



MONTREAL PROTOCOL



OzonAction

**Protecting our atmosphere
for generations to come**
25 years of the Montreal Protocol



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Protecting our Atmosphere for Generations to Come



When future generations look back at our times, what might they consider the most significant sustainable development actions we have taken, with far-reaching benefits?

We can only speculate, but the saving the ozone layer will surely be among those they will recognise. It is an extraordinary and still on-going success story of governments, experts and ordinary people coming together, responding to scientific findings, and acting resolutely to protect all life on Earth from the Sun's harmful ultraviolet rays.

Present generations are also struggling to address another global environmental problem — the problem of climate change.

The Montreal Protocol on Substances that Deplete the Ozone Layer provides an inspiring example where the global community is truly succeeding in reaching sustainable development objectives. It has been recognized as contributing to the realization of Millennium Development Goal 7, environmental sustainability.

As we mark the 25th anniversary of the Montreal Protocol the once endangered ozone layer is recovering. It is expected to return to pre-1980 levels by mid-century, assuming all countries continue to meet their compliance commitments.

The credit for this remarkable achievement in intergovernmental cooperation and environmental governance is widely shared. It was possible thanks to the passion, dedication and hard work of thousands of individuals in government, the private sector, academia, and civil society. Their efforts have literally helped save the protective ozone shield on our

sky – and prevented millions of cases of skin cancer and cataracts and it also has made a significant contribution to climate change.

In a quarter century of successful implementation, the Protocol has been continuously strengthened to cover the phase out of nearly 100 ozone depleting substances. It is the world's most widely ratified treaty, with 197 signatories. Its Multilateral Fund has enabled an unprecedented transfer of ozone friendly technologies to developing countries assisted by a powerful network of well-trained national ozone officers in every country of the world. This unique on-the-ground asset, has been critical for ensuring that the Montreal Protocol has delivered on its promises.

The Protocol is widely hailed as a classic case of science-based policy making and action to protect a global commons. The officials, diplomats, corporate leaders and others who negotiated the Protocol built on cutting edge science.

Three scientists – Paul Crutzen, Sherwood Rowland and Mario Molina – shared the 1995 Nobel Prize for chemistry for their trail-blazing work done in the mid-1970s. A decade later, in 1985, the discovery of the Antarctic 'ozone hole' created news headlines and galvanized international action that culminated in Montreal in September 1987.

While much has been accomplished in this time, there is still unfinished business.

Efforts to protect the ozone layer and to combat climate change are mutually supportive. The most recent adjustments to the Montreal Protocol, adopted in 2007, accelerate the phase out of hydrochlorofluorocarbons, or HCFCs. These gases – widely used for refrigeration and air-conditioning -- not only damage the ozone layer, but also warm the planet. The level of climate benefits that can be achieved depends on what chemicals and technologies replace HCFCs. Their phase out thus offers a unique opportunity to acquire cutting-edge technologies that not only eliminate ozone depleting chemicals, but also saves energy and maximizes climate benefits.

Looking back on the accomplishments made so far under this treaty, I hope that the Montreal Protocol community can use the same energy, ingenuity and sense of urgent optimism to help the world solve its environmental challenges.

Marco Gonzalez



03



Montreal Protocol: The Inside Story

Mustafa Kamal Tolba



04

Twenty five years ago, the world community adopted the Montreal Protocol of the Vienna Convention on the protection of the stratospheric ozone layer. The protocol is now considered a model treaty for dealing with the global environmental problems.

In the early 1970s, ozone depletion was initially raised by the scientific community as a possible impact of high-speed, supersonic aircraft. In 1974, two scientists at the University of California, Berkeley – Sherwood Rowland and Mario Molina – reported their discovery that chlorofluorocarbons (CFCs) contribute to the destruction of ozone molecules in the atmosphere. UNEP and the World Meteorological Organization (WMO) set up a joint technical committee to report annually on the status of the ozone layer. Repeated reports indicated that the ozone layer was indeed being depleted.

These results let Governments start negotiations in 1982 for a convention to deal with the problem under the auspices of UNEP. The Vienna Convention, concluded in 1984, was a non-committing treaty that urged governments to help each other to understand more about what was happening to the ozone layer. Initially we did not succeed in our efforts to reach a more concrete treaty with specific dates and targets. Nevertheless, governments asked UNEP to continue negotiations for a legally binding treaty. Canada offered to host a Ministerial conference in Montreal in September 1987 to adopt such a treaty.

Negotiations went on for two years. During this time, medical doctors started expressing their concerns about the health impacts of ozone depletion; increases in the number of skin cancers and eye cataracts. Still, the initial media and public response was subdued.

Then, around mid 1987, a new health research report cautioned how the increased incidence of ultraviolet radiation can trigger a loss of immunity in humans. This piece of information came out at a time when everyone was concerned about HIV. The media jumped at this finding, spurring much public concern that, in turn, pushed governments in the industrialized countries to act.

Despite this, political and economic considerations delayed progress in the negotiations. In early 1987,

the governments of the United States, Canada, Sweden, Norway and Finland were very supportive of my proposal for phasing out the production and use of CFCs by the end of 2000 (20% every two years starting from 1991). But the European Economic Community (EEC), Japan and the Soviet Union did not agree to any reduction. The developing countries did not see the need for any action on their part since they were producing and using very small amounts of ODS.

First, we persuaded the developed countries to agree to a 10 year grace period for developing countries using less than 0.3 kg of CFCs per capita annually. This covered virtually all the developing countries, and removed 75% of the countries from the negotiations.

Then, we studied the specific objections raised by the EEC, Japan and the Soviet Union. The first two were based on economic considerations, while the latter stemmed from domestic political concerns.

By that time, I had been the head of UNEP for a dozen years and gained the governments' confidence. Building on this, I talked informally with each party and found viable ways of allaying their fears or addressing their needs.

Engaging the chemical industry presented its own challenges. Again, I invited some CEOs for informal consultations. The US industry leaders told me that they were one to two years from developing substitutes. I shared this news with the Europeans in the presence of the Americans. Both sides agreed to halve the production and use by 2000.

When we reached the Ministerial Conference in Montreal, we still did not have an agreement on how to achieve that cut. When the conference opened, I asked for an adjournment to allow me to continue informal consultations. We did not finish the remaining points in the informal consultations until the middle of the second day; it was a three-day conference. The media was beginning to suggest that the talks would fail. I was determined to make it work.

That evening, the Mayor of Montreal had invited the Ministers and the Secretariat of the Conference to a reception. The Ministers left early to get ready



Montreal Protocol: The Inside Story

for the reception, expecting that there would be no treaty. By late afternoon we reached agreement on the remaining points. When I went to the reception, I told the Ministers the latest news which made everyone overjoyed. The draft was presented the following morning, adopted and opened for signature.

An important innovation in the Montreal Protocol was allowing both amendments and adjustments. While amendments need ratification by parliaments, adjustments are simply decided upon by consensus at the Conference of the Parties. Adjustments are applied only to the control measures - their percentages and phase-out dates.

It was decided that the Protocol would enter into force on 1 January 1989, just 15 months after its adoption. Normally this process takes five to 10 years for a required number of national parliaments to ratify. Here, the condition was that countries with two thirds of the production of CFCs should become Parties to the treaty within 15 months. I was in regular contact with the administrator of the US Environment Protection Agency (EPA) and ministers in the EEC to get the agreements of their parliaments. It was a lot of bilateral communications, but we made the deadline!

The first Conference of the Parties (COP) was held in Helsinki in April 1989. China and India - who had not yet ratified the Protocol - led the developing countries to insist on setting up a special fund to support them with the phase-out.

Developed countries initially opposed the idea. Once again I tried my compromise formulations and proposed that UNEP works out a mechanism for financial assistance to the developing countries. This was accepted. An assessment of the finances needed - which studied China, India, Egypt and some other countries - showed that we would need around US\$ 3 billion over 10 years.

When the Parties met again in London in 1990, those countries that earlier objected to a 100% cut by 2000 agreed to it. By then, the EEC had pushed British and French companies to invest in research for substitutes, which were coming out around the

same time as the American ones.

British Prime Minister Margaret Thatcher, herself a chemist, was deeply interested in the ozone issue. She convened a conference in London before the MOP and invited several heads of state and government. The event was heavily covered by media and gave a strong push to the negotiations that followed.

During the second Meeting of the Parties in London, governments agreed to set up an interim fund with an initial capitalization of US\$ 180 million for the first three years, and with an understanding that the US\$ 180 million level could increase by up to US\$ 80 million if China and India became Parties during that time period. After closed door negotiations between the heads of delegations, the UK Secretary of State for the Environment who was chairing the conference and myself, the decision to establish the fund was finally adopted without objection. The fund was to be managed by a committee of 14 governments elected by the MOP, half from developed and the other half from developing countries. Working arrangements were made to ensure equality between developed and developing countries.

As of today, the Montreal Protocol has reduced 98% of the controlled ODS. It is also considered to have set several precedents:

- Once two thirds of delegates representing a majority of both the group of Parties operating under Article 5 and the group not so operating had approved the adjusted control measures, they became binding on its all signatories without the lengthy process of formal ratification.
- The establishment, composition and operational terms of the Multilateral Fund were also novel and results oriented.
- Designating implementing agencies - the World Bank, UNDP, UNEP and UNIDO - helped developing countries to make better use of the funding support.

