THE MONTREAL PROTOCOL IN 2011

WINNING THE OZONE BATTLE, LOSING THE CLIMATE WAR

23RD MEETING OF THE PARTIES TO THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEPLETE THE OZONE LAYER

NOVEMBER 21-25,
BALI, INDONESIA



ENVIRONMENTAL INVESTIGATION AGENCY
LONDON, U.K. • WASHINGTON, DC, U.S.A.

Montreal Protocol on Substances that Deplete the Ozone Layer

23RD MEETING OF THE PARTIES TO THE MONTREAL PROTOCOL

At last year's Meeting of the Parties, delegates from over 140 nations had the opportunity to take action on a number of agenda items for climate mitigation consistent with their obligations for ozone protection. The HFC Phase-out Amendment proposals, a decision on ODS Banks, and action to maximize direct transitions to low-GWP alternatives all had the potential to far surpass the total mitigation achieved by the Kyoto Protocol. Tragically, the Parties failed to take decisive action on any of these opportunities, adding to the growing inevitability of acute and catastrophic climate change.

This year witnessed one of the hottest years on record, with increased melting of Arctic, Antarctic and Greenland ice packs, permafrost regions and the world's glaciers, as well as the first ever ozone hole over the Arctic. While the Montreal Protocol has made great strides in reducing emissions of the most powerful ozone depleting substances, the global effort to halt climate change is clearly and rapidly being lost, and the greenhouse effect is now exacerbating ozone destruction through stratospheric cooling.

As documented in the recent International Energy Agency Report[1], the possibility of limiting GHG emissions to levels that avoid runaway and irreversible climate change is almost gone. Should the current opportunity for the international community to assert control over our common future be missed due to political paralysis, then all nations, all peoples and all species will suffer the consequences of the greatest disruption to Earth's ecological equilibrium in history.

The UNFCCC process and the Kyoto Protocol simply will not address HFCs anytime in the near future, and even if they did, they would not be able to phase-out HFCs as quickly, efficiently and cost-effectively as the Montreal Protocol (see back cover for KP/MP comparison). Fast action on HFCs by the Montreal Protocol will provide time for the world to address CO_2 and other greenhouse gas emissions.

The recovery of the ozone layer will be a hollow victory indeed if it is eclipsed by the multiple, far-reaching and catastrophic impacts of acute climate change. The Montreal Protocol must act. A formal contact group on HFCs should be convened to determine how to attract climate money or other funding to maximize transitions directly from HCFCs to low-GWP alternatives, and to fund the containment, recovery and destruction of Banks. Additionally, the TEAP should be instructed to assess the costs and feasibility of an HFC phase-out and to review MLF policies, procedures and funding to ensure these factors are not causing transitions to HFCs. Finally, consideration should be given to the Decision Proposal on HFC-23 that would eliminate one-quarter of current annual HFC emissions.

The time has come for every international body and agency to take strong and immediate action to limit greenhouse gas emissions and halt climate change. Global warming is rapidly accelerating beyond our best collective efforts to resist. If there was ever a time for the world's most successful environmental treaty to expand its efforts, that time is now.

CONTENTS

3-5 MLF REPLENISHMENT

6 REGULATING FEEDSTOCK

7-9 HFC-23: DECISION PROPOSAL & OFFSET FRAUD

10 REVISITING ODS PHASE-OUTS IN ARTICLE 2 COUNTRIES

11 FUNDING CLIMATE BENEFITS IN THE MONTREAL PROTOCOL

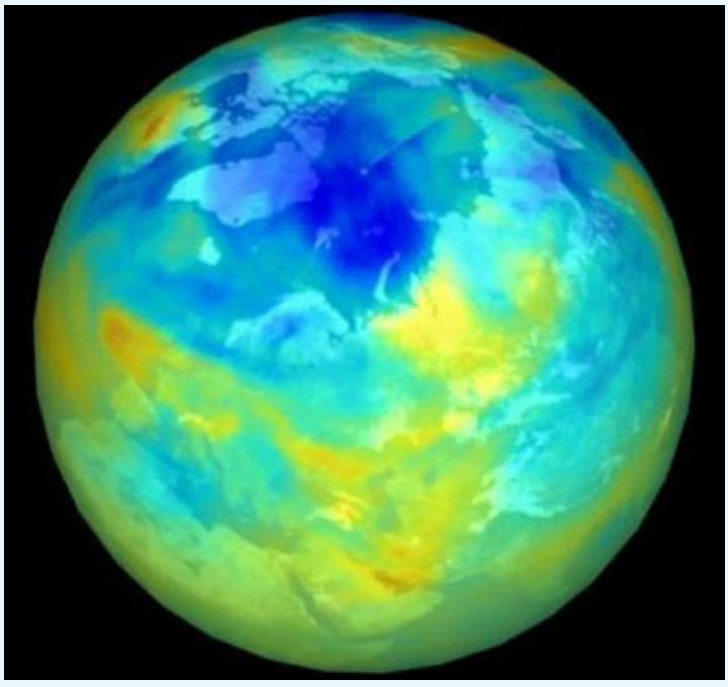
12 HFC AMENDMENT PROPOSALS

13 ILLEGAL TRADE

14 ODS BANKS

15 ENDNOTES

In March 2011 a record ozone hole was recorded over the Arctic threatening Northern Europe, Russia, and North America. (NASA)



NASA

MLF REPLENISHMENT

The November 2011 Meeting of the Parties (MOP) decision on the 2012-2014 Multilateral Fund (MLF) Replenishment must send a clear and unequivocal message that funding will be available to deliver the climate benefits promised when the accelerated HCFC phase-out was adopted. At the time, it was estimated that an extra 17.5-25.5 gigatonne CO_2 equivalent ($GtCO_2e$) mitigation would be achieved by 2050, dependent on the transition to climate-friendly and energy efficient technologies[2]. To realize this promise, adequate funding must be provided to cover the costs required to transition to low-GWP technologies.



HCFC-22 loaded for transport. A number of Article 5 Countries proposed HCFC Project Management Plans (HPMPs) to convert to HFC-410A rather than pursuing technologies or transitions and sectors where low-GWP are available. This is but one example of how financial constraints in the MLF are contributing to transitions from ODS to high-GWP HFCs.

Premature high-GWP HFC conversions by some countries threaten to prevent delivery of the promised climate benefits of the accelerated HCFC phase-out.

The majority of the HPMPs submitted by Article 5 countries demonstrate a real commitment to use low-GWP alternatives where they are available and even to take actions to commercialize low-GWP alternatives in new sectors. However, premature high-GWP HFC conversions by some countries threaten to prevent the delivery of the promised climate benefits. Proposed conversions of air-conditioning to HFC-410A in the RAC sector, and foam conversions to HFCs are ill advised and unnecessary.

Under a business as usual (BAU) scenario, 77% of the conversions from HCFCs are projected to convert to HFC technologies using HFC404A, HFC410a, HFC134a or HFC245fa[3]. The average GWP of these HFCs as a function of expected use is 1,740. In order to realize the promised level of GHG mitigation, concerted efforts to transition all or nearly all HCFCs to low-GWP alternatives need to be implemented. This has not happened to date, with the MLF recently approving several major HFC projects to replace HCFCs.

With concerted effort and adequate funding, transitions to low-GWP alternatives approaching 100% in subsequent phase-out steps is technically feasible and should be the goal of the Montreal Protocol. Given that the Article 5 HCFC phase-out will primarily occur over the next twenty years, there is sufficient time to bring viable low-GWP alternatives into the market and for each step in the phase-out to focus on sectors with viable low-GWP alternatives.

