



OzonAction Special Issue 2014

New Responsibilities
under the HCFC
Phase-out



MOP-26, Paris



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Ozone Layer Protection: The Mission Goes On

Shamila Nair-Bedouelle
Head of OzonAction Branch, UNEP

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On 20 September 2014, *The Economist* magazine published a global comparison of carbon mitigation efforts, ranking the top 20 policies and courses of action according to how much greenhouse gases have been reduced. The Montreal Protocol on Substances that Deplete the Ozone Layer emerged as number one with cumulative emissions of 135 billion tonnes of CO₂ equivalent between 1989 and 2013. Its annual emission reduction of 5.6 billion tonnes of CO₂ equivalent is twice as much as the next highest option, which is hydropower.

This incidental but substantial climate benefit resulted from the fact that many ozone-depleting substances are also powerful greenhouse gases. As climate change impacts communities, economies and ecosystems everywhere, it is essential to mitigate the threat with the same unity of purpose as we have in facing the dangers of ozone depletion. That reasoning inspired the theme for 2014 International Day for the Preservation of the Ozone Layer, which is “Ozone Layer Protection: The Mission Goes On”.

In many ways, it also resonates with all the work of UNEP OzonAction. At its 2nd Meeting (17–19 December 1990), the Executive Committee (ExCom) of the Interim Multilateral Fund noted that UNEP’s role was to provide specific functions, and specifically “to co-operate and assist in political promotion of the objectives of the Protocol, as well as in research, data gathering and the clearing-house functions.”

A flagship activity of UNEP OzonAction Compliance Assistance Programme (CAP) and a core mechanism of the Multilateral Fund family of institutions, Regional Networking provides a forum for experience exchange and knowledge transfer between the National Ozone Units (NOUs) of Article 5 countries, while adopting and addressing priority thematic areas. UNEP OzonAction CAP currently facilitates the operation of 10 Regional Networks involving 148 Governments from developing countries and countries with economies in transition as well as 12 developed countries and the European Commission.

During 2014, OzonAction CAP strived to respond to the needs of National Ozone Officers and Governments as they prepare for the 2015 deadlines on HCFC and Methyl Bromide. We have provided networking support and expertise on many cross cutting issues connected to the HCFC phase-out management plans (HPMPs) by partners in developing countries.

Since October 2013, UNEP has been responsible for implementing a portfolio of 389 ongoing Multilateral Fund projects, delivering 372 compliance assistance services, plus other projects and services for 148 developing countries. This

was a challenging portfolio: around 120 countries were directly served by UNEP-implemented projects, with 148 countries receiving CAP services. These countries ranged from very large (China) to very small countries (Niue), and included 48 classified as Least Developed Countries (LDCs), 38 classified as Small Island Developing States (SIDS), and a significant number facing highly challenging post-conflict, post-disaster or political issues.

CAP has undertaken various initiatives to give fresh impetus to compliance assistance and cooperation. These included: convening groups of Communities of Practice, technicians and Ozone Officers; exploring new forms of technical partnerships, such as setting up ‘inter- networks for co-operation’; and Network Twining and promoting South-South Cooperation.

CAP engagement with Article 5 countries covered a broad range:

- UNEP CAP is the lead agency for HPMPs in 71 countries and the cooperating agency in 28 countries, covering nearly 100 countries.
- In connection with institutional strengthening (IS) projects, CAP provided policy advice and capacity development of NOUs in the licensing and quota systems in 103 countries.
- CAP sought to raise awareness and promote evidence-based policymaking through a number of benchmarking and monitoring publications. Recent videos and publications on HCFCs represent major efforts and successful mobilisation of international, regional and national cooperation with the RAC sector stakeholders, including technicians.

In all this, we are always mindful of the unfinished business and on-going mission. We can only reiterate what UN Secretary-General Ban Ki-moon said in his Ozone Day message: “*Let us take inspiration from our efforts to preserve the ozone layer. The Montreal Protocol has shown that decisive action by the international community, including the private sector, can achieve transformative results for the common good. Let us learn from this example and apply its lesson to the urgent task of addressing the climate challenge.*”

Give a face to Ozone Layer protection – or better – many faces, since it impacts our lives in multiple ways – from the level of ultraviolet radiation we are exposed to, through the buildings we are living in, the food we are eating, to the mattresses we are sleeping on. Ozone depleting substances are an integral part of our daily lives. Ozone layer protection is not only an environmental matter – it is a developmental, public health and sustainability issue.

Ozone: Celebrating our achievements, facing new challenges ahead

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Tina Birmpili
Executive Secretary, UNEP Ozone Secretariat

The Vienna Convention and the Montreal Protocol occupy a singular position on the world stage as the first and only global environmental treaties with universal ratification. They remind us of how ambitious goals we can achieve if we are all united and committed to global partnerships.

Health treaty

The Montreal Protocol has profoundly touched our lives. Thanks to decades of concerted international action, harmful UV radiation reaching the earth surface is being reduced. According to latest information from the Environmental Effects Assessment Panel of the Montreal Protocol, by 2030 the Protocol may be preventing some 2 million cases of skin cancer each year.

Planet-saving treaty

The Montreal Protocol is a planet-saving treaty, protecting both the ozone layer and the climate. It has led to the phase-out of 98% of the historic levels of production and consumption of ozone-depleting substances globally. It has prevented adverse impacts on agriculture, animals, forests, marine life, natural ecosystems and materials. According to the latest scientific information from the Scientific Assessment Panel of the Montreal Protocol, the ozone layer is on track to recovery by the middle of the century.

Powerful messages for the world

This finding sends three powerful messages to the global community:

- We needed united action and universal membership to the ozone treaties to achieve the results that we celebrate today.
- We needed to wait for more than 25 years to see the positive results of our concerted and committed actions, a lifespan that transcends every political cycle across the world.
- The decisions we take now will bring results much later in the future. This is a fact that should be factored in during international discussions and negotiations.

To put it simply, “earth and atmosphere” can be repaired at a slow pace. These systems will respond positively to global positive actions.

Parties’ commitment under the Montreal Protocol has been decisive not only in the healing of the ozone layer but also in the mitigation of climate change through the phasing out of ozone-depleting substances. Without the Montreal Protocol, the world would now be suffering even more climate change impacts, including severe droughts, floods and storms.

Our job is not yet done

Despite our successes, our job under the Montreal Protocol is far from complete. We still have 640,000 metric tonnes of ozone-depleting chemicals, mainly hydrochlorofluorocarbons (HCFCs) which need to be phased out. We also need to manage the “banks” of these substances that remain in equipment, building walls and chemical stockpiles. We still have relatively small, remaining uses which are currently exempted for reasons of essentiality and criticality to society that need to be phased out.

The momentum for the total global phase-out of ozone-depleting substances needs to be sustained to ensure the continued recovery of the ozone layer and to optimise the climate benefits.

Vienna Convention’s 30th anniversary coming up

2015 will mark the 30th anniversary of the Vienna Convention. We need to widely disseminate stories that show the human face of our achievements and resolutely face the remaining and the new challenges ahead to lay a stronger foundation for recovery.

The Montreal Protocol has showed what is possible for our world and within each one of us -- if we believe, dream and work together. It is a daily inspiration to address new threats with renewed commitment and effort for a healthier and better world.

Our mission goes on.

Implementation for ozone protection and climate benefits

Eduardo Ganem
Chief Officer, Multilateral Fund Secretariat

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The year 2015 will mark 25 years since the Multilateral Fund (MLF) was established by a decision of the Second Meeting of the Parties to the Montreal Protocol in London, 1990. The MLF began its operation a year later in 1991 at a time when there was a risk that the ozone layer would never recover. The MLF's Executive Committee (ExCom) had to move quickly to empower beneficiary countries and provide access to the technology needed to rapidly implement the projects and national plans that would eventually allow them to achieve compliance with the 2010 control measure for CFCs, halons and carbon tetrachloride.

