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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Fifty-first Meeting
Montreal, 19-23 March 2007

PROGRESS OF INFORMAL DISCUSSIONS OF THE STOCKHOLM GROUP TO STRENGTHEN THE MONTREAL PROTOCOL

1. The Government of Sweden advised the Secretariat of its wish to inform the Executive Committee, at its 51st Meeting, of the progress of informal discussions of the Stockholm Group to strengthen the Montreal Protocol since the 50th Meeting, and requested the Secretariat to make the information available to Executive Committee Members in advance of the Meeting.

2. In this context, the Government of Sweden requested that the Report of the Third meeting of the Stockholm Group to strengthen the Montreal Protocol, held on 6 February 2007 in The Hague, the Netherlands, including its annexes, be made available to Executive Committee Members.

3. The report and its annexes are reproduced as an attachment to this document.

Version: 26 February 2007

STOCKHOLM GROUP 3RD MEETING, 6TH FEBRUARY 2007. THE HAAG REPORT

THE CHAIR'S SUMMARY (POLE)

The Montreal Protocol is providing dual protection for the ozone layer and the climate. Many ozone-depleting substances (ODSs) are also powerful greenhouse gases (GHGs), and the Montreal Protocol's phase-out of ODSs will do significantly more to reduce GHG emissions than the Kyoto Protocol. By one estimate, the Montreal Protocol's GHG reductions, provided by its phase-out of ODS, by 2010 will be roughly equal to a 10-year delay in climate-related impacts and an avoided rise in global average surface temperature of about [0.1º C].

Significant challenges are ahead, however, and they must be overcome to ensure the ozone layer's recovery and contribute positively to climate change mitigation. The 2006 Science Assessment Report highlighted the phase-out of Hydrochlorofluorocarbons (HCFCs) as an important action to reduce the risk of future ozone depletion, followed by recovery and destruction of halons and chlorofluorocarbon (CFC) banks and the phase-out of methyl bromide (MeBr) and carbon tetrachloride (CTC). The increase in HCFC production and consumption levels over the next decade raise concerns over their potential ozone and climate impacts as well as the capacity of developing countries to comply with the 2016 freeze at the high levels projected for 2015.

The contributions to the Multilateral Fund (MLF) for the implementation of the Montreal Protocol in Article 5 (developing) Parties so far have averaged US$150 million per year. The ozone protection and climate benefits of an eventual accelerated HCFC phase out, as well as other measures to strengthen ozone protection, provide deserving justification for continued financial support of the Multilateral Fund and of the Montreal Protocol in general, especially considering its cost-effectiveness in reducing GHG emissions. An accelerated phase-out, with supportive funding, will result in avoided HCFC production and consumption and benefits of alternative technology and best practices that avoid both ozone and climate impacts. Moreover, it will reduce by-product emissions of the potent GHG HFC-23 as well as by-product emissions of the ozone depleting CTC (from the production of chloroform used to make HCFC-22). It also can help in resolving the "perverse incentives" under the Kyoto Protocol's e.g., by Clean Development or Joint Implementation mechanisms, which potentially subsidize the production of HCFC-22 by generating emissions reduction credits for destruction of HFC-23 by-product emissions in approved projects. An accelerated phase-out would appropriately need to be accompanied by revisions to MLF guidelines that prevent funding of any ODS facility installed after July 1995 or any enterprise that has used the Fund's assistance for transiting to HCFCs from CFCs. Depending on how an accelerated HCFC phase-out is structured, it was roughly estimated to cost between US$ 0.5 to 1.5 billion, which over three replenishments would be roughly equal or less than current annual replenishment levels.

In light of the availability of alternatives, concerns over compliance, risks to the ozone (and climate), and the potentially higher costs of transitioning out of HCFCs under the current schedule, an accelerated phase-out of HCFCs in developed and developing countries is both possible and necessary. As with previous control measures of the Montreal Protocol, accelerated control measures for HCFC, for both production and consumption, need to include provisions for essential use exemption according to agreed criteria. For relevant applications, such criteria could include modality that heeds minimisation of climate-related impact. A timely proposal for an HCFC measure should be considered at the 19th Meeting of the Parties in September 2007. An agreement in 2007 of a HCFC control measure would allow the Parties to request an evaluation of the costs, associated with the commitments of Article 5 (developing) Parties, with the agreed measure as part of the study for MLF replenishment for 2009-2011.

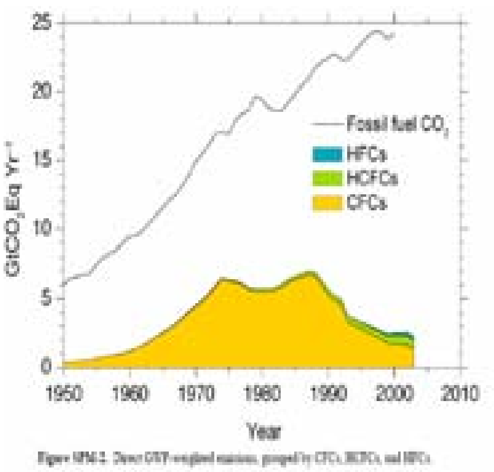
In order to meet the 15 March 2007 deadline for proposals to the Ozone Secretariat for consideration at the 19th Meeting of the Parties, and acknowledging that specific characteristics of an accelerated phase-out were not discussed in detail at the Hague meeting, the Chair proposes in Annex 1 to this Chair's Summary, elements for a broad adjustment framework for further refinement and elaboration. The Chair's Proposal calls for a stepwise reduction in HCFC consumption and production with a complete phase-out by 2040. There would be flexibility for Basic Domestic Needs, exemptions according to agreed criteria and development of constructive incentives.

It is envisaged that this proposal, to strengthen the Montreal Protocol by accelerating the phase-out of HCFCs, upon being forwarded in time by interested Party (ies), will enable a complete discussion of all relevant issues by the Parties and the opportunity to adjust the Protocol at the 19th Meeting of the Parties in September 2007 celebrating the 20th Anniversary of the Montreal Protocol.

Annex 1: Chair's Proposal for Elements of an Adjustment to Strengthen the Montreal Protocol

INTRODUCTION

The Montreal Protocol is providing dual protection for the ozone layer and the climate. Because many Ozone Depleting Substances (ODSs) are also greenhouse gases, the Montreal Protocol's phase-out of ODSs has already done and has the potential to continue to contribute significantly to reduce Green House Gas (GHG) emissions by 2010 augmenting the spirit of the Kyoto Protocol. The GHG reductions achieved by the Montreal Protocol are roughly equal to an avoided global average temperature rise of about [0.1º C.] or about 10 years of radiative forcing. This is significant in light of the warning by climate experts that the world has about 10 years remaining before positive feedbacks in the climate system could accelerate global warming beyond the point of no return.



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Thus the Montreal Protocol can further delay climate change by completing its mission to protect the ozone layer. The Montreal Protocol's success to date is based on its design and structure as well as the energetic commitment of its Parties, scientific and technical experts, and stakeholders (including representatives of environmental, industrial and other non-governmental organisations (NGOs)). But substantial challenges lie ahead that must be overcome to ensure a sustained and earliest recovery of the ozone layer, requiring continued commitment by the Parties, experts, and NGOs.

The Montreal Protocol's ozone and climate benefits create an opportunity to ensure its continued success in protecting the ozone layer. This is particularly true with regard to the commitment of developed countries to ensure the successful implementation of the Montreal Protocol by providing financial assistance to the developing countries through the Multilateral Fund. It is estimated that the implementation of the Montreal Protocol by Article 5 (developing) Parties has required approximately US$150 million per year, which not only protected the ozone layer but also protected the global climate through reductions in GWP-weighted emissions of ODSs, significantly augmenting the GHG emission reductions required by the Kyoto Protocol. These ozone and climate co-benefits provide an added justification for continued financial support of the Montreal Protocol, especially when considering its cost-effectiveness in reducing GHG emissions. The meeting estimated that the costs of an accelerated phase-out to be US $0.5 billion to US $1.5 billion, depending on the structuring of the control measure, which indicates levels of funding similar to current levels over the next three replenishment cycles.

The protection of the ozone layer offers additional benefits to the climate, particularly if the Parties strengthen the Montreal Protocol. The 2006 Science Assessment highlighted the phase-out of Hydrochlorofluorocarbons (HCFCs) as one of the most important actions the Parties can take to reduce the risk of future ozone depletion, followed by recovery and destruction of halons and chlorofluorocarbons (CFC) banks and the phase-out of methyl bromide (MeBr) and carbon tetrachloride (CTC).

An early analysis, with significant uncertainty, suggests substantial growth in HCFC production and consumption in Article 5 (developing) Parties. Growth has occurred in some developing country production, during recent years, at a rate of 25-35 percent per annum for all relevant HCFCs. This growth rate does not take into account growth in feedstock production estimated at 10 percent per year and which makes up 40 to 50 percent of the HCFC-22 production for emissive uses in Article 5 (developing) Parties. Whether or not it would be possible for production capacity to deliver the HCFC levels predicted by this analysis is unclear.

An estimate of total developing country HCFC production is as follows:

Year	**2000**	**2002**	**2004**	**2006**	**2008**	**2010**
Production for emissive use, kilo tonnes	129	168	271	380?	590?	840?
Production for feedstock, kilo tonnes	45	60	95	135?	200?	300?
Total (kilo tonnes)	174	228	366	515?	790?	1140?