Historically, the Montreal Protocol has always set schedules that inspire technical innovation, and by committing to maximize transitions directly from HCFCs to low-GWP alternatives, the HCFC phase-out is no different. In the last few years there has been a dramatic increase in the proven and commercialized low-GWP alternatives and those that are under development. In fact, Article 5 countries are frequently converting to technologies that were not even available when Article 2 countries implemented the bulk of their HCFC phase-out[4].

At the request of the Parties at the OEWG in August 2011, the TEAP looked at the wide range of available low-GWP alternatives for major sectors and discussed the preferred alternatives that in the majority of cases were low-GWP alternatives.

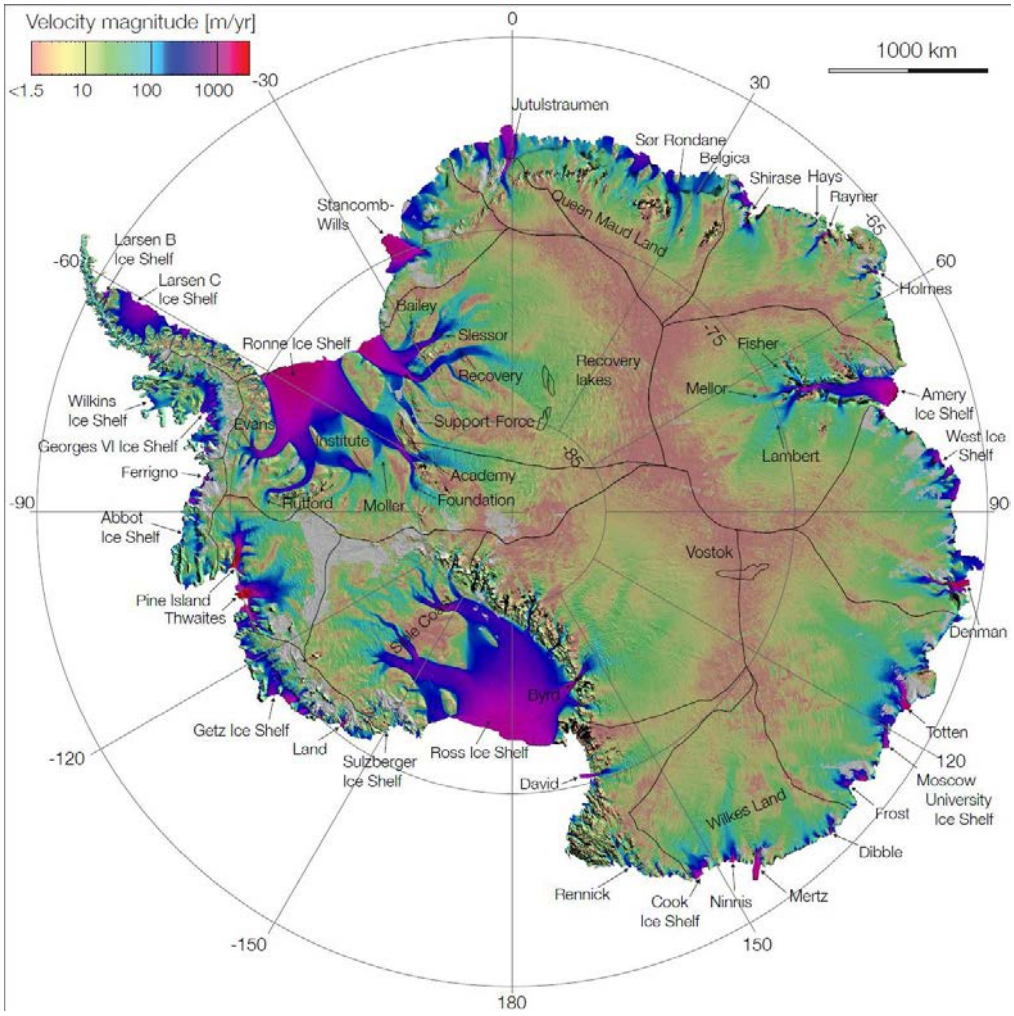
The TEAP analyzed the climate impact of the HPMPs approved so far, which cover some 80% of the HCFC consumption reductions required

to meet the 10% reduction target in 2015 (but also includes a number of LVC countries meeting the 2020 35% reduction target).

The TEAP calculated that when implemented the plans would result in a reduction of 48.88 MtCO2e emissions by 2015 – this was based on an average 20% conversion to low-GWP technologies in the RAC sector and 95% in the foam sector. The TEAP estimates that if all the conversions had been made to low-GWP alternatives, the amount of emissions avoided would have been almost 80% higher (an additional 38.8 MtCO2e).

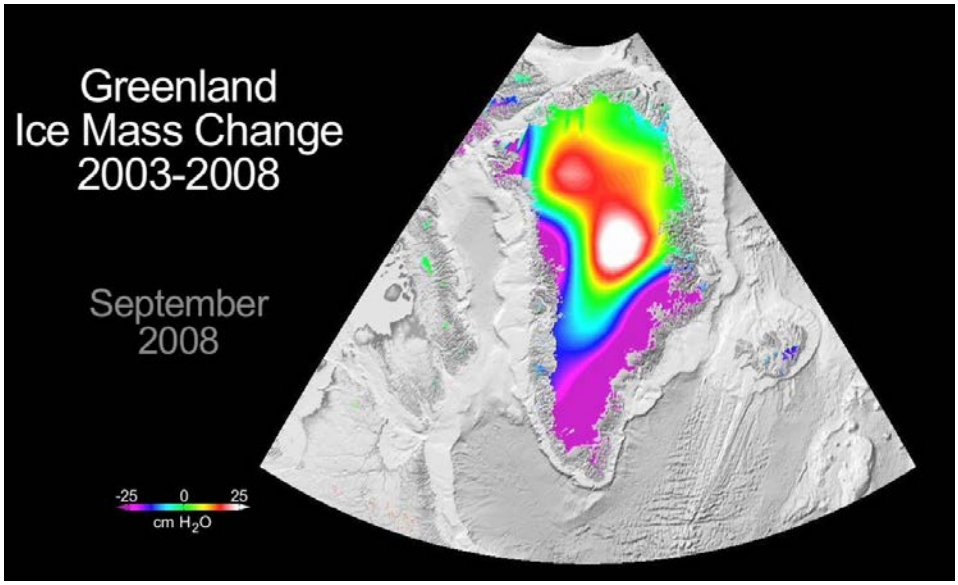
The TEAP analysis for future funding needs looks at penetration rates of low-GWP conversions of zero %, 25% and 50%. Given the rapid development and commercialization of low-GWP alternatives and the length of the Article 5 HCFC phase-out, these scenarios do not embody the aspirations stated at the time of the accelerated HCFC phase-out or attempt to maximize the transitions from HCFCs directly to low-GWP alternatives.

Additional funding of a fraction of the overall replenishment will substantially increase the penetration of low-GWP alternatives. The Parties should request the TEAP to analyze the costs of higher percentage transitions to low-GWP alternatives, and Parties should aspire to 100% conversions to low-GWP technologies, bearing in mind that the real cost of not dealing with climate change is significantly higher.



NASA

Antarctic rates of glacial melt and movement continue to accelerate beyond previous high-end estimates.



The Consolidated Business Plans for 2011-2014 prepared by the ExCom reflect that substantially more funding will be required than the projected replenishment of $490 million[7]. The need for a substantially increased replenishment does not include funding to maximize the climate benefits of the HCFC phase-out.