Due to swift action by the ExCom following the historic decision on the accelerated schedule for the phase-out of HCFCs agreed by Parties to the Montreal Protocol in 2007 the MLF is positioned to play a pivotal role in the transformation of the HCFC based industrial and servicing sectors in beneficiary countries. Only seven months after that decision, the ExCom had approved guidelines for the development of national plans to phase-out HCFCs, and by 2014 national plans were in place in the majority of the beneficiary countries to address at least the 10% HCFC reduction step required by 2015, while some countries have plans for the complete elimination of HCFCs. Taken together these approved national plans, when implemented, will address nearly 25% of HCFC consumption and 89% of the HCFC production in MLF

beneficiary countries. Moreover, the ExCom has paid careful attention to alternatives to HCFCs that minimise environmental impacts, in particular impacts on climate, in accordance with the decision by the Parties.

It is imperative that MLF beneficiary countries implement their approved national plans to phase-out HCFCs as quickly and as efficiently as possible. Every delay will result in additional amounts of HCFCs in our atmosphere. Every day lost means waiting another day for the restoration of our ozone layer and lost opportunities for climate benefits. Even more than in the CFC phase-out era, beneficiary countries face a huge challenge in that some of the alternative technologies they wish to adopt are still being developed and tested. One example of how the ExCom has assisted countries to face such challenges is by funding demonstration projects to independently assess alternatives to HCFC technologies in different industrial sectors.

We have come a long way in the global effort to protect the ozone layer. With the continued strong commitment from all donor and beneficiary countries the institution of the Multilateral Fund can continue to invest in the implementation of the Montreal Protocol with benefits for generations to come.



Tackling HFCs as Short-Lived Climate Pollutants

6 **Helena Molin Valdes**
Head, CCAC Secretariat

The international community is well aware of how much the Montreal Protocol has contributed to mitigating climate change. But there are opportunities for even more achievements and “synergistic effects” if the ozone layer protectors team up with climate champions -- such as the partners of the Climate and Clean Air Coalition (CCAC) to reduce short-lived climate pollutants.

Since its creation in February 2012, the Coalition has taken great strides, welcoming many new partners and making great progress in global efforts to reduce what are known as “short-lived climate pollutants” (SLCPs).

Especially three pollutants are responsible for a significant share of global warming:

- Black carbon, emitted from various sources including diesel cars and trucks, cooking stoves, forest fires, open burning on farms and some industrial activity.
- Methane is produced when plant and animal waste decomposes, and also from many human activities including landfills, coal mines, and natural gas or oil production facilities.
- High-GWP hydrofluorocarbons (HFCs) which are man-made greenhouse gases used in air conditioning, refrigeration, solvents, foam blowing agents and aerosols.

Addressing these SLCPs can have immediate and multiple benefits. Reducing them protects human health and the ecosystems immediately, and also showed the rate of global warming during the first half of this century. The Coalition tackles them through 11 targeted initiatives that aim at ‘quick-wins’ to reduce SLCPs.

One of them is the Initiative on Promoting HFC Alternative Technology and Standards. It aims to mobilise efforts of the private sector, civil society, international organisations and governments to significantly reduce the projected growth in the use and emissions of high-GWP HFCs in coming decades. Under this, Coalition Partners are supporting activities to move away from HFCs and minimise HFC leakages. These include: developing HFC inventories and studies; information exchange on policy and technical issues; demonstration projects validating and promoting climate-friendly alternatives and technologies; and various capacity building activities.

As of October 2014, the HFC inventories have been completed for Chile and Colombia, and the surveys are underway in Bangladesh, Ghana, Indonesia and Nigeria. Technology demonstration projects are ongoing in the Maldives and approved for Chile, India and Jordan, while more HFC surveys are kicking off in the Bahamas, Cambodia, Jordan, Kyrgyzstan, the Maldives, Mongolia, South Africa and Vietnam.

At the UN Secretary General’s Climate Summit in New York on 26 September 2014, the Coalition partners championed four statements, where 57 state and non-state entities pledged support to the amendment to phase down the production and consumption of HFC under the Montreal Protocol and action to promote public procurement of climate-friendly low-GWP alternatives whenever feasible. Supporters also welcomed complementary private sector-led efforts, including a Global Cold Food Chain Council to reduce the use and emissions of high-GWP HFCs and enhance energy efficiency in the cold food chain while minimising food spoilage, and a Global Refrigerant Management Initiative on HFCs in servicing with a goal of reducing global emissions by 30-50% within 10 years.

The Coalition is open for application for partnership, and interested entities may contact ccac_secretariat@unep.org for more information. More information: <http://www.ccacoalition.org>.

The 96 Coalition Partners (43 State and 53 Non State) are benefiting from the HFC initiative as well as the other programs:

Sector-based Initiatives

- Addressing SLCPs from Agriculture
- Mitigating SLCPs and Other Pollutants from Brick Production
- Reducing SLCPs from Household Cooking and Domestic Heating
- Reducing Black Carbon Emissions from Heavy-Duty Diesel Vehicles and Engines
- Accelerating Methane and Black Carbon Reductions from Oil and Natural Gas Production
- Mitigating SLCPs from Municipal Solid Waste

Cross-Cutting Initiatives

- Financing Mitigation of SLCPs
- Regional Assessments of SLCPs
- Supporting National Planning for Action on SLCPs Initiative (SNAP)
- Realising health benefits from action on short-lived climate pollutants in cities

Another Countdown...

Ezra Clark
Programme Officer, UNEP OzonAction

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It is the morning of 1 January 2005 and many are waking up with sore heads from the previous night's celebrations. However there is no need to reach for the headache pills and renew the gym membership quite yet, and the festivities can continue since there is something else significant to celebrate: 2005 is the year in which the first reduction step in the phase-out of chlorofluorocarbons (CFCs) became a reality for developing countries. The reduction in CFCs by this date was a huge achievement for these countries as it was necessary to cut consumption and production by a mammoth 50%.

Now fast-forward almost a decade and we are in a rather similar place. The world will soon see an equally important step in the continued success of the Montreal Protocol in phasing out ozone depleting substances (ODS). The 1st January 2015 marks the first reduction step in the consumption and production in HCFCs in developing countries. These chemicals are widely used in the refrigeration, foam, solvent, aerosol and fire-fighting sectors as a transitional substance to substitute CFCs. HCFCs are also used as feedstock (raw material) in the production for other chemical products.

At first glance it may seem that the 2015 reduction in HCFCs of 10% of the baseline established for the average production and consumption of HCFCs in 2009 and 2010 is rather modest, especially in comparison to the 50% that was required for CFCs at the same stage. However this is certainly no less of a challenge given the relatively short period of two years between the freeze and this first reduction step (in contrast to the six years that were available to countries to make the first reduction step in CFC production and consumption).

The period between 2005 and 2015 has also seen some dramatic economic and developmental changes in many Article 5 countries with an associated upsurge in the use of refrigeration and air-conditioning technology and inevitable increases in the consumption of refrigerants. All these have added to the challenge of achieving the necessary reductions by the required deadlines.

The decision taken by the Parties to the Montreal Protocol in 2007 to accelerate the phase-out of HCFCs and this first step in 2015 continues the great achievements made in both developed and developing countries in ridding the world of CFCs, halons and a range of other harmful ODS. UNEP, through its OzonAction Programme, is continuing to assist National Ozone Units (NOUs) and other key stakeholders in developing countries to meet these phase-out deadlines to make informed decisions about technologies and policies to replace HCFCs, with a particular emphasis on the climate benefits that could be achieved.

While we will need to wait until late 2015 when all the HCFC consumption and production data is reported to know for sure, initial signs are very encouraging that most developing countries will successfully meet the challenge of this first phase-out step. Until then we may need to wait to celebrate again.



