UNITED NATIONS **EP**

United Nations Environment Programme

Distr.
LIMITED

UNEP/OzL.Pro/ExCom/50/Inf.2
27 September 2006

ORIGINAL: ENGLISH

EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Fiftieth Meeting
New Delhi, India, 6-10 November 2006

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 50th Meeting of the progress of informal discussions of the Stockholm Group to strengthen the Montreal Protocol, 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 first meeting of the Stockholm Group to strengthen the Montreal Protocol, held on the 8th of July 2006 in Montreal, including its annexes, be made available to Executive Committee Members.

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

Stockholm Group—Friends of the Ozone Layer:
Informal Technical Discussion
ICAO Building, Montreal, Canada

8 July 2006

Agenda

09:00-09-15: Welcome and Introduction
09:15-09:45: TEAP HCFC Findings: "HCFCs Where are we?"
09:45-10:15: UNEP DTIE Information Exchange
10:15-11:45: Discussion
11:45-12:00: Meeting Summary
12:00-13:00: Lunch (Sweden hosting)
13:30-17:00: Report Writing

Introduction

In opening the Stockholm Group discussion, it was noted that the invitees and attendees (Annex 1) were present in their individual capacity and that any views or opinions expressed were not necessarily those of their respective government or organization affiliation. It was also noted that the introduction was limited to the viewpoints of the chair and did not necessarily reflect the opinions of the group. The discussion was an occasion to "think outside the box" and to allow for a free and open exchange of views. The key goal of the discussion was to exchange views on key challenges and ways to strengthen the Montreal Protocol (MP), to gain support with like-minded colleagues, to consider the special circumstances of the developing countries (Article 5 Parties), and to consider ways forward with corresponding options. Another task was to confirm who wished to continue in the Group and to make a roster of other possible invitees, Parties, and bodies who could contribute to the discussions.

Compliance with the control schedules for chlorofluorocarbon (CFC), carbon tetrachloride (CTC) (including process agents), methyl bromide (MB), and current and projected levels of the production and consumption of hydrochlorofluorocarbons (HCFCs) were raised as among the key challenges for the Montreal Protocol. Both the production and the consumption of HCFCs are increasing as a result of economic development in major developing countries, and the impacts on both the stratospheric ozone layer and the climate are areas of great concern.

Regarding HCFCs, a possible response to projected production and consumption levels may involve an accelerated freeze and stepwise HCFC phase-out, while allowing HCFC uses that have climate benefits including energy efficiency, so long as continued use of any ozone-depleting substance (ODS) is offset through conversion, destruction, or other countermeasures. Options could include an HCFC exemption in applications until a better environmental alternative (in terms of ODS-Climate-Other release, including energy related) is available. Such measures could need an adjustment of replenishment to finance A5 Parties

where 'Cleaner-Production' strategy (ies) can reduce the cost of HCFC replacements. This would promote best practices, reward leadership, and facilitate HCFC-free and environmentally friendly alternatives. This would include considering the climate-related impacts of hydrofluorocarbons (HFCs) as well. Such adjustments would need to be addressed by the Meeting of the Parties to the Montreal Protocol in 2007.

The chair recommended that the way forward would utilize the 2007 full assessment findings by the Scientific Assessment Panel (SAP), the Environmental Effects Assessment Panel (EEAP), and the Technical and Economic Assessment Panel (TEAP). It would also involve participating in the HCFC Workshops that will be organized by the European Commission with an additional input from Sweden, and possibly other workshops organised in various regions. It is also anticipated that industry and environmental NGOs will sponsor workshops to chart the way forward. Future options need to consider the costs and benefits of policy decisions in terms of the ozone layer, the climate, energy consumption, air quality, and other environmental concerns. It may also involve considering a dialogue between experts, interested Parties, and the ozone and climate regimes on the "perverse incentives" of HCFC-22/HFC-23 production and the Clean Development Mechanism (CDM).

Presentations – slides/overviews attached in Annexes (2-6)

- Welcome to the Stockholm Group Friends of the Ozone Layer
- TEAP/HCFC Findings "HCFCs Where are we?"
- UNEP-DTIE Information Exchange
- Some Preliminary Thoughts on Strengthening the Montreal Protocol
- Strengthening of the Assessment Panels / Stronger Support for A5 ODS Phase-Out and Solution of Operating Problems

Discussion

The discussion during the meeting addressed the key MP issues in the short to medium term perspective (5 to10 years), mainly as follows:

- ✓ HCFC measures; Substance oriented, step wise phase-out, with essential use exemptions taking into account ozone and climate related considerations.
- ✓ Compliance issues; Large CTC emission discrepancy, MB issues including the general Quarantine and Pre-shipment (QPS) exemption. Metered Dose Inhalers (MDI) issues. Servicing and disposal-management. Mainstreaming sustainability.
- ✓ Strengthening of the Assessment Panels: Ensuring the continued presence of the Scientific Assessment Panel (SAP), Environmental Effects Assessment Panel (SAP), and Technical & Economics Assessment Panel (TEAP).
- ✓ Enhancing collaboration with other environmental regimes and potential financial instruments; Increase coordination-collaboration, tap crediting w.r.t. green house gases (GHG), energy efficiency, clean production/technologies, and SAICM.

✓ Next steps

The Montreal Protocol is, in the view of many, the world's most successful multilateral environmental agreement (MEA), with the phase-out in developing countries of nearly 45 percent of all ODS consumption and more than 50% of all CFC consumption and the near-total phase-out of CFCs in developed countries. The Montreal Protocol is also the world's most successful climate change treaty, as the CFCs and several other ODS it has phased-out were also potent greenhouse gases, even though this was not the original purpose of the agreement nor an incentive, as there are no provisions of the Montreal Protocol that address climate change. Despite its success in addressing both the depletion of the stratospheric ozone layer and, implicitly, climate change, there is a continued need for sustained effort and support in identifying, discussing, and resolving the remaining challenges in view of achieving recovery of the ozone layer in due time and mitigating associated climate impacts at the same time.

The presentations (Annexes 2-6) describe an array of options and ideas to strengthen the MP. To help focus and guide the way forward, the application of "governance or integration principles" (e.g. Cross Media Analyses and Life Cycle Climate Performance) can help in framing key technical and policy issues and in evaluating policy choices.

The discussion mainly focused on issues in the following categories: phase-outs; compliance challenges for Article 5 countries; synergies with other multilateral environmental agreements; the role of science in policy-making, and the potential for financial additionalities.

HCFC Phase-Out Measures

The projected increase in HCFC production and consumption (roughly estimated to the order of 700 000 t/y by 2010) and the potentially alarming impacts this will have on both the stratospheric ozone layer (and the climate, which has so far only been investigated in the IPCC-TEAP Special Report) led some to suggest that the phase-out schedules for HCFCs need to be accelerated, in a stepped manner, tailored to individual substances and sectors. HCFCs have an Ozone Depleting Potential (ODP) on par with CFCs when considered over the HCFC lifetimes and so there are quick benefits for the ozone layer from a more rapid phase out. (Note: HCFCs have an ODP that is larger than CFCs over shorter time horizons. But under the 30-40 year time horizon needed for ozone recovery, HCFC-22 has an ODP of about 0.2 to 0.25 compared to CFCs.)

Consideration of accelerated phase-outs should be viewed from a broader atmospheric and environmental perspective, so that the MP does not simply result in the transition from one kind of adverse impact to another, notably an adverse impact on climate change. Associated policy decisions on phase-outs must be based on a thorough and integrated scientific and technical analysis that is integrated with non-ODS technical information.

The current broad categorization of HCFC and HFC compounds could be divided into a potentially narrower "bands" of "HCFCs" and "HFCs," based on

the physical chemical properties of individual HCFC or HFC compounds and the energy efficiency of various applications. For example, categories based on a comprehensive analysis of ODP and Global Warming Potential (GWP) (which take atmospheric lifetime into account) along with Life-Cycle Climate Performance (LCCP) might be useful to policymakers in determining which policy choices will result in the least adverse impacts on both the ozone layer and the climate in an integrated manner.

