Swedish programme can be attributed to:

- Clear legislation combining regulatory and economic instruments;
- Deadlines that stimulate quick action. Difficult sectors had the chance of exemption(s);
- Industry was properly informed at the highest level;
- Tight deadlines set a real challenge and initiated an urgency to adapt;
- Responsibility for implementation was put onto the ODS users, the manufacturers, service enterprises and not on to the parties selling the substances, or the authorities;
- Rapid implementation was rewarded - a quick change was cheaper than slow adaptation because exemptions were costly to obtain;
- Failure to comply meant that an operation became illegal, resulting in heavy fines, possible jail sentence and closure;
- Enforcement and supervision could be included in routine inspections by the existing environmental organisation.

At the end only about 70 exemptions were granted. Almost all companies succeeded in switching to alternative technologies before the set target date.

Environmental permits
All issued permits incorporated ODS regulation so that restrictions on use of the ODS were ensured.

Import restrictions
Sweden was one of the first countries in the world to carry out a systematic and total ban on ODS. The industry then had to invest in new technologies. To facilitate fair competition, import of products and formulations of ODS were banned to discourage production prohibited in Sweden from moving abroad. Customs officers were provided with a list of products and formulations to check and stop.
Requirements on handling ODS and equipment containing ODS

In some situations, the handling of ODS or existing ODS-containing equipment led to quite large losses of ODS. For such cases, SEPA developed guidelines to minimise losses of ODS before the target dates were in force.

Additional institutional instruments

Although regulatory and economic instruments formed the basis of the phase-out programme, complementary action was essential to make the programme effective. This included an information and research programmes, training, supervision and sanctions, review, and a significant input from SEPA staff.

The SEPA national ODS group had to be able to field a vast number of queries about every aspect of global ozone layer depletion and the implementation of ODS-free technologies. To build up this capacity in a short time we developed a flexible organisation linking specialists in various fields within SEPA.

In addition, SEPA operated an external network of partners in industry, organisations and various authorities. This unorthodox organisation just managed to do a great job in a short time.

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Nordic Policies on HCFCs

DENMARK: All uses of HCFCs are banned except: rigid extruded polystyrene and polyurethane insulating foam in existing household, commercial and industrial heat transfer systems in research, development and laboratories which were permitted until 1 January 2002.

FINLAND: Use prohibition in:
- Rigid insulating foam or equipment containing such foams;
- Integral-skin foam for safety applications;
- Refrigerants in equipment to be installed or manufactured from 31 December 1999;
- Solvents.

NORWAY: Consumption/production of HCFCs reduced 35% by 1 January 2001, 60% by 1 January 2007, 80% by 1 January 2010, 95% by 1 January 2013 and phase out by 1 January 2015.

SWEDEN:
- Ban manufacture of HCFCs;
- Prohibit use of HCFCs rigid foam insulation;
- Prohibit use of HCFCs in new refrigeration, heating or other climate units;
- Prohibit use of HCFC for refilling existing refrigeration, heating or other climate units from 1 January 2002;
- Maximum refrigerant charge limited to 20 kg for high T, 33kg for low T direct expansion systems.

Source: www.arap.org/regs
Refrigerants, Naturally! Taking Non-HCFC Technologies to the People

About the initiative Refrigerants, Naturally! Promotes a shift in the point-of-sale cooling technology in the food and drink and retail sectors towards F-gas-free refrigeration technologies. Member companies are reducing their impact on climate change and ozone depletion by replacing HCFC and HFC refrigerants with natural refrigerants, by using HCFC and HFC-free insulation material, and by reducing the energy consumption of new refrigerating equipment. This is done through substantial efforts or investments to progressively replace fluorocarbons with natural refrigerants in point-of-sale cooling applications, including R and D, testing, financial investment, staff time or public engagement. The members are committed to develop prospective timetables to move their operation towards these goals and to periodically share technical information about alternative refrigeration within the initiative via regular meetings, special events/workshops, and bilateral exchanges. Further, data and results are shared with external stakeholders, such as their wider supply chain, their industry peer groups, government decision makers, and the public. Currently, more than 300,000 hydrocarbon-based freezers by Unilever- Ice cream have already been installed throughout Europe, Latin America and Asia, as well as more than 15,000 bottle- coolers and vending machines in China, Europe and Latin America from The Coca-Cola Company, Carlsberg and PepsiCo, either operating with CO₂ or hydrocarbon refrigerants. McDonald’s opened a completely HFC-free pilot restaurant in 2004 which allowed it to monitor and test HFC-free equipment and performance.

When launched 4 years back Refrigerants, Naturally! Had three partners, i.e. the Coca-Cola Company, McDonald’s and Unilever. Presently three more multinationals have joined-in – Carlsberg, PepsiCo, and IKEA.

Greenpeace and the United Nations Environment Programme (UNEP) are official supporters and take an active role in the management of the initiative.

Background Hydrochlorofluorocarbons (HCFCs) and Hydrofluorocarbons (HFCs) are fluorinated gases (F-gases) that are widely used as refrigerants in refrigeration and cooling industry. In particular, HFCs are the most commonly used type of F-gases to replace CFCs and HCFCs—two sorts of gases to be phased out by the Montreal Protocol due to their ozone-destroying properties. But, like CFCs and HCFCs, HFCs are extremely potent greenhouse gases with a very high global warming potential (GWP). They are regulated by the Kyoto Protocol.

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Next Generation Room Air Conditioners Can Reduce Need for Power Plants, at Least Some of Them!

Currently, electrical consumption in the residential sector in developing countries is low in comparison to developed countries, but this is rapidly changing. For example, in China this is sector accounts for about 10 per cent of total electricity consumption, compared to about 30 per cent in developed countries. However, the use of air conditioners by urban residents has increased from 8 per cent in 1995 to 70 per cent in 2004 and use of refrigerators has increased from 66 per cent to 90 per cent over the same period. As this growth is expected to continue, the consequences for developing countries is the subject of a recent information paper prepared by the International Energy Agency (IEA). This paper takes two case studies, one with a manufacturing capacity (China) and without (Ghana), and estimates the potential reduction in electricity usage and CO₂ emissions through market penetration of energy efficient appliances.

The IEA study also considers various barriers to penetration of energy efficient appliances in developing countries and assesses the feasibility of enforcing energy-efficient standards. It concludes that to realise the full potential of these energy saving measures, considerable market transformation is needed in developing countries to facilitate the conversion to energy efficient air conditioners. The paper suggests that the Clean Development Mechanism (CDM) may have a role to play in financially supporting such initiatives.

The full IEA report «How to Improve Air Conditioner Energy Efficiency in Developing Countries» can be downloaded from:

1. It all started with an experts meeting convened in Chicago-USA in which UNEP and Greenpeace were requested to provide advice on commonly available alternatives refrigerants that are ozone as well as climate friendly.