Phasing out HCFCs in Trinidad and Tobago

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Marissa Gowrie
National Ozone Officer, National Ozone Unit, Trinidad and Tobago

Political commitments by all governments, including Trinidad and Tobago, have been fundamental to the success achieved under the Montreal Protocol. As we work toward meeting future challenges, all countries must join hands making sound environmental choices.

Trinidad and Tobago is a small island developing state (SIDS) in the Caribbean. Yet its commitment to ozone layer protection and fulfilling all obligations under the Montreal Protocol is as steadfast as larger countries. At the same time, changes in air conditioning and refrigeration dependent sectors -- such as tourism, health, food and industrial activity -- can have major impact on the economy.

Trinidad and Tobago acceded to the Vienna Convention and the Montreal Protocol on August 28, 1989, and operates under paragraph 1 of Article V. Since then, it has ratified all subsequent amendments to the Protocol.

Some special measures already taken by Trinidad and Tobago as part of the phase-out process include:

- Implementing a series of public awareness programmes;
- Implementing various training programmes in good refrigeration practices for trainers and technicians in the air conditioning and refrigeration industry;
- Implementing a freeze and introducing a quota system on import of all ODS since July 1, 1999;
- Imposing restrictions on the import and export of equipment requiring the use of ODS and refrigerant through a licensing system;
- Developing a refrigerant standard and labelling standard for equipment using refrigerants;
- Introducing ozone and climate friendly refrigerant (hydrocarbons) to the local market;
- Training programmes for technicians in the air conditioning and refrigeration industry to sensitise on hydrocarbons;
- Ban of imports of CFCs and halons into Trinidad and Tobago since 31 December, 2007; and
- Phasing out of HCFCs from 1 January, 2013



The Ministry provided 3 Multi-refrigerant Identifiers to the Trinidad and Tobago Bureau of Standard (TTBS) to aid in its monitoring effort of HCFC and other ODS Importation. From Left to Right: Dr. Marissa Gowrie, Mr. Theodore Reddock, Mr. Steve Williams, Mr. Errol Ramjohn and Mrs. Vidiah Ramkhelawan.

Meanwhile, methyl bromide is to be phased out completely for non quarantine and pre-shipment uses by 2015. Also, equipment using HCFCs or blends of HCFCs (such as HCFC 22, HCFC 406, HCFC 408, HCFC 409, and HCFC 401) will no longer be allowed for import from 1 January, 2015. This will make the country well on its way to meeting all targets of the HCFC phase out.

The Ministry of the Environment and Water Resources through the National Ozone Unit, works in close collaboration with the Trinidad and Tobago Bureau of Standards, the Customs and Excise Division, the Plant Quarantine Division, the Pesticides and Toxic Chemicals Unit, the Air Conditioning and Refrigeration Industry Association, and the Trade Licensing Unit of the Ministry of Trade Industry Investment and Communications, in implementing all the national controls for ODS.

Each nation, and each citizen needs to commit to take action now. When it comes to saving the environment, every action counts!

Phasing out HCFCs in India

A. Duraisamy
Director, Ozone Cell, India

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India has taken proactive steps to implement the accelerated phase-out schedule of hydrofluorocarbons (HCFCs).

The Ozone Cell, Ministry of Environment, Forests and Climate Change (MoEF&CC), developed and launched a "Roadmap for Phase-out of HCFCs in India" as early as 2009. It provides the long term vision and action plan -- including the policy instruments - for the phase-out, taking into account expected availability technologies that are sustainable and affordable to industry and consumers.

The Executive Committee (ExCom) of the Multilateral Fund (MLF), at its 66th meeting held in April 2012, approved the HPMP Stage-I for India to meet the 2013 and 2015 phase-out targets of HCFCs. Consistent with the guidelines set by the ExCom, India prioritised phase-out in foam manufacturing sector, especially in the large HCFC consuming enterprises, and initiated activities in the Refrigeration and Air-conditioning (RAC) Servicing sector to achieve HPMP Stage-I compliance targets.

In addition, technical and financial assistance was secured for systems house(s) for developing HCFC-free polyol formulations, which would assist small and medium enterprises (SMEs) to cost-effectively phase-out HCFCs: this is critical for phase-out in the foam sector during HPMP Stage-II from 2016 to 2020.

HPMP Stage-1 in India is being successfully implemented by United Nations Development Programme (UNDP) as the lead implementing agency and United Nations Environment Programme (UNEP) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) of Germany as cooperating agencies under the guidance of the Ozone Cell with active participation of the concerned enterprises.

India has already achieved the 2013 freeze target as per the accelerated phase out schedule and is progressing well to ensure that 10% reduction is achieved. At the same time, HCFC-free and low-GWP technologies are being commercialised and adopted in residential air-conditioning applications.

To ensure that phase-out of HCFCs remains sustainable, several activities under the non-investment component are being implemented by UNEP in cooperation with the Ozone Cell. These activities, involving awareness raising, capacity building, policy development and law enforcement, are important supporting pillars to project activities undertaken for HCFC phase-out as well as ensuring participation of industry and other stakeholders.

In the RAC servicing sector, for example, a number of workshops on good servicing practices have been organised to create a pool of trainers for training technicians. The infrastructure and network of service technicians training set up under the earlier CFC phase-out project has been revived. Recovery and reclamation activities are also to be progressively implemented, thus significantly reducing HCFC consumption.

As part of HPMP Stage-I implementation, targeted regulatory actions are also being undertaken. The Ozone Depleting Substances (Regulation and Control) Rules of 2000 have been amended and published in the Gazette of India in April 2014 to align with the policies and schedule of phase-out of HCFCs.



Ministry of Environment, Forests and Climate Change - Government of India. 20th International Ozone Day for the Preservation of the Ozone Layer, "Ozone Layer Protection: The Mission Goes On..."

Safety First with the HCFC Phase-out

With greater focus on using alternatives to HCFCs with substantially lower GWP than conventional options, there is now much interest in existing and new alternatives. Amongst these, the lower the GWP or environmental impact, the more significant are the safety implications.

Here is a summary of the main medium and low GWP alternatives and their safety characteristics.

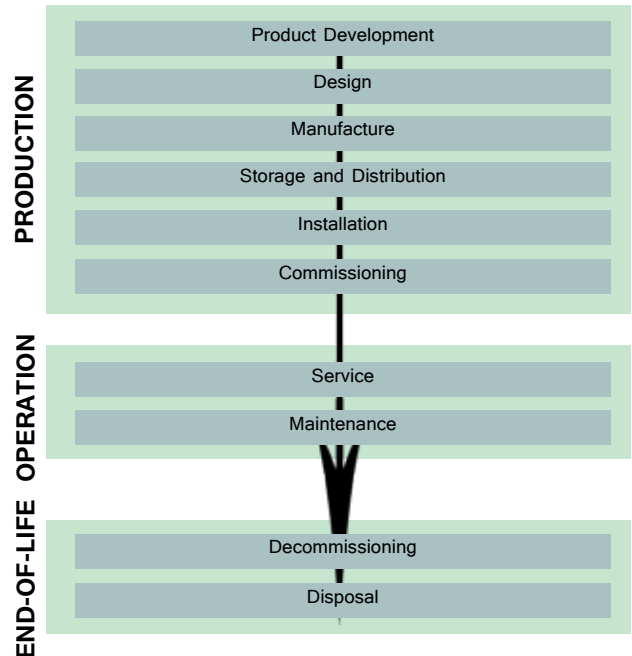
Refrigerant	GWP (100 y) ¹	Safety class (ISO 817)	ATEL (kg/m3) ²	LFL ³	Pressure (bar) at 25°C
HCFC-22	1760	A1	0.3	-	10.4
R-744	1	A1	0.07	-	64.3
HC-1270	<1	A3	0.01	2.5%	11.5
HC-290	<1	A3	0.09	2.1%	9.5
R-717	0	B2L	0.00035	16.0%	10.0
HFC-1234yf	1	A2L	0.47	6.3%	6.8
HFC-1234ze(E)	1	A2L	0.28	7.5%	5.0
R-444B	300	A2L	0.27	8.9%	12.3
R-446A	460	A2L	0.29	12.3%	15.1
R-447A	570	A2L	0.30	12.3%	15.2
HFC-32	716	A2L	0.30	12.3%	16.9