It was further noted that, where possible, continued use of some HCFCs should be permitted in contained applications, where the HCFCs have a low ODP and low GWP and achieve a high degree of energy efficiency as compared to existing alternatives and as long as no better alternatives have been identified. As examples, the Montreal Protocol could allow continued use of certain HCFCs in circumstances where their emissions are low or minimal, such as in chillers and process agents. Any emissions from continued use of some HCFCs can be offset through the destruction of existing banks, possibly from among groups, with credits carrying forward in time. Finally, it was suggested that A5 countries may consider using licensing systems to track the use of HCFCs

Compliance Prospects and Challenges for Article 5

Most agreed that for A5 countries to move forward with the phase-out of a range of ODS, it is vital that they have confidence in the scientific and technical assessment process, as the level of difficulty will be compounded by the fact that the "sense of urgency" surrounding the ozone issue has been lost. It is important to honour commitments regarding phase-out and technology transfer, bearing in mind that prolonged exemption periods for non-A5 countries, e.g. regarding MB for critical uses or for QPS, CFCs for MDIs, feedstock (FS) and process agents (PAs) for many ODSs, etc. have undermined confidence in A5 Parties that phase-out is achievable.

Rapid economic growth in A5 countries has resulted in increased production and consumption of HCFCs, making their ultimate phase-out a key challenge. In many developing countries, the priorities under the ozone regime are to achieve phase-out targets for CTCs, CFCs and halons in the short term, methyl bromide in the medium term, and HCFCs in the long term. In achieving these targets, key challenges are how to address illegal production, consumption, and trade. Additionally, compliance issues, such as monitoring, licensing, reporting, and supervision are important to achieving these targets.

With a consensus on the focus of the main challenges in the near and mid term basis, a way forward could be a common agreement on the timeline for the MP on targets, priority of phase-outs, implementing models and associated action plans. Furthermore technology transfer of robust alternatives and effective financial resources must be sustainable. Both A5C and n-A5C need to be creative in developing some new mechanisms to improve efficiency and make compliance more effective. In addition, it was noted that networks can play useful roles in this regard.

Synergies with Other Multilateral Environmental Agreements and Flexibility of Financing Instruments

It was recognized that the problems of ozone depletion and climate change (Kyoto Protocol) are inter-connected, and that cooperation and coordination with climate treaty regimes, as well as possibly other treaty regimes such as Basel, Stockholm, Rotterdam, and SAICM should be considered. Numerous options could be envisaged for the type and scale of cooperation with other treaty regimes. Participants agreed that it is important to consider that MP Parties have good control and a mandate pertaining to ozone protection. For example, it was suggested that for certain issues, such as a HCFC phase-out, the climate treaty/Parties could be asked to request that the MP assess the climate-related impacts of HCFC control. It was also suggested that while more coordination and cooperation between ozone and climate and other treaty regimes could be advantageous, there should be more discussion on what the limits should be, as some participants cautioned against allowing other issues, particularly climate, to overshadow ozone protection. In addition, an integrated approach to environmental problems would benefit from funding secretariats, such as the MLF, the GEF, and potential private-public initiatives reflecting the Kyoto Protocol's flexible mechanisms and carbon credits. Improving the financial structure and streamlining (simplifying) funding criteria of such instruments are bound to facilitate integrated efforts.

Role of Science and Technology in Policymaking

The critical importance of robust assessment panels (Scientific Assessment Panel, Environmental Effects Assessment Panel and the Technical and Economic Assessment Panel) was highlighted, together with the need to ensure its members are independent and appropriately funded in a sustained way to continue to develop the scientific and technical basis for policy decisions. The success of the Montreal Protocol largely derives from the strong contributions of its Scientific, Environmental Effects and Technical and Economic Panels. In addition to fortifying the scientific underpinnings of ozone policy, it was suggested that identifying a set of governance and integration principles (ODS, climate, energy) to help guide the Parties through policy decisions could be useful.

Next Step: Future Discussions by the Group

It was suggested that this group could serve as an informal discussion vehicle for technical and policy related issues in the coming period to address the needs and goals of the Montreal Protocol and its framework. Scientific and Effects assessments and TEAP's assessment work is typically very neutral and aggregated.

Future events to consider, for additional discussion meetings, are the upcoming <18th >Meeting of the Parties in New Delhi, the 27th OEWG in 2007, the HCFC Workshops to be organized by the European Commission, with additional inputs from Sweden, as well as the offer from Chatham House (See Annex 7) to host a

meeting or series of meetings on the future of the Protocol for the group to build on this Informal Technical Discussion.

It was further suggested that the name of the Group should be changed to reflect an emphasis on policy issues, thereby becoming the "Stockholm Group on Informal Technical and Policy Issues" or the "Stockholm Group To Strengthen the Montreal Protocol."

The next meeting of the informal Stockholm Group would be expected to discuss upon key elements from the 8th July Meeting in Montreal as reported herewith and any other issues deemed to be important during further discussions.

Other people to consider inviting:

- Additional representatives from A5 countries (such as India, Mexico, Thailand).
- Additional representatives from Eastern European countries (such as Georgia).
- Additional science and effects experts, (e.g. Mario Molina and Science Panel experts involved in the 2006 assessment)
- Additional representatives from NGOs
- Policy think tanks (e.g. Chatham House)
- Representatives from MLF, GEF; and possibly other treaty secretariats
- UNEP ED.

Continued request for participation of Technical Support experts

- K. Madhava Sarma, Stephen Andersen, Lambert Kuijpers, Masaaki Yamabe, and Jose Pons Pons: and others from outside that are considered as experienced experts.

ANNEXES

1. Invitee and participants list
2. Welcome to the Stockholm Group Friends of the Ozone Layer
3. TEAP/HCFC Findings "HCFCs Where are we?"
4. UNEP-DTIE Information Exchange
5. Some Preliminary Thoughts on Strengthening the Montreal Protocol
6. Strengthening of the Assessment Panels / Stronger Support for A5 ODS Phase-Out and Solution of Operating Problems
7. Future of Montreal Protocol: Proposal for International Workshop

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End Final 2007.09.06

Annex 1

Stockholm Group- Friends of the Ozone Layer- List of Participants- Montreal Meeting, 8 July 2006.

No.	Name	Presence	Country	Title	Affiliation
1	Afolabi, Oladapo;	Yes	Nigeria	Director	Gov
2	Ahmadzai, Husamuddin;	Yes	Sweden	Principal Executive Officer	Gov
3	Andersen, Stephen;	No	USA	Co-chair	TEAP
4	Bagai, Atul;	Yes	India	Coordinator	UNEP
5	Batchelor, Tom;	Yes	Belgium	Director	Consultancy
6	Carvalho, Suely; .	Yes	Brazil	Chief	UNDP
7	Chemouny, Phillippe;	Yes	Canada	Manager	Gov
8	Doniger, David;	Yes	USA	Policy Director	E-NGO
9	Dowling, Lesley;	Yes	Australia	Assistant Director	Gov
10	Engelhardt, Rolf;	Yes	Germany	Öberamtsrat	Gov
11	Gonzalez, Marco;	No	Costa Rica	Executive Secretary	UNEP
12	Graff, Laurence;	Yes	France	Deputy Head	EC-COM
13	Horisberger; Blaise;	Yes	Switzerland	Adjoint Scientifique	Gov
14	Horrocks, Peter;	Yes	UK	Principal Administrator	EC-COM
15	Klaly, Khaled;	Yes	Syria	Coordinator	Gov
16	Kuijpers, Lambert;	Yes	Netherlands	Co-chair	TEAP
17	Land, Tom;	Yes	USA	Manager	Gov
18	Levaggi, Marcia Rosa;	No	Argentina	Adviser	Gov
19	Mate, Janos;	Yes	Canada	Political Consultant	E-NGO
20	Mylona, Sophia;	Yes	Norway	Senior Adviser	Gov
21	Pathel; Yahyah;	Yes	Mauritius	Divisional Env. Officer	Gov
22	Pons-Pons, Jose;	No	Venezuela	Co-chair	TEAP
23	Quasnitzova, Klara;	Yes	Czech Republic		Gov
24	Sarma, K. Madhava;	No	India	Senior Adviser	TEAP
25	Shende, Rajendra;	No	India	Head	UNEP
26	Stone, Scott;	Yes	USA	Policy Analyst	E-NGO
27	Thornton, Allan;	No	USA	Director	E-NGO
28	Tingstorp, Sofia;	Yes	Sweden	Desk Officer	Gov
29	Wandinger, Marcus;	Yes	Germany	Policy Officer	EC-COM
30	Wen, Wurai;	Yes	China	Deputy Director General	Gov
31	von Bismarck, Alexander;	Yes	USA	Campaigns Director	E-NGO
32	Yamabe, Masaaki;	Yes	Japan	Research Coordinator	R-NGO
33	Zaelke, Durwood;	Yes	USA	President	E-NGO

