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CASE STUDIES FROM THE UNDP PORTFOLIO AND INNOVATIVE APPROACHES TO COOLING WITHOUT WARMING









CELEBRATION OF 30TH ANNIVERSARY OF THE MONTREAL PROTOCOL IN CHINA. PHOTO CREDIT: XIAOFANG ZHOU, UNDP MPU

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FOREWORD

The 30th Anniversary of the Montreal Protocol is a momentous occasion to celebrate one of, if not the most, successful international environmental agreements to date. The Protocol's achievements are impressive: as a result of countries' shared commitments and cooperation, coupled with the daily choices of individuals around the world, over 98 percent of ozone-depleting substances have been eliminated and we are well on the way to repairing the ozone layer by the middle of the century. In the process, the Protocol has contributed to human health by helping to avoid millions of cases of skin cancer and eye cataracts, and has also had a huge positive impact on agriculture and industrial innovation.

While international efforts to completely phaseout HCFCs continue, we are also moving to the next stage – reducing HFCs under the recently agreed Kigali Amendment, thereby further amplifying the Montreal Protocol's already significant contribution to climate action. Together, the successful implementation of the Montreal Protocol and the Kigali Amendment promise to play a key role in advancing the goals of the Paris Agreement on Climate Change.

Since 1991, UNDP's Montreal Protocol programme has proudly partnered with around 120 countries, supporting them to meet their obligations under the Protocol to protect and regenerate the ozone layer while improving energy efficiency. This report highlights select cases of this work, ranging from successful examples of technological innovation, to training and certification, as well as how South-South cooperation has helped advance this critical agenda. These efforts have greatly benefitted from the very close collaboration and cooperation among the MP Ozone Secretariat, the MP-MLF Executive Committee and Secretariat and Implementing Agencies including UNDP, which has facilitated the adoption of innovative ideas and approaches to tackle the challenges at hand.

We hope the report will serve as a valuable resource for policy makers and practitioners alike, and make an overall contribution to the Montreal Protocol's continued success in advancing sustainable development around the world.

INTRODUCTION

On this 30th Anniversary of the Montreal Protocol, we are delighted to share with you examples of UNDP's work in protecting the global ozone layer, advancing sustainable cooling solutions for and tackling climate change, and highlighting linkages to the Sustainable Development Goals.

We are proud to be part of what many consider the world's most successful environmental agreement. Through the joint efforts of our project counterparts in recipient countries, as well as close coordination with MLF and GEF Secretariats, UNDP's cumulative portfolio of 2,496 projects and sector programmes in 120 countries amounting to \$829.6 million has already eliminated 70,321 ODP tonnes per annum, generated cumulative climate benefits of 6.48 billion tonnes of CO_2 eq. emissions, and catalyzed innovative solutions for environment-friendly alternatives as this report shows. Special thanks are due to ASG Magdy Martinez-Soliman, Director of BPPS, and Nik Sekhran, Chief, Sustainable Development Cluster, for their continued support and encouragement of the programme.

We are also proud that UNDP has worked across funds, with bilateral agencies and on South-South and gender aspects under this programme. UNDP will continue to support countries develop green, efficient and sustainable solutions in the relevant sectors and help countries achieve their MP phaseout targets.



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INDIA STUDY TOUR PARTICIPANTS EXAMINING FOAM PRODUCTS IN CHINA. PHOTO CREDIT: YUN WAN, UNDP CHINA

30 YEAR RETROSPECTIVE ON THE MONTREAL PROTOCOL

The Montreal Protocol (MP) on the protection of the global ozone layer is a somewhat unique example of how the world can respond when faced with a serious environmental threat. The 1974 Rowland-Molina hypothesis was that CFCs in the stratosphere – when bombarded by UV radiation – could result in chlorine radicals that could destroy large numbers of ozone molecules and lead to ozone layer depletion. This in turn would lead to more UV radiation reaching the earth, contributing to increasing levels of skin cancer and cataracts, reduced effectiveness of vaccines, as well as slower plant growth and negative impact on marine phytoplankton.