The global economic slow-down does not excuse Article 2 countries from their obligations to restore the ozone layer and to do so while realising the greatest climate benefit possible. The recent studies connecting the appearance of the Arctic ozone hole and the massive size of the 2011 ozone hole with climate change make it imperative that the Parties to the Montreal Protocol ensure that sufficient funding is available to maximize the climate benefits from the HCFC accelerated phase-out.

ExCom Decision 54/39(h) encourages countries and agencies "to explore potential financial incentives and opportunities for additional resources to maximize the environmental benefits from HPMPs pursuant to paragraph 11(b) of Decision XIX/6" of the 19th Meeting of the Parties. The TEAP identified the following barriers in place that limit the possibilities to secure substantial additional resources to maximize the climate benefits to the HCFC phase-out:

- limited recognition of the link between the ODS phase-out and climate and the huge growth potential of high-GWP HFCs that could be phased-in under the current HCFC phase-out conditions and funding levels;

- little experience in determining the eligibility of ODS phase-out activities as part of climate change projects to secure climate funding; and

-no incentives for Article 2 countries that are willing to provide additional funds over and above their obligations under the Montreal Protocol to specifically fund higher cost transitions to low-GWP alternatives.

The TEAP estimated previously that a 20% reduction in climate emissions could be achieved under normal funding conditions, but that by securing climate funding the reduction in climate emissions caused by the HCFC phase-out could more than be doubled. Even the 40% reduction estimate is conservative given the rapid changes in low-GWP alternatives and technologies. The Parties need to determine how to facilitate greater low-GWP transitions as a matter of urgency.

RECOMMENDATIONS:

Parties must adopt several key Decisions to ensure that the MLF is directed to maximize transitions to low-GWP alternatives during the HCFC Phase-out:

• Request the TEAP to identify the sectors where direct transitions can occur, and quantify how many projects are transitioning to HFCs due to a lack of funding;

• Request that the TEAP evaluate the cost of maximizing direct transitions to low-GWP at the 2020 35% phase-out step and which key sectors do not have proven alternatives so that funding can be directed to commercialize low-GWP alternatives in those sectors;

• Direct the MLF to continue funding new low-GWP technology pilot projects that will accelerate the commercialization of alternatives to HFCs particularly focusing on the RAC sector;

• Direct the MLF to prioritize HCFC transitions in sectors where low-GWP alternatives have been commercialized and discourage transitions to HFCs in sectors where alternatives are not yet commercialized, and to scutinize each HPMP to ensure that this is happening;

• Direct the MLF to reject projects that request funding for transitions to high-GWP HFCs where low-GWP alternatives have been proven and commercialized;

• Adopt a replenishment that will facilitate the greatest number of transitions to low-GWP alternatives;

• Create incentives to encourage individual countries and/or international climate funding mechanisms to contribute climate monies to specifically fund climate mitigation;

• Request the TEAP to continue monitoring the availability and commercialization of low-GWP alternatives and to recommend actions that can be taken to increase the availability of proven low-GWP alternatives in all major sectors to enable conversions to low-GWP alternatives approaching 100% in subsequent HCFC phase-out step-downs.



Hychill and Oka, based in Australia have combined to manufacture the first hydrocarbon air-conditioning systems for production line vehicles in the world.



REGULATING FEEDSTOCK

While the Montreal Protocol controls the production of ODS for emissive uses (i.e. as refrigerants, solvents, aerosol propellants and foam blowing agents), production of HCFCs and CFCs for use as feedstock (i.e. as building blocks in the production of chemicals such as PTFE used in Teflon, pharmaceuticals or agricultural products) is unaffected by the terms of successive phase-out agreements. As such, feedstock production and use is to continue unabated *"until either the products derived from these feedstocks are no longer needed or when alternative economically attractive synthetic technologies are commercialized."*[8]

Feedstock uses are not controlled as they are considered to be 'non-emissive' applications. However, non-emissive is a misnomer given that emissions from feedstock uses are in fact considerable.[9] Losses (or fugitive emissions) can occur at various stages in the lifecycle of the feedstock, including during production, storage, transport, and transfers.[10]

Repeated attempts have been made to estimate emissions from the use of Ozone Depleting Substances (ODS) as feedstock. However, although Parties are required to report ODS production for feedstock uses under Article 7, global use of ODS feedstock is not reported and estimates are based on anecdotal evidence or proprietary unpublished market data aggregated for competitive reasons.[11] The lack of commonly accepted guidelines regarding how to properly estimate feedstock emissions involving storage facilities, transfers, transportation, fugitive losses, etc. further complicates matters.[12]

HCFC-22 production for feedstock is expected to soar over the coming decades. According to Miller & Kuijpers, global HCFC-22 production for feedstock is projected to overtake production for emissive purposes by 2015, reaching 1 gigatonne by 2035.[13] Most of this growth will come from developing (A5) countries, which are on course to treble HCFC-22 feedstock production between 2010-2035 as illustrated in Figure 1.

Meeting the accelerated HCFC phase out target presents an immense challenge for Article 5 countries. Notwithstanding the impending freeze on production and use, demand for HCFCs for emissive use in developing countries has risen steadily at about 15% per annum since 2002, barring a dip in 2008 following the economic recession.

Soaring production of HCFCs for feedstocks in Article 5 countries could severely compromise the accelerated phase out of HCFCs for emissive purposes and inevitably heighten the risk of black market trade. This increases the likelihood that "legitimate" HCFCs will be diverted to supply illegal demand. Indeed, there is no guarantee that unscrupulous manufacturers and/or distributors and end users will abide by the distinction between HCFC production for emissive purposes and production for feedstocks, and a number of precedents suggest that they will not.

The TEAP Assessment Report 2010 states "Knowledge of ODS feedstock use and emissions is incomplete"[14] owing to a lack of reporting. It also notes the majority of ODS feedstock production is for HFCs, which is not reported to a publicly accessible data bank, and therefore recommends institutionalized reporting of ODS feedstock use as well as the development of better emission control mechanisms.[15]

Additional concerns arise from the creation of HFC-23 in the manufacture of HCFC-22 that represents the vast majority of HCFC feedstock use.[16] Developing countries' HFC-23 production from HCFC-22 for feedstock uses will reach 10.76 kilotonnes per year in 2020, rising to 21.68 kilotonnes per year in 2035.[17]

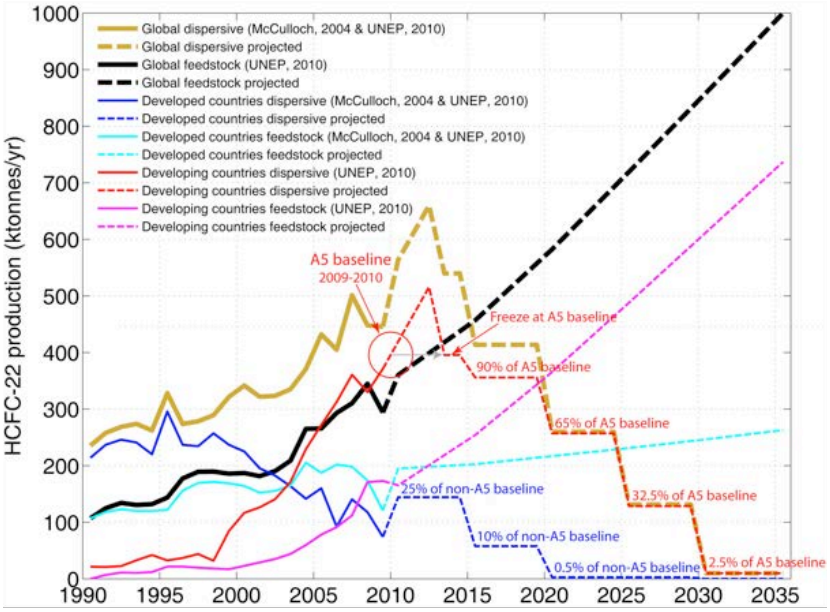


Figure 1 HCFC-22 production data (Miller & Kuijpers, 2011)

RECOMMENDATIONS:

- Require reporting of all ODS feedstock consumption by Parties;
- Require reporting of all ODS feedstock production and trade by Parties;
- Include feedstocks trade in ODS licensing systems;
- Direct the TEAP to identify substitutes and not-in-kind alternatives to ODS feedstocks;
- Direct the TEAP to explore potential to phase-out feedstock use with Essential Use Exemption (EUE) applied where alternatives are not available
- Support draft Decision XX/III[H] on *Sustained mitigation of ODS emissions from feedstock and process-agent uses*.