3. Assuming an average output of 5 TWh per power plant
The Real Accelerator of the (Developing Country) HCFC Phase-Out: Financing

Lambert Kuijpers, Co-chair TEAP, co-chair TEAP Replenishment Task Force, lambertmp@planet.nl

In order to comply with the accelerated HCFC phase-out schedule as adopted in Decision XIX/6, financial assistance for all Article 5 Parties will be needed and this will be the main subject of negotiations in Doha in November 2008.

The Technology and Economic Assessment Panel (TEAP) Replenishment Task Force has calculated the funding requirement for the period 2009-2011 (as well as for periods beyond). It started by estimating the HCFC consumption for the period 2007-2012 for separate Parties or for groups of Parties. The main HCFCs are HCFC-22, used in refrigeration and air conditioning and important for servicing, and HCFC-141b and -142b, used in foam blowing. Cost-effectiveness factors were determined on the basis of US$/kg, using assumptions for capital and operating costs. Second conversions were considered eligible; a cut-off date for eligibility (as for CFCs) was not considered a limiting factor.

A scenario called ‘baseline funding’ was developed applying two cost-effectiveness factors (based on zero or two years’ operating costs). Assuming a three-year implementation period, this scenario mainly addresses the 10 per cent reduction from the freeze year 2013 to 2015. The funding requirement determined for addressing HCFC consumption was determined at US $130-180 million including US $63 million for servicing.

A second scenario not only assumes funding the baseline, but all consumption up to and including the year 2012, which should be considered the maximum possible. This is because funding a reduction from growth occurring up to 2012 in just one reduction step to the freeze level in 2013 is the maximum feasible. Compared to the first scenario, the funding required here would increase to US $306-428 million. In the triennium 2009-2011, no funding is assumed to be required for the production phase-out. For supporting activities such as Institutional Strengthening, the Compliance Assistance Programme of UNEP-OzonAction, the Multilateral Fund Secretariat and the Executive Committee an amount of about US $93 million was calculated.

Parties at the 28th Open-Ended Working Group have requested the Task Force to look again, and in a more detailed way, at the impact of cut-off dates, second conversions, costs for conversions from HCFCs to climate-friendly technologies, as well as the impact of exports and multinational shares in companies. On the basis of the funding estimates for the two scenarios and the additional information, Parties are expected to negotiate an amount of funding which should enable Article 5 Parties to comply with the first 10 per cent reduction step of the accelerated HCFC phase-out, by January 2015.

“Climatic Advantage” – Further Opportunities to Achieve Climate Benefits

The achievements of the Montreal Protocol over its 20 year history in phasing out the production and consumption of ODS are well known. Its important role in mitigating climate emissions also merits recognition. Since 1990, actions under the Montreal Protocol in phasing out ODS have had the additional benefit, by 2010, of reducing greenhouse gas (GHG) emissions by about 11 billion tonnes CO₂-equivalent per year (GtCO₂-eq/yr) – which is 5-6 times the reduction target of the Kyoto Protocol between 2008 and 2012 – and has delayed climate change by between seven and 12 years.

The recently published 2008 UN Millennium Development Goals Report (see pg.2) describes how the annual global CO₂ emissions in 2005 reached 28 billion tonnes, a 30 per cent increase since 1990. The recently agreed HCFCs phase-out presents countries with an historic opportunity to not only reduce the levels of ozone-depleting substances in the atmosphere, but also to have a further significant impact on the climate, as many HCFCs are powerful greenhouse gases.

For example, the most commonly used HCFC – Monochlorodifluoromethane, or HCFC-22 – has a GWP of nearly 1800 times that of CO₂. If zero or low GWP substitute technologies are adopted by countries to replace HCFC usage, the new controls could deliver cumulative emission reductions of around 12 to 16 billion metric tonnes of carbon dioxide (GtCO₂-eq) over the coming decades. There is also an opportunity to gain additional climate benefits from improved energy efficiency and other improvements of the replacement technologies, significantly in appliances, including room air conditioner units using HCFCs.

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1. The total funding requirement for the period 2008-2011 also includes about US $120 million for existing commitments and some new projects for (non-HCFC) ODS, as well as for destruction; it could therefore be in the range of US $343 to 640 million.

2. 12 – 15 GtCO₂-eq: Guus Velders, Side event of UNEP’s Regional Ozone Network for Europe & Central Asia, Belgrade, Serbia – October 11, 2007. The U.S. EPA estimates that, through 2040, the HCFC agreement could reduce emissions by up to 16 billion metric tonnes of carbon dioxide-equivalents. (Previously quoted figures of potential reductions of 18 - 25 billion metric tonnes of carbon dioxide (GtCO₂-eq) such as in UNEP News Release: 14 September 2000. Ozone Treaty’s Role in Combating Climate Change Top Environment Ministers Meeting in Canada, were based on scenarios prepared by TEAP prior to the agreed HCFCs

Landscape - New Zealand
China Assesses the Challenge of HCFC Phase-out

Data reported by China under Article 7 of the Montreal Protocol shows that China’s HCFC consumption in 2006 accounted for 59 per cent of the total consumption of Article 5 countries and 45 per cent of total global consumption. In the same year, China’s production of HCFC was 90 per cent of total production of Article 5 countries and 69 per cent of total global production.

In the past five years, HCFC production and consumption in China have increased rapidly. In comparison with 2002, both production and consumption increased three times, with an annual increase between 13 and 38 per cent, and an average increase of 28 per cent in production and 26 per cent in consumption.

The most widely used HCFCs in China are HCFC-22, -141b and -142b. Using a scenario that assumes an average annual growth rate of 9 per cent for HCFC-22, -141b and -142b and 3 per cent for other HCFCs, China would be at risk of non-compliance with the 2013 and 2015 Montreal Protocol targets.

- **Consumption**
  - Projected Baseline: 22,000 ODP tons (300,000 MT)
  - Peak in 2012: 27,000 ODP tons (400,000 MT)
  - Difference: 5,000 ODP tons (100,000 MT)

- **Production**
  - Projected Baseline: 33,000 ODP tons (400,000 MT)
  - Peak in 2012: 41,000 ODP tons (600,000 MT)
  - Difference: 8,000 ODP tons 200,000 MT

- **Reduction in 2015**
  - Production: 3,300 ODPs (about 50,000 MT)
  - Consumption: 2,200 ODPs (about 30,000 MT)

China needs to take extensive action to control HCFC growth. The challenges include:
- Addressing a large industrial-economic sector comprising a total annual production value of US $100 billion, over 10,000 enterprises and several million employees.
- Rapidly reversing a present annual growth of more than 20 per cent, and achieving a freeze by 2013 (a reduction of about 80,000 MT) and a 10 per cent reduction in 2015 (a reduction of about 30,000 MT).
- Overhauling the policy framework to meet requirements of the Protocol’s Montreal Adjustment on HCFC phase out.
- Overcoming the low public awareness of HCFC phase-out and alternative technologies.