Developed (nA5) Parties' HCFC production, developing (A5) Parties' HCFC consumption, together with global consumption of HCFC for the period 2000-2004 is as follows (kilo tonnes):

Year	**2000**	**2002**	**2004**
Production, nA5	393	330	211
Consumption, A5	195	196	280
Consumption, global	517	481	459

MODIFICATIONS TO HCFC CONTROL MEASURES

An accelerated phase-out of HCFCs would avoid projected increases in production and consumption by 2015, where about 70 percent will come from HCFC-22 and 30 percent from

HCFC-141b and 142b. In addition to depleting the ozone layer (and possessing a global warming potential of 1,780), HCFC-22 production can result in by-product emissions of hydrofluorocarbon HFC-23 (GWP, = 11,700) and CTC from the production of chloroform used to make HCFC-22 (CTC have an ODP of 1.1 (Ozone Handbook 6th Ed. 2006) and a GWP of 1,400). Additional measures, such as pursing energy efficiency advances and Life Cycle Analysis (LCA) and Life Cycle Climate Performance (LCCP) criteria, can help guide the Parties on how to quantify the additional benefits of a control measure to the climate.

Many participants stated that there is need to consider adjusting the current control measures for HCFC production as soon as possible for both developed and developing countries and for HCFC consumption for developing countries. It was noted that accelerated HCFC production measures exist in some non-A5 Parties. Some participants urged prompt action in order to meet the 15 March 2007 deadline for circulation of proposals to the Ozone Secretariat for consideration at the 19th Meeting of the Parties.

An accelerated phase-out of HCFCs is both possible and necessary, in light of the availability of alternatives, concerns over compliance, and the costs of late transitioning out of HCFCs.

Alternatives to HCFCs are available for all applications where they are used, which include commercial and industrial refrigeration as well as stationary air conditioning. Maximising benefits to the climate as well as ozone layer will depend on both the type refrigerant used as well as improvements in design and energy efficiency of the technology, practice and incentives in which the refrigerants are being used. Promising techniques, e.g. based on natural refrigerants, that maximise advantages from both ozone and climate perspectives may merit additional consideration for further support and incentives, including economic and legislative.

Current projections for production and consumption of HCFCs raised concerns over the potential impacts to the ozone layer and the climate as well as whether developing countries will have difficulties complying with the 2016 consumption freeze, given the projected increase in HCFC production and consumption by 2015. There also was concern over the costs of a transition out of HCFCs at the production and consumption levels projected for 2015, especially when compared to the smaller costs of a transition at current production and consumption levels. In the context, it may be worth noting that the growth in HCFCs has to take into account the case where CFCs were replaced by HCFCs (in particular for HCFC-141b replacing CFC-11; not so much in the case for HCFC-22), and the increase in consumption due to population and economic growth where the HCFCs did not replace CFCs.

Proposal(s) to strengthen the Montreal Protocol by accelerating the phase-out of HCFCs will enable a complete discussion of all relevant issues by the Parties and the opportunity to adjust the Protocol at the 19th Meeting of the Parties in September 2007 celebrating the 20th Anniversary of the ozone regime.

POSSIBLE FURTHER CONTROL SCENARIOS/ADJUSTMENTS

Proposed adjustments will need to consider the freeze date and possible step-wise reductions of both production and consumption of HCFCs in both developed and developing countries.

Given the concerns over projected HCFC production and consumption levels by 2015 as well as compliance with the 2016 freeze date by developing countries, an earlier freeze date should be considered to avoid increased production of HCFCs. An earlier freeze date could also avoid increases in capacity and demand projected over the next decade.

In addition, it was discussed that, for developing countries, a step-wise schedule, possibly modelled after the step-wise schedule for developed countries, could be implemented after the freeze date. A step-wise schedule for the production sector, in developed countries, could possibly be modelled after the production sector phase down of the European Community with a delay in the production phase down in developing countries.

TECHNICAL AND ECONOMIC FEASIBILITY OF ADEQUATE ALTERNATIVES

Alternatives exist for HCFCs in all applications.

To capture climate benefits in transitioning out of HCFCs, alternatives should be evaluated in terms of their cumulative environmental impacts, such as under Life Cycle Analysis and Life Cycle Climate Performance, which would consider both direct impacts based on a substance's GWP and indirect impacts such as by-product emissions and GHG emissions from energy consumption. Some alternatives, such as ammonia, CO2, and hydrocarbons, have lower (or negligible) GWPs compared to HFCs. Their use depends on applicable incentives and regulations, including safety. The transition from HCFCs will result in the application of state-of-the-art technology and best-practice in equipment design and performance, including improvements resulting in small charge size, reduced leakage, enhanced recovery and destruction during servicing and equipment end-of-life, and increases in energy efficiency.

HCFC-22
Chemical substitutes are available with comparable (or higher) GWP. The LCCP and energy efficiency of products using substitute refrigerants can be significantly better with design, containment, recycling during service and at end-of-life, together with destruction when no longer needed. Investment costs for products dependent on application, regional features etc. Redesign to avoid HCFCs is more cost-effective than retrofitting later. Compressor development for HFCs has been achieved to a large extent. In some cases changes, such as in piping and heat exchanger design that can only be done for new systems could possibly lead to cost reduction. Conversion of HCFC-22 to propane is possible without major modifications, with comparable or better energy efficiency. Modifications for safety will be necessary, however, particularly for larger systems with large refrigerant charge inventories, which have impacts on the energy efficiency. Costs for R-410A are expected to be comparable to HCFC-22 once R-410A dominates market share. Costs for hydrocarbon-based equipment are 5 to 25 percent higher

depending on specific safety measures and size of equipment. An accelerated HCFC-22 phase-out is technically and economically feasible.

HCFC 141b
Substitute chemicals are available for all uses, especially where HCFC-141b is used as solvents or propellants. The LCCP for Hydrocarbon (HC) blown foams is superior to HCFC-141b foams without end-of-life measures and HC foam is likely to be cost effective when greenhouse gas emissions were quantified. Emissions of HCFC-141b from insulating foam depend on end-of-life treatment.

HCFC-225
Substitute chemicals are available. Minor exceptions exist in technical applications, e.g. cleaning of oxygen systems that have complex geometry. An earlier HCFC phase-out could be considered with exemptions for minor HCFC-225 solvent uses, possibly under the existing exemption criteria and process, or if the Montreal Protocol allowed production to be offset by destruction of ODSs.

HCFC 123
Substitute chemicals are available for solvent uses. Substitute chemicals are not available with equivalent environmental performance for some air conditioning applications. Some HCFC-123 uses in centrifugal chillers achieve an energy efficiency advantage of 10 percent or higher than existing alternatives. HCFC 123 use applies only to centrifugal chillers. There are other alternatives (HCFCs and HFCs) for scroll or screw compressors where design and mode of operations also yield energy efficiency benefits. With near-zero chiller emissions with incentives (for this refrigerant), an earlier HCFC phase-out could take place with highly contained HCFC-123 centrifugal chiller uses possibly allowed by an agreed to essential use exemption or otherwise, with offsets by ODS destruction.

Costs
In terms of costs, HFC alternatives to HCFCs are more expensive. However, this will not significantly affect the cost of equipment. Other alternatives, such as hydrocarbons and ammonia, are less expensive, and equipment costs are a function of regional incentives and regulations, including safety. For example, safety regulations could require changes in equipment design.

TECHNICAL ASPECTS OF FUNDING ISSUES: MLF, GEF, AND POSSIBILITY OF INVOLVING OTHER FUNDING, INCLUDING CLIMATE FUNDING, CDM/JI, BILATERAL FUNDING, PUBLIC-PRIVATE ACTIVITIES, ETC.

The ozone and climate benefits of the Montreal Protocol can provide an additional incentive to donor countries to replenish the Multilateral Fund to ensure compliance with an accelerated phase-out of HCFCs. These climate benefits should be clearly communicated to the climate change community and to the appropriate offices and officials in donor countries as additional justification for maintaining the continuity of the financial support of the Montreal Protocol and protection of the ozone layer.

The climate benefits of an accelerated phase-out include replacing HCFCs with alternatives that have lower GWPs (considering both direct and by-product emissions). In addition, the transition to state-of-the-art technology and best practices will yield increased energy efficiency and lower leak rates. In particular, it was emphasized that increases in energy efficiency offers both environmental and economic benefits.

Furthermore, these climate benefits can be leveraged to provide additional support measures, including public-private partnerships, alternative financial mechanisms such as the Kyoto mechanisms (including the Clean Development Mechanism and Joint Implementation), revolving funds, equity partnerships. They also can spur cleaner production, advances in energy efficiency, streamlined administration, greater transparency, and additional opportunities with other implementing agencies.

Most participants expressed preference for a sectoral approach (currently a key MLF approach) to funding an accelerated phase-out, due to its greater flexibility. Some participants expressed concern over linking the Montreal Protocol with the U.N. Framework Convention on Climate Change and its market-based instruments, stating that it could jeopardize the authenticity of the political and technical capital of the Montreal Protocol. Importantly, emissions reduction credits for 'avoided emissions', due to elimination of all or part of the future HCFC production, could provide additional financial support for the protection of the ozone layer and the climate.