¹ Global warming potential (GWP) is the direct GWP only
² Acute Toxicity Exposure Limit (ATEL); this is the lower of effects related to asphyxiation, central nervous system, cardiac sensitisation, LD50 or simply an absence of data generated using the methods prescribed within certain standards
³ LFL is the lower flammability limit by percent by volume

This shows how all the alternatives have at least one characteristic that implies a greater safety concern in comparison to HCFC-22. In particular:

- R-744 (carbon dioxide) has a much higher operating pressure and lower Acute Toxicity Exposure Limit (ATEL);
- Hydrocarbons such as R-1270 (propene) and R-290 (propane) have higher flammability;
- R-717 (ammonia) has lower flammability and higher toxicity;
- Unsaturated HFCs -- such as R-1234yf -- are lower flammability;
- The mixtures of unsaturated HFCs and saturated HFC such as R-444A, R-446A and R-447A have lower flammability but higher operating pressures; and
- Some saturated HFCs -- such as HFC-32 -- have lower flammability and higher operating pressures (yet also has a significant GWP).

Given these variables, it is important to consider how they are handled throughout the lifetime of the systems and equipment where they are used. The important stages are shown below. This implies that attention must be given at relevant stages.



All those involved in these different stages must ensure that these measures are adopted and put in place. Those responsible can include a wide variety of stakeholders, e.g.:

- Manufacturers of systems and equipment, for the safe design, production and installation of systems;
- Training institutes for the establishment of workshops for training and certification of technicians;
- Logistics enterprises for the risk assessment and procedures for storage and distribution of products;
- National authorities for monitoring and checking that the various industry stakeholders are adhering to best practice; and
- Regulators, standardisation entities and certification bodies to ensure that industry players do not push in obstructive measures

Overall, most stakeholders recognise that to use refrigerants with lower GWP, air conditioning and refrigeration systems must be made with other characteristics that may include higher toxicity, flammability and/or operating pressure. In most instances this does not translate as a significantly greater risk or societal burden, but it does oblige stakeholders to be more careful in production, use, application and disposal of the systems and equipment.

Yet, this can yield greater long-term benefits to those stakeholders, e.g. more stringent technician practices, better serviced equipment, fewer leaks and more reliable systems. Ultimately, this benefits everyone.

Standards in Refrigeration and Air Conditioning Sector: Ensuring Quality and Safety

Didier Coulomb
Director, International Institute of Refrigeration (IIR), France

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Standards have been developed in the Refrigeration and Air Conditioning (RAC) sector as well as other sectors for several decades as voluntary commitments by private companies. These were necessary to guarantee a certain level of quality of the material or services provided, as well as safety in use.

RAC standards are implemented at the national, regional and international levels, and generally include correspondence between these levels, even though this is not compulsory. There are also local standards which are still not harmonised at an international level and international standards which are not carried out at a national level. Depending on how they are formulated, standards can be an aid or a barrier to trade. National regulations also often refer to standards.

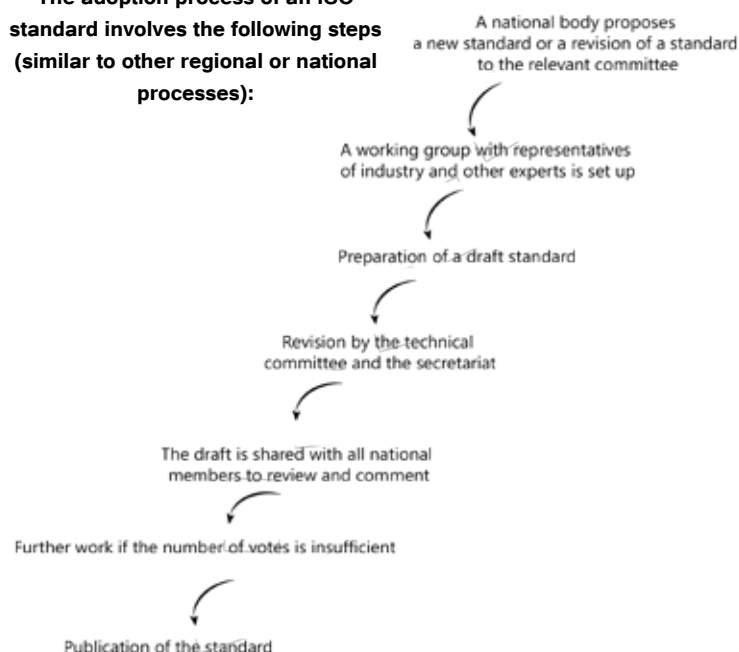
At the international level, there are two parallel systems: the International Standardization Organization (ISO) and the International Electrotechnical Commission (IEC), covering all kinds of products and production systems. ISO includes about 20,000 standards and there are some 300 committees managing these standards. One of them, TC 86 covers the RAC sector. However, other committees in ISO and IEC are also dealing with the RAC sector.

Within TC 86, there are eight sub-committees. Currently, the main strategic ones are:

- SC 1: Safety and environmental requirements for refrigerating systems; and
- SC 8: Refrigerants and refrigeration lubricants.

Companies are currently trying to develop new refrigerants and equipment with a low global warming potential in order to replace Hydrochlorofluorocarbons (HCFCs) which are soon to be phased out under the Montreal Protocol and current Hydrofluorocarbons (HFCs), which are generally potent greenhouse gases. These alternative refrigerants generally present safety drawbacks. For that reason, two standards were recently revised. They were: ISO 5149 on mechanical refrigerating systems used for cooling and heating safety requirements and ISO 817 on refrigerants - designation and safety classification. Because of rapid changes concerning refrigerants, new amendments are being drawn up, and will soon be presented regarding safety conditions.

The adoption process of an ISO standard involves the following steps (similar to other regional or national processes):



Participating in this process is helpful for companies and countries that wish to build their own products without any trade barriers or to benefit from products adapted to local conditions. However, people who participate must have a solid technical background and the ability to spare time, since adoptions require years of correspondence and discussions. Small and medium enterprises are rarely represented in such processes. Developing countries seldom participate as full members in ISO Committees and sometimes are not members at all.

Standards are a crucial issue. Countries must adopt standards in the RAC sector, particularly to avoid accidents and they must set up standards with their industries. This sector is seeing rapid changes due to energy and environmental factors, and standards must keep up with these trends. Participating in relevant international discussions is one way to ensure a more inclusive process.

Certification in the safe and efficient use of refrigerants

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Marco Buoni - Vice President of Air conditioning and Refrigeration European Association (AREA) and Director of Centro Studi Galileo (Training Centre)

Energy efficiency & RAC equipment

According to the *Action Plan for Energy Efficiency: Realising the Potential (2006)*, Europe wastes at least 20% of its energy due to inefficiency. According to the European Commission, “*realising the 20% potential 2020, which is the equivalent to some 390 mega tonnes of oil (Mtoe), will result in large energy and environmental benefits. CO₂ emissions should be reduced by 780 Mt CO₂ with respect to the baseline scenario, which is more than twice the EU reductions needed under the Kyoto Protocol by 2012*”.

RAC applications are responsible for a sizeable part of the energy consumed globally. AREA is fully aware of the significant energy savings achievable by raising energy efficiency in the RAC sector. Some of these savings could be achieved without major investment in capital equipment and plant refurbishment but with education, good maintenance, implementation of good energy use practices and enforcement of relevant regulations.