HFC-23: DECISION PROPOSAL & OFFSET FRAUD

HFC-23 is a by-product of HCFC-22 manufacture, and one of the most powerful known GHGs with a GWP of 14,800[18] and an atmospheric lifetime of 270 years.[19] Since 2007, several billion dollars have been channelled through the UNFCCC's CDM for 19 HFC-23 abatement projects - 11 in China, five in India and one each in Argentina, Mexico and South Korea.

This enormous financial outlay, borne primarily by the EU and Japan, has been spent to purchase almost half the Certified Emissions Reductions (CERs) ever generated under the CDM.[20] Unfortunately, one-half to two-thirds of these offsets are fake, and have not produced any additional decrease in global GHG emissions.

Although HFC-23 can be destroyed for just €0.17 per CO2e tonne, when this destruction is commoditized and sold as CERs, it can command as much as €12-€15, or 70-90 times more than it costs to destroy the gas.[21] As a result, the value of HFC-23 credits may exceed that of the primary product (HCFC-22)[22] since every tonne of HFC-23 that is destroyed generates 11,700 credits (the CDM uses a GWP of 11,700).

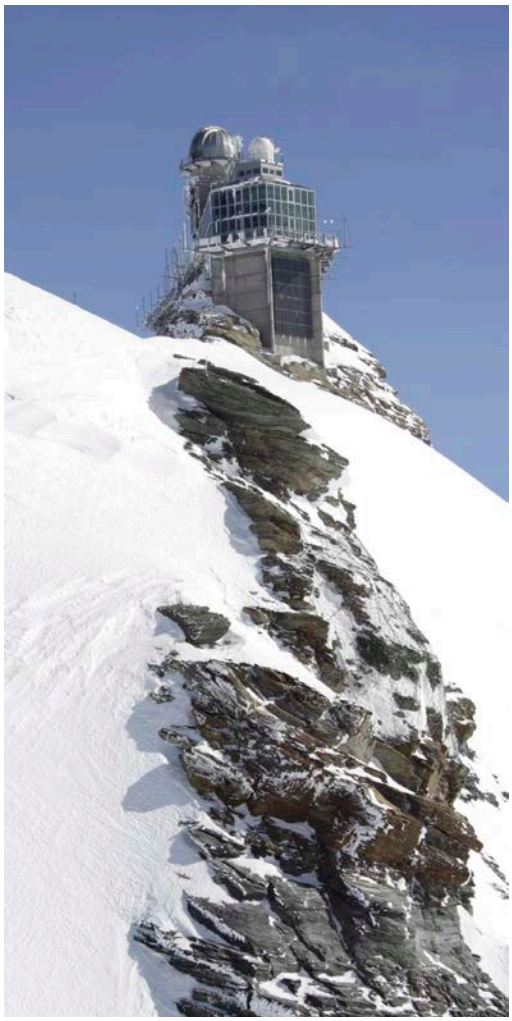
The CDM's HFC-23 abatement program is largely a fraud, providing massive subsidies to producers of super greenhouse gases and little benefit for climate.

Some CDM HCFC-22 plants derive greater revenue from selling HFC-23 offsets to Kyoto Parties than they do from selling HCFC-22. In their 2007 Annual Report, Gujarat Chemicals in India stated that 88% of their pre-tax profits came from selling carbon credits.[23] This perverse incentive encourages plant operators to manipulate and increase the so-called "waste gas ratio", leading to artificially higher production of HFC-23 and encouraging higher production and use of HCFC-22, itself a potent GHG (GWP 1,810) and ODS that is being phased out under the Montreal Protocol. Production of HFC-23 at non-CDM plants is typically much lower with product to waste ratios approaching 100:1 as opposed to 35:1 at CDM plants.[24]

Formal submissions to the UNFCCC in early 2010 indicated that the majority of CDM HCFC-22 plants had manipulated HFC-23 waste ratios to maximize crediting levels and/or inflated HCFC-22 production. As a result, in August 2010 the CDM Executive Board suspended credit issuance for HFC-23 projects and put the HFC-23 Methodology on hold. In May 2011, the CDM Methodologies Panel issued recommendations for establishing a more conservative limit on the HCFC-22/HFC-23 waste ratio and reducing the amount of HCFC-22 production eligible for crediting.[25]

Although the CDM Executive Board has since had several opportunities to act, as yet no agreement has been reached, with China and Japan resisting efforts to reduce the allowable waste ratio for crediting, from 3% to between 1% and 1.4%. Despite the fact that no changes have been made to the HFC-23 methodology, the hold on HFC-23 credits was lifted after several months and the flow of bogus credits resumed in November 2010.

As of November 11th 2011, more than 350 million HFC-23 credits have been issued.[26] Based on the recommendations of the Methodologies Panel, around one-half to two-thirds of these credits are fake, which is up to



A study by EPMA, the Swiss Federal Laboratories for Materials Science and Technology, found that EU HCFC-22 manufacture were emitting more HFC-23 than claimed in national emissions reports. The study showed Solvay's plant near Milan venting 10-20 times more HFC-23 than Italy is reporting. Significantly higher emissions were also reported from The Netherlands where Dupont operates a plant, and to a lesser extent from the Ineos plant in the UK. Emission levels from the Arkema plant in France were also twice as high as reported values. Although these releases are dwarfed by HFC-23 emissions in China, all nations should require HCFC-22 producers to take full responsibility for capture and destruction of all HFC-23 including costs.

230 million credits or more than 30% of all credits issued by the CDM to date.

Fortunately, after determining that any action by the CDM Executive Board to revise the HFC-23 Methodology would fail to remedy its inherent flaws, and concerned by the enormous number of cheap credits of illegitimate value flooding its Emissions Trading System (ETS), the EU adopted a Regulation in June 2011 banning the use of all industrial gas offsets in the ETS after April 2013.[27] This ban will apply to all HFC-23 credits as well as those from N2O production facilities.

In view of the fact that the ETS ban would only apply to traded sectors, and that EU governments would still be able to use industrial gas offsets to meet their national compliance targets within non-traded or "effort sharing" sectors (e.g. agriculture and transport), Denmark tabled a proposal pledging to forswear use of these credits and asked other EU members to follow suit. To date, 16 of the 27 EU Member States, including France, Germany and the UK have sided with Denmark.[28] Italy and Spain are expected to offer the greatest resistance as their national utilities are heavily invested in HFC-23 projects.[29]

The EU ETS ban coincides with the end of the first seven-year crediting period for two HFC-23 projects in China, with the majority of HFC-23 projects ending later in 2013 and in 2014. Aside from the EU, Japan is the only other major market for industrial gas offsets and a number of Japanese firms are heavily invested in existing HFC-23 projects. Part of the reason for China and Japan's resistance to revising the HFC-23 Methodology likely stems from a common interest in using HFC-23 offsets in a post 2012 Kyoto successor arrangement negotiated bilaterally. Canada has never used HFC-23 credits and Australia and New Zealand have indicated that they have no interest in allowing these credits to be a part of their respective national emissions trading systems.[30]

The CDM's HFC-23 abatement program is largely a fraud, providing massive subsidies to producers of super greenhouse gases and little benefit for climate. The fact that as much as



Arkema's Changshu Haike facility in Jiangsu, China is one of a dozen CDM HFC-23 destruction projects suspected of manipulating HCFC production to generate excess HFC-23 offsets.