Participants discussed options for funding an accelerated phase-out of HCFCs through the Multilateral Fund and noted that Parties could authorise a change to the eligibility criteria of the MLF Executive Committee's Guidelines to better meet the financial requirements of an accelerated phase-out of HCFCs. The current MLF Guidelines do not allow funding of facilities installed July 1995 or any enterprise that has used the Fund's assistance for transitioning to HCFCs from CFCs. These guidelines may need to be amended appropriately. In addition, participants discussed opportunities for the MLF and Global Environment Facility to finance an accelerated HCFC phase out, bearing in mind their current project eligibility criteria for funding.

It was also noted that some developing countries are in a different position now than they were 20 years ago when the decision was made to phase-out CFCs, enabling them to play a different role in the further implementation of the Montreal Protocol and helping to create a new paradigm for protection of the ozone layer.

Agreement by the Parties at their Nineteenth Meeting in 2007 on an Adjustment to a control measure on production and consumption of HCFCs would allow a study to consider this control measure in the evaluation in 2008 of the cost of the Replenishment of the Multilateral Fund for the period 2009-2011. Furthermore, the accelerated phase-out of HCFCs creates an additional justification for donors to continue to support the Multilateral Fund at current levels.

FURTHER WORK

Participants recognized that agreement on an Adjustment to the control measure on HCFCs could be accomplished this year at the 19th Meeting of the Parties. The new control measure would provide the basis for a (TEAP) study in 2008 on the level of replenishment necessary for the next period. Participants were made aware of Decision IX/5 which made acceptance of a new control measure conditional on funding. Such a precedent may be useful in 2007 for facilitating an agreement for an Adjustment.

COMPLIANCE TOWARD EXISTING MEASURES

CTC

An update was provided on the current applications of CTC, the global production and feedstock uses of CTC, linkage between HCFC and CTC production, and challenges from potential emissions from projected gross production of CTC.

CTC and HCFC-22 are linked. Measures addressing HCFC and ozone-climate therefore would benefit from a packaged approach. Production of HCFC-22 uses chloroform as feedstock, and the production of chloroform generates CTC as a by-product. Based on an industrial estimate, 40 percent of the total production of HCFC-22 is used for production of Polyterafluoroethylene (PTFE).

Some CTC can be used as feedstock through contained re-use and recycling. With regard to current applications, CTC is used as feedstock for production of CFCs and other chemicals and as a solvent and process agent. Its use for DVAC (divinyl acid chloride) is increasing. Demand for PTFE is estimated to grow at about the same rate as the demand for HCFC for emissive uses (10 percent per year). In 2003, the global production capacity of HCFC-22 was estimated at 803,500 tonnes per year. In 2005, the total feedstock use of CTC was 175,000 tonnes. With the projected increases in chloroform use to produce HCFC-22, by-product production of CTC is expected to increase to 260,000 tonnes by 2015 if measures are not taken to ensure its destruction and/or use as a feedstock.

With HCFC-22 production capacity of 803,500 tonnes in 2003 and increasing demand for PTFE products etc. could increase production capacity to more than 1 million tonnes. There will be, thus, more than 150,000 tonnes of CTC that will need to be taken care of. For example bys use as feedstock, either as a result of increased demand for current feedstock uses or in new feedstock uses, or destroyed. Additionally, new chloromethane processes could be used that re-use the CTC by-product for production of methyl chloride.

The technical assessments, both by IPCC/TEAP (Intergovernmental Panel on Climate Change / Technical and Economic Assessment Panel) Special Report from 2005 have not taken into account the issues regarding increasing by-product CTC production and associated emissions. One of uncertainties of the 2006 TEAP report on CTC emissions was based on the fact that there may be emissions from landfills since it was used as a solvent for such a long time; these emissions have not been clearly defined although a number of papers exist.

CFC MDIs

Many Article 5 parties use CFC Metered-dose Inhalers (MDIs) with a belief that essential use process would be applicable to them even before 2010. These Article 5 Parties left this sector to be dealt with at a later stage and concentrated on other sectors. But the Montreal Protocol allows essential use exemptions only after the final phase-out in 2010. This misunderstanding resulted in some countries excluding ODS consumption data for MDIs in their reporting to the Ozone Secretariat. This led to difficulties and uncertainties in data collection and analysis of their needs, which has not been reflected until recently. As the 2010 phase-out date approaches, countries are giving priority to the phase out of CFCs for MDIs, due to concern over the potential non-availability of pharmaceutical grade CFCs.

Countries using CFC MDIs may be grouped into two categories: those which import, but do not manufacture CFC MDIs and those which manufacture CFC MDIs.

Import-only countries have been encouraged by the Parties through Decision XXII/2(6a) to develop a transition strategy and seek review by the TEAP. Further, the Executive Committee of the MLF has been requested to consider approving technical, financial, and other forms of assistance to develop transition strategies. But the recent ExCom decision stating that transition strategies will only be approved for assistance if countries can demonstrate they need such assistance has created a “Catch-22” situation, since many of these countries need assistance first in order to assess the problem before they can determine if they need assistance.

About 12 Article 5 Parties produce MDIs. Their technology transfer needs are being addressed fully or partially, through MLF assistance, ongoing project preparation or technology conversion on their own. Some have had difficulties to convert all their formulations; others mention delays in finalizing the process, registration etc. For ongoing projects funded by the MLF, project implementation takes longer than other sectors, registration and formulations testing cause delays and transition strategies can only be finalized once technology assistance and conversion occurs.

With the 2010 phase-out date approaching MDI manufacturing countries which have not received technical assistance and have not changed to non-CFC MDIs or alternative drugs for asthma treatment, will need to give priority to MDIs for their remaining CFC consumption. This may increase the price of CFCs and help spur a transition to ODS substitutes in the non-MDI sectors such as in the refrigeration sector. It was also commented that replacement technology could be developed in Article 5 countries, although at present there is not enough capacity for HFC-134a alternatives.

Methyl Bromide

The discussion on methyl bromide focused on technology, trade, and transparency issues.

Technology issues with methyl bromide mainly involve the transfer of best practices, including Integrated Pest Management. It was noted that U.N. agencies that have greater access to farming communities can help disseminate information, such as the Food and Agriculture Organisation of the United Nations (FAO). Farmers Associations and NGOs can also help reach farmers and fumigators at the grass roots. Additionally, it was commented that by licensing fumigators, the size of the regulated community can be reduced from thousands of farmers to a much more manageable number of fumigators. It also makes monitoring and control of imports more manageable.

Regarding trade issues, Quarantine and Pre-shipment (QPS) requirements are determined by the importing country, which can require the exporting country to use methyl bromide for fumigating wood packaging and other commodities, or heat treatment, which is also an option. Illegal trade in methyl bromide also is a key issue.

Transparency issues relate to compliance, as a large amount of methyl bromide use is for Quarantine and Pre-shipment applications not subject to control measures. As a result, it is important to monitor its import, export, and use to ensure that methyl bromide imported or exported for QPS purposes is not used as a fumigant. In addition, there are instances where methyl bromide is not labelled properly, and farmers using it as a fumigant do not know to take proper precautions.

A ban on the use of cans by unlicensed farmers has been shown to significantly reduce the use of methyl bromide as it would restrict methyl bromide fumigation to only licensed operators.

Another issue regarding methyl bromide is its increased use, by a factor of 4-5, to fumigate wood packaging, due to the ISPM15 requirement originating from the International Plant Protection Convention (IPPC), which applies to nearly all wood used for shipping and packaging in containers in international trade. Dealing with this issue requires greater communication between environment and agriculture ministries as well as greater collaboration with the IPPC to reduce or eliminate methyl bromide or wood packaging and to develop alternatives where heat treatment is not feasible or too expensive.

Future actions include focusing on best practices for use of methyl bromide for fumigation. Collaboration with farmer associations was one effective way of information exchange. For QPS, it was suggested it would be useful to seek explore the possibility of placing control measures on some uses of methyl bromide for QPS, in terms of minimizing its use across the board and forbidding its use where there are technologically and economically feasible substitutes.

Conclusion and Next Steps

The next meeting of the Stockholm Group could take place immediately before the special two-day dialogue scheduled for June 2007, prior to the Open-Ended Working Group. [Tentative date for the Meeting: 31 May 2007].

At the next meeting, key issues still outstanding for discussion include ODS banks and stocks and available options to reduce their impacts on both the ozone and the climate, including the possibility of developing methodologies that could benefit from flexible mechanisms (Clean Development Mechanism, Joint Implementation etc.) that provide Certified Emission Reductions (CERs), Emission Reduction Units (ERUs) etc, for the recovery and destruction of banks. In addition, it was suggested that it would be useful to invite someone from the Basel Convention to discuss the issues involving the transport of equipment and vessels containing ODS for destruction.

ATTACHMENTS

Annex 1: Chair's Proposal for Elements of an Adjustment to Strengthen the Montreal Protocol

(Separate e-mail dispatch)

Presentations at the 6th February 2007, The Haag Meeting, of the Stockholm Group.