The Montreal Protocol's success is a tribute to everyone who worked extra hard - and sometimes beyond their call of duty - in the early days.

Mustafa Kamal Tolba



05



A Climate Success Story to Build On

Mario Molina and Durwood Zaelke



06

In the early 1970s, scientists discovered the first human threat to the Earth's atmosphere — the threat from chlorofluorocarbons, or CFCs, to the stratospheric ozone layer.

The ozone layer shields plants and animals, including humans, from deadly ultraviolet radiation. If the ozone layer were depleted as a consequence of human activities, millions of people would develop skin cancer and health care costs would reach several trillion dollars later this century. Worldwide it would be a catastrophe.

The CFC story started in 1974 with the publication by Mario Molina and F. Sherwood Rowland of their conclusion that CFCs were migrating to the upper atmosphere and destroying the ozone layer. The conclusion was initially disputed by industry, but later empirical evidence showed beyond doubt the destruction of the ozone layer. It also showed that the Antarctic ozone hole was caused by CFCs and related chemicals, a dramatic event that helped galvanize political action. The magnitude of the ozone loss was so unexpected that scientists originally thought their instruments were faulty.

But political action to protect the ozone layer started even before the Antarctic ozone hole was discovered, as citizen consumers in the United States, Canada and Europe acted voluntarily to boycott the ubiquitous spray cans — an average of 15 cans in every household — that used CFCs as propellants for hair spray, deodorants and many other products.

National laws came next, followed by a successful effort to develop an international treaty, the Montreal Protocol, in 1987. The Montreal Protocol Parties agreed to cut 50 percent of the first group of CFCs and related chemicals within 12 years. At the next two annual meetings the parties were confident that they could do better and agreed to increase the reduction to 75 percent, and then 100 percent of CFCs, and to move their deadline to 10 years rather than the original 12 years. We saw how success truly breeds success.

The Montreal Protocol commemorates its 25th anniversary of enactment later this year, and has reason to celebrate: It has reduced nearly 100 damaging chemicals by nearly 100 percent. Because these same chemicals that destroy the ozone layer

also warm the climate, the Montreal Protocol also has made a tremendous contribution to climate protection, somewhere between five and 20 times as much as the Kyoto Protocol, depending upon how it is measured. This is a planet-saving treaty, protecting both the ozone layer and the climate system. And it can do still more.

This starts with the pending proposals to use the Montreal Protocol to phase down production and use of hydrofluorocarbons, or HFCs, that have high global warming impact. HFCs do not destroy the ozone layer, but some of them are super greenhouse gases that are now being used as substitutes for CFCs and the other chemicals being phased out under the Montreal Protocol. Because of the growing demand for air conditioning and refrigeration in a warming world, HFCs are the fastest growing climate warmer in the United States and elsewhere, growing globally at 10 to 15 percent per year.

The first proposal to do this was made by low-lying islands, led by the Federated States of Micronesia. This was soon followed by a similar proposal from the United States, Mexico and Canada.

Today, 108 countries have expressed their support in a declaration under the Montreal Protocol. If they can overcome remaining opposition from Parties where most of the future growth in the high impact HFCs will occur, the Montreal Protocol will be able to provide what is a truly significant climate mitigation in the short-term, providing an essential complement to the mitigation we must achieve from reducing carbon dioxide emissions, the key climate pollutant controlling the Earth's long-term temperature.

The Montreal Protocol Parties have always reached decisions by consensus. It is hoped a similar approach will prevail to ensure that the world does not miss a vital opportunity to provide near-term climate mitigation and to significantly slow the rate of warming.

One way or the other, it would be a fitting culmination of 25th year of the world's most successful environmental treaty to launch the formal negotiations on the amendment to phase down the high-impact HFCs when the parties meet later this year. This would also provide broader political momentum for additional action to address the accelerating impact of climate change.

CONTACT

Mario Molina, who shared the Nobel Prize in Chemistry in 1995 for his work on chlorofluorocarbons in the atmosphere, teaches at the University of California, San Diego.
Durwood Zaelke, who is president of the Institute for Governance and Sustainable Development in Washington and Geneva, teaches at the University of California, Santa Barbara.



Financing Technology Transfer and Industrial Transformation for Ozone and Climate Benefits

One hundred and forty-eight of the Montreal Protocol's 197 Parties are Article 5 countries (whose annual per capita consumption and production of ozone depleting substances or ODS is less than 0.3 kg). In 1990, an amendment of the Protocol established the Multilateral Fund to provide Article 5 countries with finance, technical assistance and technological support to assist them to phase-out their consumption and production of ODS.

Over the past 22 years, over US\$ 2.8 billion has been approved by the Multilateral Fund's Executive Committee to support over 6,800 projects and activities. Funding has been approved -- or is already committed -- for the complete phase-out of all ODS excluding HCFCs. The recipient Article 5 countries have permanently eliminated over 98% of ODS consumption and production excluding HCFCs.

This has not only resulted in ozone layer benefits but also significant benefits for the climate. Projects supported by the Multilateral Fund have not simply provided capacity building but have fundamentally and rapidly transformed a range of diverse ODS consuming industries, including the air-conditioning, refrigeration, industrial cleaning, fire fighting, aerosol and fumigation sectors, in a cost-effective manner.

On the cusp of non-HCFC phase-out in September 2007, on the 20th anniversary of the Montreal Protocol, Parties agreed to accelerate the phase-out of HCFCs -- chemicals having a high global warming potential (GWP) that also damage the ozone layer. The Fund's response was rapid. In less than seven months, the Executive Committee had started funding countries to prepare their HCFC phase-out management plans (HPMPs) to freeze, reduce and eventually eliminate their HCFC consumption. Later, after complex technical discussions that took place over several meetings, the Committee agreed on policies for funding and approving stage I of HPMPs.

By the end of April 2012, the Committee had approved HPMPs for 122 Article 5 countries: 79 low volume-consuming (LVC) countries and 43 non-LVC countries. HPMPs for the remaining countries should be in place by the end of 2012.

All 122 countries with approved HPMPs have pledged, at a minimum, to meet the first two Montreal Protocol control measures for HCFCs,

namely to freeze HCFC consumption by 2013, and to reduce 10% by 2015. Some LVC countries with a strong national level of commitment, together with former LVC countries that have HCFC consumption only in the refrigeration servicing sector, have had funding approved in principle to phase out HCFCs beyond the 10% required in 2015. Nine of these countries have already pledged to completely phase out HCFCs in advance of the Protocol's deadline.

Technology transfer protecting generations to come to encourage a transition to low GWP technologies, the Committee provides extra funding of up to a maximum of 25% above the cost effectiveness threshold for projects in which low GWP alternatives are being introduced. LVC countries are for the most part phasing out HCFC-22 in the refrigeration and air-conditioning sector, but some LVCs also have foam manufacturing sectors using HCFC-141b, which has been earmarked for conversion to non-HCFC technology.

Non-LVC countries aim to first transform their foam and refrigeration manufacturing sectors. The main target is the elimination of HCFC 141b used as a foam blowing agent, and to a lesser extent HCFC 22 used as refrigerant in the manufacturing of refrigeration and air-conditioning equipment, and HCFC 22/HCFC 142b used in the production of extruded polystyrene foams. For the most part ozone and climate-friendly foam blowing technologies (cyclopentane, CO₂, methyl formate and methylal) are being selected. Better servicing practices and enforcement of HCFC import controls will reduce the amount of HCFC-22 used for refrigeration servicing and each kilogramme of HCFC-22 not emitted due to better refrigeration practices will result in approximately 1.8 CO₂-equivalent tonnes saved.

The Multilateral Fund continues to take innovative approaches to tackle global environmental issues. The partnership between developed and developing countries, on which it is based, continues to be a prime example of successful international environmental cooperation, bringing about real changes for the environment and protecting future generations.

Maria Nolan



07



K Madhava Sarma (1938 – 2010): Pathfinder and Trail-blazer in Ozone Protection

When K Madhava Sarma left us on 30 September 2010, the ozone community lost an indefatigable pioneer whose vision, wisdom and leadership had helped shape the ozone protection regime for a quarter century.

Mr Sarma had a long and fruitful association with inter-governmental efforts to protect the ozone layer -- first as a delegate from India, and then as Executive Secretary of UNEP's Ozone Secretariat from 1991 to 2000. He nurtured the Montreal Protocol as it grew from a fledgling treaty with fewer than 50 Parties to one that had well over 150 Parties by the time he completed his term. He put it on the right path to universal ratification, a rare achievement by any international environmental agreement. He also remained engaged with the ozone community till the very end.

Mr Sarma was an illustrious member of the prestigious Indian Administrative Service (IAS) for 30 years, from 1961 to 1991, much senior to me. He was an established international civil servant by the time I joined India's Ozone Cell as Director in 1998. When I met him for the first time the following year, he immediately took me under his wings. 'Read all you can about the Montreal Protocol if you want to represent your country in international forums' he advised me. Over the years, he mentored me gently, building my capacity to deal with the complex science and mind-boggling inter-governmental diplomacy of ozone.

His amazing depth of knowledge was matched by his humility and tact. As an Indian delegate, he had been involved in the negotiations between the first and the second Meetings of the Parties (1989-1991), when he was an able spokesman for all the developing countries. He had co-sponsored many provisions of the London Amendment including one on the financial mechanism.