Outside of China, virtually all non-CDM HCFC-22 facilities in the world voluntarily absorb the costs for destroying HFC-23.

30% of all offsets ever produced under the CDM are fictitious and do not correspond to genuine emissions reductions is staggering. Equally alarming is that the CDM, which supplies the majority of offsets to international carbon markets, does so largely by incentivizing and rewarding production of HCFC-22. The abrogation of responsibility evident in the CDM's handling of HFC-23 crediting, and the clear violation of the Kyoto Protocol's spirit and intent by HCFC-22 manufacturers, make Parties or enterprises that continue to utilize HFC-23 credits guilty of complicity in one of the greatest environmental scandals of the modern era.

In addition to the problems arising from HFC crediting, HFC-23 emissions from non-CDM facilities in China and elsewhere have caused atmospheric concentrations of HFC-23 to more than double since the 1990s. Around 127 million tonnes CO2e (25% of all HFC emissions) are being emitted each year in the form of HFC-23 waste gas, with the vast majority originating from Chinese HCFC-22 plants and production lines not covered by the CDM.[31]

China has recently threatened that current facilities that are paid by the CDM to destroy HFC-23 will start to vent the super greenhouse gas if they no longer receive revenue from CDM credits. According to Bloomberg, the revenue management director of China's CDM Fund stated in an interview that "If there's no trading of [HFC-23] credits, they'll stop incinerating the gases". It was also

stated that "almost all the big Chinese producers of HFCs" have joined in this approach claiming that they "can't bear the cost" of destroying HFC-23 and that "they'll lose competitiveness." This ignores the fact that the cost of destruction is a fraction of the funds already received from the CDM.[32]

There are a number of options to ensure these plants continue to capture and destroy HFC-23 that could additionally address the large quantities of HFC-23 being vented into the atmosphere by non-CDM facilities in China.

The logical solution would be for China to utilize some of the approximately US$1.3 billion collected from taxing CDM credits, primarily from HFC-23, at a rate of 65%.[33] These funds are more than sufficient to pay for the capture and destruction of all HFC-23 from CDM and non-CDM plants alike within China for decades.

Beyond the non-CDM HCFC-22 plants and production lines in China, virtually all other non-CDM HCFC-22 facilities in the world voluntarily absorb the costs for destroying HFC-23. There is no reason why China and other nations should not implement this standard international industry practice by requiring producers to assume responsibility for HFC-23 destruction when their current CDM crediting periods expire. This is certainly reasonable given the vast sums already paid and the minimal cost of preventing HFC-23 emissions.

An alternative or complementary means of facilitating HFC-23 destruction at HCFC-22 plants that are still venting would be for Parties to adopt Draft Decision XXIII/[C], Phase-out of HFC-23 by-product emissions, submitted by Canada, Mexico and the U.S.A. This Decision seeks to address these emissions by requesting the ExCom to: update information on HCFC-22 facilities in A5 nations; develop estimates of incremental costs associated with the collection and destruction of HFC-23; formulate guidelines for funding projects to collect and destroy HFC-23; and, facilitate development and implementation of HFC-23 destruction projects for facilities or production lines not covered by the CDM. Incremental funding for purchase, installation and operation of equipment is estimated at US$2-3 million per unit,[34] with annual operating costs being much lower and dependent on production levels.

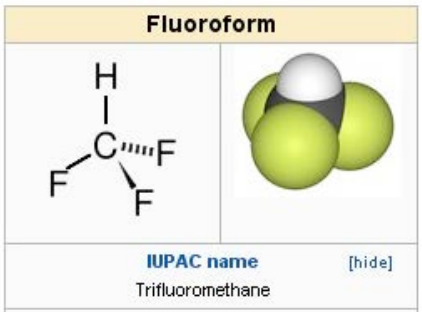
With the exception of Japan, all Kyoto Parties have made it clear that HFC-23 offsets have no place in the future of international carbon markets. With little or no interest in the development of new CDM HFC- 23 projects or renewal of existing projects, current and ongoing HFC-23 emissions must be addressed outside the CDM. Voluntary capture and destruction by producers, supplemented if need be by incremental funding through the Montreal Protocol, offers a cost-effective solution. HFC-23 is a by-product of an ODS substance being phased out and under direct regulatory control of the Montreal Protocol, and it is therefore the responsibility of Parties to address and resolve this issue without delay.



Production of HCFC in China is responsible for about 90% of the doubling of atmospheric HFC-23.

RECOMMENDATIONS:

- Governments should mandate that HCFC-22 manufacturers assume responsibility for destroying HFC-23;
- Parties should adopt draft decision XXIII/C Phase-out of HFC-23 by-product emissions;
- The CDM Executive Board should retire the HFC-23 methodology and refrain from renewing any existing projects.



REVISITING ODS PHASE-OUTS IN ARTICLE 2 COUNTRIES

The history of the Montreal Protocol is one of an evolving treaty responsive to science, technology, and the needs of industries and Parties dependent on ODS and ODS substitutes. Its governance and the institutions that have contributed to its success in reducing production and consumption of ODS are the same features that will maximize climate benefits while restoring the ozone layer.

Of paramount importance is that,unlike the UNFCCC, under the Montreal Protocol all Parties accept firm reduction commitments. The Montreal Protocol has already successfully phased-out the production and consumption of the vast majority of 97 ODS in accordance with set schedules in both developed countries ("non-Article 5 Parties") and developing countries ("Article 5 Parties").[35] This has been achieved through an innovative approach based upon the legal principle of common but differentiated responsibilities that incorporates a grace period for Article 5 Parties, allowing them to implement mandated phase-out schedules after non-Article 5 Parties, in recognition of non-Article 5 Parties' larger historic contribution to ozone depletion and Article 5 Parties' right to continued growth and development.[36]

Article 5 charges developed nations with responsibility to provide financial and technological assistance to developing nations in the implementation of technologies and processes with less ozone depleting effects.[37] Under Article 10A, non-Article 5 countries are required to transfer "best available, environmentally safe substitutes and related technologies" to Article 5 nations at "fair and most favorable trade conditions."[38] This commitment to facilitate access to relevant scientific information, data, training, and technology was reasserted in the Helsinki Declaration adopted at the First Meeting of the Parties in 1989.[39] Consequently, Parties are required to adhere to all aspects of these terms during ODS phase-outs including the accelerated 2007 HCFC Phase-out pursuant to Decision XIX/6 which was adopted in order to prevent the release of additional ODS, but equally to prevent some 15-20 GtsCO2e emissions.

Article 2 countries must act now to transition out of and bypass HFCs.