- Chairs Presentations (3)
- Scientific Assessment (1): Ozone-Climate, Dr. Guus Velders **(To be provided later)**
- TEAP Co-chair Presentations (2)
- World Bank Presentation (CTC) (1)
- UNDP Observations (1): Extract from HCFC Surveys
- Value of HFC-23 Destroyed (1): DuPont. Mack MacFarland

CHAIR'S PROPOSAL FOR ELEMENTS OF AN ADJUSTMENT TO STRENGTHEN THE MONTREAL PROTOCOL

Ideas for Preamble

Recalling the global spirit of cooperation in protecting the stratospheric ozone layer and the commitment of developed countries to finance the incremental costs of the phase-out of ozone-depleting substances in developing countries,

Recognizing the climate benefits of the Montreal Protocol's phase-out of ODSs, and that measures to strengthen the Montreal Protocol will produce additional benefits for both ozone and climate,

Acknowledging the significant challenges still facing the Montreal Protocol to ensure the recovery of the ozone layer to pre-1980 levels,

Mindful that environmentally superior alternatives and substitutes are available for all but some specialized HCFC applications, and that without an accelerated HCFC phase-out production and consumption may increase to levels that will be increasingly difficult and costly for the Parties to finance costs of future phase out,

Noting that both the ozone layer and the climate will benefit from prompt action by the Parties, and that this proposal is designed to ensure a complete and thorough discussion of challenges facing the Montreal Protocol and to preserve the opportunity for action at the 19th Meeting of the Parties in September 2007.

Ideas for HCFC Phase-Out Schedules

The current phase-out schedule for HCFCs in Article 5(1) countries requires a freeze in consumption in 2016 at 2015 levels and a complete phase-out by 2040.

The HCFC production control requires a freeze, with respect to the base level, in 2004 for non-Article 5(1) and in 2016 for Article 5(1) with a 15 % (of base level) provision for Basic Domestic Needs (BDN).

An accelerated phase-out could be based on the following:

- Establish [2006] production and consumption levels as the baseline.
- Freeze production and consumption levels in [2015] at either [__ %] of the baseline or the production and consumption levels in [2015], whichever is less.
- Implement a stepwise reduction schedule, with a complete phase-out by 2040
- Allow essential use exemptions according to agreed criteria
- Allow a small percentage of production to satisfy basic domestic needs
- Advance HCFC phase-out in the production and consumption sectors for non-Article 5 Parties to the maximum extent feasible.

[The phase-out schedule for HCFC consumption would thus be (new controls in bold):

Control measure	CURRENT Non-article 5 (1)	CURRENT Article 5 (1)	**PROPOSED** Article 5 (1)
Freeze	1996 (on 1989 HCFC consumption + 2,8% of 1989 CFC consumption	2016 (on 2015 HCFC consumption)	**[2015] (on [2006] HCFC consumption)**
-35 %	2004		**2014**
-65%	2010		**2020**
-90%	2015		**2025**
-99.5%	2020		**2030**
Phase-out	2030	2040	**2040**

The phase-out schedule for HCFC production would thus be (new controls in bold):]

Control measure	CURRENT Non-article 5 (1)	CURRENT Article 5 (1)	**PROPOSED** Non-article 5 (1)	**PROPOSED** Article 5 (1)
Freeze	2004 (on 1989 HCFC production + 2,8% of 1989 CFC production and 1989 HCFC consumption + 2.8% of 1989 CFC consumption)	2016 (on 2015 average of production and consumption)	**[current]**	**2016 (on 2006 average of production and consumption)**
-35 %				
-65%			**2008**	**2018**
-90%			**2015**	**2025**
-99.5%			**2020**	**2030**
Phase-out			**2030**	**2040**
BDN	2004 - 15% of base	2016- 15% of base	**X% base**	**X% base**

BDN = Basic Domestic Need

Ideas for Financial Assistance

The Parties should enable the Multilateral Fund and possibly other relevant financial mechanism, such as the Global Environment Facility, to provide financial assistance for the incremental costs of control measures for HCFCs on the similar basis as CFCs. Financial assistance can be made conditional, as it was in Decision IX/5: Conditions for control measures on Annex E substance in Article 5 Parties. The Parties should consider providing guidance to the Kyoto Protocol Mechanisms' (such as CDM and JI) projects aimed at moving away from HCFCs to ozone and climate friendly alternatives.

Ideas for ODS Destruction

The Parties could consider creating greater incentives for the recovery and destruction of ODSs currently contained in banks and stockpiles, which are not subject to controls and represent a significant source of emissions in terms of both ODP tonnes and GWP. Such incentives need to be balanced as to not generate perverse incentives.

Stockholm Group Meeting III

The Hague 2007-02-06

The Chair's Introduction (1/2)

- Here We are Individuals Not Representing our Organizations
- An occasion to think outside the box
- Freedom to exchange views
- No attribution "Chatham House" Principles
- Brainstorm & Draft Core Proposal
- Confirm Who Wishes to Continue on Group
- Make a Roster of Others Who Should be Invited

The Chair's Introduction (2/2)

3 key objectives of the 3rd Meeting of the Stockholm Group are to help advance:

- HCFC Controls (Consumption & production– A5C and non-A5C)
- Compliance towards Existing Measures
  - CTC (incl. Process Agents, Production sector)
  - MeBr-QPS-MDI
- Consensus Conclusions and Next Steps

Answers to Concerns:

1. HCFC:
   - Control Scenarios (Prod. & Consumption)
   - Viable Alternatives
   - Costs
   - Financing
2. Compliance
   - CTC Discrepency
   - Sectors (MeBr, QPS, MDI)

Conclusions

1. Small Drafting Group
   - Chair
   - About 5 (MS, SS, LK, PH-PT, ?)

2. Summary and Chair's "Pole". Sense. For comments as per practice

3. First Draft 7 Feb. 2007

Stockholm Group
Meeting III
Costs and Methods

The Hague 2007-02-06

The Chair's Introduction (1/5)

- Hitherto phase-out funding has been provided via MLF, GEF, Bilaterals, Public and Private and other IFIs. MLF major: ca $2.1B during 1991-2006;
- 2006-2008 triennial replenishment $470 million;
- Next replenishment for 2009-2011 (2008);
- TEAP Terms of Reference 2007.

The Chair's Introduction (2/5)

- HCFC ca 85,000 ODP t (± large) 2010
- At historic Prod. & Consumption figure $8700 per ton ODP (Prod-consumption)
- $ 0,7 billion (± very large)

- Some key clarifications, that need to be addressed:

The Chair's Introduction (3/5)

- Currently No guidelines for HCFC;
- Hitherto: Indicative List of Categories of Incremental Costs: 2nd MOP;
- ExCom Dec (17/7) Not to consider projects that have capacity installed after 25 July 1995.
- ExCom Dec (20/48) not to pay for 2nd conversion (from HCFC)
- Can the Decisions be amended?

The Chair's Introduction (4/5)

- What is the tonnage to be addressed? Consumption by ODP-ton. Production by ODS-ton
- Current MLF Practice of funding incremental costs of ODS other than HCFCs:
  - Separate funding guidelines for production & consumption phase-out;
  - Production phase-out a function of compensation for profit forgone & labour displacement for premature closure;
  - Consumption phase-out a function of conversion to alternative with funding of incremental capital and operating costs;
  - Eligible funding a function net incremental costs (Δ (cost-saving/benefit))

The Chair's Introduction (5/5)

- Are sector/sub-sector guidelines needed, a priori?
- Can we learn from the merits of the Sectoral Approach vs. Project by Project?

Stockholm Group
Meeting III
Funding

The Hague 2007-02-06

The Chair's Introduction Funding

- Hitherto phase-out funding has been provided via MLF, GEF, Bilaterals, Public and Private and other IFIs
- Key Questions:

The Chair’s Introduction Funding

Can we leverage additional measures, e.g.

- Cleaner production, energy efficiency? Alternative financing mechanisms? such as revolving finance, equity, "Flex. Mex." financing? (one program $930 M)
- Additional implementation agents? Public-private partnerships?
- Streamline administration, transparency, outsource?

Technical Options for HCFC Phase-out

Lambert Kuijpers
Stephen O. Andersen
Jose Pons Pons

TEAP Co-Chairs

*this presentation represents the viewpoints of the presenters
and not necessarily of the Technology and Economic Assessment Panel
or the organizations who employ the authors

Outline

- What is the issue
- Data on HCFC production & consumption
- Growth in Article 5 countries
- HCFCs and substitution issues
- Economic considerations
- Concluding remarks

The issue(s)

- HCFCs have pre-Montreal uses and are low-ODP alternatives for other ODSs
- HCFC consumption is rapidly increasing in developing countries while decreasing in developed countries
- HCFC production and consumption is rapidly increasing in developing countries (no freeze until 2015) as a result of population and economic growth. Parties can accelerate the HCFC phase-out to better protect the ozone layer and climate

HCFC Growth in Article 5 countries

- HCFC production and consumption will continue to grow uncontrolled in the period 2005-2015 in Article 5 countries
- 2015 HCFC production (excluding feedstock) likely to exceed 700 ktonnes in 2015: more ODP tonnes than 2005 CFC production
- Article 5 countries can stabilise or decrease HCFC use before 2010

HCFC data in TEAP reports

- 2003: HCFC-22 production capacity estimated for 2015 at 565 ktonnes, demand at 342 ktonnes
- 2005: HCFC demand:
  - 2002: 496,000 tonnes
  - 2015: 551,000 tonnes (BAU)
  - 2015: 391,000 tonnes (MIT)

developed countries		developing countries	
2002:	279,000 tonnes	2002:	217,000 tonnes
2015:	62,000 tonnes	2015:	489,000 tonnes (BAU)
2015:	33,000 tonnes	2015:	358,000 tonnes