This hypothesis was ignored until the discovery of the Antarctic "ozone hole" in 1985 that shocked the world, proving the Rowland-Molina hypothesis was correct. Action was immediate. In 1985 itself, the Vienna Convention was adopted and in 1987, the Montreal Protocol (MP) was agreed upon. This was the fastest response – ever – of the international community to a severe international environmental problem. And in 1991, the Multilateral Fund (MLF) for the Implementation of the Montreal Protocol was established to assist developing countries transition away from ozone-depleting substances (ODS).

Why has the Montreal Protocol been so special?

The question is often asked why the world moved so quickly and effectively in dealing with ozone layer depletion. Several reasons come to mind.¹

• Focus The MP was set up to eliminate ODS. It has focused on that main objective to protect the global ozone layer and has binding obligations for all Parties but with different timetables to phaseout ODS. Alternatives have been developed and applied by industry rapidly. Several ODS alternatives are HFCs with high global warming potential (GWPs); it was only with the Kigali Amendment to the Montreal Protocol in 2016 that HFCs were added as controlled substances.

- New area of work and scientific consensus
 This was a new area of research and work without
 many vested interests. The analysis carried out
 by the Montreal Protocol's Scientific Assessment
 Panel (SAP), the Environmental Effects Assessment
 Panel (EEAP) and the Technology and Economic
 Assessment Panel (TEAP)) and its sector specific
 Technical Options Committees (TOCs) was accepted
 and acted upon. This also allowed for future
 amendments and adjustments to the Protocol to be
 agreed upon based on new emerging evidence.
- The role of technical innovation Skeptics had long said that CFCs were irreplaceable. However, industrialized countries took the lead in technical innovation. Developing countries under the MLF and its four implementing agencies (UNDP, UNFP, UNIDO, World Bank) – and some bilateral partners – followed rapidly with applied technical innovation almost every year, from 50% reduced CFCs during 1991-92 to even lower ODP CFC alternatives during 1993-94, to the introduction in 1994 of hydrocarbons in sectors where CFCs were used, and the introduction during 1995-96 of HCFC-22 in refrigeration and other low-ODS in the foams, solvents and fire extinguishing sectors. The speed of this technical innovation/evolution – especially during the first five years (1991-1996) of the Protocol – has not been matched by any other environmental convention or protocol.
- Chemical suppliers on board The major ODS chemical producers worldwide – instead of fighting this development – decided to join it even though they would be giving up in the beginning on a very lucrative business. They led the search for non-ODS alternatives and were able to develop new lines of business to replace those they had lost. So industry, in general, was very supportive of the MP. This public-private sector cooperation helps explain the success of the MP.

¹ Frank Pinto, Environment Initiatives by the United Nations Including RIO+20, presentation to the visiting Vienna University graduate student group to the United Nations, New York, 20 February 2015.



CHILDREN'S DRAWING COMPETITION TO CELEBRATE THE 30TH ANNIVERSRY OF THE MONTREAL PROTOCOL IN INDIA. PHOTO CREDIT: NATIONAL OZONE UNIT, INDIA

- Capacity building, training and institutional development The MLF Executive Committee (ExCom) decided early in the process to give priority to – and allocate funding for – capacity building, training and institutional development in recipient developing countries to ensure long-term success. National Ozone Units were created and strengthened, and this paid immense dividends when national compliance mechanisms had to be formulated, and these National Ozone Units were able to take the lead in developing national legislation and supporting compliance mechanisms.
- **Developed-Developing country cooperation** A unique form of cooperation between developed and developing countries under the MP that facilitate technology transfer was unprecedented.
- Effective trade regulations The MP adopted very clear prohibitions on ODS trade with non-Parties to the Protocol. This resulted in 197 Parties to the Protocol ratifying it in record time, so that recipient countries would have access to ODS during the transition process to new technologies. And these policies were strictly enforced, stopping trade in illegal ODS and thus facilitating the conversion process. It demonstrates that difficult environmental issues can be tackled and resolved successfully in an equitable and sustainable manner.²
- Special handling for SMEs During its first five years (1991-96), the MLF ExCom focused on conversion of larger ODS producing and consuming