Welcome to
The Stockholm Group
Friends of the Ozone Layer

Husamuddin Ahmadzai

Here We are Individuals
Not Representing our Organizations

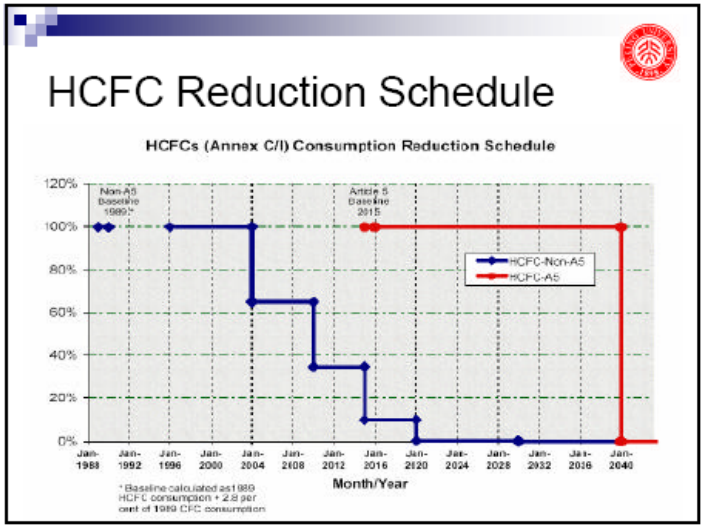
- An occasion to think outside the box
- Freedom to exchange views
- No attribution
- Like-Minded are invited to continue dialogue

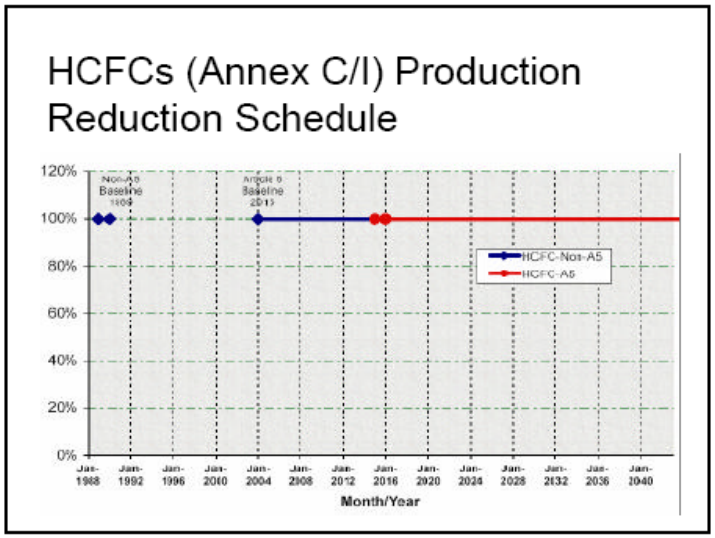
Meeting Goals

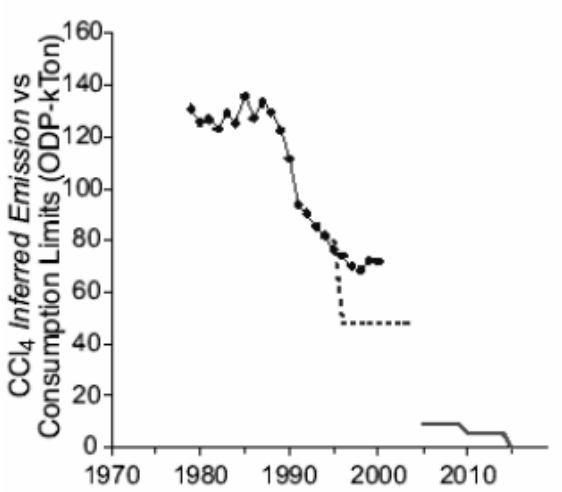
- Find Consensus on Key Challenges and Ways to Strengthening the Protocol
- Gain Momentum with Like-Minded-Colleagues
- Consider the Special A5(1) Circumstances
- Brainstorm & Consider Ways Forward/Options
- Confirm Who Wishes to Continue on Group
- Make a Roster of Others Invitees, Parties and Bodies Who can Contribute to the Discussions

Food for Thought (1/4)

- HCFC Issue
  - Consumption
  - Production
- Compliance Period
  - CTC, PA, Production







Est. CTC production (2000) 300.000 t/a

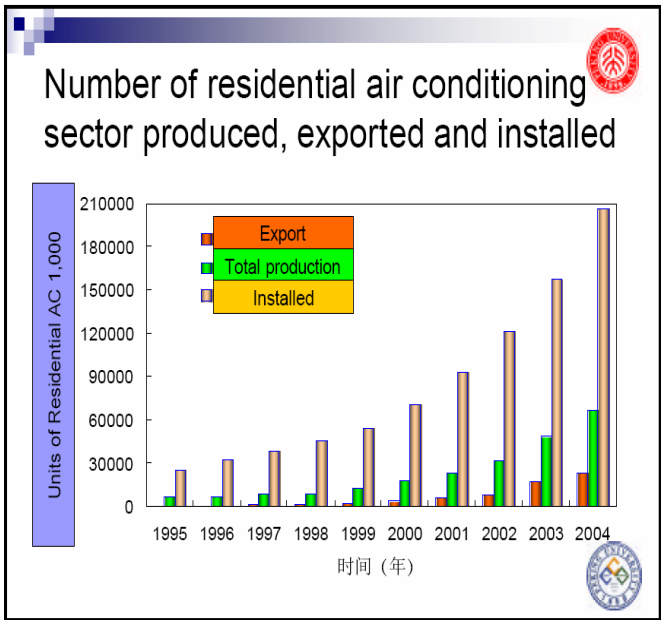
Food for Thought (2/4)

- Annual HCFC Capacities:
  - 860 000 t 2002 ca 60 plants
  - 770 000 t 2010 ca 50 plants
  - HCFC 22: 560 000 - 610 000
  - HCFC 141b:100 000 - 130 000
  - HCFC 142b = 90 000 - 100 000
  - HCFC 123 = ca 10 000
  - HCFC 124 = ca 10 000
  - HCFC 225 = ca 10 000