In his national and international capacities, Mr Sarma made many significant contributions to environmental policy, law, institutions and international cooperation. These covered not just ozone but also other multilateral environmental agreements.

During his term as Executive Secretary, Mr Sarma guided the Parties through many consequential -- and sometimes turbulent -- meetings. He negotiated the adoption of three Amendments to the Protocol,

and helped resolve key issues at those meetings, including replenishment of the Multilateral Fund. He also streamlined the administration of the institutions of the Protocol and its reporting requirements.

He received various awards and honours including the US-EPA Stratospheric Ozone Protection Award in 1996; UNEP Award for Extraordinary Contributions to Ozone Layer Protection in 1995; Special Vienna Convention Award for Ozone Layer Protection in 2005; and Montreal Protocol Visionary Award in 2007.

After retirement, Mr Sarma became an 'elder statesman' of ozone, occasionally serving as a consultant or advisor. In 2002, he co-authored (with Stephen O Anderson) 'Protecting the Ozone Layer: The United Nations History' -- the definitive and comprehensive chronicle of events and processes that helped save the ozone layer.

His enthusiasm and work ethic never changed. He worked on his last assignment despite failing health to ensure the India HCFC policy strategy he was preparing was included in India's HPMP. He employed a young expert to attend some stakeholder workshops but did not charge those costs to the project. Such was his commitment to the cause of ozone. A month later, when I represented the ozone community at Mr Sarma's funeral in Chennai, I felt like having lost my father for a second time.

Mr Sarma left behind a loving family, many publications and a global network of friends and colleagues. His lasting legacy is the slowly recovering ozone layer.





All Roads Lead to Geneva...

Switzerland is proud to host the 24th Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer (MOP 24) in Geneva from 12 to 16 November 2012.

This Meeting will still find the inter-linkages between ozone layer depletion and climate change and the search for the most appropriate ways to address them anchored at the top of its Agenda. Geneva – well known for its pragmatic and results-oriented spirit which has led to the solution of many challenging international issues – will hopefully provide an ideal setting for seeking common ground and realistic solutions.

For decades, Geneva has played a central role in international initiatives concerning the environment and climate change. In February 1979, the first World Climate Conference was held in Geneva under the auspices of the World Meteorological Organisation (WMO). A few years later, again in Geneva, WMO and the United Nations Environment Programme (UNEP) launched the major scientific initiative known as the Intergovernmental Panel on Climate Change (IPCC) whose outstanding work was recognized with the Nobel Peace Prize in 2007.

What better auspices for this significant meeting which will mark 25 years of the Montreal Protocol? Given the success in achieving reductions in controlled substances to protect the atmosphere for generations to come, the world community indeed has much to celebrate – including the universal phase-out of the production and consumption of CFCs. This meeting should inspire and challenge the Montreal Protocol community to address the remaining issues with the same proactive spirit and determination.

Switzerland is determined to continue its contributions to fight both ozone depletion and climate change. Having ratified the Montreal Protocol in 1988, Switzerland has been an active, open-minded, transparent and solution-oriented negotiating partner in the global collaborative processes to protect the ozone layer.

At domestic level, the Swiss government has banned the consumption of CFCs and halons in almost all sectors between 1991 and 1994. Since 2010, the production and consumption of all ozone depleting substances (ODS) are completely phased out in Switzerland -- thanks to the innovative and positive attitude of the Swiss companies that have introduced

safe alternatives. Within its ambitious policy on climate change mitigation, Switzerland in 2003 included fluorinated greenhouse gases in its national ODS regulations.



While regularly contributing to the Multilateral Fund for the implementation of the Montreal Protocol, Switzerland has also provided additional, bilateral funding to refrigeration projects in India, Indonesia, Argentina, Chile and Costa Rica. These initiatives aim at strengthening local technical capacities and expertise to develop and adopt environmentally safe alternatives to ODS.

Through these projects, as well as from its participation in UNEP Regional Networks of National Ozone Units, Switzerland has had many valuable opportunities to exchange experiences with peers from developing countries. Together, we have developed a mutual understanding of the specific circumstances under which the Montreal Protocol has to be implemented.

The Montreal Protocol is at the interface between atmosphere protection and chemicals management. It represents a perfect example for Switzerland's advocacy towards increased co-ordination and integration of the different international conventions on the environment. The current funding policy followed by the Ozone Fund -- and encouraged by Switzerland – clearly shows how this approach enables positive synergies and helps avoid contradictions and duplication of work.

The positive outcomes of existing technical co-operation between the Montreal Protocol and the Conventions on Climate Change, POPs and hazardous waste should encourage commitments by all institutions financing or implementing projects and activities under the Montreal Protocol to ensure that these activities contribute whenever possible to protection efforts in other sectors of the environment.

Blaise Horisberger



09

CONTACT

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The Montreal Protocol can do more!



Lena Ek



10

The Montreal Protocol is widely recognised as a success story which has put the ozone layer on the road to recovery. The Protocol has also already helped significantly to protect the global climate since ozone depleting substances are also potent greenhouse gases. The Protocol's accomplishments on both fronts shows that worldwide consensus on important environmental issues is within reach. This is an important message that gives us hope for tackling many difficult environmental problems.

In 2007, the Parties to the Montreal Protocol took a historic decision: to accelerate the phase out of HCFCs. This was unique in that it stated that alternatives to ozone depleting substances (ODS) should not create other environmental problems, especially in respect of climate.

The success of this decision depends on our common efforts to implement it. I share the concern, expressed by many Parties, about the rapid increase in the use of HFCs -- many of which have a high global warming potential.

Although more ODS alternatives are now available, some continue to use HFCs despite their climate impacts.

We must aim to protect not only the ozone layer but also our climate.

Given the tremendous success of the Montreal Protocol, and considering that HFCs are used in the same applications as CFCs and HCFCs, I see the

merits of including HFCs under the Protocol. Such a measure need not exclude HFCs from the scope of the UNFCCC or the Kyoto Protocol, or affect existing commitments by the Parties.

Indeed, we can do more to protect the climate. Sweden has been an initiator of the new Climate and Clean Air Coalition on short-lived climate pollutants. Its aim is rapid action on methane, black carbon and short-lived HFCs. This can delay climate change, reduce health impacts from air pollution and also increase crop yields. Introducing cost effective and environmentally friendly alternatives to HFCs is part of the Coalition's aim. Measures within the Coalition should be seen as complementary to efforts under the UNFCCC and the Montreal Protocol. It is extremely important that Parties continue to work hard to achieve targets in both these global treaties.

The Montreal Protocol has achieved much in 25 years, but still faces challenges. While we need to retain our focus on finalising the phase out of controlled ODS, including exempted uses, we need to address the remaining uncontrolled substances as well. For example, the use of methyl bromide for quarantine and pre-shipment treatment is not yet regulated. It is the same with ODS used for feed-stock and as process agents. Illegal trade in ODS is another problem.

The upcoming Meeting of Parties the Montreal Protocol is an opportunity to do more for both the ozone layer and climate. I sincerely hope that we will be able to continue the success story of the Montreal Protocol.

C O N T A C T :: Ms Lena Ek Minister of the Environment, Sweden



Keep the Commitment and Win the Future

During the past 25 years, the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer have continued to improve the legal framework and administrative mechanisms of the Protocol, and to promote the protection of the ozone layer and phase out ozone depleting substances (ODS) using scientific, technical, administrative and economic approaches. They have collectively achieved remarkable results, and the Protocol has become a model for implementing international environmental conventions.

In my view, there are several major reasons for this success.

- First, under a common vision of protecting the ozone layer, all Parties support and cooperate with each other adhering to a consistent spirit of consultation, especially following the principle of common but differentiated responsibility.
- Second, Parties involved in the decision process continue to pay attention to independent scientific, environmental, technological and economic feasibility assessments, and have developed a more impartial and practical implementation schedule.
- Third, the establishment of a special Multilateral Fund committed to providing assistance and support to developing countries.
- Fourth, setting up global and regional networks for OzoneAction, through the strengthening of relevant international organizations, implementing agencies and capacity building of each country's ozone agency.
- Fifth, the introduction of advanced environmental protection and energy saving technology for the sustainable development of industry has led to a win-win situation, benefiting both the economy and the environment.

By 1 January 2010, the world's developing countries achieved the comprehensive phase-out of CFCs, halons and carbon tetrachloride and the other major ODS. This is the Montreal Protocol's greatest success in the past 25 years.

In September 2007, at the conclusion of the 20th anniversary of the Protocol, an accelerated phase-out plan of HCFCs was adopted, and objectives of the participating Parties in next 20 years clarified. Although the substantial phase-out of HCFCs has only just begun, we are delighted to see that industry

is applying the new alternative technologies. These technologies will not only eliminate damage to the ozone layer, but also reduce adverse effects on climate.

At the same time, we know very well that promoting new technologies is not a simple technical transformation. It requires hard work from government and industry. There are only a few months to go before the HCFC freeze year of 2013. I sincerely hope that all Parties will continue to cooperate so that the freeze target is successful.

As a Party to the Montreal Protocol since 1991, the Chinese Government has always strictly abided by the obligations of the Protocol, and has actively phased out ODS. During the past 20 years, China has gradually developed comprehensive policies, regulations and a management system for the protection of the ozone layer. It has constantly strengthened compliance through capacity building in various sectors and levels of Government, and has developed an effective management mechanism.