HCFC data in TEAP reports (2)

- The TEAP 2005 Supplementary Report estimated global HCFC demand and emissions:

global demand		global emissions	
2002:	496,000 tonnes	2002:	271,000 tonnes
2015:	551,000 tonnes (BAU)	2015:	492,000 tonnes (BAU)
2015:	391,000 tonnes	2015:	292,000 tonnes

HCFC Production data (Article 7)

	1990	1995	2000	2001	2002	2003	2004
Production data (ktonnes)							
nA5	223	462	402	362	336	251	220
A5	22	35	128	140	168	212	271
TOTAL	244	496	331	502	504	463	491
Production data (ODP ktonnes)							
nA5	12.6	31.6	29.3	26.4	25.4	17.0	14.0
A5	1.2	2.0	7.7	8.5	10.6	13.6	17.3
TOTAL	13.8	33.6	37.0	34.9	36.0	30.6	31.3

HCFC Production data (percentages)

Production data (percentages from ktonnes)

world	1990	1995	2000	2001	2002	2003	2004
HCFC 22	94	66	64	65	64	72	75
HCFC 141b	2	23	26	26	29	20	16
HCFC 142b	3	9	8	7	5	7	8
HCFC 123	<1	1	1	1	1	1	1
HCFC 124	<1	1	1	1	<1	<1	1
HCFC 225	<1	<1	1	1	1	1	<1

HCFC Production data (percentages)

Production data (percentages from ODP ktonnes)

A5 only	1990	1995	2000	2001	2002	2003	2004
HCFC-22	100	89	83	82	73	69	71
HCFC-141b	<1	10	17	17	26	29	27
HCFC-142b	<1	1	<1	<1	1	2	1
HCFC-123	not produced in A5 countries						
HCFC-124	not produced in A5 countries						
HCFC-225	not produced in A5 countries						

A5 growth patterns

- Early analysis -- with significant uncertainty -- suggests a strong developing country production and consumption growth at 20-35% (without feedstock production which would be roughly 50% of HCFC-22 production for emissive uses in A5 countries)

year	2000	2002	2004	2006	2008	2010
ktonnes	129	168	271	380?	590?	840?
feedstock	45	60	95	135?	200?	300?

- The majority of the production and use will be HCFC-22 with 25-30% HCFC-141b

Where from here

- Two issues need to be clearly separated
  1) The replacement of CFCs with HCFCs
  2) The growth in consumption of pre-Montreal HCFC uses as a result of population and economic growth

HCFC chemicals -background

- Refrigerants can be compared for theoretical energy efficiency, but the efficiency actually achieved depends on design, controls, service and quality of components
- Life cycle climate performance (LCCP) includes the direct refrigerant greenhouse gas emissions and the indirect fuel combustion greenhouse gas emissions from the fuel to power the system
- The higher first cost of energy efficient products is repaid by electricity savings and climate benefits
- Energy efficiency is often driven by regulations, not by the markets

HCFC-22

- Chemical substitutes are available with comparable (or higher) GWP
- The LCCP and energy efficiency of products using substitute refrigerants can be significantly better with design, containment, recycling during service and at end-of-life, and destruction when no longer needed
- Investment costs for products dependent on application, regional features etc.
- Redesign to avoid HCFCs is more cost-effective than retrofitting later

HCFC-141b

- Substitute chemicals are available for all uses (certainly for 141b solvents and propellants)
- The LCCP for HC blown foams is superior to HCFC-141b foams without end-of-life measures and HC foam is likely cost effective when greenhouse gas emissions were quantified
- HCFC-141b emissions from insulating foam occur gradually over time and rapidly at end-of-life disposal

HCFC-225

- Substitute chemicals are available
- Minor exceptions exist in technical applications
  - Cleaning oxygen systems that have complex geometry and blind spaces where unacceptable residue from other solvents might accumulate
- An earlier HCFC phase out could be considered with minor HCFC 225 solvent uses, possibly allowed by essential use exemption or if the Montreal Protocol allowed production if offset by destruction of ODSs

HCFC-123

- Substitute chemicals are available for solvent uses
- Substitute chemicals are not available with equivalent environmental performance for some air conditioning applications
  - Some HCFC 123 air conditioning chiller uses achieve a 10+% greater energy efficiency
  - Near zero chiller emissions with incentives
- An earlier HCFC phase out could take place with highly contained HCFC 123 chiller uses possibly allowed by essential use exemption or offset by ODS destruction

Technical & Economic Investigations for Article 5 Countries

- How can Article 5 countries phase out HCFC emissions without major disruption?
- How can access to the best HCFC replacement technology and financing of incremental costs be provided?
- How can manufacturing technologies be changed for new products not requiring HCFCs?
- How can equal or better energy efficiency be guaranteed?
- How can stakeholders be constructively engaged?

Economics

- What are the financial and environmental costs of the current Article 5 control measures (2015 freeze, 2040 phase-out)?
- What would be the incremental costs of an accelerated HCFC phase-out?
- Are the combined ozone and climate benefits greater than the incremental costs of an accelerated HCFC phaseout, taking into account that the phase-out would avoid the cost to mitigate HFC-23 GHG emissions inadvertently produced as an unwanted byproduct of HCFC-22 production?

Possible HCFC Phase-out Strategies

- Promote HC and not-in-kind options where safe and energy efficient
- Complement HCFC phaseout with stringent energy efficiency standards
- Implement HFC responsible use with sales deposit to finance recovery/recycle and end-of-life destruction
- Earn carbon credits for incremental direct and indirect greenhouse gas reductions achieved by accelerated HCFC phaseout and ODS destruction off-sets

Concluding Remarks

- A large number of case studies underway in Article 5 countries will probably show how strategies can be designed to decrease the dependency on HCFCs, in particular for new economic activities
- These case studies can be the basis of determining whether MLF investment can be cost effective per ODP kg relative to the costs of the ongoing phase-out of other ODSs

Technical Options for the Phase-out of HCFC-22 in Air Conditioning

Lambert Kuijpers
Jose Pons
Stephen O. Andersen

TEAP Co Chairs

*this presentation represents the viewpoints of the presenters
and not necessarily of the Technology and Economic Assessment Panel
or the organizations who employ the authors

Outline

- HCFCs and HFCs in Air Conditioning
- Data on emissions
- Substitution issues
- Economic considerations
- Concluding remarks

HCFCs and HFCs in Air Conditioning

- HCFC-22 has been used for a long time in stationary air conditioning; both in unitary and in chiller products (screw, scroll compressors)
- HCFC-22 in AC can be replaced by HFC-134a, HFC-blends, HCs and (new) low GWP alternatives; each has specific advantages or disadvantages
- Lifetime of the AC product is something that needs to be considered, related to servicing
- HCFC consumption for AC is rapidly increasing in several developing countries

Emissions (SROC and TFSRS report)

Emission data (global, ktonnes)

	CFCs		HCFCs		HFCs		
	-11	-12	-22	-123	-32	-125	-134a
2002	7	6	92	4	0.5	0.5	5
2015 (BAU)	3	3	118	6	10	10	48
2015 (MIT)	1.5	1.5	48	2	5	5	28

Emissions (SROC and TFSRS report)

Emission data (global, Mt CO2eq)

	CFCs		HCFCs			HFCs		
	-11	-12	-22	-123	-32	-125	-134a	Total
2002	32	66	163	0	0	2	7	271
2015 (BAU)	16	35	210	0	7	35	68	370
2015 (MIT)	7	17	86	0	3	18	39	170

Units in operation and HCFC-22 bank

Product Category	Estimated Units (2004)	Estimated HCFC-22 Bank (metric-tonnes)
Window-mounted and Through-the Wall (Packaged Terminal) Air Conditioners	115 million	81,000
Non-ducted or Duct-free Split Residential and Commercial Air Conditioners	259 million	305,000
Ducted, Split Residential Air Conditioners and Heat Pumps	83 million	273,000
Ducted Commercial Split and Packaged Air Conditioners	21 million	228,000
Total	478 million	887,000

Mitigation scenario

- Mitigation scenario assumes
  - charge reduction
  - containment
  - recovery and recycle during service
  - end of life (recovery and destruction)
  - use of low GWP substances
  - energy efficiency advantages via e.g. ”Top Runner” awards

Substitution issues (1)

- HCFC-22 can be replaced by HFC blends with or without major equipment modification, however HFC blends are more expensive and do not offer a real GWP advantage (HCFC-22-1700, R-407C-1800, R-410A-2100, R-417A-2300, R-419A-3000)
- HFCs do not give better energy efficiency than HCFC-22 as a refrigerant (standards can influence equipment designs)
- Pure refrigerant candidates: HFC-134a, HCs, CO2
  - HFC-134a requires major equipment modification
  - CO2 has not demonstrated comparable or better efficiency
  - HC (propane) is the only straightforward pure refrigerant capable of high energy efficiency

Substitution issues (2)

- Current trend is to go from smaller to split AC systems
- HFC blends are often preferred over other options, such as hydrocarbons (and carbon dioxide) (due to flammability, toxicity, reliability)
- Large systems (e.g. chillers) have inventories of HCFC-22 of more than 100 kg
- Small stationary systems (hermetic window units, other units with small charges) could well apply hydrocarbons (as in refrigerators and larger vending machines)