For existing RAC systems, most energy efficiency losses stem from a lack of regular and qualified preventive maintenance. Frequent checking by properly qualified and certified professionals is therefore essential for maximum efficiency of the system. In the EU, the F-Gas Regulation provides for such requirements for systems running on certain fluorinated gases. Although the original objective was to prevent leakages, the combination of enhanced qualification of professionals and regular checks also helps achieve energy efficiency of the systems.

Choosing the right refrigerant

Designing a RAC and Heat Pumps (RACHP) system involves a key element: choosing the “right” refrigerant, i.e. the correct heat exchange media for cooling or heating.

Each refrigerant has its downsides. Some HFCs have high global warming potentials (GWPs). Alternatives show toxicity, flammability or very high working pressure depending on the refrigerant. In addition, each RAC system will show different levels of energy efficiency depending on its characteristics and the refrigerant it uses. This is where contractors’ added value lies: in guiding users to make the most efficient choice.

Low GWP Refrigerant handling issues

The AREA position paper “Low GWP Refrigerants” sets out a general guidance in identifying which refrigerant is best for which application. This guidance paper raised concerns about the lack of field technicians properly trained in the safe handling of low GWP refrigerants. In particular, there was a general concern about the safety aspects of non specifically trained technicians when handling highly flammable hydrocarbons, high pressure CO₂ gases or toxic ammonia.

An increased use of online “e-learning” training (i.e. www.realalternatives.eu) has enabled many existing technicians to cover the necessary theoretical aspects of new and refresher training requirements without impacting their daily workload. Many aspects of the training, however, must be carried out in practical environment due to the nature of the qualification. This requires quality training centres where practical abilities can be assessed and improved upon prior to demonstration testing for certification.

Training and certification consists of written or online examination of theoretical, environmental and regulatory knowledge followed by a practical test consisting of demonstration of a candidate’s ability to properly and safely cut, prepare and join by brazing of sections of a refrigeration circuit, followed by correct leak tightness and strength pressure testing, evacuation, charging and putting into work a small refrigeration system; their ability



to correctly identify and repair faults in a working system; and their ability to identify refrigerants by using comparator charts, etc.

Who needs to be certified (EU experience in fluorinated gases)?

A - Natural persons (i.e. personnel) carrying out certain tasks on certain types of equipment must be certified or qualified. Certification consists in theoretical and practical assessment.

Relevant equipment

- Stationary refrigeration, air conditioning and heat pump
- Refrigerated trucks (above 3.5 t) and trailers
- Air conditioning equipment in road vehicles within the scope of Directive 2006/40/EC on mobile air conditioning (recovery operations only)
- Air conditioning equipment in road vehicles outside the scope of Directive 2006/40/EC on mobile air conditioning (recovery operations only)

Tasks

- Installation, servicing, maintenance
- Repair
- Decommissioning
- Leakage checking
- Recovery

B - Undertakings (i.e. companies, but also self-employed contractors) carrying out certain tasks on certain types of equipment for other parties must be certified.

Certification consists of:

- employment of personnel certified, for the activities requiring certification, in a sufficient number to cover the expected volume of activities; and
- proof that the necessary tools and procedures are available to the personnel engaged in activities for which certification is required.

Relevant equipment

- Stationary refrigeration, air conditioning and heat pump

Tasks

- Installation, servicing, maintenance
- Repair
- Decommissioning

Equipment users must take reasonable steps to ascertain that those performing the above mentioned tasks holds the necessary certificate.

Summary of certification requirements

	Installation, servicing, maintenance	Repair	Decommissioning	Leakage checking	Recovery
Stationary RACHP equipment	 	 	 		
Refrigerated trucks & trailers					
A/C in road vehicles					 (1)



Natural person



Company

(1) Personnel must be appropriately qualified

Training is important and it is the only method to transfer to the contractor the knowledge to install, maintain and repair RAC systems containing alternative refrigerants considering both the technical and safety aspects. Training should be both theoretical and practical.

For the training facilities AREA suggests that test rigs, equipment and components related to each alternative refrigerant are recommended to simulate best practices.

Minimum requirements for certification and certification schemes

AREA suggests that certification should be made mandatory. Each candidate who wants to handle alternative refrigerants should hold a certificate which is assessed to the requirements of EU regulation 303/08 (certification on fluorinated gases) and should take part in an assessment specifically for the alternative refrigerant they wish to handle.

Sustainable refrigeration for food and nutrition security

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James Lomax
UNEP Programme Officer for Sustainable Food Systems

Refrigeration – in particular, the cold chain – is key to ensuring food and nutrition security. Today's world actually produces enough food to feed all 7.2 billion human beings, yet the poor availability of and access to this food means that food systems are failing to fulfil nutritional and environmental needs. There are profound imbalances in availability, consumption and diets, as seen by over 800 million people being hungry, two billion malnourished lacking the essential micronutrients needed to lead healthy lives, and more than 1.4 adults being overweight/obese.



The UN's Food and Agriculture Organisation (FAO) estimates that to satisfy the demand of a growing and richer population – who seek more meat in their diet – by 2050, food production will have to increase by at least 60% in the next few decades. However, this figure can be reduced by improving production efficiency, changing dietary trends and decreasing food losses and waste. Cold chains can play a significant role in this last process.

In developing regions such as sub-Saharan Africa, Asia and parts of Latin America, there is a high level of food loss (i.e. food that becomes unfit for human consumption due to spoilage). Fresh produce, such as dairy, fruits, vegetables, meat and fish can spoil easily – sometimes more than half the produce can go to waste. With the increased demand for resource intense foods such as livestock products and the embedded resources within them, it is imperative that of the food that is harvested as much as possible is consumed. This resource loss is even more important considering resource scarcity in these

regions that are on the frontline when it comes to climate change and extreme weather events.

Studies show that increased cold storage facilities can reduce about a quarter of the amount of food lost if levels of refrigeration were at a similar level as in developed countries. One of the most important steps in ensuring that fresh produce is consumed comes just after harvest. The shorter time it takes for food to be cooled after harvest the better its shelf life and nutritional quality. This, however, presents a significant challenge given that most food is produced in rural areas where electricity provisions are basic and/or that fuel to generate electricity is scarce and/or expensive. For example, 70% of people in Sub-Saharan Africa have no access to electricity and 80% of those are located in rural areas.

So the question is not why there should be a cold chain, but how to ensure that there is energy to sustain it. In many parts of the developing world, renewable energy sources are abundant, but cannot be easily harnessed due to lack of infrastructure or expertise. More investments are needed in these aspects, or else massive volumes of food will continue to get spoilt and lost, and issues of food safety and food security will continue to affect millions, especially in the developing world. And with these investments there is an opportunity to ensure that new cold chain infrastructure is constructed with ozone friendly refrigerants.



Phasing out Methyl Bromide: Success and Challenges

Marta Pizano, Ian Porter, Mohammed Besri
Co-chairs of Methyl Bromide Technical Options Committee (MBTOC)

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Methyl bromide (MB) was introduced into agriculture in the 1950s as a broad-spectrum, efficient fumigant for commodity and pre-plant soil fumigation. In 1992, MB was listed as an ozone depleting substance and controls were imposed by the Montreal Protocol to first regulate consumption and then to phase-out. The deadlines were: 1 January 2005 for developed countries (non-A5 Parties) and 1 January 2015 for developing countries (A5 Parties).

Under a special provision, Parties may use MB after the phase-out date through critical use exemptions (CUE), which may be granted for specific circumstances where replacing MB is particularly difficult for technical or economic reasons. Such exemptions are recommended by MBTOC and authorised on a yearly basis.

MB is also used in many countries for preventing and controlling QPS (quarantine and pre-shipment) pests and diseases that can affect commodities. Since no suitable alternatives were considered available for these uses at the time when MB was classified as an ODS, they remained exempted from control. This situation may change in the future because alternatives to MB have been developed in the QPS sector and are in use in several Parties; in fact, some Parties have already phased-out QPS uses entirely.