In June 2010, the State Council of China formally promulgated regulations for ODS, providing a strong legal guarantee of the long-term development of China's protection of the ozone layer.

The Ministry of Environmental Protection leads China's performance in meeting Montreal Protocol objectives by coordinating the activities of other related ministries and of industry; developing and implementing the China Country Program for ODS Phase-out and sector phase-out plans; and applying for Multilateral Fund support. It has successfully phased out a total of over 100,000 tonnes of ODS production and 110,000 tonnes of ODS consumption. This accounts for half of the entire phase-out volume of developing countries.

It is worth noting that 2012 is also the 40th anniversary of the adoption of the Declaration on the Human Environment at the UN Conference on the Human Environment in Stockholm, and the 20th anniversary of the UN Conference on Environment and Development in Rio de Janeiro.

At a global level, there still are many challenges in managing the environment and natural resources on the road to sustainable development. We in China reaffirm our commitment to working together to pursue our common goal of "patching up the sky".

Zhang Lijun



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"One commentary stood out above all others: the poet Archibald MacLeish's essay 'Riders on the Earth'. 'For the first time in all of time,' he wrote, 'men have seen the Earth: seen it not as continents or oceans from the little distance of a hundred miles or two or three, but seen it from the depths of space; seen it whole and round and beautiful and small.' This view, he prophesied, would remake mankind's image of itself. 'To see the Earth as it truly is, small and blue and beautiful in that eternal silence where it floats, is to see ourselves as riders on the Earth together, brothers on that bright loveliness in the eternal cold – brothers who know that they are truly brothers.'24 " Earthrise, by Robert Poole

The Montreal Protocol: The View from 25 Years

Nearly 50 years ago, men walked on the Moon and returned alive, having seen the Earth rise above the lunar horizon. The last 50 years also saw the rise of a great environmental peril: destruction of Earth's ozone layer. This peril was – and continues to be – addressed with focused intensity by people from every nation through their collective commitment to the future of life on our planet.

The lens that focuses this collective commitment is the Montreal Protocol, the international treaty to protect the ozone layer, and this September 16 marks its 25th anniversary. From this vantage point, we have a wider view of the Treaty's value.

In the relationship between science and policy, in advancements in key technologies, in ongoing national implementation of chemical controls, and in the framework that engages many players to actively balance rigorous measurement with selective flexibility, we see that the Montreal Protocol allows a uniquely powerful vision for collaborative effort.

When the Montreal Protocol was agreed in 1987, initial goals for reduction of ozone depleting substances (ODS) were modest. But from the start, the Treaty presumed that goals should be informed over time by scientists asking: what is necessary to solve the environmental problem?

As scientific understanding of ozone destruction became more precise, Parties responded by strengthening the Treaty. From an initial 50% cut in a subset of ODS, to fuller elaborations through amendments agreed in London (1990), Copenhagen (1992) and Beijing (1999), the treaty has sharpened its focus from a measure fit only to slow ozone layer destruction to one capable of assuring its restoration.

In hindsight, we can appreciate that the Montreal Protocol's successive ODS production phase-outs drove a process larger than merely changing chemicals used in equipment. Progress in energy efficiency, leak prevention and pollution reduction have translated Treaty-driven technology change into wholesale market transformation, allowing global companies to leverage the opportunities created by the Protocol's goals to innovate and improve.

For example, when the Montreal Protocol was signed, U.S. residential air conditioning performed with an average Seasonal Energy Efficiency Ratio (SEER) under 9 -- lower if installed or operated improperly. Repair or ultimate disposal of equipment commenced with venting refrigerant to the atmosphere. The best U.S. equipment now exceeds SEER 24, and refrigerant is routinely recovered for reuse. New low-GWP options are beginning to be used that promise even better results.

Thus, the Montreal Protocol's ODS reductions have catalyzed leadership companies and innovators worldwide to help protect ozone – and to see in this effort a key market advantage. Their drive and creativity to improve technologies and products is strengthened by Treaty schedules, which provide certainty to encourage investment. Innovators continue to stretch the limits of the best that is technically achievable in myriad industrial and consumer contexts. Taken together, their efforts have

quietly – and with minimal disruption to consumers or markets – revolutionized industrial sectors.

The role of governments, negotiators, regulators and implementers who set the Treaty's course is also central to the Montreal Protocol's success. Ever-stronger Treaty goals have been hammered out in respectful and frank international exchanges, then translated into meaningful national limits. Thanks to the efforts of implementers from all sides, from the Ozone Secretariat to individual national ozone units -- fidelity to treaty goals and its necessary antecedent, careful measurement of controlled ODS -- underpins all aspects of the Treaty's operations.

True to its pragmatic history, the Montreal Protocol balances this rigor by welcoming even limited improvement as a starting point. In the near term, the treaty allows flexibility to recognize differing national circumstances and uses of high social value. Exemptions that make sense are explicitly accommodated – but also carefully reviewed. This, too, ultimately strengthens the Treaty's credibility.

Environmental non-governmental organizations (NGOs) have played a vital role in shaping flexibility in specific instances, and more broadly in the Montreal Protocol's vision of its future. They keep aspirations high, and ensure that our focus remains on how best to use the Montreal Protocol's visionary framework to maximize future environmental benefits.

A vital learning from the past 25 years, then, is that global environmental problems are best solved together, with key roles for all nations and all sectors of civil society. The Treaty's vision is broad; it is not a narrow view in which governments alone are held to have sole capacity to clearly see the path forward. The vision of scientists, regulators, diplomats, industry and sector experts, environmental NGOs and others has created an accord that, above all, is hopeful. The Treaty's starting points were modest, but its goals remain bold. This, too, is key to its success: an environmental vision of the future must be hopeful if it is to motivate and inspire.

The Treaty was most recently strengthened in 2007 in Montreal, when Parties agreed to tighten controls on hydrochlorofluorocarbons. A stirring moment of negotiations came when the gavel banged down late in the evening of the last day, to seal the Parties' agreement.

But the context for this historic accord was set in the opening of that 20th anniversary meeting. Over massive video screens, astronauts from the International Space Station orbiting Earth saluted delegates, shared their hopes for our success, and also their unique view from far above the Earth's stratosphere.

The Montreal Protocol itself offers us a unique view of the Earth. It is a lens through which Parties share a vision of environmental improvement. In this treaty, we see ourselves as fellow riders on a shared planet, as collaborators in the demanding work of innovating a sustainable future, and as filial children who have inherited, and aspire to pass on unstained, this beautiful Earth.

Drusilla Hufford



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CONTACT

Drusilla Hufford Director of the Stratospheric Protection Division of the U.S. Environmental Protection Agency. The views expressed herein are her own and do not necessarily represent the views of the EPA





Low Volume, Full Participation

The Montreal Protocol is the most successful Multilateral Environmental Agreement. This did not happen by chance, but was accomplished through a sustained and collaborative process. Low Volume Consuming (LVC) countries have made a substantial contribution to this global effort.

During the CFC phase-out, 103 countries were classified as LVCs – those consuming less than 360 tons of ODS. Although they were non-producers and their collective emissions impacted the ozone layer far less, LVCs took many actions to replace ODS as did all other Article 5 countries.

The total volume of ODS phased out from the LVCs may seem relatively small. However, LVCs have accounted for phasing out approximately 7,742 tonnes of ODS, approximately 4.7% of the total ODS phased out by Article 5 countries.

This success can be attributed to many factors:

- *The political commitment of respective governments:* These actions have provided invaluable support mechanisms and created an enabling environment to drive the initiatives on the Montreal Protocol.
- *Financial cooperation:* Setting up the Multilateral Fund in 1990 and the strategic financing of Institutional Strengthening Projects (ISP) in LVCs were crucial for sustaining momentum in phase-out. The ISP was the single most important arrangement that allowed LVCs to meet their obligations.
- *Technical cooperation:* Research work by the Assessment Panels, and the technical support provided by the Implementing Agencies on technology options, provided the knowledge and skills base to LVCs on appropriate choices.
- *Education and awareness:* The awareness raising initiatives provided all stakeholders with accurate and latest information.
- *Participatory governance:* The involvement of LVCs in the negotiation processes at the Executive Committee meetings and in the Meetings of the Parties enabled sound decisions and policies for LVCs.

THE CHALLENGES AHEAD

LVCs face a new set of challenges in phasing out Hydrofluorocarbons (HCF). Although these may appear formidable at first glance, they are indeed surmountable.

- The lack of alternatives with low Global Warming Potential (GWP) as replacements for all applications. Since LVCs are widely regarded as “technology takers”, the decision as to what technologies are introduced is usually made outside of these countries. Already, there is sufficient evidence that points towards a heavy influx of HFC technologies with significantly higher GWP as replacements for the HCFC based equipment currently in stock.
- There is a much larger volume of substances to be phased out and there is an apparently limited amount of resources and capacity -- both human and financial -- to manage the process.
- The uncertainty of the financial architecture in the years leading up to and beyond 2030 to fund institutional and phase-out activities is a cause for concern. At the last replenishment of the Multilateral Fund (23rd MOP), there was no increase in funding for the triennium 2011 - 2014.
- The willingness by LVCs to accept and/or adapt to new and emerging technologies and their economic implications. Those LVCs with economies in transition are more likely to introduce cheaper technologies as opposed to the more expensive yet environmentally friendly ones.
- To sustain phase-out and guard against “backward retrofitting”, countries need mechanisms for continuous compliance monitoring and enforcement after phase-out targets are met. Illegal trade in ODS will continue to be a challenge.
- Maintaining stakeholder confidence and continued involvement. This becomes necessary as the refrigeration and air-conditioning industries evolve and different forms of alternative technologies are introduced.