Economic considerations

- Compressor development for HFCs largely done, which favours R-407C and R-410A
- Conversion to R-410A requires changes such as in piping and heat exchanger design that can only be done for new systems (could possibly lead to cost reduction)
- Conversion of HCFC-22 to propane possible without major modifications, with comparable or better energy efficiency (modifications for safety will be necessary, particularly for larger systems with large refrigerant charge inventories)
- Costs for R-410A comparable to HCFC-22 once it would have taken over the market, costs for hydrocarbons 5-25% higher dependent on specific safety measures and size of equipment

Concluding remarks

- Substitute chemicals for HCFC-22 are available
- HFC blends have market head start
- Pure HFC-134a and CO2 not likely candidates
- Hydrocarbons (propane) has similar properties as HCFC-22 and can be used without major modifications (dependent on size of equipment)
- Economic considerations favour HFCs in larger systems, and could well favour HCs in smaller systems
- An accelerated HCFC-22 phase-out is technically and economically feasible

Challenges in CTC Phase-out Management

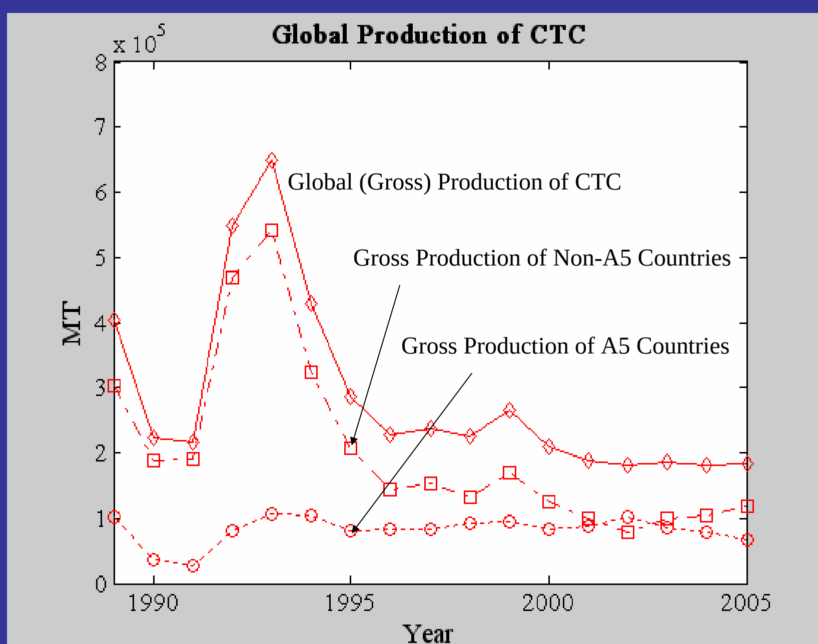
Presented by
Steve Gorman
The World Bank Group
Third Meeting of the Stockholm Group: Measures to Strengthen the Montreal Protocol
6 February 2007
Hague, the Netherlands

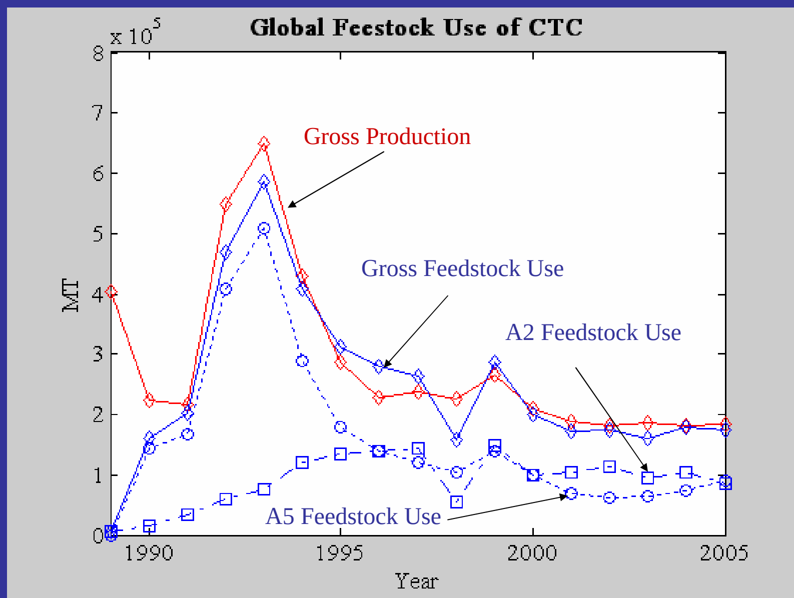
Outline

- Current Applications of CTC
- Global Production and Feedstock Use of CTC;
- Linkage between HCFC and CTC;
- Gross Production of HCFC-22: Consumption and Feedstock;
- Projected Gross Production of CTC: 2006 – 2015;
- Potential Emission and Challenges.

Current Applications of CTC

- CTC is currently used as feedstock for production of other chemicals (e.g., CFCs, and DVAC, and possibly many others), and as solvent and process agents.
- CTC used as feedstock is allowed by the Protocol. However, demand for CTC as feedstock for CFC production is on the decline due to CFC production phase-out.
- CTC use for non-feedstock purposes would be eliminated by 2010, except some limited quantities allowed by the Protocol (i.e., process agents).





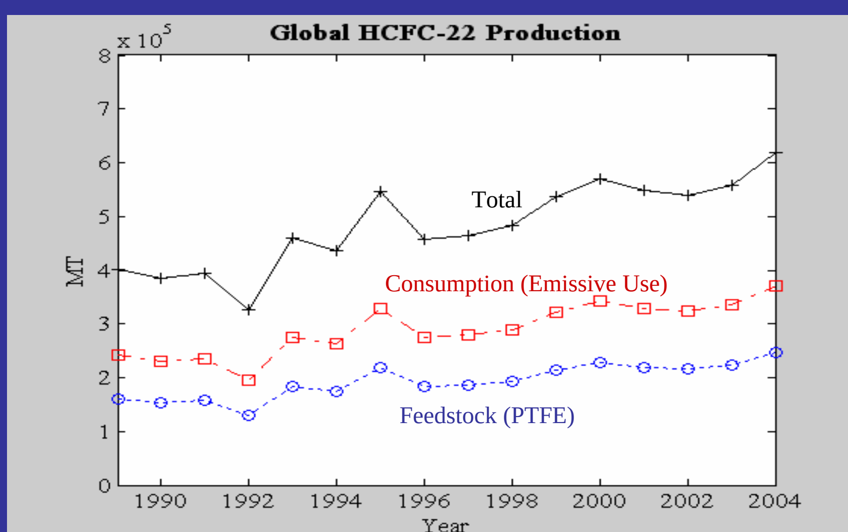
Gross Production and Feedstock Use in 2005

- In 2005, the global gross production of CTC is 184,512 MT;
- The total feedstock use of CTC for CFC production is 69,285 MT based on an average conversion ratio (CTC:CFC) of 1.2;
- The total feedstock use for all feedstock applications is 174,929 MT.

Linkage between HCFC and CTC

- Production of HCFC-22 uses chloroform as feedstock. Production of chloroform generates CTC as by-product. Based on an industrial estimate, 40% of the total production of HCFC-22 is for production of PTFE.

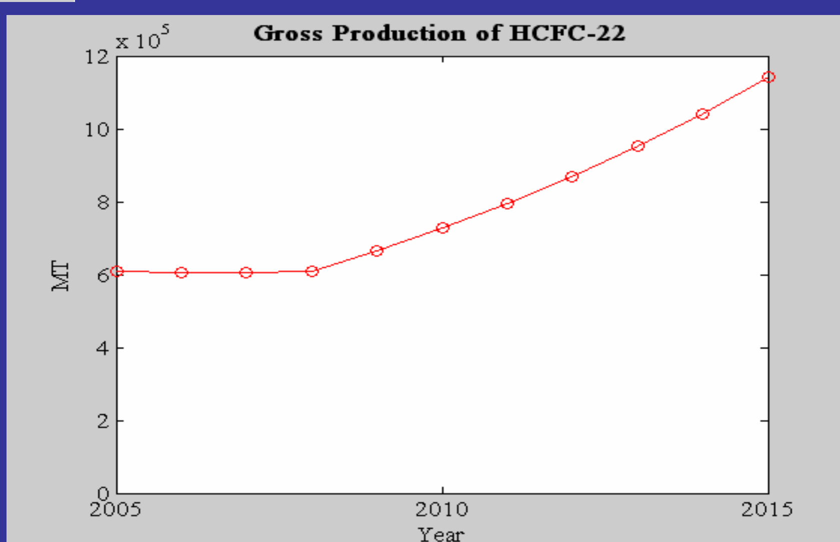
Gross Production of HCFC-22: Consumption and Feedstock



Projected Gross Production of HCFC-22

- Assumptions:
  - Demand of HCFC-22 for PTFE is 40% of total HCFC-22 production;
  - Demand of PTFE grows at the same rate as the demand of HCFC-22 for emissive use (~10%);
  - Demand of PTFE could grow faster if production of oil based paint with PTFE based paint;
- Demand for HCFC-22 for emissive use in A2 countries is assumed to gradually decline from to the 25% of the 2001 level by 2008 (as per EU regulations) while A5 demand for emissive use would growth at the rate of 10% a year.