Through the Protocol, and often with help from its Multilateral Fund (in the case of A5 Parties) most countries have been able to adopt successful control solutions to some difficult pest and disease issues. The large total phase-out of MB so far achieved has contributed significantly to reducing atmospheric pollution caused by methyl bromide and consequently to ozone layer recovery.

Some benefits associated to the MB phase-out include:

- Over 80% of global consumption of MB has been phased out by 2014.
- Approximately 30% of the fall in stratospheric chlorine levels is due to reductions in MB use and the ozone layer is repairing.
- In non-A5 Parties, present consumption amounts to less than 1% of the overall consumption baseline (average consumption in 1991).

- More than 90% of the overall consumption baseline for A5 Parties (average consumption for the period 1995–1998) has been already replaced with alternatives, ahead of the January 2015 deadline.
- Technically and economically feasible alternatives have been identified and proven effective for the vast majority of MB controlled uses.
- Those sustaining the phase-out gain market benefits, since environment-friendly production practices are increasingly important to consumers.

In spite of these significant successes, some important challenges remain, and efforts in replacing this chemical need to continue:

- Use of MB for QPS is not controlled and QPS consumption is significantly increasing in certain regions. This is particularly true in some A5 Parties over the past decade and is a cause of concern, as it cannot always be explained in terms of increased trade.
- Implementation of alternatives has proven to be much more difficult in some sectors than others, for example in the production of plant propagation material (nurseries) which is subjected to very high health standards and often official certification (pest and disease free).
- Confusion between QPS and non-QPS uses and weak tracking systems for MB imported into a country can lead to illegal use and trade and needs to be controlled.
- Initially successful alternatives may lose effectiveness. For example, resistance to phosphine has been reported in some insect pests resistance breakdown has occurred in certain varieties and rootstocks of vegetables previously resistant to some soil borne pathogens e.g. *Fusarium Verticillium*, *Meloidogyne*.
- Some alternatives, particularly fumigants, are becoming restricted in some countries, whilst others are not available or are too expensive, making their use not economically feasible.

Montreal Protocol and the Green Economy

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Nick Dale
Senior Environmental Policy Consultant, Metroeconomica

The Green Economy is now very much on the global agenda. A number of international organisations and research networks are focusing on how we can make sustained progress towards the greening of economies.

UNEP's Green Economy Initiative, a key driver in this field, defines a green economy as one that "results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities".

This definition combines economic, social and environmental goals, and challenges the notions that there is an inevitable trade off between environmental sustainability and economic progress and that a green economy limits growth and perpetuates poverty in the developing world. Rather, a green economy should be an engine for achieving sustainable development and supporting progress towards the Millennium Development Goals and the Post-2015 Development Agenda.

What better example then, when looking for insights into how to effect a transition to a green economy, than to examine the experience of the Montreal Protocol. Reflecting on the overall impacts of the Protocol during the last three decades show that, in addition to achieving the phase out of ODS, it has stimulated many Green Economy benefits, even though these were not the primary motivation, and in many instances, not been much heralded.

Because the Montreal Protocol's contributions have been spread across many business, public and voluntary organisations in signatory countries, its overall contribution to the Green Economy is difficult to quantify. We do know, however, that rather than imposing an overall cost on participating economies, the Protocol has strengthened them and moved them towards a Greener Economy. Significant investments made in ozone layer protection resulted in technological advances and design innovations that were more energy efficient, reduced costs and produced cleaner and more reliable products. Furthermore, the transfer of know-how and technology enabled some developing countries to compete better in international markets and significantly expand production.

ODS phase-out has also contributed to GDP growth by avoiding losses in agricultural and fishery yields that could have resulted from ozone depletion, and the avoided health costs of cancers and cataracts incidence. The avoided cases of melanoma and non-melanoma cancers have indirectly

helped alleviate poverty, especially among agricultural workers in developing regions with high surface ultraviolet radiation levels.

The Protocol has also brought about important health and safety benefits for workers through improved equipment and phase out of dangerous chemicals, such as methyl bromide in agriculture and carbon tetrachloride as a solvent. In fact, safety at work is a key element of training for technicians and operators in all projects supported by the Multilateral Fund.

An important environmental co-benefit of the Protocol is the reduction in Greenhouse Gas emissions due to ODS phase-out. In the 20 years up to 2010, the phase-out of production and consumption of ODS is estimated to have reduced GHG emissions by a net 135 billion tonnes of CO₂ equivalent – about five times more than the Kyoto Protocol annual emissions reduction target for the period 2008–2012. This has an estimated total value of around US\$ 3.2 trillion.

Preventing ultraviolet rays from reaching the surface has also helped protect livestock, terrestrial plants and aquatic organisms – all of which have significant economic benefits for agricultural and fisheries sectors.

Finally, the institutions and mechanisms of the Montreal Protocol also played a key role in facilitating gradual transition towards a Green Economy. In particular, arrangements for transfer of clean technology and capacity building contributed to the success of ODS phase-out programmes and to raising environmental standards in developing countries.

The Montreal Protocol shows how international cooperation in addressing a major environmental issue can support greening the global economy. Today, the Protocol remains relevant: it has much to contribute to climate mitigation through continuing actions to phase-out of HCFCs, and through the development and commercialisation of energy efficient technologies.

For more information on UNEP's Green Economy Initiative, see: *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, United Nations Environment Programme, 2011. For a more detailed assessment of the subject of this article see: *The Montreal Protocol and the Green Economy: Assessing the contributions and co-benefits of a Multilateral Environmental Agreement*, UNEP 2012.

What's happening with the Antarctic ozone hole?

Paul A. Newman, Chief Scientist for Atmospheric Sciences at NASA and
Eric R. Nash, web curator for the Ozone Watch

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The 1985 discovery of the Antarctic ozone hole by Joseph Farman, Brian Gardiner, and Jonathan Shanklin drove an intense exploration into the causes of polar ozone decline. By 1989, chlorine monoxide (ClO), bromine (BrO), nitrous oxide (N₂O), and ozone measurements from the Antarctic Airborne Ozone Experiment definitively proved that the chlorine and bromine from ozone depleting substances (ODS) --mainly CFCs and halons -- were responsible. While the landmark 1987 Montreal Protocol regulated the production and consumption of ODS, subsequent amendments stopped the growth of ODS by the mid-1990s.

The Antarctic ozone hole begins developing during August, and by late September the Antarctic region is dominated by very low total column ozone values (Fig. 1). Typical values of ozone are around 250 Dobson Units (DU) in late July and decline to values of less than 150 DU by late September.

Figure 1 shows total column ozone derived from the OMPS instrument on the Suomi NPP satellite on 19 September 2014, with an area coverage of 21.9 million km², and a lowest value of 139 DU. As the figure shows, the 2014 Antarctic ozone hole has developed in a manner consistent with most of the ozone hole observations since the mid-1990s: a large ozone loss over a continentally sized region by late September.

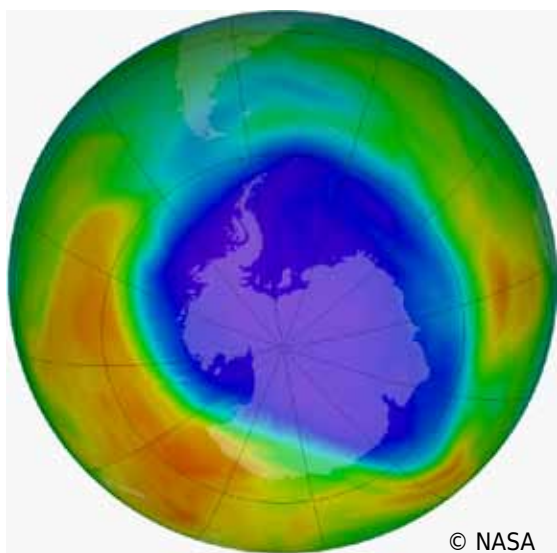


Figure 1. The Antarctic ozone hole is defined by a region of extreme ozone loss that occurs during August through October over Antarctica. This false color image of total column ozone over Antarctica on 19 September 2014 shows extremely low levels (blue-purple colors), surrounded by high values (orange-red).