- Inter-linkage ODS-Climate i.e. HCFC-HFC-CTC

HCFC-22/CTC/HFC-23

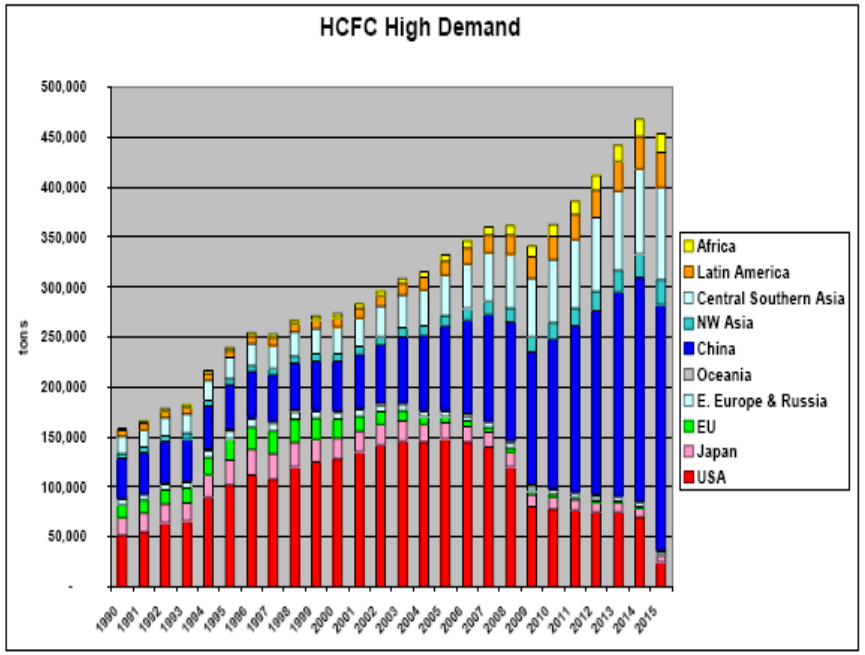
- Produce 1 MT HCFC-22, needs 1.5 MT $HCCl_3$
- Produce 12-14 MT $HCCl_3$ contemporary produce 1 MT CTC;
- Produce 100 MT HCFC-22, emission 2-4 MT HFC-23, GWP=11,700
- HCFC-22 (CHF_2Cl) ODP=0.055, GWP=1,700
- CCl_4 ODP=1.1 GWP=1,400



Food for Thought (3/4)

- China may be the largest HCFC producer & consumer globally
- By 2004 it had 18 HCFC-22 plants, annual plant capacity 370 000 t
- TEAP estimated 10 plants and an increase 2002-2010 from annual capacity 125 000 t to ca 150 000 t
- Including domestic consumption and export (feedstock, refrigerants, foaming agents and others)
- Production = emission
- Short-term potency HCFC = CFC

HCFC refrigerant – High demand.



Food for Thought (4/4)

- Accelerate & facilitate stepwise HCFC phaseout
  - Allow HCFC uses that protect the climate if ODS conversion/destruction/measures offsets chlorine emissions
  - Allow HCFC use under global End Use Equipment Exemption where environmentally (ODS-Climate-Other release) acceptable options are unavailable
  - Adjust replenishment to finance A5 Parties
- Pursue ‘Cleaner-Production’ strategy (ies) (ODS-Climate-Other release) to reduce the cost of HCFC replacements
- Promote best practices and reward leadership & front runners that use HCFC-free and environmentally friendly alternatives

Next Steps

- Utilize the pending Full Assessment Findings by SAP, EEAP, and TEAP
- Join the HCFC Workshops to be financed by the European Commission
- Encourage other regions to organize their own workshops to find a way forward
- Calculate the costs and benefits in terms of ozone layer, climate, energy consumption, air quality and other environmental concerns

Agenda to Follow

- 09:00-09-15: Welcoming Introduction (HUA)
- 09:15-09:45: TEAP HCFC Findings
- 09:45-10:15: UNEP DTIE Information Exchange
- 10:15-11:45: Discussion
- 11:45-12:00: Meeting Summary
- 12:00-13:00: Lunch
- 13:30-17:00: Report Writing
  - Not everyone need stay for report writing

HCFCs: where are we ?

Lambert Kuijpers
Stephen O. Andersen
Jose Pons-Pons

TEAP Co-Chairs

*this presentation represents the viewpoints of the authors
and not necessarily 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 their own pre-Montreal uses and are a replacement option for other ODSs
- HCFC consumption has increased in developing countries while decreasing in developing countries
- HCFC production and consumption is increasing in developing countries (freeze in 2015) as a result of replacements and as a result of growing economic activities
- Parties can phaseout after 2015...or before

HCFC Growth in Article 5 countries

- Uncontrolled HCFC production and consumption will continue to grow in the period 2005-2015 in Article 5 countries
- Production levels may exceed 700 ktonnes in 2010: equivalent or more in ODP tonnes than the CFCs in 2005 still to be phased out
- A number of Article 5 countries can choose to stabilise or decrease HCFC use before 2010

HCFC data in TEAP reports

- 2003: HCFC-22 production capacity for 2010 estimated at about 200 ktonnes
- 2005: HCFC demand, banks and emissions:
  - 2002: 496,000 tonnes
  - 2015: 551,000 tonnes (BAU)
  - 2015: 391,000 tonnes

developed countries		developing countries	
2002:	268,000 tonnes	2002:	217,000 tonnes
2015:	47,000 tonnes	2015:	489,000 tonnes (BAU)
2015:	18,000 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	2015:	492,000 tonnes (BAU)
2015:	391,000 tonnes	2015:	292,000 tonnes

HCFC Production data (Article 7)

Production data (ktonnes)

	1990	1995	2000	2001	2002	2003	2004
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 developing country growth

year	2000	2002	2004	2006	2008	2010
ktonnes	129	168	271	400?	580?	700?

- 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 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
- Energy efficiency is often driven by regulations, not by the markets

HCFC-22

- Several substitute chemicals are available
- Most have a comparable (or higher) GWP
- Energy efficiency of the substitutes is comparable
- The LCCP of HCFC-22 and substitute refrigerants is better with 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.
- Conversion of existing HCFC equipment is quite different from the construction of new non-HCFC equipment

HCFC-141b

- Substitute chemicals are available for many uses (certainly for 141b solvents and propellants)
- Generally, energy efficiency is lower or the costs of achieving equivalent efficiency are higher relative to CFC-11 foam
- The LCCP for HC blown foams could be superior to HCFC-141b foams without end-of-life measures and HC foam might be cost effective if 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 can take place with minor HCFC-225 solvent uses allowed by essential use exemption or if the 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 can take place with highly contained HCFC-123 chiller uses allowed by essential use exemption or if 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?

Concluding remarks

- A large number of case studies underway in Article 5 countries 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 phaseout of other ODSs

Informal Technical Discussion – Stockholm Group: 8 July 2006: Montreal

Compliance Assistance Programme
OzonAction
UNEP DTIE

Purpose of the note

- UNEP DTIE's OzonAction's interaction with the national Ozone officers from the developing and developed countries
- Interface with other stakeholders through its regionalized Compliance Assistance Programme.
- The issues raised in DTIE's presentation benefit from the feedback from such interaction: Ears on the ground.

Key Issues

- Sustainability of the Phase out and Compliance
- Servicing needs and Disposal of unwanted ODS
- HCFCs
- CTCs

Sustainability of Phase out and Compliance

- Nearly 45% of all ODS consumption and more than 50% of all CFC consumption has been phased out.
  - need to mainstream of the Montreal Protocol goals into other institutions, agendas and mandates including those at a national and regional level.
  - Maintaining high-level political awareness in Article 2 and 5 countries is also highly important.
  - Establishing inter-linkages with other MEA communities and environmental initiatives.

Servicing needs and disposal of ODSs

- Controls of ODS emissions
- Recovery, Recycling, Labelling, collection, transportation, storage, reclamation and reuse
- Disposal of un-usable ODS
- Disposal of equipment and foam
- Coordinated climate and ozone protection actions

HCFC demand and its impact

- Consumption and production growing at an alarming rate in developing countries
- Production trends in China and India: A big challenge
- The carbon credit transactions yield significant revenues and profits for the HCFC producers
- cost of phasing out HCFCs and the pain of transition: Issue of pre 1995 HCFC capacity
- suitable funding mechanisms including market based interventions need to be designed

Messages on HCFCs

- examine methods to curb dependence on HCFCs through:
  - technical studies on cost effective substitution of HCFCs and
  - capacity building of developing countries on adoption of non-ODS alternatives in place of HCFCs.
- examine methods to curb dependence on HCFCs (and by consequence reduce generation of HFC-23).
- need for regulatory interventions in both developed and developing world on monitoring and controlling use of HCFCs as well as cross border movement of HCFCs.