With the experiences gained in phasing out CFCs, LVCs are poised to meet the Stage I and Stage II phase-out targets of the Montreal Protocol.

Leslie Smith



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A Tale of Two Protocols

I would like to congratulate the Montreal Protocol on Substances that Deplete the Ozone Layer on this important anniversary.

In its 25 years, the Montreal Protocol has made a name for itself as one of the most successful multilateral environmental agreements of its time. Parties to the Protocol are well on the way to phasing out ozone depleting substances (ODS).

Montreal also showed the world what international cooperation at its most decisive and inclusive can achieve. And it did something unexpected: it was an effective early move to protect the climate, as many ODS are also potent greenhouse gases (GHGs), by leading to a significant drop in such emissions between 1988 and 2010.

I celebrate that the Montreal and Kyoto Protocols work closely together to coordinate efforts to mitigate fluoridated gases. Under the Montreal Protocol governments agreed on an accelerated freeze on and phase out of HCFCs, benefiting both the ozone layer and climate change. Meanwhile, Parties to the Kyoto Protocol decided that the Clean Development Mechanism should not inadvertently lead to an increase in HCFC-22, a gas regulated by the Montreal Protocol.

However, cooperation could be further strengthened on both implementation of mitigation action and identifying areas for future actions. This

is important to preserve gains, e.g. in the use of hydrofluorocarbons (HFCs) as replacements for more potent ozone depleting substances. Some HFCs could significantly influence climate in the future: without intervention, the projected increase in HFC emissions could cancel out much of the climate benefit achieved so far under the Montreal Protocol.

There are viable options on the table to prevent this from happening. They include using alternative methods and processes, using non-HFC substances with low or zero global warming potential, or using HFCs with low global warming potential.

Governments are this year focused on evaluating and calibrating sustainability goals. Under the UN Framework Convention on Climate Change, we are negotiating the most detailed and encompassing agreement to respond appropriately to climate change.

This is to be completed by 2015, and to enter into force by 2020. Meanwhile, Parties to the Kyoto Protocol agreed on a second commitment period of the Protocol, starting in 2013. Under the parent Convention, countries have put forward pledges to reduce or limit emissions before 2020.

If fulfilled at their maximum potential, these would still be some 6 Gigatons of carbon dioxide equivalent short of keeping the global average temperature rise to the agreed 2 degree Celsius goal above pre-Industrial levels. To deal with this, governments launched a work programme at the 2011 Conference of the Parties in Durban to increase mitigation ambition, to close that gap. In 2013-15, they will review the 2°C goal based on the latest science.

International cooperation at all levels is essential for the world to reach a low-emissions, climate-resilient future. Such action is now more important than ever to chart an efficient path forward to the vision of a sustainable future— a vision that both Protocols and their parent Conventions contributed to building, through their shared principles, experiences and journeys.

I look forward to enhanced cooperation with the Montreal Protocol, its Parties and with the Ozone Secretariat.

Christiana Figueres



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C O N T A C T

Christiana Figueres Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC)





Assessment Panels: Hard Evidence for Right Decisions

The Assessment Panels were created by a Meeting of Parties (MOP) decision in 1989 to advise the Parties on the changing scientific, technical and economical understanding of the ozone layer depletion issue.

The architects of the Protocol realized that scientific understanding of ozone depletion would improve over time and that the original control measures could prove to be inadequate. At the same time, they realized that technology innovation would likely make future controls more technically and economically feasible, and much easier to achieve than industry believed at the time. So a process of on-going assessment of science, technology and economics was built into the Montreal Protocol and still continues to serve the Parties.

The 25th anniversary of the Montreal Protocol is a good opportunity to acknowledge and thank all past and current members of the three Assessment Panels, namely Science, Environment Effects and Technology and Economics.

Each Panel has played a critical role in the Protocol. As a former co-chair of the Technology Assessment Panel (TEAP), I want to share my perspective on factors I consider critical for the success of the assessment process.

The first factor is the quality of its membership. Sound expert advice ensures the Panels' credibility. The assessment process depends on the members' knowledge which has to be substantive and diverse enough to cover different technologies, sectors and applications. They also have to cover particular circumstances of different countries and regions.

Most of the TEAP, Technical Options Committee (TOC) and Subsidiary Body members come from affected industries. The industry has been a constructive partner: many corporations offered their experts as TEAP, TOC and Subsidiary Body members. This contribution of employees' time and sponsorship of travel expenses have been crucial to TEAP's success. The Montreal Protocol Trust Fund supported developing country experts' participation in meetings.

Within the Panel itself, the composition of members is important when considering technology transfer flows

and regional/global situation regarding the status of new technologies. A technology solution appropriate for one region may not be feasible elsewhere. This balance enables TEAP to assess better the extent to which alternatives are technically and economically feasible throughout the world.

Technology transfer during the first 20 years was clearly a North to South process. And TEAP has had a critical mass of international experts to provide the advice that Parties needed. Now, the manufacturing of chemicals and products has shifted to the South. We can see the importance of South-South technology transfer: these are shaping the international market of products containing ODS and alternatives.

TEAP representation of industry experts continues to be mostly from non Article 5 countries. We should heed TEAP's call to increase its Article 5 representation as well as improve the regional balance of its membership.



Second factor is technical and scientific integrity, and objectivity. Panel members must maintain a 'firewall' so the experts who generate the information are not the ones making the policy decisions. When these two groups cross their boundaries, the assessment process results can be challenged. This has to be avoided at all costs. Parties

must have confidence in the Panels' competence and objectivity.

The Panels go through exhaustive peer reviews and have a multitude of stakeholders. These processes are very complex. The MOPs and Open Ended Working Group (OEWG) meetings are key opportunities for communications between the science and technology communities of world experts. The Ozone Secretariat has facilitated the process so assessment results are communicated clearly and respond to Parties decisions.

Panel members must be able to communicate clearly the current scientific and technical knowledge, for the Parties to make informed decisions. Parties can then decide if they have adequate information and analyses from the experts.

Suely M. Carvalho



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CONTACT

Dr. Suely Machado Carvalho served as TEAP Co-chair for 10 years before joining Director Montreal Protocol Unit, UNDP



Fresh Challenges for a Proven Protocol

DuPont shares the widely held view that the Montreal Protocol is the most successful multilateral environmental agreement in history.

In the 25 years since it was signed, the Protocol has made incredible progress toward protecting the ozone layer. We are proud of the role DuPont has played in supporting the agreement since 1986.

Three key elements contributed to the Protocol's success.

- It aligned the goals of governments, industry and environmental organizations, grounded in sound science. This facilitated the development and evolution of a regulatory structure that spurred innovation.
- It combined flexibility with regulatory certainty, enabling governments to adapt the programme to their own circumstances. Also, by recognising HCFCs as interim solutions, it allowed more rapid progress than if only non-ozone depleting solutions were allowed. In addition, it provided confidence in the market for environmentally superior products, which enabled rapid progress in technology development and ultimately, in ozone layer protection.
- It made special provisions for developing countries, primarily through the Multilateral Fund, and an allowance for later implementation of schedules to reduce the use of ozone depleting substances.

The Protocol stimulated innovation on many fronts. In some applications, CFCs were replaced by entirely new technologies. For example, the electronics industry identified processes that did away with the need for cleaning solvents. Overall, about 80 per cent of CFC use was eliminated through the use of non-fluorochemical technologies. For the remaining 20 per cent, DuPont and others rapidly developed and commercialised HCFC and HFC alternatives, while equipment manufacturers adapted their products to use these alternatives.

HFCs are an important solution in addressing ozone depletion and are currently responsible

for less than 1 per cent of global greenhouse gas emissions. Nonetheless, projected growth in their use through 2050 could reverse much of the greenhouse gas reductions already made by the Protocol. Therefore, by modifying the Montreal Protocol regime to address HFCs, we can make a significant contribution to reducing global greenhouse gas emissions.

The Montreal Protocol will enter an important new phase in 2013 as emerging markets begin to meet its mandated freeze. Countries will then have the opportunity to continue the Protocol's unprecedented success in climate protection by approving an amendment that has been offered. This amendment would cap and reduce HFCs, using the Protocol's existing framework to allow countries to unite in addressing the climate change impact of HFCs. We strongly encourage the nations of the world to adopt this amendment, taking an important step in greenhouse gas reductions.

Estimates vary on potential climate benefits of a programme to cap and reduce HFCs, but they range as high as a cumulative reduction of more than 100 Gigatonnes carbon dioxide equivalent through 2050.

The Montreal Protocol continues to encourage technological innovation toward more environmentally superior alternatives to meet needs such as refrigeration, air conditioning and thermal insulation. Extending its model could continue to drive the availability of safe, cost-effective, energy-efficient solutions with lower impact on the global climate in the decades ahead.