The HCFC phase-out follows the structure of previous ODS phase-outs with Article 2 countries leading the way, creating and transferring alternatives to Article 5 countries. Decision XIX/6(9) encouraged all Parties to promote the selection of alternatives to HCFCs that minimize environmental impacts, and particularly impacts on climate. Decisions XIX/6 and XX/9 instructed the ExCom of the MLF to consider and incentivize climate benefits in the selection of alternatives for HCFCs in the phase-out by Article 5 countries, by promoting the selection of low-GWP alternatives and bypassing HFCs. Article 2 countries began phasing-out HCFCs in 1996, achieving close to a 65% reduction in HCFCs by 2009. Regrettably, since climate co-benefits were not a condition or aspiration of the Article 2 phase-out, as of 2009 approximately 77% of all Article 2 conversions had been to high-GWP HFCs.[40]

This contrasts with the ExCom's approach, which has been to promote dramatic conversions in Article 5 countries directly to low-GWP substitutes. This has led to the commercialisation of many refrigerants and technologies for the first time although astonishingly, many of the low-GWP alternatives being pioneered by Article 5 countries cannot yet be legally sold in many Article 2 countries.[41] Indeed, HFCs are currently the fastest growing GHGs in most Article 2 countries precisely because of conversions from HCFCs to HFCs.

The acceleration of the HCFC phase-out and the advanced stage of Article 2 phase-outs is causing Article 5 countries to often commercialize low-GWP alternatives before these technologies are available in Article 2 countries (e.g. methyl formate). This is the exact opposite of how the concept of common but differentiated responsibilities is supposed to work.

Article 2 countries should revisit their HCFC phase-outs and employ the same standards as the ExCom for their remaining transitions, and take immediate steps to remedy the impact of past transitions that have resulted in widespread adoption of HFCs. In this spirit, the current EU review of its F-gas Regulation should phase-out HFCs in all new equipment and technologies by 2020, through a combination of use bans and market restrictions.[42] Climate-friendly, commercially and technologically viable alternatives to HFCs are available in all major sectors in the EU, and such restrictions are fully consistent with EU support for an international HFC phase-out.

These principles should apply across all sectors with particular emphasis on the RAC sector. Decisive action on low-GWP alternatives by Article 2 countries will increase the availability of low-GWP alternatives worldwide and begin to redress the current imbalance. In concrete terms, it is vital that more alternatives are commercialized prior to 2020 if Article 5 countries are going be able to achieve meaningful climate mitigation under the scheduled 35% reduction step.

To comply with their obligations, Article 2 countries must act now to transition out of and bypass HFCs. The development of viable alternatives will ensure effective technology transfer to Article 5 countries, which will enable developing countries to achieve the greatest climate benefits possible from their HCFC phase-outs.

FUNDING CLIMATE BENEFITS IN THE MONTREAL PROTOCOL

Three unique and significant climate mitigation opportunities now exist at the Montreal Protocol: (1) the current HCFC phase-out in Article 5 countries; (2) the recovery and destruction of ODS Banks, and; (3) a phase-out of HFCs (covered on next page).

Maximizing direct transitions to low-GWP alternatives that bypass HFC use in the accelerated HCFC phase-out can prevent approximately 18 GtCO2e emissions. Promoting and financing the destruction of ODS still present in equipment, chemical stockpiles, foams, and other products (collectively referred to as "Banks) can cost-effectively prevent the emission of 7-8 GtCO2e in the near- to mid-term, and an additional 9 GtCO2e or more thereafter. Unfortunately, given the global economic slowdown, there is little chance the current replenishment of the MLF will be immediately expanded to fund these efforts.

In accordance with decision XX/7, the Ozone Secretariat prepared a report on funding options for the destruction of ODS Banks.[43] The twenty funding possibilities identified in that report also cover the range of opportunities to enhance and maximize the climate benefits and direct transitions from HCFCs to low-GWP alternatives. Of the available options, attracting climate monies to begin addressing these issues holds the greatest possibility for a rapid increase in funding given the billions being invested in a broad range of less cost-effective mitigation activities. However, in order to compete for this money, the Montreal Protocol needs to make it clear to Governments that the mitigation possibilities are significant, cost-effective and immediate. Additionally the Montreal Protocol must assess and articulate the incentives for countries to increase their contributions to the triennial replenishment for the sole purpose of securing climate benefits that are either not cost-effective on an ODP basis or that involve Banks, which are not currently eligible for MLF funding.

Many developed countries are engaging in climate mitigation for forests, clean energy and other sectors to demonstrate action to mitigate GHG emissions. The Montreal Protocol does not need to get involved in issuing carbon offsets, however through the MLF it could easily quantify and track the tonnes of CO2e emissions avoided through additional funding to projects that destroy ODS banks or make possible low-GWP conversions over and above MLF funding. It could also operationalize the climate facility in the MLF and maintain a database of contributors, projects funded and mitgation achieved. In essence, there are a number of options that would not require major changes in MLF or Montreal Protocol policy that could be used to attract climate money to finance these major but as yet unfunded mitigation opportunities.



It is important in attracting climate money that the incentives do not affect the current funding commitments for eliminating ODS. The donor countries have to provide sufficient and stable funding, and all costs associated with destroying ODS must be paid by the MLF. Climate money would only cover excess costs, such as those for converting small and medium enterprises (SMEs) to low-GWP alternatives, or of using alternatives to achieve major climate savings that are more expensive than those permitted by MLF guidelines. Likewise, if Article 5 countries have seized ODS from illegal trade that needs to be destroyed, or collected Banks of banned ODS (HCFCs should not be considered to safeguard against perverse incentives), funding for that destruction and the associated climate benefits should be paid by the MLF.

EIA recommends that the Parties resume discussions from the OEWG and evaluate strategies for attracting climate funds. Climate money is being spent now. If the Montreal Protocol cannot afford to act on the largest, fastest and most cost-effective mitigation opportunities currently available, then Parties need to attract the money that will make such action affordable.

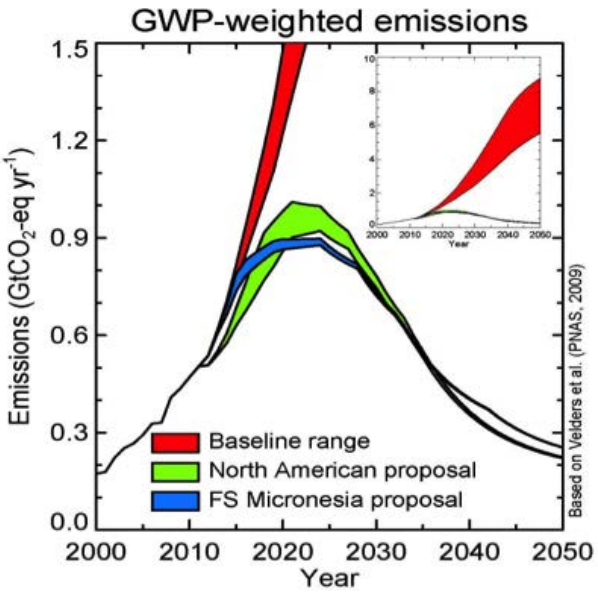
HFC AMENDMENT PROPOSALS

An amendment to phase out HFCs under the Montreal Protocol is by far the most significant, immediate and cost-effective prospect available for combating climate change. With the potential to avoid 88 to 140 GtsCO2e emissions by 2050 at a cost of approximately €5-11 billion,[44] there simply is no other near-term strategy for mitigation that could be implemented to achieve a comparable level of GHG mitigation.

As in 2009 and 2010, two HFC amendment proposals were submitted in 2011 by Micronesia and by North America. They have slightly different timelines for phasing-down HFCs, but both achieve essentially the same level and quantity of emissions reductions by 2050 (see graph). Both proposals also call for a combined HCFC and HFC baseline in recognition of their similar and largely interchangeable nature, and as a means of allowing Parties more flexibility in meeting reduction levels.