CTC phase out and impact on Chloromethane plant

UNEP

- Chloromethane production and CTC
- Control measures for CTC unique
- CTC demand in other (non CFC) feedstock applications increasing
- Managing CTC production when use reaches zero vis a vis C1, C2 and C3 which will still be in demand
- technology transfer for reducing CTC production in the chloromethane plants to nil

Key Messages on CTC

- ► Identification and monitoring of CTC used for feedstock applications. This may need to continue for ever i.e., even after 2010 phaseout date.
- ► Awareness and capacity building on technologies for reducing emission of CTC during handling and transportation.
- ► Technical interventions for chloromethane plants to reduce the level of CTC production to nil or almost nil.

NOTE FOR INFORMAL TECHNICAL DISCUSSIONS
Stockholm Group meeting
to be held in Montreal on Saturday 8th July 2006 at ICAO Conference Room 6

Prepared by UNEP DTIE OzonAction

Purpose of this note

This note highlights following key issues for the consideration of Informal meeting of the Stockholm Group to be held on 8th July in Montreal. UNEP DTIE's OzonAction has been interacting with the national Ozone officers from the developing and developed countries and other stakeholders through its regionalized Compliance Assistance Programme. The following note benefits from the feedback from such interaction.

Key Issues:

a. Sustainability of the Phase out and Compliance
b. Servicing needs and Disposal of unwanted ODS
c. HCFCs
d. CTCs

Introduction:

Under the Montreal Protocol, the developed countries had already succeeded in putting an end to the production and consumption of the most damaging Ozone Depleting Substances (ODS) such as the CFCs, except for a few with medical uses by the year 1996.The developing countries have also greatly reduced the use of these substances by adhering to the applicable reduction schedule under the Protocol. There has therefore been a significant reduction in the consumption of ODS generally in the last decade and particularly after the year-end 2005. Nearly 45% of all ODS consumption and more than 50% of all CFC consumption has been phased out. The focus in the next few years is to reduce the remaining consumption in refrigeration and air-conditioning as well as service sector and few other end users (e.g., methyl bromide fumigation, MDIs) consuming ODSs.

1. Sustainability of the Phase out and Compliance

While the Compliance with the Montreal Protocol seems to be proceeding satisfactorily, there is need to mainstream of the Montreal Protocol goals into other institutions, agendas and mandates including those at a national and regional level. The key to long-term sustainability for the ODS phase out requires that Article 5 countries fully internalizes the Montreal Protocol in its national plans. This invariably necessitates transfer or assumption of responsibility and ownership from external agencies and bodies to national counterparts and institutions. The goal is that the country will reduce and eventually eliminate its need for structured external assistance and intervention, including financial, technical and political support.

Message that need to be addressed: The Multilateral Fund community must find ways to export the Montreal Protocol goals and processes, to the extent feasible, into the agendas, legal mandates and work of other institutions and mechanisms which are supported by core, long-term funds. Once adopted, those goals should become sustainable in the long term as they no longer require the active promotion of the Montreal Protocol community. Such exports must take place at all levels, i.e. national, regional and international. This can only be accomplished through pro-active interaction/communication at the political and technical-operational levels, information sharing, joint activities involving civil society, Government, technology institutions and industry, and co-financing of project as well as technical assistance initiatives. Maintaining high-level political awareness in Article 2 and 5 countries is also highly important. At the international level, this interaction should include establishing inter-linkages with other MEA communities and environmental initiatives.

2. Servicing needs and disposal of ODSs

There is still a large existing population of equipment and technologies dependent on ODSs that requires servicing for years to come. Despite the various investment projects undertaken to introduce and encourage

good practices for handling ODS under the Montreal Protocol there are some key issues that need to be addressed:

a) **Controls of ODS emissions.** The Montreal Protocol does not control emissions of ODS therefore such leaks are not reported by Parties. ODS stored in ODS-based equipment (refrigeration & air conditioning equipment, halons-based fire extinguishing equipment etc.) is subject to leaks resulting in emissions of these substances in the atmosphere over an extended period of time. The lack of specific actions to reduce emissions of ODSs can have a serious adverse impact on the fundamental objective of Vienna Convention – protection of Ozone Layer. There is a need for the international community to take specific actions to address this issue. Additional regulations and legislation and other approaches may be required to control these emissions especially in the developing countries.

b) Recovery, Recycling, Labelling, collection, transportation, storage, reclamation and reuse:

The best practices for such activities need to be set up and enforced with supporting legislations and regulations.

c) **Disposal of un-usable ODS**. Unwanted ODS need to be disposed in environmentally friendly and cost effective manner. It is estimated that in the Asian Region, there are over 200,000 tons of ODSs that are still under use / banked in different applications just in the Asia region. A portion of this can be recovered for reuse. However, a portion of ODS recovered through recovery and recycling techniques is not usable. Further procedures and systems need to be developed for safe, proper, and effective destruction of these substances. Technologies relating to destruction of ODSs have been researched as well as adopted by several industries in the developed world. Further, these technologies are evolving to adopt better practices in terms of environmental impact and safe use. However, in the developing countries, there are very limited applications observed on use of destruction technologies of ODSs because of lack of technical inputs / systems for managing and eventually destruction of ODSs. Thus, there is a need to introduce provisions and mechanisms for implementation of destruction technologies to reduce emissions of unwanted ODSs.

d) **Disposal of equipment and foam**. Despite implementation of strict regulations for disposal of ODS and ODS-based equipment, the developed countries are encountering issues relating to cost-efficient and environmentally-safe disposal of equipment as well as foam products using ODSs. The key issues pertaining to collection, processing and destruction of ODS have been and are being addressed. As more and more ODS based equipment is put out of use the same problems are going to be increasingly faced in developing countries as well - for which adequate preempted steps are required.

e) **Coordinated climate and ozone protection actions.** The reduction of ODS has encouraged the use of alternates some of which have very Global Warming Potential (GWP). The impact in some cases can be significantly higher than any emission reduction efforts in large power generation plants based on fossil fuels. Dependence on such alternatives could be reduced through concerted efforts of information exchange and technology transfer.

3. HCFC demand and its impact

HCFC-22 (ODP=0.055, GWP=1,780) consumption and production is growing at an alarming rate in developing countries, and with it the production of HFC-23 (ODP=0, GWP=11,700). HCFC demand in developing countries especially in the Asian region has been growing at an alarming rate. This is observed both on feedstock as well as other applications primarily in refrigeration & air conditioning systems and foam applications. While the former does not get affected by Montreal Protocol stipulations, it is critical to take a closer look at the latter.

HCFC global demand in 2002 was 400,000 tonnes. It is expected to grow to 600,000 tonnes in 2015. The production capacities in the developing countries are rising fast. For example, it is estimated that HCFC production capacity in China is more than 350,000 tons per annum up from about 150,000 tons per annum, which was the capacity about 4 years ago. India, with swing production capacities (i.e., reduction in CFC production levels contributing to increase in HCFC production levels) is also seeing growth of more than 30% per annum over the last three years. Apart from these large producers, the consuming countries in the

region are seeing increase in demand growth both due to original equipment demand for new HCFC-based technologies / installations and service demand for existing HCFC-based refrigeration systems.

The carbon credit transactions are expected to yield significant revenues and profits for the HCFC producers and this is also expected to redefine business strategies of HCFC producers in developing countries.

HCFCs are currently being produced and used in the developed world. But there are steps being taken for reducing production and use of these substances. It may also be noted that accelerated phaseout is proposed to be implemented by countries like USA, Canada, Japan and EU. This results in a significant reduction in demand of HCFCs which can also affect the economics of companies producing HCFCs in developed world.