China expects to reduce HCFC growth from 9 per cent to 4 per cent through making policy interventions, undertaking public awareness campaigns, and implementing demonstration projects. The Government believes that these measures will result in avoidance of an increase of 90,000 MT of HCFC consumption before 2013 and the freeze target and the 10 per cent reduction target in 2015 will become easier to meet. Furthermore, China is considering prioritizing the HCFC phaseout in the XPS foam sector because of the availability of alternatives and the high ODP value of HCFC-141b.

Overview of sector characteristics in China

**Room Air Conditioners**
- Large, rapidly growing sector;
- More than 65 million room air-conditioner units produced in 2006, about 75 per cent of the global market;
- Several dozen manufacturers: big companies have more than 1000 models;
- Almost 80,000 MT HCFC-22 consumed as refrigerant in 2006.
- More than 90 percent of the refrigerant used in room air conditioners is HCFC-22;
- Current alternative to HCFC-22 is R410A, but this has a high GWP;
- Hydrocarbons and HFC blends with low GWP are still in the research stage.

**Polyurethane Foams**
- Rapidly growing sector, with a more rapid increase expected in the future due to energy efficiency requirements for products and buildings;
- Actual number of manufacturing enterprises is not known, but could be several thousands with a large number of SMEs;
- Broad range of applications - insulation panels, blocks, boards, pipe insulation, spray foam, appliance insulation and insulated trucks/trailers;
- About 40,000 MT of HCFC-141b consumed in 2006;
- Current alternative to HCFC-141b are hydrocarbons, HFC-245fa, HFC-365mfc and water.
China Assesses the Challenge of HCFC Phase-out

Individual air conditioners, most of which run on R-410A, were installed, chosen lithium bromide as a contribution to the CFC phase-out process. At the time of the survey, 14 had opted for R-134a and the other four had systems. Of the 18 venues that had already signed purchasing contracts, Twenty-one of the Olympic facilities installed central air-conditioning - 32 years ahead of Montreal Protocol schedule. Ahead of Montreal Protocol schedule - but also avoided the use of HCFCs; were being used at the Olympic venues. These data enabled BOCOG to survey at the end of 2006 that revealed that no CFC-based refrigerants and employed solar energy. McDonald’s engaged to not use any ODS. Haier, promised not to use installed 4,000 bottle coolers that used non-ODS natural refrigerants. and raced to make the event “ozone-friendly”. The Coca Cola Company Late Medal - Green Medal: Achieving an Ozone-Friendly Olympics

As part of a wider cooperation framework to help ensure the environmental sustainability of the 2008 Summer Olympic Games, the Beijing Organizing Committee for the Games of the XXIX Olympiad (BOCOG) and the UNEP teamed up to help ensure that this ultimate sporting event was also a record-breaker in terms of ozone layer protection.

UNEP DTIE’s OzonAction Programme assisted BOCOG by providing conceptual guidance on avoiding use of ODS at all Games facilities and venues; suggestions for specific implementation activities; and assistance in cooperating with other bodies involved in ozone protection. Regular meetings were held between both organisations to monitor progress and identify needed actions, and both met with equipment suppliers for the Olympic venues. BOCOG developed eight main procurement guidelines to make the Games “ozone friendly” and provided them to their suppliers.

After the procurement guidelines were implemented, the Beijing Municipal Research Institute of Environmental Protection conducted a survey at the end of 2006 that revealed that no CFC-based refrigerants were being used at the Olympic venues. These data enabled BOCOG to confirm that they have not only avoided the use of CFCs - two years ahead of Montreal Protocol schedule - but also avoided the use of HCFCs - 32 years ahead of Montreal Protocol schedule.

Twenty-one of the Olympic facilities installed central air-conditioning systems. Of the 18 venues that had already signed purchasing contracts at the time of the survey, 14 had opted for R-134a and the other four had chosen lithium bromide as a contribution to the CFC phase-out process. Individual air conditioners, most of which run on R-410A, were installed in 17 venues. In addition, nine venues used R-134a, R-407C and other coolants do not harm the ozone layer.

Regarding fire-extinguishing equipment, 18 venues had signed purchasing contracts for ODS-free fire-extinguishing products by the end of 2006. All of them had avoided halon-based substances, opting instead for other chemicals such as heptafluoropropane or ammonium phosphate salt.

The use of carbon tetrachloride and methyl chloroform for cleaning, laundry and electronic circuit boards was prohibited. Companies supplying foodstuffs from greenhouses were required to avoid the use of methyl bromide fumigants.

The sponsors of this Olympic Game also picked up the ODS-free baton and raced to make the event “ozone-friendly”. The Coca Cola Company installed 4,000 bottle coolers that used non-ODS natural refrigerants. McDonald’s engaged to not use any ODS. Haier, promised not to use any CFCs and developed new refrigeration products, which used natural refrigerants and employed solar energy.

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Gold Medal - Green Medal: Achieving an Ozone-Friendly Olympics

As part of a wider cooperation framework to help ensure the environmental sustainability of the 2008 Summer Olympic Games, the Beijing Organizing Committee for the Games of the XXIX Olympiad (BOCOG) and the UNEP teamed up to help ensure that this ultimate sporting event was also a record-breaker in terms of ozone layer protection.

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Fluorocarbon Industry Constantly Tackling Technical Challenges

Since the early days of the Montreal Protocol, businesses that produce fluorocarbons and those that manufacture equipment utilizing these compounds have been busy identifying new technologies and developing them to be effective at all the stages of the CFC and HCFC phase-outs. As the Protocol’s HCFC phase-out schedule takes shape in all countries over the next few decades, industry is ready to provide safe, efficient, cost-effective, and environmentally acceptable solutions to ozone depletion and climate change.

It was an unprecedented challenge for industry to replace CFCs in the business sectors and in the myriad products that contained them. There was no single solution to replace the ubiquitous CFCs used as refrigerants, solvents, foam-blowing agents, propellants, and sterilants. Nevertheless, with a huge investment of effort from experts around the world, business was able to invent new compounds, such as HFCs, invest billions of dollars, and successfully replace CFCs wherever they were used.

The Protocol’s success depended on the implementation of CFC alternatives such as HCFCs, a set of compounds with significantly lower ozone-depletion potential (ODP). As the Montreal Protocol Parties established dates for the HCFC phase-out, business faced the challenge of repeating the difficult and expensive task of replacing another widely used compound.

HCFCs continue to be important since they are needed as substitutes for high ODP CFCs and to service a wide array of air-conditioning and refrigeration equipment for the duration of the useful life of these products. While the Parties agreed in 2007 to further phase down HCFCs, they may be used in new equipment until 2020 in developed countries, and 2030 in developing countries. In the meantime, business has commercialized some technologies as alternatives to HCFCs and will stop manufacturing HCFCs within the Protocol’s time-frames.

In addition to emissions reductions, and recovery/recycling/reclamation, new energy-efficient and cost-effective technology will continue to be the solution to ozone depletion. Industry has already implemented some alternatives to HCFCs and will be ready to meet the Protocol’s goals with new or improved solutions, including HFCs, that protect not only the ozone layer, but prevent unnecessary emissions of carbon dioxide.