Is the ozone hole getting better? The answer is somewhat mixed. Figure 2 shows an average of the area covered by the Antarctic ozone hole from 1979 to 2013. There is quite a bit of year-to-year variability in the area values that mainly result from year-to-year stratospheric temperature variations. For example, temperatures in the lower stratosphere were very warm in 2002 because of a major stratospheric warming that was driven by atmospheric dynamics, which led to a small ozone hole area.

After the late-1990s, there appears to be a decline in the ozone hole area. However, this decline is not necessarily related to ODS but may be related to increased dynamics in the last decade that has warmed the stratosphere and decreased ozone.

Comprehensive models of the stratosphere are used to project the evolution of the Antarctic ozone hole. These models account for changing both ODS levels and greenhouse gas levels. The model projections show that the ozone hole should start showing a response to declining ODS levels within the next decade. Furthermore, models also project that the continued decline of ODS will lead to a recovery back to pre-1980 levels by about 2070.

While scientists are not yet confident that the recent ozone hole improvements are due to ODS, they are confident that the ozone hole will improve as long as countries continue to abide by the Montreal Protocol.

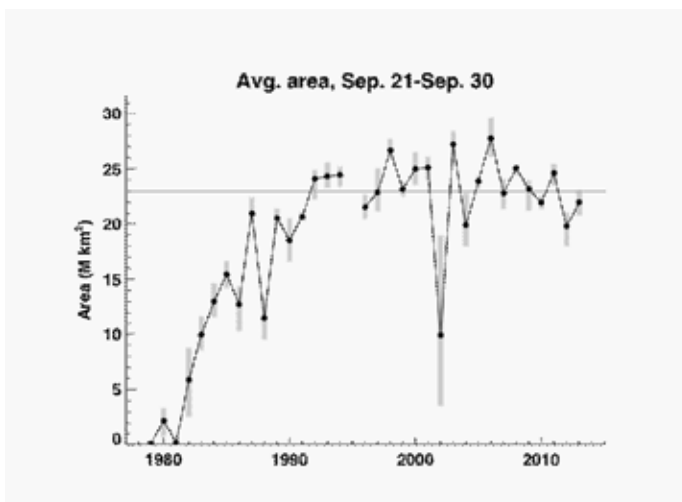


Figure 2. The area covered by the Antarctic ozone hole from daily estimates averaged over 12–30 September. The area is estimated from the region covered by values less than 220 Dobson Units (blue-purple region shown in Fig. 1).

International Year of SIDS: Mauritius and the Montreal Protocol

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P. Jhugroo
Permanent Secretary, Ministry of Environment & Sustainable Development, Mauritius

Mauritius, as a Small Island Developing State in the Indian Ocean, deeply appreciates the initiative of the United Nations to dedicate 2014 as the "International Year of SIDS". This draws attention to the inherent vulnerabilities and challenges faced by Small Island Developing States (SIDS) and call for collective actions by the global community to address their special needs.

SIDS are often characterised by their limited resources, inadequate access to technology, vulnerability to disasters and heavy reliance on international trade and foreign aid. SIDS are also among the first to face impacts of climate change, even though they emit very small quantities of greenhouse gases and are low volume consumers of Ozone Depleting Substances (ODSs).

Mauritius joined the Montreal Protocol in 1992 and has been actively engaged in implementing its provisions. Conscious of the vital need to protect the ozone layer and the planet, Mauritius phased out chlorofluorocarbons (CFCs) five years ahead of the 2010 target. Other ODSs -- namely halons, carbon tetrachloride and methyl chloroform -- have also been phased out well ahead of specified targets.

Mauritius is now committed to phasing out hydrochlorofluorocarbons (HCFCs) by 2025, again well ahead of the set target of 2030. Mauritius has played an active and important role in high level negotiations and expert group meetings over the years to help the Protocol to achieve its targets. In recognition, Mauritius was on the scroll of honours on the occasion of the 25th Anniversary of the Protocol in 2012. This year, Mauritius has the privilege of chairing the high level Executive Committee of the Multilateral Fund to support the Protocol.

One main challenge in phasing out HCFCs in Mauritius, and in all SIDS in general, is the illegal trade in ODS. Recognising the need for capacity building in this area and with a view to consolidating enforcement at entry points, Mauritius hosted a regional 'Train-the-Trainer' workshop for Customs officers of the island states of the Indian Ocean. The training was organised in collaboration with UNEP to coincide with the International Day for the Preservation of the Ozone Layer 2014.

This workshop involved Customs officers from the Maldives, Comoros, Reunion Island, Madagascar, Rodrigues, Seychelles and Mauritius. They were given the latest updates and skills on enforcement of regulations on ODS and on using refrigerant identifiers. The workshop was also an ideal platform to

consolidate existing cooperation, share experiences and trigger a new era of partnership among the islands.

Another key challenge in phasing out HCFCs is ensuring the shift to climate friendly refrigerants while avoiding the transition through high global warming hydrofluorocarbons (HFCs). In order to leapfrog to natural refrigerants such as hydrocarbons and ammonia, various initiatives are being taken by Mauritius. These include: capacity building and awareness raising of different target groups on the benefits of natural refrigerants. Additionally, carbon dioxide as refrigerants, a refrigeration cascade system for supermarkets will be installed this year at a training institution for demonstration and training purposes.

Mauritius is actively pursuing the path of sustainable development, yet like other SIDS, it requires the support of the international community to continue moving forward. In fact, during the Third International Conference on SIDS held in Samoa in September 2014, Mauritius and other SIDS advocated for support by the global community for sustainable development endeavors of SIDS. Mauritius appealed for strong partnerships and collaboration of the international community in terms of financial and technical support, technology transfer and capacity building. At the United Nations Climate Summit in New York on 23 September 2014, the President of the Republic of Nauru, as Chair of the Alliance of Small Island States, reiterated the same plea. However, to fully benefit from such support, SIDS will have to develop a coherent strategy to address the challenges of global warming and ozone layer depletion in a harmonised way.

Mauritius is attempting to meet this challenge through the 'Maurice Ile Durable' initiative, which is the national strategy for sustainable development. In line with this year's theme for Ozone Day, "Ozone Layer Protection: The Mission Goes On", SIDS will continue to contribute to meet their obligations.



Third International SIDS Conference: Implications for the Montreal Protocol

Artie Dubrie
Regional Network Coordinator for Pacific Island Countries

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“We, the Heads of State and Government and high-level representatives, having met in Apia from 1 to 4 September 2014 at the third International Conference on Small Island Developing States, with the full participation of civil society and relevant stakeholders, reaffirm our commitment to the sustainable development of small island developing States. This can be achieved only with a broad alliance of people, governments, civil society and the private sector all working together to achieve the future we want for present and future generations.” - SIDS ACCELERATED MODALITIES OF ACTION (S.A.M.O.A) Pathway document (<http://www.sids2014.org>)

The Pacific island of Samoa was the host of the 3rd International Conference on Small Island Developing States (SIDS) held in September 2014. All SIDS are Parties to the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer. All SIDS are in compliance with these international environment agreements.

UNEP through its OzonAction Compliance Assistance Programme is assisting SIDS in meeting and sustaining compliance for the phase-out of ozone depleting substances (ODS). This is provided through a combination of services including for example: South-South, North-South and triangular cooperation; institutional and human resources capacity building, technology transfers and adaptation. In each of the three geographic clusters of the

SIDS, UNEP manages Regional Networks and networking amongst the national ozone officers.