It must be recognized that HCFCs were declared as interim substitutes for conversion from CFCs as they were about 1/20 less harmful than CFCs. Therefore, the Multilateral Fund to the Montreal Protocol had funded projects for transition from CFCs to HCFCs. Thus, the dependence on HCFCs has invariably increased in developing countries and this technology transition has predominantly happened in the last 6-8 years.

The most important aspects of HCFC phaseout are:

- the fact that the enterprises which had adopted transition technologies from CFCs to HCFCs are likely to face a cost of phasingout HCFCs and the pain of transition.

- It must be recognized that some enterprises were already using HCFCs (not as a result of conversion) and some have converted to HCFCs without the help of MLF. The phase out of such HCFC consumption need to be addressed.

- the dependence on large installations especially in countries like India, China, Thailand etc. on HCFCs which prolongs demand of HCFCs.

- suitable funding mechanisms including market based interventions need to be designed to facilitate the phaseout which, in turn, minimizes cost to the industry and consumers.

Message that need to be addressed: In light of the above, it is critical for the Parties to the Protocol to examine methods to curb dependence on HCFCs and minimize risks of countries who have consumption of HCFCs. This can be addressed through a combination of technical studies on cost effective substitution of HCFCs and capacity building of developing countries on adoption of non-ODS alternatives in place of HCFCs. It is in the interest of the Parties to both the Kyoto and Montreal Protocol to examine methods to curb dependence on HCFCs (and by consequence reduce generation of HFC-23).

There is also a strong need for regulatory interventions in both developed and developing world on monitoring and controlling use of HCFCs as well as cross border movement of HCFCs. This needs to be aligned with specific interim targets for phasing out HCFCs so that the phaseout of HCFCs can happen in a gradual and systematic manner.

4. CTC phase out and impact on Chloromethane plant

Chloromethane production facilities provide raw materials/inputs for production of several chlorine based finished products including CFCs and HCFCs.

Chloromethane production facilities use chlorine as a raw material which is reacted with either methanol or methane for production of four co-products namely, methyl chloride(also known as C1 in business parlance), methylene chloride (also known as C2 in business parlance), chloroform (also known as C3 in business parlance) and carbon tetrachloride(also known as C4 in business parlance). The chloromethane

business profitability is primarily driven by optimizing product mix of chloromethane within technological as well as market constraints.

Carbon tetrachloride (CTC) production and consumption for non-feedstock applications is controlled under the Montreal Protocol. It is a unique substance in the sense that there are no freeze limits to CTC and 85% reduction in production and consumption for non-feedstock applications need to be implemented from the year 2005.The final phase out date is 1 January 2010. There is no specific deadline for production reduction for CTC manufactured and consumed for feedstock applications.

Of these four substances produced in a chloromethane plant, Chloroform is experiencing an increase in demand due to increase in HCFC production and Carbon tetrachloride faces a decrease in demand due to phase out of its use in non-feedstock applications. While CTC demand for manufacturing CFCs (which is a feedstock application) is decreasing with a decrease in CFC production, there is an observed increase in CTC demand in other feedstock applications. This, however, has uncertainties associated with industry demand pattern & trends and market structures for those applications. It must also be noted that CTC imports are also prevalent and is also undertaken by players in the market for both feedstock and non-feedstock applications.

Since C1, C2, C3 and C4 are co products, production decrease in one of the products can result in decrease in overall production of other products due to technology parameters. Currently, there are very few technologies available which can reduce C4 production to nil and hence, there is always a small volume of C4 that would be produced in the chloromethane manufacturing facility. If, say, the demand for C4 falls to nil for feedstock applications, after 2010, the chloromethane facilities have no option but to reduce production of C1, C2 and C3 or incinerate C4 – both these options are expensive options for the industry and not desirable.

Thus, a balanced view needs to be taken on facilitative mechanisms for CTC phaseout. While all attempts should be made to reduce CTC demand for non-feedstock applications (which is being undertaken through agreements with the Executive Committee of the Multilateral Fund), it is also essential to provide for technology transfer for reducing CTC production in the chloromethane plants to nil. This would be critical for economically operating CTC producing plants in developing countries.

Along with this, controlled use of CTC for feedstock applications should be allowed and the related decisions on feedstock use have to be taken through a transparent consultative process with the technical experts including industry from developing country. This is critical to ensure that the cost the country and industry, particularly in cases where CTC is used for feedstock applications, is minimized. Essentially, technologies and practices to ensure reduction in emission of CTC would help in achieving the Protocol objectives with minimal regulations driven reduction in CTC use for feedstock applications, which may be detrimental to the economies of developing countries.

Thus, the key messages that need to be addressed in connection with CTC phaseout include:

- Identification and monitoring of CTC used for feedstock applications. This may need to continue for ever i.e., even after 2010 phaseout date.

- Awareness and capacity building on technologies for reducing emission of CTC during handling and transportation.

- Technical interventions for chloromethane plants to reduce the level of CTC production to nil or almost nil.

Strengthening
The Montreal Protocol

Some preliminary thoughts

Paper 15 June 2006

Option:
Accelerate Phaseout

- Separate Consideration for A5 and non-A5
  - HCFC-22, 141b, & 142b
  - Methyl Bromide
- Essential Use or Offsets for Desired Use
  - HCFC-123 for building AC chillers?
  - HCFC-225 for cleaning oxygen systems?
  - HCFC for specific fire protection?

Exemptions
Options: Feedstock/Process Agents

- Put a limit on inadvertent emissions
- Pursue phaseout as plants close
- Periodically review
- Ban uses where alternatives are available
- Insist or encourage low-ODS options for uses without ozone-safe chemical substitutes or not-in-kind alternatives

Option:
QPS & Other Unlimited Exemptions

- Allow use only if alternatives are unavailable
- Require collection and destruction
- Pursue not-in-kind alternatives
  - e.g. pest-free plastic or corrugated pallets replace wood pallets that require methyl bromide treatment

Option:
Collect & Destroy

- Appreciate that incentives are required
- Allow flexibility to protect the environment
  - Trading among groups, at environmentally favorable terms, on an ODP basis
  - Carry forward of credits for destruction, with a likelihood that some credits will be retired
  - Incentives for joint climate & ozone protection
  - New production for essential/critical use only when destruction offsets are unavailable

Fine-Tune Definitions & Controls

- Coordinate CTC and CFC/HCFC phaseout
- Streamline controls for new ODS
- Collaborate with Kyoto & other Treaties
  - Maximize Joint Environmental Benefits
  - Double-up Trade Enforcement
  - Coordinate Financial Mechanisms
- HCFC: Adjustments; Amendments; Dec.

Some preliminary thoughts on strengthening the Montreal Protocol
K. Madhava Sarma and Stephen O. Andersen

15 June 2006

Some preliminary thoughts on strengthening the Montreal Protocol
K. Madhava Sarma and Stephen O. Andersen[1]

1. Unconditional exemptions from the control measures - Is change needed?

The ODS claimed to be feedstocks by one or more Parties, the ODSs formally approved by the Meetings of the Parties as process agents, and the Methyl Bromide used for Quarantine and Pre-shipment applications are exempted from control measures.

Feedstock and Process Agents:

The ODS claimed by any Party to be feedstock is exempted because, in theory, the ozone-depleting feedstock is entirely converted into other chemicals that do not harm the ozone layer. In practice, however, ODS emissions occur during the feedstock use. The ODS defined by the Meeting of the Parties as process agents is exempted but a limit is put on the emissions during use. It is presumed that the economic benefits in continuing the use of ODS as process agents outweigh the environmental costs of the insignificant emissions permitted and because, in theory, the ozone-depleting process agent is contained in the process or partially converted into other chemicals that do not harm the ozone layer. Parties have not yet set limits on emissions that occur during feedstock use.