enterprises in recipient countries, given the need to show results and tackle the largest units first. It was, however, soon recognized that there were thousands of small and medium sized enterprises (SMEs) whose ODS consumption individually may have been small but which were labour-intensive, employing a large number of workers. With larger enterprises converting to non-ODS technologies, SMEs faced the prospect of being driven out of business with the loss of thousands of jobs. So the MLF ExCom developed guidelines to facilitate the ODS transition process in SMEs, with UNDP taking the lead in developing new and innovative processes under umbrella projects which comprised local manufacture of inexpensive, low maintenance equipment which had low operational costs which the SMEs could afford. As a result, SMEs were able to successfully transition to new non-ODS technologies and maintain both market share and employment levels, thereby safeguarding livelihoods. This approach proved invaluable when dealing with MLF ExCom approved sector (e.g. aerosols, foam, fire extinguishing, solvents and refrigeration) ODS phaseout programmes followed by national ODS phaseout programmes.

The Montreal Protocol and Climate Change

While the Montreal Protocol was established to eliminate ODS, since most ODS are also potent greenhouse gases, their phaseout has had considerable co-benefits for climate change mitigation. For instance

² Suely Carvalho, Partnerships for Change: 25th Anniversary of the Montreal Protocol (1987-2012), UNDP, September 2012.

CFC-11 has a GWP of 4,750 (compared to 1.0 for CO₂) and CFC-12 has a GWP of 10,900. As the MP continued eliminating ODS, it was also able to reduce their global warming potential significantly.

In this section and in the case studies that follow, the $\rm CO_2$ eq. emissions are calculated by getting the GWP values from the latest IPCC Assessment and multiplying it by the tonnes of ODS eliminated.

The Economist³, in a special September 2014 issue on climate change, reported that the Montreal Protocol had, during the period 1989-2013, reduced cumulative CO_2 eq. emissions by between 130-135 billion tonnes⁴. So the Montreal Protocol has been a very effective climate mitigation tool compared to other global policy actions.

Some of the ODS-replacement chemicals also had significantly high GWPs. For example, HCFCs have GWPs in the 725-2,310 range and HFCs have GWPs in the 675-14,000 range. HCFCs are already in the process of being phased out. Given the huge quantities of HFCs already in use, it was argued that if the MP were quickly amended to include them, it might be possible for the MP to eliminate the CO₂ equivalent of as much greenhouse gas emissions in the next 35 years as the MP did during 1990-2010. MP Parties also felt that the increase of HFCs in sectors the Montreal Protocol institutions worked with, especially refrigeration and A/C, was due to the alternatives to ODS introduced to comply with the MP.

Proposals to include HFCs under the MP (even though they do not affect the ozone layer) were intensively discussed at MP meetings during 2009-2016 – they relate to the same sector as those addressed under the MP, and given the proven success of the MP, it was felt that the transition from HFCs to new

The MP Kigali Amendment

In October 2016, during the 28th MP MOP in Kigali, Rwanda, 197 countries adopted the "Kigali Amendment" on HFCs. The Kigali Amendment establishes specific targets and timetables to phasedown production and consumption of HFCs, with developed countries agreeing to help finance the transition of developing countries to help meet the global commitment to avoid over 80 billion metric tons of CO₂ eq. emissions by 2050.⁵

Countries ratifying the Kigali Amendment commit to cut their production and consumption of HFCs by over 80% over the next 30 years. Most developed countries will start reducing HFCs by 2019, while developing countries (so called Group 1) will freeze their HFC production and consumption in 2024.

In addition, countries also agreed to begin examining opportunities to increase the energy efficiency of appliances and equipment to achieve additional GHG mitigation, while also delivering sustainable development benefits such as better air quality, improved public health, improved energy access and energy security. Efforts made by countries to phasedown HFCs can be part of their Nationally Determined Contributions (NDCs) under the Paris Agreement of the UNFCCC.

Developing countries that are Parties to the Kigali Amendment can access financial and technical support under the MLF to meet their HFC reduction targets. In 2017, a group of developed countries donated \$27 million in "fast start funds" to help developing countries take early action and build capacities to support HFC phasedown activities; these funds will be channeled through the MLF. In addition, 19 philanthropies contributed \$52 million to support developing nations in the transition to

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