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Common Sense in Conversion: Moving Away from HCFCs

The latest provisions of the Montreal Protocol accelerate the HCFC phase-out mandate that Parties should act to protect the climate while choosing alternatives to ODS. This has put the burden on the Parties to seek low-GWP HFCs or non-HFC alternatives. The expansion of the Montreal Protocol with a climate remit provides a new opportunity for environmental authorities and NGOs to cooperate on the way forward for both the ozone layer and the climate. Parties will want to use the most successful strategies from the CFC phase-out: corporate and military leadership; product bans, taxes and labels; government/industry partnerships; ample Multilateral Fund (MLF) funding; information clearing-houses and networks; and essential use exemptions where alternatives to HCFCs and HFCs are not yet environmentally superior. Implementing agencies will want to welcome opportunities to capture climate and other co-benefits while further protecting the ozone layer.

The strategy to achieve the joint ozone and climate protection goal should include the following elements:

- Fully finance ozone and climate benefits at the MLF (one MLF window with the financial value of climate benefits replenished to the MLF by the Parties or carbon-offset financing institutions);
- Use Life-Cycle Climate Performance as the metric for selecting alternatives that satisfy safety and health criteria (such as HFC-1234yf to replace HFC-134a in vehicle AC);
- Favour not-in-kind, natural chemicals, and low-GWP HFCs with near-zero emissions (such as hydrocarbons or CO₂ insulating foam or mineral wool);
- Allow continued HFC use where environmentally superior alternatives are not yet available at affordable cost (such as HFC-134a for metered-dose inhalers MDIs);
- Establish an essential-use provision or exemption for necessary and desirable low ODP and low GWP HCFC uses (such as highly efficient HCFC building air conditioning chillers);
- Demand near-zero emission, recovery and recycling in service and end-of-life, and ozone and climate offsets for essential uses (making continued ODS and HFCs both climate- and ozone-neutral).

This article conveys the perspective of the authors and does not necessarily reflect the views of the Technology and Economic Assessment Panel (TEAP) or the US Environmental Protection Agency.
Lessons from History: Meeting the Challenge of Illegal HCFC Trade

It is impossible to assess the risk of illegal trade in HCFCs without a strong feeling of déjà vu. When the Environmental Investigation Agency began researching the illicit trade in CFCs in the mid-1990s, it quickly became apparent that the regulatory controls had unwittingly created favourable conditions for a thriving black market. These conditions included: production controls in industrialised countries where demand remained high; large amounts of installed equipment reliant on CFCs; and burgeoning production of CFCs in some developing countries.

And history could repeat itself because similar conditions now prevail for the trade in HCFCs, prompting fears that illicit traffic in these chemicals could grow rapidly. Industry insiders are predicting that, as use of HCFCs is increasingly capped, the resulting price rises in widely used HCFCs, especially HCFC-22, could provoke a surge in smuggling within a few years. Seizures of illicit HCFCs have already occurred, notably in Asia and North America, and a US industry coalition has warned that illegal imports of HCFCs are on the rise. Lessons from CFC smuggling trends suggest a rapid rise in trafficking of HCFCs could occur before the end of the decade.

So much for the bad news. The good news is that impressive progress has been made in the fight against CFC smuggling, and these experiences should leave enforcement agencies well placed to meet the challenge of illegal trade in HCFCs. Most of the parties to the Montreal Protocol now have ODS licensing systems in place, which can be used to monitor trade in HCFCs. In Asia, these systems have been used to create an informal method of prior notification between exporters and importers. A huge amount of capacity building, especially for customs agents, has been carried out around the world and refrigerant identifiers installed at many ports. By tapping into these resources and remaining vigilant, the growth of HCFC smuggling can be curbed, and the mistakes of the past avoided.

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Why Destroying ODS Banks is Critical for Climate and for Small Island Developing Countries

At the November 2008 Meeting of the Parties to the Montreal Protocol, decisions will be taken on how to collect and destroy ODS in discarded products and equipment, including refrigerators, air conditioners, and foams. These proposals were submitted by Mauritius, the Federated States of Micronesia, and Argentina, and were well received at the Open-Ended Working Group meeting (OEWG) in Bangkok.

These ‘banks’ of ODS are an important target, containing 400,000 or more tons of ODP, and 6 to 20 billion tons of CO₂-eq. Collection and destruction will provide tremendous benefits for the ozone layer and for the global climate.

The climatic benefits are particularly important for small island developing States (SIDS), which will be among the first to suffer from sea-level rise and other abrupt climate changes. Some SIDS will cease to exist, and all will suffer disproportionate impacts from abrupt climate changes.

Because the ‘tipping points’ or ‘points-of-no-return’ for abrupt climate changes may be as close as 10 years away, Mauritius and other SIDS are aggressively pursuing climate mitigation strategies that have the potential to delay ‘climate forcing’ in the short-term. Urgent climate mitigation is needed to delay arrival of the tipping points.

Mauritius is proud to have joined last year with the Federated States of Micronesia, Argentina and Brazil and a small group of developed country Parties to propose adjustments to accelerate the phase-out of HCFCs, in a way that promotes climate benefits, including energy efficiency.

This joint effort, launched at the 20th anniversary meeting last September, is the first initiative in which all countries have explicitly agreed to mandatory and enforceable climate mitigation, including full incremental costs funding for required technologies. The climate benefits will be 16 or more billion tons of CO₂-eq, which compares favorably with the Kyoto Protocol’s goal of 1 billion tons of CO₂-eq below 1990 levels per year from 2008-2012.

This is on top of the Montreal Protocol’s other climate mitigation, which has reduced greenhouse gas emissions by 135 GtCO₂-eq between 1990 and 2010, and delayed climate forcing by up to 12 years. When pre-Montreal Protocol efforts to protect the ozone layer are included, such as voluntary reductions in CFCs and domestic regulations in the 1970s, the delay in climate forcing is 35 to 41 years. Thus the Montreal Protocol has been playing a major role in keeping the world from passing the tipping points for abrupt climate changes.

Mauritius and other SIDS see the Montreal Protocol as a fair and equitable treaty that can play an expanded role in protecting the climate system, as well as the ozone layer. We believe that all Parties will benefit from a decision this November to address banks, and we are encouraged by the strong support in the statement from the Major Economies Meeting in Japan in July 2008, where leaders of the world’s 17 major economies pledged to “continue to promote actions under the Montreal Protocol on Substances that Deplete the Ozone Layer for the benefit of the global climate system”. The leaders recognized the “need for urgent action” and committed to act “without delay” to strengthen the Montreal Protocol for the benefit of global climate.

For island States, addressing banks is a critical step the Parties can take this year to help delay the tipping points for abrupt climate changes, including catastrophic sea-level rise. Success in November will give us a bit more time to solve the broader climate change challenge, especially the emissions of CO₂ from fossil fuels, while giving us on-the-ground experience that can help us learn how to do more, faster, in the future.