By completely exempting Feedstocks and Process Agents, the Protocol fails to motivate research into possible ozone-safe alternatives for feedstocks and process agents. It also fails to encourage adoption of ozone-friendly or ozone-safe alternatives that are currently available. If this exemption remains "as-is," the production of ODS may continue to be used for feedstocks and process agents forever. Furthermore, it is possible that some of this ODS will be illegally diverted for other uses that are banned by the Protocol. This potential consequence could only be avoided by continued vigilance, but Parties may not be able to continue oversight indefinitely.

Parties can (a) put a limit on inadvertent emissions of ODS used as feedstocks, (b) provide for a mandatory periodic review by the Parties of all feedstock and process agent uses, and (c) ban such uses where better alternatives are available.

Parties can insist on or encourage the use of low-ODP ODS in cases where ozone-safe substitutes and alternatives are not available.

Quarantine and Preshipment applications of Methyl Bromide

The Montreal Protocol currently exempts methyl bromide used for quarantine and preshipment (Q&PS) applications. The MBTOC and TEAP have already pointed out

[1] The views presented here are the personal views of the authors and do not necessarily represent the views of UNEP, the Montreal Protocol Technical and Economic Assessment Panel (TEAP) where K. Madhava Sarma and Stephen O. Andersen serve, the U.S. Environmental Protection Agency where Stephen O. Andersen is employed, or other organizations where the authors are employed or serve.

the alternatives available for some Q&PS uses, and the potential methyl bromide emissions reductions that can be achieved by recovering and recycling the methyl bromide used in Q&PS. With the exemption, there is no incentive for reduction of use or emissions of MB.

Parties can provide for a periodical review and gradual withdrawal of the quarantine and preshipment exemption as and when technical & economic assessment reveals the emergence of alternatives or scope for reduction of consumption through recovery and recycling? The Parties have adopted a similar approach for the use of ODS for Laboratory and Analytical applications

2. Destruction of ODS

Article 1, Paragraph 5: *Production* means the amount of controlled substances produced, minus the amount destroyed by technologies to be approved by the Parties and minus the amount entirely used as feedstock in the manufacture of other chemicals. The amount recycled and reused is not to be considered as "production".

The control measures on ODS are for each year. Therefore, if a Party destroys an ODS of particular group in the Annexes to the Protocol, it is eligible to produce that year an ODP equivalent amount of any ODS in the same group over and above the quantity permitted by the Protocol for that year. The Party is not allowed to produce an ODP equivalent amount of an ODS in another group and is not allowed to carry forward the eligibility to produce the ODS in a future year.

There has been some destruction of unnecessary ODS in some countries mostly due to regulations that mandate such destruction of ODS contained in abandoned equipment. Not all countries have such regulations. The TEAP has pointed out the significant scope for destruction of ODS. Relative to what could be destroyed the actual destruction of ODS is insignificant

Even though destruction of ODS is beneficial to the ozone layer, many countries may be reluctant to mandate destruction in view of the cost involved and the absence of specific national benefits. No Party would need additional production of the same ODS that is available for destruction. Also, some Parties may have plenty of ODS for destruction but not other Parties.

Some of the Non- Article 5 Parties have been applying for and getting essential/critical use exemptions for ODS for the last ten years and there is no time limit fixed for the end of such exemptions nor a quantitative limit on such exemption.

On the one hand, there stocks of some ODS that can be destroyed to the benefit of Ozone Layer but there are no incentives for such destruction. On the other hand, the Parties are permitting production and consumption of other ODS for essential/critical uses.

A possible way for Parties to provide incentives for destruction of unnecessary ODS is as follows.

(a). Change the Protocol so that a Party destroying X ODP tonnes of any ODS can produce the same ODP quantity of any other ODS during that year or any future

year and trade this right to produce with any other Party to the extent needed by the other Party for essential/critical uses or basic domestic needs approved by the Parties.

(b). Permit additional production for essential/critical uses only to the extent it cannot be compensated by destruction.**3. Permitted production**

A. The Protocol has been amended so that, after 2010, the non-Article 5 Parties do not produce substances of Annex A Groups I and II and for Other CFCs of Annex B (CFCs and Halons) (Article 2A, 2B and 2 C). However, for Carbon tetrachloride and Methyl Chloroform (Articles 2D and 2E) the non-Article 5 Parties can produce up to 15% of their base level production indefinitely.

The Parties can adjust the Protocol to ensure that no production of carbon tetrachloride and methyl chloroform is permitted by non-Article 5 Parties after the 2010/2015 phaseout dates for these ODS.

B. The Article 5 Parties, for the ODS of Annexes A and B, follow the control measures of the non-Article 5 Parties as adopted by the Second Meeting of the Parties in 1990. Hence, the Article 5 Parties are to phase out their consumption of these ODS, excepting methyl chloroform, totally by the year 2010 and methyl chloroform by 2015. However, the control measures permit production, even after the phase out dates, up to 15% of their base level production. Such production is unnecessary.

The Parties can adjust the Protocol to ensure that no Annex A and B ODS production is permitted by Article 5 Parties after their phase out dates.

C. For HCFCs, there is only a production freeze mandated (by 2004 for non-Article 5 Parties and by 2016 for Article 5 Parties).

The Parties can adjust the Protocol to completely phase out HCFC production while simultaneously phasing out HCFC consumption.

D. There is no provision in the protocol at present for any essential use exemption for HCFCs. The HCFCs have varying ODPs. The links between ozone depletion and climate change are very clear now. It, therefore, makes sense to make synergistic choices, with exemptions due to technical or environmental necessity. Some of the low ODP HCFCs have a great climate advantage over zero-ODP HFCs (Example: HCFC-123 chillers have significantly higher energy efficiency than air conditioning systems using HFCs regulated under the Kyoto Protocol). Parties may desire to take an integrated view of the problems of ozone depletion and climate change and permit temporary use of low ODP HCFCs to avoid use of high GWP HFCs

The Parties can extend the Essential Use Exemptions to HCFCs for limited applications where alternatives are not yet available or where Parties decide that such applications serve the interests of environment better. Such exemptions could be offset by destruction of surplus or contaminated ODS among groups and with credits carried forward in time (see #2 and other discussion above).

4. **Limits on essential/critical use exemptions**

Some preliminary thoughts on strengthening the Montreal Protocol

K. Madhava Sarma and Stephen O. Andersen

Some of the Non- Article 5 Parties have been applying for and getting essential/critical use exemptions for ODS for the last ten years. There is no time limit fixed in the Protocol to end such exemptions nor a quantitative limit on such exemptions fixed. The Article 5 Parties too may demand similar privileges in future.

Parties can place limits regarding the quantity of essential/critical use exemptions allowable to each Party, perhaps as a percentage of the base level or per capita consumption.

5. Expedited procedures for controls on new ODS

It has been the experience that chemists may come up with new ODS (example nPb or the CF3I ingredient in the new mobile AC refrigerant). The present procedure for inclusion of these new ODS in the list of controlled substances and for prescribing control measures is cumbersome and takes a long time. Quick action by the Parties will be necessary in such cases to avoid damage to the Ozone Layer. There have been some proposals in this regard before the Parties and the Secretariat has placed a report before the Parties in 2002 after studying provisions of other conventions. No decision has been taken so far.

Parties could phase out an exhaustive list of now uncontrolled ODS, shifting the burden to proponents who would have to propose an Adjustment or EUE for any significant new use.

6. Advancing the phase out of HCFCs

A timetable was set in 1992 (up to 2030 for non-Article 5 Parties and 2040 for Article 5 Parties) for the phase out of HCFCs. This leisurely timetable was based on the theory that industries that converted from CFCs to HCFCs need to recoup the costs of this conversion before going on to new ozone-safe technologies. However, in actual practice the phase out is well ahead of the timetable in many countries. Industries in these countries have moved out of HCFCs and adopted ozone-safe technologies.

Parties can adjust the Protocol to advance the phase out of HCFCs significantly, with a few exceptions if necessary.