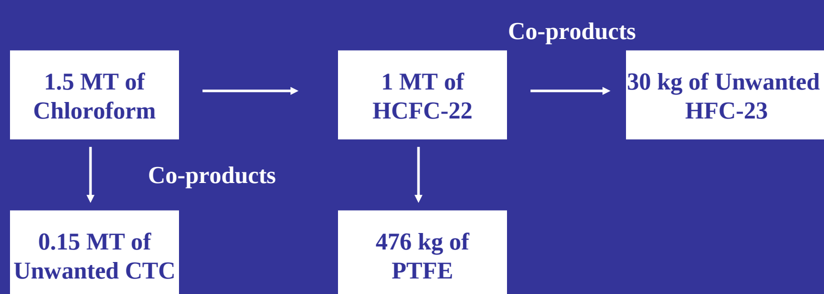
Projected HCFC Production



Indirect Co-Production of CTC and HFC-23 from HCFC-22 Production

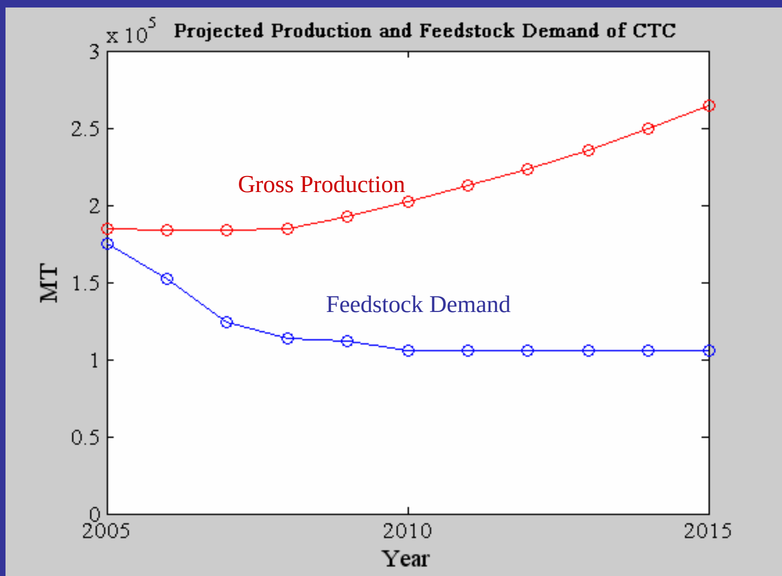
- Demand of HCFC-22:
  - Refrigerant;
  - Feedstock for production of PTFE (Teflon);
- Production Ratio:
  - 2.1 MT of HCFC-22 to 1 MT of PTFE;
  - 1.5 MT of chloroform to 1 MT of HCFC-22;
  - 0.1 MT of CTC to 1 MT of chloroform;
  - Or, 315 kg of CTC for every MT of PTFE; and
  - HFC-23 is co-produced from the production of HCFC-22 (3% of HCFC-22).

Conversion Ratios (CTC:Chloroform:HCFC-22:HFC-23:PTFE)



Projected Gross Production of CTC

- Gross CTC production is assumed to be equal to gross production in 2005 less the reducing CTC demand for CFC production plus additional by-product CTC generated from increasing production of HCFC-22;
- For the feedstock use, it is assumed that CTC demand for other feedstock use remains unchanged from 2005 – 2015.



Potential Emission of CTC

- In 2003, the global production capacity of HCFC-22 was 803,500 MT per year;
- More HCFC-22 plants are being expanded or newly built to meet increasing demand of HCFC-22 as refrigerant and increasing demand of Teflon products;
- With projected production of more than 1 million MT of HCFC-22 in 2015, at least there will be more than 150,000 MT of unwanted CTC.

Challenges

- Significant quantity of unwanted CTC would have to be destroyed; or
- Identify new feedstock use of CTC; or
- Expand the demand for CTC of the existing feedstock use; or
- Adoption of new chloromethane process to reuse by-product CTC for production of methyl chloride (C2). For example, the process developed by Meilan in China.

UNITED NATIONS DEVELOPMENT PROGRAMME- HCFC SURVEYS

UNDP CONTRIBUTION TO THE STOCKHOLM GROUP MEETING
6-7 FEBRUARY 2007, THE HAGUE

Observations extracted from HCFC Surveys

NOTE : Analyses of Surveys are ongoing, as some surveys are not yet in their final form. As their finalization is UNDP's priority, so the 51st Executive Committee has as much information from surveys as possible, this presentation should be seen as an "advanced peek" rather than a final interpretation. It is based on a sample of the 9 surveys submitted to the MLFS. Data will be reviewed once the 3 pending reports are finalized.

1. ABOUT THE SURVEYS

1.1 APPROACH AND PREPARATION

The Executive Committee of the Multilateral Fund at its 45th Meeting, approved activities to be implemented by UNDP, which aimed to conduct limited surveys of HCFC use in selected countries, with a goal of enabling the Executive Committee to establish a national aggregate level of HCFC consumption in the future for these countries, against which projects and activities may be funded. The selected countries were:

Latin America:	Argentina, Brazil, Colombia, Mexico, Venezuela
Middle East:	Iran, Lebanon, Syria
South Asia:	India, Sri Lanka
Southeast Asia:	Indonesia, Malaysia

To ensure effective coordination of survey activities in this global project involving 12 countries and to better address cross-regional issues, UNDP planned the activities to be carried out, using a three-stage process:

- Data collection and survey at the national level
- Compilation and analysis of survey data
- Presentation and reporting of survey data

The national-level data collection and survey work was carried out through recruitment of a local consultant entity (either an individual or a firm/institution) in consultation with the Governments. The compilation and analysis of the survey data was carried out through UNDP's international experts and researchers to impart credibility and quality. The presentation and reporting of survey data was carried out in consultation with the country governments, which in turn ensured the required country-level consultations within the respective industry and expert institutions and the validation of the survey.

1.1 AGREED TEMPLATE

SURVEY OF HCFCS IN (COUNTRY)

2- SURVEY METHODOLOGY

The work methodology has been to initially prepare a desk study that identifies information sources. These sources were then surveyed and interaction was initiated with the various producers/ suppliers/importers of HCFCs-related chemical products and equipment and/or their representatives and industrial associations. In this way, it was attempted to identify and quantify all current production and consumption of HCFCs in sectors such as, the Foam and RAC sector, solvents and firefighting applications and any other use in the sectors of HCFCs. Continuous contact with sector entities and experts to do the updating of lists of all these users, with the objective to classify the data, including HCFC users separated by sector, HCFC user that received assistance under the Montreal Protocol Program, and the identification of all possible HCFC users that did not receive assistance under the Montreal Protocol Program.

While the surveys will provide information on HCFCs per sector and per substance, much attention has been focused on growth calculations based on Real GDP Growth Projections. Individual sector growth was also taken into account.

The national expert incorporated these data along with related forecasts, conclusions and recommendations into a detailed report following MPU's template agreed. This report was reviewed by the international expert responsible for the region and then forwarded to the Government for additional comments and decisions on policy related issue and final validation and endorsement before being submitted to the MLF Secretariat.

2- PRELIMINARY MESSAGES

2.1 ON CONTROL MEASURES AND CHALLENGES TO CURB DEMAND

The 9 finalized surveys used country specific growth rate to estimate the unconstraint HCFC demand in 2015. Table below compares with the latest available 2005 HCFC consumption:

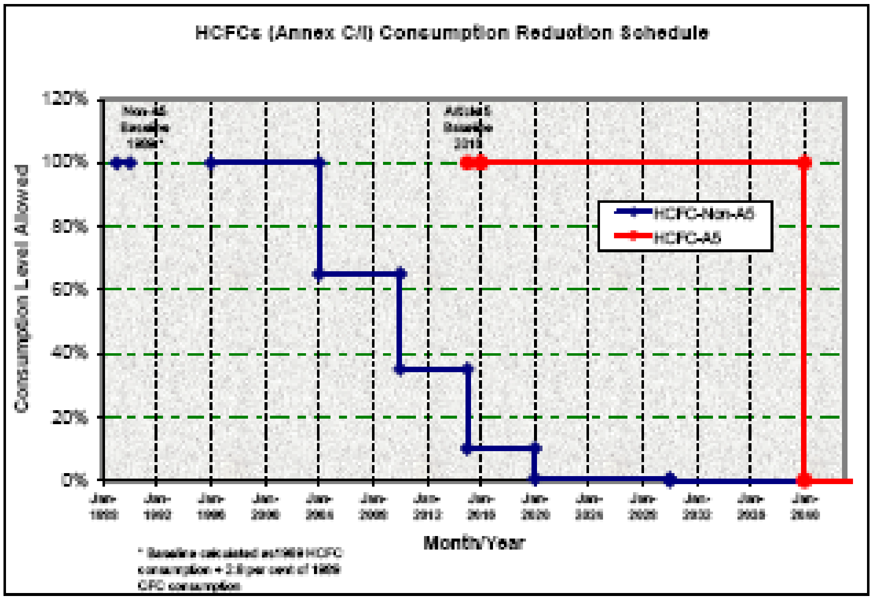
HCFCs - SURVEYS
Consumption (metric tonnes)

9 Countries	2005	2015- unconstrained
Argentina, Brazil, Colombia, India, Indonesia, Iran, Lebanon, Mexico and Venezuela	52,140	124,160

The surveys show unconstrained growth expectations for 2015. Different growth factors were considered for different countries, including sector specific growth. Virtually all LA countries in the surveys have a growth rate of around 2.0 while the Asian countries are showing significant larger growth rates—albeit with much larger variations.