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The agreement in September 2007 to accelerate the phase-out of HCFCs was intended not only to protect the earth’s ozone layer but at the same time to minimize impacts on the environment, particularly the earth’s climate. While this will enable the Montreal Protocol to continue its success of reaping the dual benefits of ozone layer protection and climate, it brings additional challenges to the Multilateral Fund and its Executive Committee to adhere to its mandate of assisting Article 5 countries to comply with the Montreal Protocol’s HCFC phase-out schedule. This will be reflected in its funding policies to support substitutes with not only zero ozone depleting potential but also with lower impact on climate change and higher energy efficiency. Efforts may also be needed to diversify sources of funding to meet these additional needs and optimize environmental benefits.

Only seven months after the historic agreement on HCFCs, the Executive Committee approved guidelines for HCFC phase-out management plans (HPMPs) and provided the opportunity for each Article 5 country to develop the framework for its over-arching strategy for total HCFC phase-out. The Committee recommended that the strategy be implemented in a stepwise or staged approach, and that countries should take advantage of the dynamic HPMP guidelines as these not only enable early action on HCFC phaseout but also retain countries’ flexibility to take advantage of new technologies as they evolve. The decisions taken by the Executive Committee at its recent meetings on HPMP guidelines and on related costs represent milestones in the actions to address major environmental issues.

Stage one of the HPMP needs to cover the HCFC baseline freeze in 2013 and the 10 per cent HCFC reduction in 2015. To reach these targets the Executive Committee is providing funds for HPMP preparation based on the requirements of the HPMP guidelines to enable countries to develop specific plans in order to meet the 2013 and 2015 targets. As of July 2008, 101 countries have already received funding for HPMP preparation.

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The 20th anniversary of the Montreal Protocol was clearly a triumph for both the Parties to the Protocol and the global community. In keeping with their proactive nature, the Parties to the Protocol went well beyond celebrating the success of this truly remarkable treaty. Instead, through their decision on HCFCs, they took a leap forward in their efforts to protect both ozone and climate change. By so doing, they demonstrated that the Montreal Protocol truly represents a global partnership for global benefits.

In the year since the decision to move forward on HCFCs, a great deal has been accomplished. In keeping with the Protocol’s culture of success and partnership, we have seen a burgeoning of country and privately driven efforts to share information on environmentally friendly alternatives. We have also witnessed quick action on the approval of Multilateral Fund guidelines that are already enabling many Article 5 parties to begin to map out a strategy for their HCFC phaseout. Finally, we are monitoring as cutting edge work is taking place to develop new alternatives and technologies as well as new initiatives are underway to enable the Parties to better understand and take into account the energy efficiency and life cycle implications of changes they may make. These and other strong efforts that will be needed to effectuate the phaseout of HCFCs are requiring an expansion of or change from our historic model. Indeed, the Ozone Secretariat itself is embarking on a new path aimed at enhancing our support for the various regions and regional networks, and to increasing our work and support in the area of compliance. We believe that these and other changes taking place in all of the ozone institutions will add to the vitality of our common efforts and further assist the parties as they continue strengthening the Montreal Protocol as a model multilateral environmental agreement.

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Summary of Key Decisions Related to HCFCs

Decisions by the Meeting of the Parties to the Montreal Protocol

November 2006
XVIII/12: Requests the Technology and Economic Assessment Panel (TEAP) to assess measures for addressing ozone depletion, with a focus on HCFCs.

September 2007
XIX/6: The Parties agreed to accelerate the phase-out of HCFCs production and consumption. For Article 5 Parties the baseline will be the average of the 2009 and 2010 levels and the phase-out schedule was set as follows: Freeze in 2013, 10 per cent reduction by 2015, 35 per cent reduction by 2020, 67.5 per cent reduction by 2025, and complete phase-out by 1 January 2030. An annual average of 2.5 per cent for servicing would be allowed for the period of 2030-2040. This allowance should be reviewed in 2025.

XIX/8: Requests the TEAP to conduct a study addressing prospects for the promotion and acceptance of alternatives to HCFCs in the refrigeration and air-conditioning sectors in Article 5 Parties, with specific reference to particular climatic conditions.

XIX/10: Terms of reference for the study on the 2009-2011 replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol. TEAP to prepare a report for the XXth Meeting of the Parties (MOP) to enable a decision to be made on the 2009-2011 replenishment of the Multilateral Fund (MLF), including scenarios indicating eligible incremental costs and cost-efficiencies associated with implementation by Article 5 Parties of the adjustments and decisions relating to HCFCs.

Decisions by the Executive Committee of the Multilateral Fund

November 2006
50/6: Request the Secretariat to prepare a final report on priorities for the triennium 2006-2008, beyond the needs identified by the model rolling three-year phase-out plan for the 52nd meeting, taking into account the HCFC surveys currently under preparation and any relevant available TEAP reports, and states that the report should provide information on the overall cost and cost-effectiveness of projects and activities.

July 2007
52/4: Requests the Secretariat to prepare a discussion paper for the 53rd Meeting on options for assessing and defining eligible incremental costs for HCFC consumption and production phase-out activities.

December 2007
53/37: Sets the ratification of the Copenhagen Amendment as the prerequisite for accessing MLF funding for phasing out the consumption of HCFCs and that of the Beijing Amendment as the prerequisite for accessing MLF funding for the production of HCFCs. The existing policies and guidelines of the MLF for funding the phase-out of ODS other than HCFCs would be applicable to the funding of HCFC phase-out unless otherwise decided by the Executive Committee. The decision requires that institutions and capacities developed through MLF assistance for the phase-out of ODS other than HCFCs should be used to economize the phase-out of HCFCs and that sufficient assistance from the MLF would be provided to guarantee the sustainability of such institutions and capacities.

53/39: Notes that the anticipated actions required by Article 5 countries to meet post-2010 obligations indicate need for institutional strengthening funding after 2010 and that possible funding for institutional strengthening support beyond 2010 should be examined, especially in light of decision MOP XIX/6 regarding accelerated HCFC phase-out. The decision requests the Secretariat to: review possible funding arrangements and levels for capacity building; explore the extent, nature and eligibility of any additional measures that might be considered for funding by the Executive Committee to address activities for HCFC phase-out consistent with guidelines pertaining to institutional strengthening activities to be agreed by the Executive Committee; and to report to the Executive Committee by the first Meeting of 2009.

April 2008
54/4: Requests that information (on price data) on all ODS, including HCFCs and their alternatives, be included in country
programme data reports and that the Secretariat continues to obtain feedback from Article 5 countries on the risk assessment, the general indicators of possible risk of non-compliance therein, and their ability to achieve compliance.

54/5(b): Requests the Secretariat to include an HCFC analysis in future versions of the compliance-oriented model/three-year phase-out plan and requests implementing agencies to include tonnage for all HCFC activities, excluding preparatory projects, based on current practices or any modifications subsequently approved by the Executive Committee.