Linda J. Fisher



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CONTACT

Linda J. Fisher Vice President - DuPont Safety, Health & Environment and Chief Sustainability Officer. Prior to joining DuPont in 2004, Ms. Fisher served in a number of key leadership positions including Deputy Administrator of EPA



Achieving the Right Chemistry



INNOVATIVE FOAM PROCESSING EQUIPMENT HELPS IN MEETING STRINGENT DEADLINES

The progressive replacement of substances that deplete the stratospheric ozone layer or cause global warming demands appropriate technical solutions. In search of such solutions, it is necessary to comply with the physical and processing characteristics of new alternative chemicals.

Cannon have been on the forefront of this technological revolution. It has developed patented solutions for the use of Liquid Natural Carbon Dioxide (CO₂), today widely used for the expansion of flexible foams.

In the field of rigid foams for insulation, where the blowing agent also influences the transmission of heat, a number of chemical alternatives have been developed in past 20+ years. The most used until now have been various types of pentanes, flammable hydrocarbons whose handling and processing require special care to avoid explosions. Special equipment designed by Cannon has been supplied to thousands of end users around the world to store, premix, meter and mix these flammable products more safely and efficiently. Numerous solutions are available for new foaming plants or to retrofit existing ones.

New chemicals are available today to be used as co-blowing agents to further reduce the thermal conductivity of the pentane-blown foams: Hydrofluorocarbons (HFC-245fa and others), Hydrofluoroolefins (HFO-1366 mzz, HFO-1234, etc.) and others (Methyl Formate, Methylal, etc.) featuring lower global-warming potential and better insulation values than HFCs.

Also for these new blends of expanding agents, Cannon have developed adequate processing solutions, based mostly on the successful blending concept of the Multi EasyFroth premixing unit.

The selection of the most appropriate blowing agent must be made by the foam manufacturer in accordance with the desired economic, processing and performance targets.

The wide experience matured in this field – in the past three decades and in every country and application – is constantly transferred to customers when they select Cannon as supplier.

SAGA: MAKING A DIFFERENCE IN ARMENIA

SAGA Ltd, a 100% owned Armenian company was founded in 1995 as a refrigeration equipment trading company and later expanded its activities into manufacturing of commercial refrigeration equipment.



In 2001, the company manufactured display cases, chest freezers, bottle coolers and visi-coolers with production of 6,000 units per year using CFC-11 as the polyurethane (PU) foam blown agent and CFC-12 as the refrigerant. With a grant from GEF, the company phased out the total annual consumption of 6.5 ODP tonnes. Through the conversion of SAGA Ltd., Armenia's national ODS consumption was reduced by 6.5 ODP tonnes.

The new production line provided by UNDP and UNOPS allowed SAGA Ltd to adapt the new HCFC-141b PU foam formulation in manufacturing insulation panels. The high capacity 80 kg Cannon foam dispenser replaced manual foam mixing and pouring operations. New HCFC-22-based refrigerant charging equipment, new vacuum pumps and leak detectors provided for assembly line enhanced the production capability of the company. The company purchased and installed a new 6-meter hydraulic press in new production facility that enabled the company manufacturing high quality insulation sandwich panels. This equipment, coupled with Cannon dispenser, significantly increased both productivity and quality of SAGA's manufacturing operations.

Currently, the company is one of the most important manufacturers of commercial refrigeration equipment in the Caucasus region producing about 3,000 units in 2011 and exporting its product to Georgia, Kazakhstan and Russia. The present project will convert all HCFC-22 based commercial refrigeration to hydrocarbon refrigerant (R-290). It will also convert the current use of imported HCFC-141b based formulated polyol in foam blowing to the use of cyclopentane. The overall impact would be to completely transition the manufacturing facility to natural refrigerants and low GWP blowing agents by 2013.



Hovik Dallakyan and Maurizio Cusinato



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Cannon Pentane Module

Special precautions are demanded for handling potentially explosive Blowing Agents: this Cannon dosing module for Pentane-blown formulations features enhanced ventilation and gas detectors to remove any trace of flammable gas from the working area.



CONTACT

..... **Maurizio Cusinato** Executive Director Cannon Afros, Italy
 **Hovik Dallakyan** Deputy Director of Saga, Armenia



A Choice of Futures



The 25th anniversary of the Montreal Protocol is an occasion to celebrate the collective efforts of the international community to save the planet from human destruction. This level of successful international cooperation in response to an environmental crisis is unprecedented. Then again, it is – and was – an accurate reflection of the danger the depletion of ozone layer could bring to the inhabitants of our planet.

The causality between ozone layer depletion and CFC emissions was first hypothesized in 1974. The ozone layer is expected to sufficiently (though not fully) recover by mid-century. This means that it will take nearly 75 years to restore this one aspect of natural equilibrium that was lost due to human action.

The ozone crisis teaches us many things. Chief among them is the fact that once human activity tips nature's balance, it takes dramatic action and many decades to undo that damage. As of today, we do not know if the damage can be fully repaired. This lesson must guide us now on another atmospheric problem -- scientists warn us that we are within a decade of reaching cataclysmic climate 'tipping points'.

As we reflect on the successes of the Montreal Protocol, we must also ask how much more could the Protocol have achieved -- and how much more it can still achieve -- to protect the ozone layer and the climate.

The Montreal Protocol literally saved the planet from imminent emergency by phasing out CFCs. Since it was signed, the same companies have introduced a series of chemicals that are harmful to the ozone layer and the climate. So unfortunately, there is still a way to go.

The Montreal Protocol could have achieved much more to protect the ozone layer and the climate had it not been subject to industry's agenda, which paved the way for the widespread adoption of HCFCs and HFCs. In our view, the Montreal Protocol missed an opportunity to encourage the development and marketing of environmentally safer alternatives to CFCs, such as natural refrigerants.

In the early 1990s, the chemical industry claimed that it was not possible to meet our refrigeration needs without their fluorocarbon products. Yet as always we must be careful accepting industry rhetoric, for in 1993 Greenpeace proved that it was possible to develop (and make freely available) the Greenfreeze hydrocarbon technology for domestic refrigerators.

As refrigerants, hydrocarbons are safe for the climate and the ozone layer. Today, there are approximately 650 million hydrocarbon refrigerators in the world, and by 2020, the Greenfreeze technology is expected to represent 80% of global refrigerator production.

Natural refrigerant alternatives are now available for HCFCs and HFCs in most applications. Globally, businesses and manufacturers are building momentum, as is evident by the work of initiatives like Refrigerants, Naturally! and the Consumer Goods Forum, a group of 650 global corporations that have committed to phasing out HFCs from 2015. There are also new models of highly-efficient natural refrigerant air conditioners in China and India. Clearly, with our human passion for curiosity and inquiry, and a little innovation, sustainable long-term solutions are indeed possible.

A world without the harmful effects of HFCs is within reach -- but it requires motivated action and urgency on the part of governments. We must look beyond short-term returns on investment to the long-term consequences.

We humans share many global commons, including the atmosphere, which reminds us of the fragile interconnectedness of all life. Can we create the future we want by design, or in response to disaster? The Montreal Protocol is one of our better international examples of forward-thinking design. I can't think of a better way to celebrate its 25th anniversary than to join forces with the UNFCCC in a bold initiative to eliminate all HFCs by 2020, and to replace them with forward-looking, sustainable alternatives.

Kumi Naidoo



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A Winning Formula

The 25th anniversary of the Montreal Protocol provides an important moment to reflect on what has allowed this historic treaty to operate successfully and achieve its goals.

Often cited as the most successful multilateral environmental treaty ever negotiated, the United Nations Environment Programme's recent "Fifth Global Environmental Outlook" highlighted the Protocol's success, and noted "substantial progress" to "eliminate consumption of ozone-depleting substances."

This progress translates into real benefits for real people, as the report goes on to estimate that the Montreal Protocol will avoid 22 million cases of cataracts for people born between 1985 and 2100, and 6.3 million skin cancer deaths up to 2165 in the United States alone.

The Alliance for Responsible Atmospheric Policy, which was originally organized to address this issue in 1980, started as a US-only industry coalition. It has since evolved into a global coalition that works effectively with partners around the world, including those in developing countries.

The participation of industry -- individually and through organizations such as the Alliance -- has been an important component in the success of this environmental protection effort. Industry leaders and experts have been involved in the technological assessment and policy process, and through continuously improving fluorocarbon-based technologies. Reduction in reliance upon ozone-depleting compounds has been dramatic, sustained and ahead of schedule.

Meanwhile, these technologies -- including refrigeration and air conditioning, foam insulation, medical aerosols, technical aerosols, and solvents -- have enabled economic development in both developed and developing countries but without further depleting the ozone layer.

The Montreal Protocol may not have achieved its environmental objectives as effectively without industry leadership on the technology front. The Alliance has worked to find opportunities to manage the transition to safe and effective substitutes. This effort required the industries to take many other factors into account in developing and using new compounds. These included considerations of safety, flammability and energy efficiency.

Many others, such as government leaders, environmental NGOs and the scientific community, also played key roles in this effort. The formula for the Montreal Protocol's success—science driven goals, managed transitions for new technologies, special consideration of developing country circumstances, and financial assistance for developing country transition—is a formula that worked. However, care must be taken to ensure steadiness of approach, and consistency if this kind of formula and model are used to address other environmental problems.