Despite strong support for action on the part of nearly 100 nations, a few Parties (primarily China and India) have consistently blocked discussion based on questions regarding the legality of action on HFCs by the Montreal Protocol, lack of information on alternatives, and concerns about costs. These questions have been addressed at length and appear to have far more to do with certain Parties seeking leverage to use in the UNFCCC negotiations than any substantive reason why the Montreal Protocol should not act on HFCs.

As every nation is a member of the Montreal Protocol, and given that production and use of HFCs is not regulated under the UNFCCC or any other international accord, there is no conflict or negative consequence arising from the Montreal Protocol taking action on HFCs, all the more so as the UNFCCC only controls emissions. On the contrary, the unquestionable and enormous contribution that an HFC phase-out would make toward climate mitigation has become generally accepted within the UNFCCC with the exception of resistance offered by the same Parties that have blocked discussion of HFCs in the Montreal Protocol.



Similarly, with the increasing availability of low-GWP alternatives, and indeed the current feasibility of converting entire sectors (e.g., foams, mobile air conditioning, domestic and industrial refrigeration) to low-GWP compounds and technologies, there are no longer any technical reasons for Parties to delay action to phase out HFCs. A recent European Commission study determined that low-GWP alternatives are available in all key sectors and that 16 of the 22 major use sectors could achieve a 100% HFC phase-out by 2020, with the remaining sectors able to largely accomplish the same by 2030.[45]

Research in 2009 estimated that HFC emissions will reach between 5.5 and 8.8 GtsCO2e by 2050.[46] Recent data also supports these figures with global HFC consumption expected to reach over 3 Gts CO2e by 2030.[47] The Velders analysis also indicates that global HFC emissions will significantly exceed previous estimates after 2025, with developing country emissions as much as 800% greater than developed countries emissions by 2050.

Projected global HFC emissions in 2050 are equivalent to 9–19% of CO2e emissions in business-as-usual scenarios and contribute a radiative forcing equivalent to 6–13 years of CO2 emissions near 2050. This percentage increases to 28–45% compared with projected CO2 emissions in a 450-ppm CO2 stabilization scenario. Consequently, if left unchecked HFC use will prove fatal to efforts to arrest and reverse climate change by largely negating anticipated reductions in CO2 and other GHG emissions.

The need for action to curtail HFC emissions is critical, particularly in Article 5 countries where soaring demand for refrigeration and air-conditioning is triggering a corresponding rise in consumption. As HCFCs are progressively phased out, HFCs are set to become the dominant substitutes, and are estimated to replace over 75% of historic HCFC consumption unless the Montreal Protocol acts to transition into low-GWP alternatives. Setting a clear schedule to transition directly to low-GWP alternatives will ensure that these nations do not invest in an HFC cul-de-sac, requiring far more costly and difficult mitigation efforts in the future.

RECOMMENDATION:

- Parties should give full support to advancing an HFC amendment beginning with a formal HFC contact group and instructing the TEAP to undertake a cost and impact assessment of an HFC phase-out.

ILLEGAL TRADE

Illegal trade in ODS arose as an unintended consequence of the phase-out of CFCs in the 1990s. The accelerated HCFC phase-out agreed by the Parties in 2007 opened up new criminal opportunities, and there is now widespread concern that as the phase-out commences in developing countries there will be a sharp increase in black market trade worldwide.[48]

Indeed, booming production of and demand for HCFCs in developing countries, combined with on-going demand and limited supply due to legal restrictions in Article 2 countries have laid the foundations for a repeat of the wide-scale profiteering seen during the CFC phase-out.[49] Many of the techniques used for smuggling CFCs are now being copied by those involved in the illegal trade in HCFCs, including false labelling, mis-declaration, selling fake recycled or reclaimed material, concealment, transhipment fraud and double layering of merchandise.

The risk of illegal trade in HCFCs is particularly high in Article 5 countries. Production of HCFCs in Article 5 countries overtook that of non-Article 5 countries for the first time in 2004. China is responsible for most of this growth; in 1997 it produced 1,500 ODP tonnes of HCFCs, and by 2009 this had risen to 28,500 ODP tonnes.[50]

Industry research shows that the overwhelming demand for HCFCs in Article 5 countries is for the refrigeration and air conditioning (RAC) sector.[51] Demand for non-emissive uses such as feedstock use, not controlled by the Montreal Protocol, is also significant.[52]

Although strict restrictions on trade in HCFCs have only come into effect in non-Article 5 countries over the last few years, and Article 5 countries are not required to freeze consumption and production of HCFCs until 2013, illegal trade in HCFCs is already a reality.

The international community's experience with combating CFC smuggling offers important lessons for global efforts to control trade in HCFCs. Initially the Montreal Protocol did not take into account the possibility of illegal trade, and the problem become entrenched before action was taken to set up a licensing scheme in 1997 and financial support given to end production of CFCs in Article 5 countries.

Despite this experience, implementing the most effective policies to combat illegal trade will pose a real challenge in the years ahead. Fortunately, there are a number of solutions to choose from, including the establishment of licensing and import systems, stepping-up of enforcement capabilities and the creation of networks to improve information sharing.[53]

RECOMMENDATIONS:

- Ensure all HCFCs including feedstock.are covered by licensing systems
- Ban all HCFC-equipment exports to Article 5 countries (new and second hand).
- Monitor feedstock production to prevent black market sales.
- Use quotas, import taxes and market fees to reduce demand as part of HCFC phase-out management plans.
- Establish incentives for introduction of non-HCFC technologies, e.g., lower customs duties for non-ODS and low-GWP alternatives to HCFCs and related products and equipment.

Illegal consignment of HCFCs and CFCs seized in India.



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ODS BANKS

ODS have accumulated in equipment, chemical stockpiles, foams, and other products ("Banks") for decades and pose a huge threat both to ozone and the global climate. If ignored, ODS Banks will delay recovery of the ozone layer by years and nullify all of the climate mitigation achieved during the first Kyoto commitment period.

Historically, the Montreal Protocol has only controlled the production and consumption of ODS - not emissions.[54] As a result, ODS that were legally placed onto the market in products and equipment, but have not yet been emitted to the atmosphere, have accumulated in Banks.[55] Under the current ozone and climate governance regimes, ODS-GHGs in Banks exist in a regulatory void.

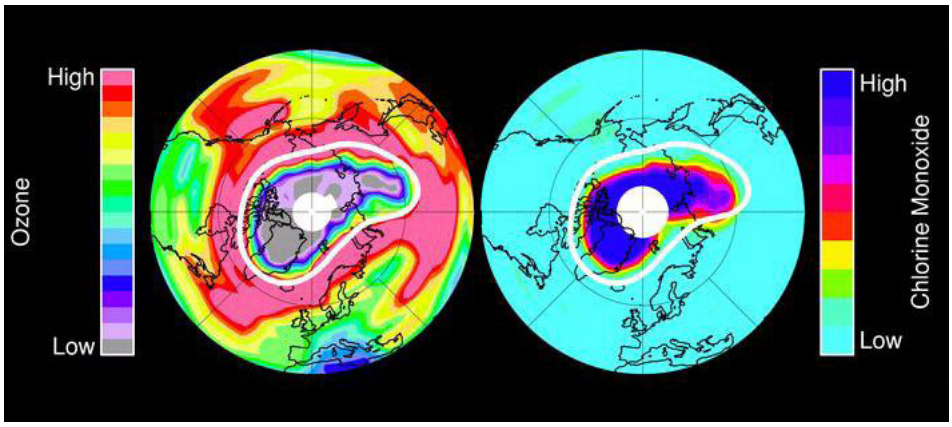
When the TEAP first assessed Banks in 2002, they were estimated at 21 GtCO2e. By 2010, this amount had dropped to 16-17 GtCO2e of ODS, 12 GtCO2e of CFCs and 4-5 GtCO2e of HCFCs.[56] As active recovery has not been undertaken, the difference in estimates is primarily due to the release of these super greenhouse gases into the environment. Given the historic rate of emissions, 2 GtCO2e or more has escaped from Banks since the TEAP's last report. To make matters worse, the amount of HCFCs in Banks are expected to rise as the HCFC phase-out continues.