54/39: Countries should use the guidelines to develop stage one of the HPMPs, which would address the freeze in 2013 and the 10 per cent reduction in 2015. For countries with a servicing sector only, the stage one of the HPMP and subsequent stages should be consistent with existing guidelines for the preparation of RMPs/RMPUs and with the preparation of TPMPs where applicable, contain commitments to achieve the 2013 and 2015 HCFC control measures and, to enable the release of funding, include a performance-based system for HPMPs based on the completion of activities in the HPMP.

Requests the countries to adopt a staged approach to the implementation of an HCFC Phase-out Management Plan (HPMP), within the framework of their over-arching strategy. In the HPMPs, consideration should be given to HCFC control measures in legislation, regulations and licensing systems as part of the funding of HPMP preparation as necessary and confirmation of the implementation of the same should be required as a prerequisite for funding implementation of the HPMP. The HPMPs should contain cost information at the time of their submission based on the most current HCFC cost guidelines. The decision encourages exploration of potential financial incentives and opportunities for additional resources to maximize the environmental benefits from HPMPs. The decision requires HPMPs to address the use of existing institutional arrangements and the role of refrigeration associations.

July 2008

55/5: Urges the countries with ongoing projects to consider using the approved funding for conversion to non-HCFC alternatives where possible. The Secretariat is requested to identify projects where conversion to HCFC-based equipment is still being considered, in order to assess the feasibility of conversion to non-HCFC alternatives.

55/13: Requires that a discount of 25 per cent should be applied to the survey component of the funding for preparation of the HPMP to be approved for countries that had received funding for the HCFC surveys. It determines funding level for preparation of HPMPs for countries with reported zero HCFC consumption – US$ 30,000, whereby additional funding may be requested if levels of HCFC consumption greater than zero were identified during preparation and reported under Article 7. Also requests the Secretariat to prepare for the 56th Meeting a cost structure for determining funding levels for the preparation of HCFC investment and associated activities with inputs from the bilateral and implementing agencies. It requests the Secretariat to apply the cost structure to any submissions for the preparation of HCFC investment and associated activities to the 56th Meeting.

55/42: Requests that the open-ended contact group should continue to discuss the issues related to the HCFC production sector at the 56th Meeting.

55/43: Set out an extensive decision on the preparation and submission of initial projects to address HCFC uses in aerosol applications, foam and refrigeration manufacturing sub-sectors, fire extinguishers and solvents. The intention would be to enable the Committee to choose projects that best demonstrated alternative technologies and facilitated the collection of accurate data on incremental capital cost and incremental operating costs or savings, as well as other data relevant to the application of the technologies.

Bilateral and implementing agencies are invited to submit demonstration projects for the conversion of HCFCs in the refrigeration and air conditioning sub-sectors to low-global-warming potential (GWP) technologies, to identify all the steps required and to assess their associated costs. Also requests the Secretariat to approach other institutions with the objective of identifying individual, regional or multilateral funding mechanisms suitable for co-financing in order to achieve additional climate benefits and to report to a future Meeting.

The information above is summarized; please consult the reports of the Executive Committee meetings for the exact text of the respective decisions.

www.multilateralfund.org/documents.htm and http://ozone.unep.org

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The Montreal Protocol Who’s Who

UNEP DTIE will unveil a new web portal at the 20th Meeting of the Parties in Qatar to honor the visionaries, innovators and implementers who are making the Montreal Protocol a global environmental success story.

You have a unique early-bird opportunity to nominate ozone protection champions from your country or region. Please visit www.unep.fr/ozoneaction to access the online nomination form.
Integrating and Sequencing Financing to Protect the Ozone Layer and Mitigate Climate Change

The acceleration of HCFC phase-out is one of various obligations under a multitude of Multilateral Environmental Agreements that developing countries have to implement. The challenges in meeting the Montreal Protocol 2013 freeze and the 2015 reduction targets of 10 per cent are many. They include, among others, the limited time available, the need to tap into different sources of finance to cover non-eligible project components, and the feasibility of technology transfer to bring desired climate benefits.

UNDP projects have been designed to achieve the combined objectives of different conventions and protocols. Examples include the removal of barriers to energy efficiency investment in buildings (replacing energy inefficient chillers), and refrigeration appliance replacement programmes that reduce ODS demand and save energy. Such projects also look into final disposal of collected ODS (refrigerant and/or foam). Similar approaches can be applied when addressing the challenges of HCFC phase-out.

UNDP is helping countries integrate and sequence different sources of funding and, in collaboration with Fortis Bank, has established the MDG-Carbon Facility to assist with project development and access to carbon finance. UNDP has also spearheaded initiatives for HCFC phase-out management strategies and action plans, and has designed pilot projects to validate emerging technologies. As the designated lead agency in several developing countries, representing over 70 per cent of the HCFC consumption, UNDP stands ready to assist countries to meet their compliance obligations with different Multilateral Environmental Agreements in a coherent and coordinated way.

Project development utilizing multiple financing sources requires considerable coordination among partners. Synchronization of different project cycles and financial mechanisms is challenging for the stakeholders, financial partners and agencies involved. Parties to various conventions need to improve cross-convention interaction and synergies to enable speedier access to available funding opportunities (including market-based mechanisms). With that, HCFC projects under the Multilateral Fund will have a better chance of delivering the expected benefits for the ozone and climate regimes.

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Convenient Opportunity to Address an Inconvenient Truth

Accelerated phase out of HCFCs provides a unique and convenient opportunity for the world community to address two of the most threatening issues the world is facing today: climate change and ozone layer depletion. The UNEP OzonAction Strategy is to enable 145 developing countries to avail this extraordinary opportunity. There is now global, regional and national infrastructure that has been adequately strengthened and capacity is built in the developing countries as a result of the experience of the governments and the industries over last two decades in phasing out CFCs.

It is true that in terms of sheer volume, the amount of HCFCs that developing countries have to phase out by 2030 is far larger than the CFCs that they will have phased-out by 2010. However, they now have ‘hands-on’ experience in phasing out more than 90% of the CFCs and some other ODSs, and more than that, they know that while implementing the Montreal Protocol, they are contributing to other important environmental and development goals.

UNEP OzonAction has an overall mandate to enable countries to meet compliance with the Montreal Protocol through capacity building and technology support. While implementing this mandate, UNEP will utilise the lessons learned over the last 20 years in working with the developing countries through delivery of its integrated services, such as information exchange on technologies and policies, regional networking of the National Ozone Units, training of technicians, policy makers, and customs and monitoring officers.

The foundation of this exercise will be laid by developing the HCFC Phase-out Management Plan – HPMP - through a participatory approach. UNEP OzonAction has gained experience from developing Country Programmes in more than 100 countries. Based on the lessons-learned, UNEP has developed a guidance manual for the development of HPMPs which will play a key role in developing HPMPs in nearly 60 countries, including India and China.