The current challenge facing the industry and the wider global policy community is to mitigate the environmental impact of these fluorocarbon technologies on global climate change. As we work to address this challenge, it is important to keep in mind what has made the Montreal Protocol a success; we should not stray from this winning formula.

As we address the climate impact of fluorocarbon technologies, it is important for the global policy community to maintain regulatory consistency without picking 'winners' and 'losers'. This will foster global technology investments that will allow fluorocarbon technologies to continue to contribute to economic growth while further reducing their environmental impact.

There is a great deal of work ahead to address ongoing challenges. However, as we pause to reflect upon a successful quarter century of the Montreal Protocol, the Alliance is confident that adhering to the Protocol's formula will lead to an equally meaningful celebration of its 50th anniversary.

Phil Lapin and Dave Stirpe



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CONTACT

Phil Lapin Chair of the Alliance for Responsible Atmospheric Policy
 Dave Stirpe Executive Director of the Alliance for Responsible Atmospheric Policy



The Advantage of Being An Early Bird

«Greener growth needs to be in the heart of the global economic agenda from now on if a growing world population is to enjoy prosperity without exhausting the planet's finite resources for the future», stated Connie Hedegaard, EU Commissioner for Climate Action, recently during the Rio+20 summit.

More than 25 years of legislation on ozone depleting substances (ODS) in European countries clearly demonstrates that policy can foster environmentally friendly technologies leading to technical leadership and greener growth. EU legislation has often set very ambitious objectives and, at the time of their adoption, it was often believed that those were unachievable. Sceptics have been proven wrong.

GOING FIRST

The proverbial early bird catches the worm. In this sense, setting up a legal framework inviting European industry to develop alternatives has opened the door to global business opportunities.

Possibly one of the most striking examples was the introduction of refrigerators using hydrocarbons as early as 1992 through the co-operation of Greenpeace and a small German manufacturer. Today, this technology is used worldwide and has become a global standard.

Confronted with the obligation to phase out of ODS, as early as 1996, the two biggest manufacturers in Germany voluntarily agreed to replace their blowing agents with Carbon Dioxide. While one manufacturer fulfilled this agreement, the other replaced HCFC partly with HFC-134a. Today, the latter has to deal with an environmentally poor product and image. Globally, this technology move unlocked the door to environmentally benign blowing agents -- and new business opportunities for those manufacturers that were early adopters.

EU companies also played a vital role finding alternatives to methyl bromide, for critical uses as well as quarantine and preshipment. Many alternatives were developed and are now marketed globally, allowing the EU to phase out the use of methyl bromide in 2010. This too offered business opportunities and jobs, and reduced health costs arising from methyl bromide's harmful properties.



GOING ONLINE

E-governance was a foreign word to many when the EU decided to develop an online licensing system in 2000. Ever since, this system has been a role model for other e-governance tools in the EU and in other countries. Electronic licensing put industry in the EU in an advantageous situation because their applications are processed much faster and more efficiently, thus reducing the administrative burden. It also revolutionised enforcement because all enforcement officers have direct access to the information wherever they are and whenever they need it.

The EU is currently re-developing the system with the objective of having licences checked and issued automatically as a next step in reducing the administrative burden and increasing competitiveness.

GOING HALON FREE

Having completed the phase-out in 2010, ahead of schedule, the EU is now addressing the remaining uses that are not relevant for consumption. Also in 2010, the EU put end dates for the use of non-virgin halons for critical uses. If a society wants to maintain long-term economic sustainability in aviation and defence, the issue of the diminishing stocks of halons must be addressed.

Just two years later, we already see that alternatives are becoming more visible on the horizon. Adopting them early will provide a strategic advantage avoiding shortages in critical sectors.

We are looking forward to seeing some more early birds, and these will even be flying...

Alexandros Kiriazis



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CONTACT

Alexandros Kiriazis Policy Officer, European Commission, Directorate General Climate Action



Nigeria: Public-Private Partnership in Technology Innovation



The 25th anniversary of the Montreal Protocol brings back many vivid memories.

We remember the hard work, cooperation, leaps of faith while making decisions in the face of uncertainties, and resolving differences with understanding and solidarity. We are proud of achievements that ignited -- and keep alive -- our hopes for an ozone-safe world.

Since our collective struggle to save the ozone layer started 25 years ago, some of our fellow travelers have passed away -- we salute them all and commit to double our efforts in continuing the work.

The Multilateral Fund has had a slogan of countries being "in the Driver's Seat". This has encouraged and given us the impetus towards technology, policy and operational innovations in implementing the Montreal Protocol in our countries to find solutions to problems arising from our peculiar situations. One example from Nigeria illustrates how we localized the global effort.

At the commencement of ODS phase-out in the foam sector in Nigeria, it became necessary to choose the right technology option that could be sustained locally -- one that is simple and easy to handle by all beneficiaries. There was a local technology for the fabrication of box foam machines. Although functional, it was crude and not environmentally friendly.

The government's desire to leverage on this led to an innovative approach for the improvement of our local technology both in terms of its technical performance and environmental sensitivity. The innovation was a public/private partnership that resulted in a local

company, Pamaque Nigeria Ltd., designing and fabricating a local brand of box foam machine that was internationally tested and accredited (see picture).

This was a collaborative effort where the government of Nigeria provided the policy direction; UNDP Nigeria (through its Ozone Programme Implementation and Management Unit) initiated and led the process; the Montreal Protocol Unit of UNDP in New York provided technical support for the international evaluation; and Pamaque Nigeria provided the local technical know-how and funding.

The Montreal Protocol funds were not spent on the development of the local brand. Apart from being easier to operate, the local product meets all Montreal Protocol requirements.



Locally designed and fabricated Box Foam Machine by Pamaque Nig. Ltd.

David Omotosho



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A View from the Balkans



Marin Kocov



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The Macedonian ozone story started in 1997 with the establishment of the National Ozone Unit under the Ministry of Environment and Physical Planning. The Ozone Unit was a main milestone for the overall “ozone” action in the country.

It was the first time in Macedonia that the management of chemicals would be performed through the planned implementation of concrete policy activities and serious capital investments. The parallel activities in two directions produced results: adoption of policy and legal measures on one side, and investments in the industry towards the non-ODS technology on the other.

Starting from mid-2001, a comprehensive scheme for ODS recovery and recycling was established for the first time in the country and the region. Most service technicians handling ODS containing equipment were identified and trained in good practices in refrigeration and airconditioning sectors.

In addition, recovery and recycling equipment was delivered to authorized service shops. As a result of this, significant volumes of refrigerants have been recovered and recycled each year. In order to provide permanent communication with the service technicians, the Ozone Unit initiated the creation of the Service Technicians Association within the framework of the Macedonian Chamber of Commerce. This novel approach enabled the Association to become a serious partner in the decision-making procedures

and ODS legislation adoption. Together with the Ozone Unit, the Association is a promoter of accelerated implementation of the stakeholders’ legal obligations.

Following sustainability principles, the secondary vocational schools were involved in the action. The campaign for training of the professors still continues; the school curriculum is upgraded with the special programme on ODS management and equipment handling.

Given its success, the Montreal Protocol model of chemical management has been used by Macedonia in managing other chemicals too. The principle of synergy and shared experiences has been used in implementing the Stockholm Convention on Persistent Organic Pollutants and also in the Strategic Approach to International Chemical Management initiative. The staff of the National Ozone and POPs Unit shares not only the premises, but also their knowledge, information and dedication to sound chemical management.

Macedonia’s ODS success story has been sustained for 15 years. Some tasks are completed, some are halfway through, and some are anticipated for the near future. But the path is well defined, and the formula for success known.

Macedonia will not rest until the last kilogram of ODS is phased out.

CONTACT

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25 YEARS OF THE MONTREAL PROTOCOL

25
1987-2012



**Protecting
OUR ATMOSPHERE
for generations to come**

PUBLICATIONS



THE MONTREAL PROTOCOL AND THE GREEN ECONOMY ASSESSING THE CONTRIBUTIONS AND CO-BENEFITS OF A MULTILATERAL ENVIRONMENTAL AGREEMENT

This global study addresses how and to what degree national, regional and international actions taken under the Montreal Protocol have also contributed to the restructuring of national economies and the global one towards a “Green Economy”, defined as “one which achieves increasing wealth, provides decent employment, successfully tackles inequities and persistent poverty, and reduces ecological scarcities and climate risks”. The study addresses how this multilateral environmental agreement has contributed to the development of new industry sectors, job creation, trade, health and ecosystem benefits, energy efficiency, and climate change mitigation.



PRACTICAL GUIDE ON INTERLINKAGES BETWEEN OZONE DEPLETION AND CLIMATE CHANGE

This guide is an awareness raising and educational tool to help stakeholders understand the main links and differences between ozone depletion and climate change and showcase some of actions people can take to confront both the climate and ozone challenges.



ESTABLISHING AN HCFC IMPORT QUOTA SYSTEM

UNEP OzonAction CAP has developed this practical, step-wise guide to assist National Ozone Units in Article 5 countries with designing and implementing such quota systems. This 27-page guide addresses policies facilitating implementation of the HCFC phase out, principles of an import quota system, how to establish an HCFC import quota system, additional measures which may help in enforcement of HCFC import quota systems, and import quota systems for equipment containing or relying on HCFCs. It also provides examples and lessons learnt, as well as suggested formats for questionnaires and accompanying letters to be used in a survey of potential HCFC importers and exporters.