Actions to recover and destroy CFCs and HCFCs in refrigeration and air conditioning Banks are among the most cost-effective climate mitigation opportunities. However, the window for reaping this double dividend on ozone and climate protection by recovering and destroying these Banks is rapidly closing:

- In developed countries/Non-Article 5 Parties, TEAP estimates that approximately 72% of CFC Banks and 40% of HCFC Banks in refrigeration and air conditioning will be emitted during the period from 2010 to 2015 releasing 0.7 GtCO2e of CFCs and 0.6 GtCO2e of HCFCs.

- In developing countries/Article 5 Parties: TEAP estimates that over 65% of the CFCs in refrigeration and air conditioning, constituting 1.7 GtCO2e will be emitted during the 2010-2015 period. In addition, HCFC consumption by Article 5 Parties will continue to rise through 2012. TEAP estimates that HCFC RAC Banks in Article 5 Parties will increase by 11% over the 2010-2015 period, to approximately 2.36 Gt CO2e in 2015.[57] All of these Banks will need to be recovered and destroyed.

In Article 5 Parties, HCFC production and consumption will increase through 2012, and these Banks will continue to be replenished with HCFCs for decades to come. In all Parties, Banks of high-GWP HFCs will become an increasing problem as HFCs replace ODS as the preferred substitute for CFCs and HCFCs. Conservative estimates project that HFCs in all Banks worldwide will be approximately 4.7-5 Gt CO2e by 2015, more than 5.7 Gt CO2e in 2020, and grow significantly thereafter.[58] These Banks will need to be managed using the same infrastructure, training, and governance institutions required to manage ODS Banks. The TEAP reports that end-of life measures have potential cumulative savings of around 6 GtCO2e."[59] It estimates that early retirement of equipment will mitigate an additional 3.5-4 Gt CO2e emissions over the 2011–2050 period, not accounting for further CO2e savings from increased energy efficiency.



Arctic ozone depletion as a function of atmospheric chlorine. The Arctic developed a record ozone hole in 2011.

It is often forgotten that promoting Banks destruction will also have significant ozone benefits. According to TEAP, end-of-life measures across all sectors have potential cumulative savings of around 300,000 ozone depletion potential (ODP) tonnes.[60] These ozone benefits must be accounted for when considering the cost of managing ODS Banks to destruction.

RECOMMENDATIONS:

- The MLF ExCom should expedite the Banks pilot projects so that cost effective plans for Banks destruction can be disseminated.

- All Article 2 countries should review and strengthen their ODS collection programs and related enforcement efforts to minimize ODS releases to the environment.

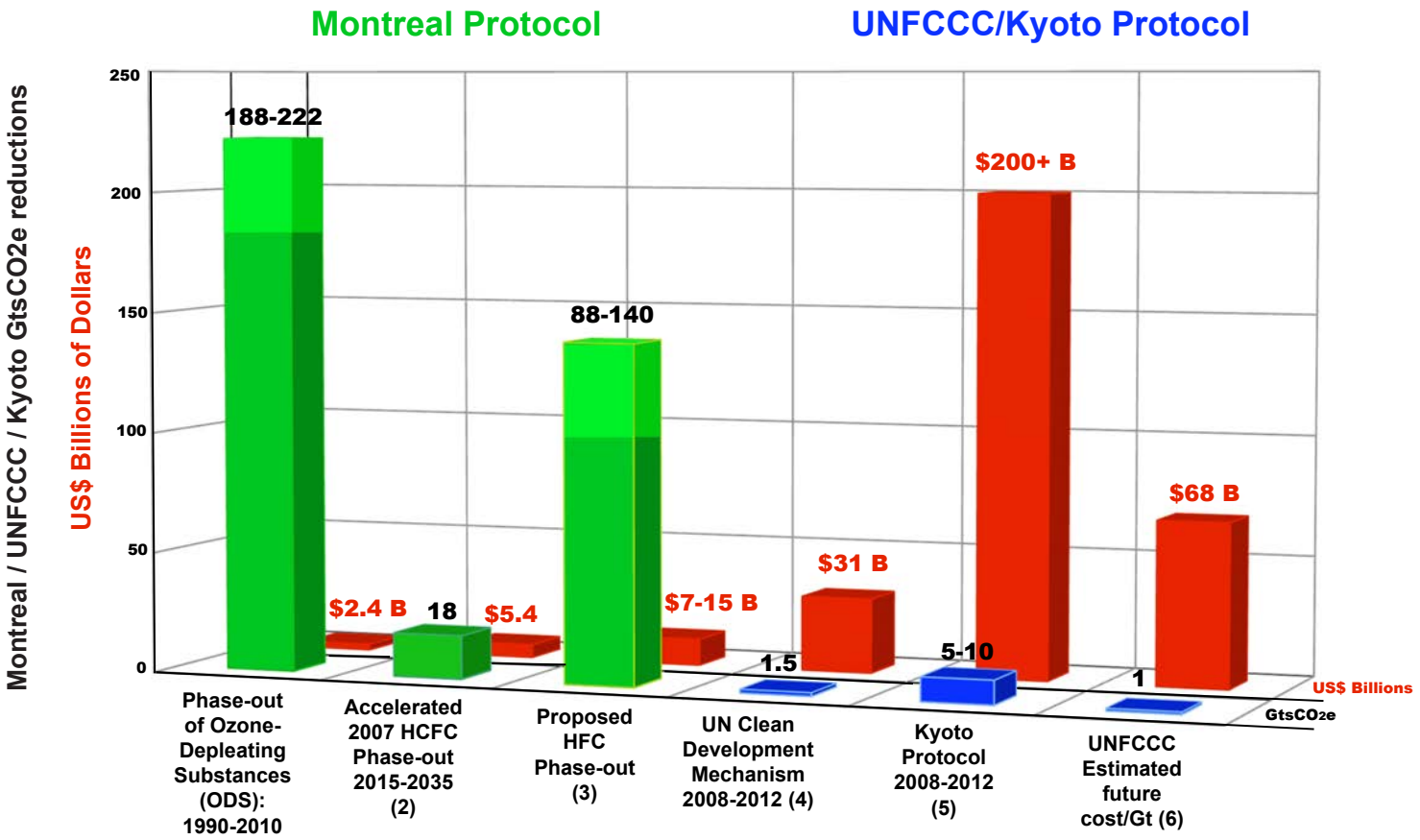
- All Parties to the Montreal Protocol must act to obtain funding to prevent this massive release of ODS and super greenhouse gases.

- A global conference on Banks should be convened with representatives of the Montreal Protocol, the UNFCCC and all sources of financing identified by the TEAP with the intent of initiating a comprehensive plan to address all Banks of CFCs, HCFCs, and HFCs.

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Comparison of Emissions Reductions and Costs



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ACKNOWLEDGMENTS

Front cover imagery courtesy of NASA

EIA's Atmospheric Campaign is made possible by support from: Rockefeller Brothers Fund.