7. Adjustments, Amendments and Decisions

The 'adjustments' have been mentioned by the Protocol in Article 2, Paragraph 9.

"9. (a) Based on the assessments made pursuant to Article 6, the Parties may decide whether:

(i) Adjustments to the ozone depleting potentials specified in Annex A, Annex B, Annex C and/or Annex E should be made and, if so, what the adjustments should be; and

(ii) Further adjustments and reductions of production or consumption of the controlled substances should be undertaken and, if so, what the scope, amount and timing of any such adjustments and reductions should be;"

(b) Proposals for such adjustments shall be communicated to the Parties by the Secretariat at least six months before the meeting of the Parties at which they are proposed for adoption;

(c) In taking such decisions, the Parties shall make every effort to reach agreement by consensus. If all efforts at consensus have been exhausted, and no agreement reached, such decisions shall, as a last resort, be adopted by a two-thirds majority vote of the Parties present and voting representing a majority of the Parties operating under Paragraph 1 of Article 5 present and voting and a majority of the Parties not so operating present and voting;
(d) The decisions, which shall be binding on all Parties, shall forthwith be communicated to the Parties by the Depositary. Unless otherwise provided in the decisions, they shall enter into force on the expiry of six months from the date of the circulation of the communication by the Depositary.

"Adjustments" are changes to the Protocol mentioned above. These adjustments will be binding on all the Parties.

Other changes to the Protocol are **"Amendments"** to the Protocol under Article 9 of the Vienna Convention under which Montreal Protocol has been arrived at. The procedure is long and the Amendments are binding only on those Parties that ratify the Amendments.

'Article 9: Amendment of the Convention or protocols
1. Any Party may propose amendments to this Convention or to any protocol. Such amendments shall take due account, *inter alia*, of relevant scientific and technical considerations.
2. Amendments to this Convention shall be adopted at a meeting of the Conference of the Parties. Amendments to any protocol shall be adopted at a meeting of the Parties to the protocol in question. The text of any proposed amendment to this Convention or to any protocol, except as may otherwise be provided in such protocol, shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate proposed amendments to the signatories to this Convention for information.
3. The Parties shall make every effort to reach agreement on any proposed amendment to this Convention by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the amendment shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting, and shall be submitted by the Depositary to all Parties for ratification, approval or acceptance.
4. The procedure mentioned in paragraph 3 above shall apply to amendments to any protocol, except that a two-thirds majority of the parties to that protocol present and voting at the meeting shall suffice for their adoption.
5. Ratification, approval or acceptance of amendments shall be notified to the Depositary in writing. Amendments adopted in accordance with paragraphs 3 or 4 above shall enter into force between parties having accepted them on the ninetieth day after the receipt by the Depositary of notification of their ratification, approval or acceptance by at least three-fourths of the Parties to this Convention or by at least two-thirds of the parties to the protocol concerned, except as may otherwise be provided in such protocol. Thereafter the amendments shall enter into force for any other Party on the ninetieth day after that Party deposits its instrument of ratification, approval or acceptance of the amendments.
6. For the purposes of this article, "Parties present and voting" means Parties present and casting an affirmative or negative vote.

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"Decisions" are taken by the meetings of the Parties held under Article 11 of the Protocol and under the Rules of Procedure for the meetings approved at the first meeting of the Parties. Are "Decisions" binding on all the Parties? This is a legal issue.

Which proposal can be taken up as an adjustment, which as an amendment and which as a decision? This too has to be legally and strategically decided to accomplish protection of the stratospheric ozone layer in a manner that is cost effective and avoids unnecessary environmental burden to other resources—not trading ozone protection for climate change.

Montreal Protocol Informal Technical Discussions

Jose Pons Pons 2006.07.07

Strengthening of the Assessment Panels.

- Forceful findings by the Environmental Effects would bring back the feeling of urgency that seems to have disappeared from the Protocol.
- The Science Panel is going through an important change worth following.
- TEAP has still a lot to offer, but has been consistently under funded and sometimes mistreated (it looks as if people forget what a great deal they are getting at virtually no cost)

Stronger support for A5 ODS phase-out and solution of operating problems.

- Indeed, if we want A5 to go on with future measures such as accelerated phase-out of HCFC/ MB they need to be confident in the process.
- To me the attitude of non A5 regarding phase-out of CFC MDIs in A5 does not help in this direction. If you recall MDI projects were routinely turned down at the ExCom (there were compelling reasons at the time to turn down those projects), but it seems unfair that now Parties that attempted to solve the MDI phase-out could fall into non compliance. Similarly, the reluctance to fund recovery projects for ODS in appliances (CRP by Colombia) or the continued use of MB through CUEs gives the impression that rules are either bent sometimes in favour of the developed nations for economic convenience.

- **Closure of the QPS exemption**, particularly in view of the implications of IPSM15 with its requirement that pallets and wood crates be fumigated before shipment.
- **Better coordination with other conventions** Basel, Stockholm and streamlined mechanisms to handle contaminated ODS in A5,

Montreal Protocol Informal Technical Discussions

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Stronger support for A5 ODS phase-out and solution of operating problems.

- Indeed, if we want A5 to go on with future measures such as accelerated phase-out of HCFC/ MB they need to be confident in the process.
- To me the attitude of non A5 regarding phase-out of CFC MDIs in A5 does not help in this direction. If you recall MDI projects were routinely turned down at the ExCom (there were compelling reasons at the time to turn down those projects), but it seems unfair that now Parties that attempted to solve the MDI phase-out could fall into non compliance. Similarly, the reluctance to fund recovery projects for ODS in appliances (CRP by Colombia) or the continued use of MB through CUEs gives the impression that rules are either bent sometimes in favour of the developed nations for economic convenience.

- **Closure of the QPS exemption**, particularly in view of the implications of IPSM15 with its requirement that pallets and wood crates be fumigated before shipment.
- **Better coordination with other conventions** Basel, Stockholm and streamlined mechanisms to handle contaminated ODS in A5,

CHATHAM HOUSE

THE FUTURE OF THE MONTREAL PROTOCOL: PROPOSAL FOR INTERNATIONAL WORKSHOP

The debate launched by Canada on the future development of the Montreal Protocol invites responses to a wide-ranging series of questions. This process would benefit from input from the policy research community, which contains several organisations and individuals which have worked and published on the Protocol. These often bring related knowledge of other MEAs and international institutions.

We therefore propose a two-day international experts' workshop, involving policy researchers and key individuals from the ozone regime, including key parties, the Secretariat, TEAP, industry and NGOs. Numbers would be limited to about forty, to facilitate discussion. The workshop would take place in Chatham House's conference facilities in London, a setting which would provide the opportunity for a fuller and more comprehensive exchange of views than would be possible in the more hurried surroundings of a meeting of the parties.

The topics to be discussed would be finalised after further discussion by the parties at Delhi, but likely candidates would include:

- Key phase-out challenges over the next twenty years (e.g. methyl bromide phase-out)
- Future development of the Multilateral Fund
- Future of the non-compliance system
- Monitoring trade and preventing illegal trade
- Working together with other MEAs

For each subject we would commission one or two key experts to produce background and options papers, to provide a framework for the discussions. The papers, together with a full report of the meeting, would be prepared and posted on the Chatham House website, and could be made available to the Parties to the Protocol. A summary of the options and discussions could also be presented to any seminar organised by the Parties.

Funding would be required, of approximately £40–60,000 (€60–90,000)

Chatham House

Chatham House (the Royal Institute of International Affairs) is an independent policy research institute based in London, with extensive experience of organising conferences and workshops, and producing publications, on all aspects of international relations. Its Energy, Environment and Development Programme, the largest of its ten research programmes, has a long history of engagement with the Montreal Protocol and other MEAs, particularly on the topic of illegal trade. Together with the Environmental Investigation Agency, it is currently conducting the study on monitoring transboundary movements of ODS commissioned by the Seventeenth Meeting of the Parties.

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