CUSTOMS AND ENFORCEMENT OFFICERS QUICK GUIDE: CHANGES IN THE 2012 HS NOMENCLATURE FOR HCFCs AND CERTAIN OTHER OZONE DEPLETING SUBSTANCES

The Parties to the Montreal Protocol requested the World Customs Organization (WCO) to revise the HS codes for HCFCs. This 4-page Quick Guide provides key information related to these new classifications and briefly explains the changes.



CUSTOMS AND ENFORCEMENT OFFICERS INFORMATION NOTE: MONITORING TRADE IN HCFCs

This guidance document has been prepared in advance to the revised Training Manual for Customs Officers in order to allow customs officers to be better prepared for the new challenges resulting from the rapid increase in volume of HCFCs traded globally and the need for monitoring and control of that trade in view of the Montreal Protocol provisions.



VIDEO & AUDIOVISUAL



PSAs ON OZONE SAFE GENERATION

The Ozone Secretariat and UNEP OzonAction have produced together two 30-second videos in six UN languages for global broadcasting and viral distribution on the web by NOUs and partner organizations.

These Public Service Announcements (PSAs) mark the 25th anniversary of the Montreal Protocol (MP) by hailing the achievements of the Ozone Multilateral Environmental Agreement after two and a half decades of activities. Their messages also stress the MP as the protector of our atmosphere for generations to come.

The first video piece briefly introduce the ozone layer depletion issue and enforces its recovery that was made possible when the MP Parties joined hands 25 years ago for saving the ozone layer - a global action at its best. The second PSA evolves around the multiple benefits of the Montreal Protocol which is not restricted to the ozone related issue only but also unfolds into positive impacts to our biodiversity, climate, health and economy.

ONLINE VIDEO COMPETITION



United Nations Environment Programme (UNEP) has launched a global video competition for young people to produce a very short video on protecting the ozone layer. It is open to all young people born on or after 16 September 1987 – the historic day when Montreal Protocol was adopted by governments 25 years ago.

Videos, focusing on any aspect of the Protocol, need to be Public Service Announcements (PSA) of 90 seconds or less. Live-action, animation, text onscreen or a combination may be used.

Upload entries to www.youtube.com/ozonaction before 15 October 2012.
More information at: [OzonAction Programme](http://OzonActionProgramme)
<http://youtu.be/8lzN4yXVs1I>



SHORT DOCUMENTARY: ALTERNATIVES TO HCFCs: TAKING ON THE CHALLENGE.

Buildings, air conditioners, refrigerators are all part of our everyday lives. What do they have in common: manmade chemicals called hydrofluorocarbons, HCFCs.

Recognizing their detrimental effect on climate change and ozone depletion, the Parties of the Montreal Protocol decided to accelerate the phase-out of HCFCs in 2007.

This short documentary seeks out answers on alternative and potential planets benefits from the technical experts closest to the issue and showcases some inspiring conversion projects. Indeed, with financial assistance and technology transfer facilitated by the Protocol's Multilateral Fund, developing countries are already taking on the challenge, thus paving the way for the adoption of ozone and climate friendly alternatives to HCFCs.

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KEY WEBSITES OF OZONACTION



MONTREAL PROTOCOL E-LEARNING MODULE

UNEP DTIE's OzonAction Branch and the World Customs Organization collaborated to develop the Montreal Protocol e-learning module. This interactive online training module, based on UNEP's Training Manual for Customs Officers, presents the latest information on the international policy governing the control and monitoring of Ozone Depleting Substances, as well as an overview of the technical issues including new information on chemicals and products traded and how these may be smuggled. The module is periodically updated to take into account the developments in international trade and provides new material to reflect the changes in the Montreal Protocol, the Harmonised Systems codes, licensing systems and other relevant information.

Once registered, users of the Montreal Protocol e-learning module can follow the course at their own pace and obtain a certificate after successfully completing it. The module is also ideal as an introductory course prior to attending UNEP's Customs training workshops and is also a great refresher course for experienced officers.

HOW TO REGISTER

Customs and Enforcement officers: contact your country's national coordinator for the World Customs Organization to register:

<http://e-learning.wcoomd.org/hosting/Learning/Coordinators.pdf>
or contact the WCO E-learning team: elarning@wcoomd.org

National Ozone Officers who wish to use the course: Contact your UNEP OzonAction Regional Office.»



IPIC

An online tool to assist countries achieve formal compliance through informal prior informed consent on trade of ozone depleting substances.

<http://www.unep.org/ozonaction/ipic>



UNEP OZONACTION WEBINAR SERIES

Engaging the ozone layer protection community in online global knowledge sharing.

<http://www.unep.org/ozonaction/webinar>



25TH ANNIVERSARY OF THE MONTREAL PROTOCOL ON FACEBOOK

The Montreal Protocol is celebrating its 25th Anniversary this year. Be part of the celebration by sharing your best MP memories on Facebook.

Through the dedicated Facebook page, we'll be collecting and displaying memories and pictures over the coming year to develop a new kind of global history. Help us celebrate 25 years of protecting our atmosphere for generations to come – Join us and share your memories!

The Montreal Protocol in Numbers



26 000 000 The number of square kilometers covered by the Antarctic Ozone Hole on the 12th September 2011.

Source: National Aeronautics and Space Administration, Goddard Space Flight Center, Ozone Hole Watch
http://ozonewatch.gsfc.nasa.gov/meteorology/annual_data.html

61 430 The number of refrigeration servicing technicians that have been trained under the Multilateral Fund, based on the latest Country Programme data reported for 2006-2011. In addition 18,640 technicians have been trained and 1,472 trainers for technicians have been trained to recover and recycle HCFCs.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/66/6) 21 March 2012
<http://www.multilateralfund.org/66/English/1/6606.pdf>

50 210 The number of refrigeration servicing technicians that have been certified under the Multilateral Fund, based on the latest Country Programme data reported for 2006-2011. In addition 9,449 technicians have been certified on HCFCs.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/66/6) 21 March 2012
<http://www.multilateralfund.org/66/English/1/6606.pdf>

38 698 The total ODP tonnes of HCFC-22 that has been recovered to date by developing countries as part of Multilateral Fund projects, based on the latest Country Programme data reported for 2010-2011. Of this amount, 37,841.8 ODP tonnes were reused.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/66/6) 21 March 2012
<http://www.multilateralfund.org/66/English/1/6606.pdf>

25 800 The total ODP tonnes of CFC-12 that has been recovered to date by developing countries as part of Multilateral Fund projects, based on the latest Country Programme data reported for 2006-2011. Of this amount, 21,342.4 ODP tonnes were reused.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/66/6) 21 March 2012
<http://www.multilateralfund.org/66/English/1/6606.pdf>

13 267 The number of operational recovery machines provided to developing country under the Montreal Protocol's Multilateral Fund, based on the latest Country Programme data reported for 2006-2011. In addition 1,317 recovery machines are operational for HCFCs.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/66/6) 21 March 2012
<http://www.multilateralfund.org/66/English/1/6606.pdf>

5 675 The number of operational recycling machines provided to developing country under the Multilateral Fund, based on the latest Country Programme data reported for 2006-2011. In addition 476 recycling machines are operational for HCFCs.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/62/6), 22 October 2010
http://www.multilateralfund.org/62nd_meeting_of_the_excutive_c.htm

4 312 The number of customs officers reported as having been trained on HCFC.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/62/6), 22 October 2010
http://www.multilateralfund.org/62nd_meeting_of_the_excutive_c.htm

2 892 The number of refrigeration technician trainers that have been trained under the Multilateral Fund, based on the latest Country Programme data reported for 2006-2011.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/66/6) 21 March 2012
<http://www.multilateralfund.org/66/English/1/6606.pdf>

2 420 The total ODP tonnes of CFC-11 that has been recovered to date by developing countries as part of Multilateral Fund projects, based on the latest Country Programme data reported for 2006-2011. Of this amount, 2,153.2 ODP tonnes were reused.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/66/6) 21 March 2012
<http://www.multilateralfund.org/66/English/1/6606.pdf>

197 The number of countries - comprising all of the Member States of the United Nations - which are Party to the Montreal Protocol. This universal ratification is matched by no other global treaty to date.

Source: Ozone Secretariat, Status of Ratification, 28 June 2012
http://ozone.unep.org/new_site/en/treaty_ratification_status.php

147 The number of developing country members of the Regional Networks of Ozone Officers, a unique capacity building platform managed by UNEP's OzonAction Programme that supports compliance with the Montreal Protocol obligations. Twelve developed country partners also participate in the Networks.

Source: UNEP DTIE OzonAction, Regional Networks web page, October 2011
<http://www.unep.org/ozonaction/Portals/105/documents/network/Table%20of%20Network%20Countries-%2031%20Oct%202011.pdf>

75 The percentage of developing countries employing recovery and recycling machines that reported that the machines had been functioning 'satisfactorily' or 'very well', based on the latest Country Programme data reported for 2006-2011.

Source: Multilateral Fund Secretariat, Status of Implementation of Delayed Projects and Prospects of Article 5 Countries in Achieving Compliance with the Next Control Measures of the Montreal Protocol (UNEP/OzL.Pro/ExCom/66/6) 21 March 2012
<http://www.multilateralfund.org/66/English/1/6606.pdf>

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