The key message that UNEP will be delivering, through practical case studies, is that the phase-out of HCFCs would not only contribute to protect the ozone layer but, more than that, it would make a significant contribution to reducing the climate change. The estimates indicate that globally there would be opportunity to reduce the emissions by around 12 to 16 billion metric tonnes of carbon dioxide (GtCO₂-eq) over the 2010 – 2040 period. If this is done in the way that it improves the energy efficiency of the equipment and appliances using HCFCs - and this is feasible - then advantage could be significantly more. This is strikingly significant if we consider that the target of reduction of emission during the first Kyoto Protocol commitment period of 2008-2012 is about 5 billion metric tonnes of carbon dioxide (GtCO₂-eq).

While contributing to solving these two global problems, countries have an unparalleled opportunity to get additional benefits by reducing energy consumption. Estimates indicate that if energy efficiency of the room air-conditioning units improve through technology transfer from developed countries, the developing countries would together benefit by reducing their energy consumption in the order of 10 - 40 per cent. Communicating the multiple advantages at the global and local level will be the key element of UNEP strategy. UNEP's web-based HCFC Help Center will become a hub for the information on alternative HCFC technologies and policies. UNEP will also provide the information on innovative co-financing options for these activities apart from the Multilateral Fund.

After all it will be a fitting finale for the story of the Montreal Protocol if we can tell the world that this is a story not only of protecting the ozone layer but also of mitigating climate change.

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Strategy on HCFCs: Technology and Partnership

The historical decision XIX/6 on Adjustments to the Montreal Protocol taken by the 19th Meeting of the Parties, in September 2007, regarding the accelerated schedule of phase-out of production and consumption of HCFCs, undoubtedly ushers in a new era and sets fresh major challenges for all stakeholders - including Parties, Protocol bodies, Implementing Agencies, industry and technology developers and providers - in terms of funding, availability of acceptable alternatives, environmental benefits and time frames.

Since the inception of the Multilateral Fund, UNIDO has been an active Implementing Agency in providing assistance to Article 5 Parties to meet their ODS phase-out targets through the development and implementation of phase-out plans and projects. And, taking advantage of its comparatively strong standing in the industrial sector, it was among the leaders in adopting long-term, environmental ODS substitutions in the foam and refrigeration sectors.

In the HCFC era, the strategic objective for UNIDO is to continue assisting Article 5 countries in meeting their obligations in a sustainable manner. To achieve the above strategic objective, UNIDO considered the following:

- Participate in ongoing discussions regarding the development of new policies and guidelines related to HCFC phase-out;
- Review and upgrade the capacities of the UNIDO Montreal Protocol team to respond to HCFC phase-out requirements;
- Build strong ties with and establish a network of technology providers;
- Strengthen ties with Article 5 partners and build their capacities in HCFC phase-out related areas using all available means;
- Build and strengthen partnerships with other implementing agencies in order to integrate efforts to achieve a more coordinated and effective programme implementation.

Based on the above, UNIDO organized a seminar in Vienna on «Alternative Substances and Technologies to Phase Out HCFCs in Article 5 Countries and Countries with Economies in Transition during the period 18-20 February 2008 ». Participants included representatives from Article 5 and non-Article 5 Parties, experts from academia and industry, sister implementing and bilateral agencies, the Multilateral Fund (MLF) Secretariat and the Ozone Secretariat.

It is believed that the exchange of information that took place during the seminar has enabled UNIDO, implementing agencies and the countries concerned to better understand the requirements for preparation of their HCFC phase-out management plans (HPMP).

The 54th and the 55th Executive Committee meetings approved funds for UNIDO to prepare HPMPs in 33 countries. And UNIDO will spare no effort in working with partner countries and other implementing agencies to meet the challenge.

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Blending Past Experience with Fresh Ideas for the HCFC Phase-out

The Parties to the Montreal Protocol took a decision a year ago which has changed the course of our work by introducing new challenges as well as opportunities. Decision XIX/6 on accelerated HCFC phase-out has set in motion a second phase of ODS phase-out, whereby Article 5 countries will face their first Protocol obligation in fewer than five years.

What is different in this phase is the context. HCFC production and consumption trends indicate high growth in Article 5 countries, particularly in the refrigeration sector where R-22 represents 80 per cent of all consumption. R-22 is in abundant supply at low cost and likely to remain so.

Already, HCFC consumption in metric tonnes has exceeded 200 per cent of peak CFC consumption, a trend that will affect phase-out costs. Additional expense arises from the fact that more investment will be needed to achieve the same ODP reduction levels. This is because HCFC is only 10–20 per cent as potent as CFC and most equipment used for HCFC-based product manufacturing is relatively new due to recent conversion from CFC-based technology.

The World Bank believes that the question of financing will be critical to countries’ success in controlling HCFC. The Multilateral Fund is to cover incremental costs, however not all phase-out costs will be incremental.

By recognizing the link between HCFCs and climate change, Decision XIX has prompted the Bank to look at how GEF and carbon finance can be leveraged to boost HCFC phase-out efforts. Improved energy efficiency in new equipment, control of HCFC production and ODS destruction all have considerable promise for generating additional resources considering the considerable climate benefits that will result.

Through its expertise in ‘financial engineering’, the Bank can help countries tap into a number of funds, such as the new Climate Investment Fund and Carbon Partnership Facility within the Bank, to complement Multilateral Fund assistance. The Bank will also use experience with sector and national ODS phase-out plans to support countries in developing flexible, programmatic approaches that generate environmental co-benefits through a combination of policy and investment interventions. With carefully designed and phased programmes that make the most of the climate and ozone inter-linkages, HCFC phase-out is achievable.
Fast-Track Climate Mitigation:  
the Montreal Protocol Shows the Way

To keep the climate system from passing tipping points for abrupt and irreversible climate changes, it is critical to pursue fast-track mitigation strategies in the near-term, starting immediately. Such urgent actions complement efforts to develop a post-2012 climate treaty to address mid- and long-term climate goals.

Several fast-track climate mitigation strategies are available, which also provide significant co-benefits. These include:

- strengthening the Montreal Protocol to capture additional climate mitigation, which also benefits the ozone layer;
- reducing emissions of black carbon, or soot, which also benefits public health;
- reducing precursors for tropospheric ozone, which also benefits public health;
- sequestering carbon in biochar, which also improves soil productivity, while producing carbon-negative bio-energy;
- sequestering carbon in forests, which also benefits local communities, wildlife, and biodiversity;
- increasing energy efficiency, which also reduces costs, increases competitiveness and energy independence, and creates jobs; and,
- expanding the use of renewable energy sources, which also increases energy independence, creates jobs, and protects public health.

The Montreal Protocol is a model for achieving near-term climate benefits. By successfully phasing out 97 chemicals that harm both the ozone layer and the climate system, the Montreal Protocol has produced a net 135 billion tons of CO₂-eq. in climate mitigation, and delayed climate forcing by up to 12 years.

Last year’s adjustment to accelerate the phase-out of HCFCs has the potential to produce an additional 16 or more billion tons of CO₂-eq. in climate mitigation, and delay the recovery of the ozone layer by three years. This year’s proposals to collect, destroy, or safely store banks of ODSs from discarded products and equipment can produce still more—an estimated 6 billion tons of CO₂-eq. by 2015, depending upon how much is actually recovered, and more thereafter.