In 2005 the largest HCFC consuming country in this 9 country- sample was Mexico (28% of total consumption in 2005 for this group), followed by Brazil (24%) and India (21%). With expected larger growth rate, in an unconstrained scenario, in 2015 India would be number 1 in consumption of HCFCs, followed by Mexico and Brazil.

- *Analyzing the graph below it is easy to imagine how extremely difficult it will be for article 5(1) countries to freeze and continue at that level* ***if NO action to constrain this scenario is taken well before 2015.***



- *Countries were pleased with the information available in the surveys and see that the preparation of surveys on HCFC use and growth patterns are an essential first step in such a process,* ***but not enough. They are committed to accelerate the process and move forward but require a*** *more integrated, follow up approach, such as a HCFC country strategy to be able to do so.*

In this regard, a presentation by the TEAP Chairs to a Workshop of the "Stockholm Group" July 8, 2006 is of interest. The questions were:

- How can Article 5 countries phaseout HCFCs without major disruption?
- How to access technology and financing?
- How does energy efficiency factor in?
- What are the related financial and environmental costs?
- What are the cost if we accelerate the phaseout of HCFCs?
- How do we deal with unwanted by products of HCFCs (HFC-23, CTC)?

The questions asked were the same UNDP attempted- at least partially, due to limitations of our mandate—to address through these surveys. In order to respond, countries need to progress from the surveys to a Strategy.

UNDP believes that the MLF can play a significant role in assisting Article 5(1) countries in preparing and implementing strategies that will allow meeting the Protocol's deadlines—or even do better, ***as many countries have indicate that is their desire to do so provided they have answers to the questions above.***

- *Baseline data per substance as per 2005 consumption, confirms the dominating position of HCFC-22 (65%).*

This table will certainly in the future be completed with 2015 consumption by substance and it will most likely show that HCFC-22 grows faster that HCFC-141B and other HCFCs. Much of this is related with ongoing replacement of CFC-12 in servicing applications (by HCFC-22 of HCFC blends with 22) while in foams the CFC phaseout is substantially completed. The relative product distribution is in harmony with what the TEAP chairs expect (majority HCFC-22 with 25-30% HCFC-141b).

HCFCs -SURVEYS
2005 Distribution of Consumption by Substance

9 Countries sample	HCFC 22 % total	HCFC 141b % total	Other (blends/123) % total	Total 2005 Metric tons
TOTAL	65 %	32.4%	2.5%	52,140

- *Data so far indicates large variations per country in the use of HCFC-141b based on substitution patterns in foams.*

For instance, one country in LAC region shows much lower HCFC 141b use than another by a large amount. This information will be important if focused HCFC phaseout plans are to be considered. For instance, a county with a low percentage 141b—and therefore a large penetration of HCs will most likely have only small companies using 141b and therefore can expect challenges in a residual HCFC phaseout program for the foam industry—and vice versa for countries with large HCFC-141b penetration.

- *Data indicates that in some countries there is use of HCFC 141b as a solvent, for cleaning refrigeration circuits. Countries which have HCFC 141b identified as solvents in refrigeration have indicated they need assistance to replace this use and are willing to start that the soonest.*

Other countries where this substance was not intensively marked as a solvent show a different distribution by sector.

- *Breakdown of HCFC use by manufacturing versus servicing sectors confirmed to be very country dependent.*

This supports the need for having surveys which are country specific. Some countries with large manufacturing industry in the past have shown less HCFC use than expected but large servicing needs. This indicates a large potential for improving servicing practices to curb demand using in large part the available infrastructure for management of CFCs as refrigerant.

HCFCs –SURVEYS: Distribution of Consumption in 2005 in Foam and Ref Manufacturing versus RAC Servicing
(as "rounded" % of total HCFC 2005 consumption in country)

Country Group 10,000 - 15,000t	**Mexico**	**Brazil**	**India**	
Manufacturing	64	45	79	
RAC Servicing	35	52	20	
Country Group 2,000 - 4,000 t	**Indonesia**	**Argentina**	**Venezuela**	**Iran**
Manufacturing	56	38	21	83
RAC Servicing	44	59	77	17
Country Group < 2,000 t	**Colombia**	**Lebanon**		
Manufacturing	59	31		
RAC Servicing	31	69		

- *While the use of HFCs faces challenges based on operational costs, using HCs will face challenges based on investment costs and related to the enforcement of safety in SME settings.*

Simplification and economizing the technology may be required to overcome this. There are opportunities as well. If the simplification of HC technology would be successful, there may be operational savings. The simultaneous introduction of good operating practices may decrease the use of HFCs and limit the cost increase—at least in service applications.

- *A challenge identified will be to convert to zero ODP options and at the same time reducing the climate change impact.*

- *Stated goal to promote synergies amongst International Conventions was recognized by Parties and mentioned **repeatedly** by all countries that participated in the surveys.*

- *Strong objections surfaced related to the way HCFC 22 production is played with, taking advantage of the carbon finance market. Concerns were raised related to the co-generation of CTC and HFC-23 when producing HCFC-22. Concerns related to the expected excess production of HCFC-22 were indicated.*

- *Some countries expressed their favor towards the use of the carbon credits revenue to shut down HCFC 22 production and provide financial assistance to Article (5) countries.*

- *Concerns of increase production to sell carbon credits and the poor quality of produced HCFC-22 surfaced during stakeholder consultations. The impact in the life expectancy of equipment in HCFC importing countries and difficulties to control quality of imports has been also mentioned.*

3. WHERE FROM HERE?

CHANGE IN MLF FUNDING POLICIES and GUIDELINES?
COUNTRY STRATEGIES?
TECHNOLOGY ISSUES?
PHASEOUT COSTS?
ISSUES PER SECTOR?
OPPORTUNITIES PER SECTOR ?
CO-FUNDING OPPORTUNITIES AND CHALLENGES?

- *There is a multitude of issues that will determine the future of the use of HCFCs.* ***While virtually all countries are interested in "HCFC growth adjustment" programs and most surveyed are willing to consider accelerated phaseout strategies, all have stated that to do so, technical and financial assistance will be needed and current MLF policies—geared towards substances with large ODPs such as CFCs—need to be adjusted****.*

In principle, the phaseout of a kg HCFC could cost the same as a kg CFC but the cost effectiveness would be 10-20 times higher.

- *Other sources of finance such as CDM co-funding is also on everyone's mind. For large refrigerator manufacturers, this will be a realistic opportunity but recipients should realize that funding comes afterwards and consequently interim funding may be needed.*

- *A survey is not a strategy! Countries will need to formulate such HCFC strategies as a matter of priority.*

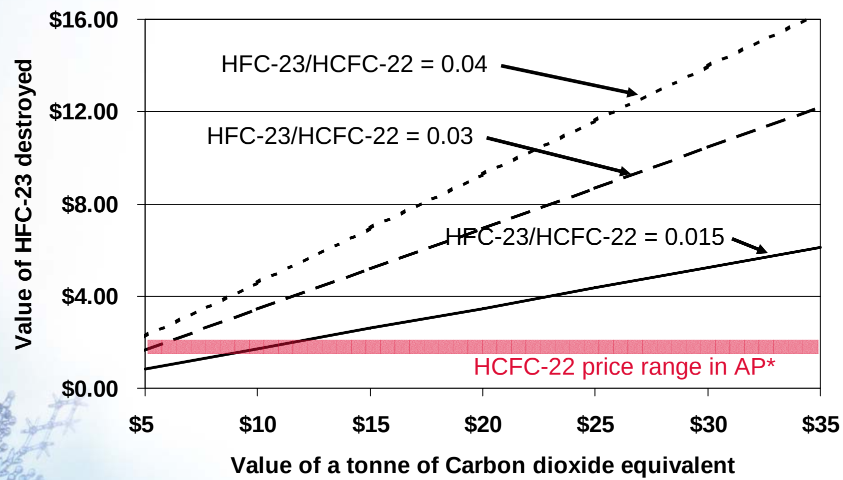
- *Because of poor cost-effectiveness, there is a need to look into cost mitigation.* ***Technology is one of the areas that can provide such mitigation****. The CFC phaseout has shown a continued lowering of equipment costs and there is no reason not to expect the same for the HCFC phaseout.*

- *Concrete actions by Article-5 parties to control and reduce consumption of HCFCs to ensure compliance with the 2016 freeze would need to be formulated and initiated at the earliest.*

- *Challenges and constraints for such actions include sustained and cost-effective availability of environment-friendly substitutes for HCFCs and access to technology and funding to facilitate transition without undue burden on the economy of the country and constraints on consumers and industry.*

- *Surveyed countries expect that the international community will recognize these challenges and provide technical and financial assistance to Article-5(1) countries- starting with the first control on HCFCs, i.e. the freeze at 2015 levels from 2016.Countries indicated that once the HCFC Country Strategy is ready they wish to address industrial conversion indicating they will be ready to commit to accelerating phaseout.*

Value of HFC-23 destroyed associated with production of 1 kg of HCFC-22



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*From Japan Customs records for 2005 found at: http://www.customs.go.jp/