Further climate mitigation could be produced if HFCs were regulated under the Montreal Protocol, where they could be phased-out, rather than under the Kyoto Protocol. The Montreal Protocol has the expertise and experience to phase out HFCs, and they should be added to the list of controlled substances next year and phased-out as quickly as feasible. Otherwise HFCs will be used as substitutes for HCFCs, and contribute to climate change.

Requiring the use of Life Cycle Climate Performance (LCCP) is critical for capturing more of the Montreal Protocol’s climate mitigation potential, including the climate benefits of the HCFC phase-out. LCCP measures both the direct climate impacts of the substance, as well as the indirect climate impacts from energy use, which can be up to 80% or more of total climate emissions.

Finally, in addition to its direct climate mitigation, the Montreal Protocol has important lessons to share with the climate negotiators, including its “start and strengthen” approach, its ability to “disaggregate” the ozone problem into manageable pieces, its quick-response Technology & Economic Assessment Panel and Technical Options Committees, its successful financial and technology transfer mechanism, its dedication supporting strong national ozone units in 146 developing country Parties, its fast adjustment process, and its comprehensive compliance assistance approach.

Success with the Montreal Protocol and other near-term mitigation strategies are essential to buy the international community time to negotiate, ratify, and implement a post-2012 climate treaty, and time to replace existing high-carbon technologies with new low-carbon technologies and otherwise undertake the changes necessary to achieve our mid- and long-term climate goals.

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Highlights of TEAP/TOC Reports on HCFCs

HCFC phaseout is seen as one of the most significant activities that would contribute to Ozone Layer protection and Climate friendliness. Following are the highlights from reports of Technology and Economic Assessment Panel (TEAP)/Technical Option Committee (TOC) and Special Report on Ozone and Climate (SROC) by Intergovernmental Panel on Climate Change (IPCC) and TEAP.

- As per SROC report in the year 2006, the demand of HCFCs in developing countries in 2015 would be about 2.3 times the 2002 consumption levels. Without any interventions, the banks of HCFCs in these countries in RAC and Foam sector in 2015 would be 2.2 times and 2.3 times, respectively of the 2002 levels (Report of the Task Force Response to Decision XVIII/12, August 2007);
- Evaluations using the approach previously adopted by the Science Assessment Panel to assess the influence of factors on ozone recovery (return to 1980 levels of EESC) show that accelerated HCFC phase-out can advance ozone recovery by up to 3.3 years based on a mid-latitude assessment and by about 7.1 years, if certain other practical measures are adopted. (Report of the Task Force Response to Decision XVIII/12, August 2007);
- In the recent past, blends based on Hydrofluorocarbons (HFCs) with minor quantities of Hydrocarbons (HCs) are being used in the market as alternatives to HCFCs in servicing. (TEAP Report, Volume 1, May 2008);
- Foam applications not only result in demand increase but also contribute to a large bank of ODSs deferring emissions to the atmosphere. (TEAP Report, Volume 1, May 2008);
- Service sector is one of the major contributors to HCFC demand and emissions. It is estimated that leakage rate could be more than 50%, annually, for servicing equipment depending upon age of equipment. (Report of the Task Force Response to Decision XVIII/12, August 2007);
- HCFCs are used in feedstock applications (not controlled in the Montreal Protocol) in manufacture of PTFE (in case of HCFC-22), Vinlylidene Fluoride (in case of HCFC-141b) and pharmaceuticals and agricultural chemicals (in case of HCFC-123). (Report of the Task Force Response to Decision XVIII/12, August 2007);
- The Clean Development Mechanism will continue to play a key role in ensuring that HFC-23 emissions from HCFC-22 production do not contribute unnecessarily to greenhouse gas emissions. It will also be necessary to avoid CDM revenues remaining with the HCFC-22 producers to prevent on-going market distortions. Therefore, cooperation between countries hosting HCFC-22 production would be very valuable in ensuring a level playing field (Report of the Task Force Response to Decision XVIII/12, August 2007).

List of the HCFC-related reports:

- Report of the Task Force on HCFC issues (With particular focus on the impact of The Clean Development Mechanism) and Emissions Reduction benefits arising from earlier HCFC phase-out and other practical measures, August 2007.
- UNEP/OzL.Pro.19/INF/4 Co-chairs’ consolidated issues paper on proposals for accelerated phase-out of HCFCs.
- UNEP/OzL.Pro.19/INF/4/Add.1 Co-Chairs’ Paper with reflections on the informal consultation on the proposals to phase out HCFCs, Montreal, 28 July 2007.
- UNEP/OzL.Pro.19/INF/5 Analysis and calculations on the various scenarios for accelerated HCFC phase out contained in the proposed adjustments of the Protocol – Submission by the United States of America.
- UNEP/OzL.Pro.19/INF/6 Analysis and calculations on the various scenarios for accelerated HCFC phase out contained in the proposed adjustments of the Protocol – Submission by the United States of America.
- UNEP/OzL.Pro.19/INF/8 Analysis and calculations on the various scenarios for accelerated HCFC phase out contained in the proposed adjustments of the Protocol – Submission by the Multilateral Fund Secretariat.

The information above is summarized; please consult the respective reports for the exact text: http://ozone.unep.org/Assessment_Panels/

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Natural Refrigerants: Sustainable Ozone- and Climate-Friendly HCFC Alternatives

Replacement of R22 in the commercial and industrial refrigeration and air-conditioning sector poses a big challenge for developing countries in planning and implementing the accelerated HCFC phase-out. The articles in this handbook demonstrate that natural refrigerants have proven to be energy efficient, economically feasible and environmentally friendly replacements to HCFCs and can be utilized in various systems that previously used R22. The handbook contains 31 articles by individual authors covering the following issues:

• policies and legislation on F-gases and related issues (Part 2);
• a technical assessment of natural refrigerants in different applications (air-conditioning, commercial and industrial refrigeration and heat pumps) (Part 3);
• case studies by manufacturers and end-users providing insights into market developments, and examples of successful conversions to natural refrigerants (Part 4).


New OzonAction Education Pack for Secondary Schools

This guide, targeted for secondary school students (13-15 years old) includes teacher's book, student's book and Ozzy and Zoe Ozone Collection and contains an entire teaching and learning programme, based on the basic knowledge, practical skills and participation, to enable teachers and children to learn about simple solutions to protect the ozone layer and safely enjoy the sun.

www.unep.fr/ozonaction/information/educationpacksec_school.htm

Ozzy Goes Island Hopping

The fourth issue of the "Ozzy Ozone: Defender of our Planet" comic book series, entitled "Ozzy Goes Island Hopping" features ozone depletion and climate change with a special focus on HFCs. Ozzy Goes Island Hopping is a joint publication of UNEP, UNICEF, UNESCO and the World Organization of the Scout Movement with the participation of the governments of the hosting islands.

www.unep.fr/ozonaction/information/mmc/lib_detail.asp?r=5061