The compliance obligations to this multilateral environmental agreement are linked to the sustainable developmental priorities as detailed in the S.A.M.O.A pathway document. One of such linkage is through Executive Committee Decision XIX/6 for the adaptation to longer term energy efficient, climate and ozone friendly technological alternatives as Parties address accelerated phase-out of hydrochlorofluorocarbons (HCFCs). This is in alignment with S.A.M.O.A Pathway document under article 47 as: “We recognize that the phasing out of ozone-depleting substances is resulting in a rapid increase in the use and the release into the environment of hydrofluorocarbons with a high potential for global warming. We support the gradual phasing down of the consumption and production of hydrofluorocarbons (HFC).”

A review of the S.A.M.O.A. pathway document on some of the key linkages with the Montreal Protocol are summarised in the following table:

S.A.M.O.A pathway document (selected items)	Montreal Protocol implications towards adaptation to longer term non-ODS alternatives
Sustainable tourism, food security and nutrition; health and non-communicable diseases	Methyl Bromide applications in Plant Quarantine and pre-shipment. Refrigeration and air-conditioning (RAC) technological transitions and impacts to food and medicine storage and supply chains.
Sustainable energy, climate change sustainable consumption and production, education, capacity building and technology transfers	Required RAC knowledge, skills and capacities the investment planning, design, selection and servicing stages of technology adaptation.
Oceans, seas and biodiversity	Protection of the ozone layer is necessary for healthy, productive and resilient eco-system.
Management of chemicals and waste, including hazardous waste	Management of use, emissions and safe disposal of ODS.
Financing	The Multilateral Fund is financially supporting the phase-out of ODS in all SIDS.
Trade	HCFC phase-out of addressed through supporting the adaptation of best longer term technological alternatives.
Data and statistics	Annual data reporting obligation of each SIDS.
Institutional support for SIDS	MLF is supporting national Institutional Strengthening in SIDS.

Refrigerant Consumption in Fishing Vessels Operating in the Waters of Pacific Island Countries

Ribanataake Awira - Fisheries Development Adviser, Fisheries Development Division, FFA
Co-authors: Artie Dubrie - Regional Network Coordinator (PICs), UNEP ROAP and
Leonard Rodwell - Fisheries Development Adviser, Fisheries Development Division, FFA

Marine Fisheries is the single largest industry and bread earner for many Pacific Island countries. Economic benefit derived from this sector is sourced through a direct involvement of Pacific Island Countries (PICs) in fishing, fish processing and through the licensing arrangement between PICs and foreign fishing nations. Many different nations operate fishing vessels in the PIC region and refrigeration is essential in all stages of the fisheries industry: from catching to processing, to the consumer. Although PICs are complying with their obligations under the Montreal Protocol on the phasing out of Hydrochlorofluorocarbons (HCFCs), this sector is still an elusive area. The demand and market supplies routes of refrigerants and refrigerant servicing in the marine fishing sector is not known for PICs and perhaps for other regions.

The management of Ozone Depleting Substances (ODS) in the fishing sector has to be intimately aligned with the nature and complex magnitude of this industry including that of clarifying the responsibility of flag states and vessels owners and in the context of sustainable development. As of June 2014 the number of vessels registered under the Pacific Islands Forum Fisheries Agency (FFA), Good Standing Register stands at a total of 1,332 vessels (FFA database 2014) including bunkers, fish carriers, long liners, mother ships, pole and liners and purse seiners. Out of this total, the vessels with cold storage capabilities, that have a direct link to the consumption of refrigerants with ozone depleting properties are long liners, purse seiners, fish carriers and pole and line fishing vessels (Figure 1).

One may ask why there are so many vessels operating in the region vying for the same four species of tuna? The answer is that the tuna fishery in the waters of the FFA member countries is the largest in the world and the need to generate and maximise economic benefit from fishery resources for PICs, as for some, this is the only resource they have. Ten years ago income from fisheries access was around US\$ 40 million but now PICs are getting somewhere around US\$ 250 million in fishing revenue and other direct benefits. This shows an increase of over 500% which can be attributed to the management measures put into place by FFA and the Tuna Commission as well as the introduction of the Parties of the Nauru Agreement vessel day scheme in 2007. In 2013 the total catch of tuna resources from the Western and Central Pacific - Commission Area (WCP-CA) was 2.61 million tonnes and this is valued at US\$ 6.3 billion. Catch taken from waters of the FFA member countries is 1.56 million tonnes or 60% of the WCP-CA total and this is valued at US\$ 3.4 billion.

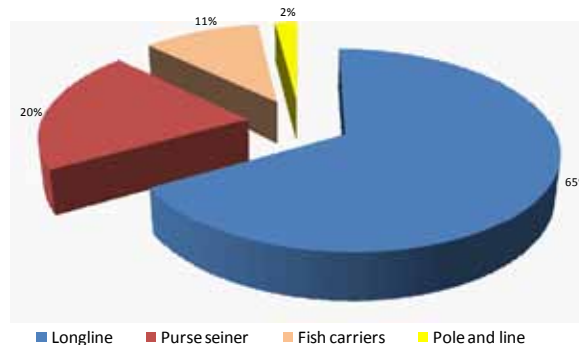


Figure 1. List of good standing vessels as of June 2014 in the FFA Good Standing Register (Source: FFA 2014)



Figure 2. Offloading of tuna from a purse seiner to a fish carrier (Source: FFA 2014)

With more than 1,000 vessels roaming the Pacific Ocean from various nationalities fishing for tuna, there is an urgent need to have mechanisms to monitor and control the consumption of all refrigerants used on fishing vessels to ensure that PICs meet their obligations under the Montreal Protocol and the International Maritime Organization's (IMO) agreement on the prevention of air pollution from ships which is covered under MARPOL 73/78 Annex VI. FFA Members do not have this capacity, nor do they have the financial, human or institutional resources. Of concern is to control the supply of refrigerants and refrigerant finger printing as possible regulatory tools in the control of illegal, unreported and unregulated (IUU) fishing. Previously published IUU loss estimates for the Western and Central Pacific region are somewhere in the region of US\$ 750 million to US\$ 1.5 billion a year. Where IUU involves vessels not already licensed in the fishery, it can be assumed that for IUU there will also be a high demand for refrigerants and that they may be traded illegally to meet the demand of illegal fishers.

The phasing out of ODS use as refrigerants in the fishing sector nationally, regionally and internationally needs to be urgently addressed. The sustainability of the marine eco-systems depends on a healthy ozone layer.



Les Bonnes Pratiques en matière de Climatisation Individuelle.

This booklet was produced to help air-conditioning technicians in their work concerning technical issues but also to enable them to work in the safest conditions.



Informal Prior-informed Consent (iPIC).

The iPIC mechanism is a voluntary and informal system of information exchange on intended trade between the authorities in importing and exporting countries that are responsible for issuing ODS trade licenses.

The designated authorities in charge of issuing import / export licenses are encouraged to consult the iPIC info sheets of their respective trade partners before issuing any license.



International Standards in Refrigeration and Air-Conditioning.

This guide is intended to provide an introduction to standards and how they can be useful in supporting the adoption of alternatives in the context of the HCFC phase-out in developing countries. It also includes an overview of existing standards related to HCFCs and their alternatives, barriers to alternatives, the process of the adoption of international and regional standards at the national level, barriers to the adoption and how to overcome them.



Phasing out Methyl Bromide in Developing Countries - A Success Story and its Challenges.

This booklet addresses the efforts undertaken to phase-out Methyl Bromide in developing countries, the lessons learned and what is pending to reach final phase-out. It further analyses factors that may impact or put at risk the continuity of the phase-out and possible ways to mitigate them.



CAP Achievements. As we implement the outcomes of the Rio+20 conference on sustainable development, the remarkable success story of the Montreal Protocol on Substances that Deplete the Ozone Layer acts like a beacon of hope. The ozone layer protection has multiple benefits toward biodiversity, health, the world's economy and climate change. The regional highlights is a bi-annual booklet including updated information from all regional networks.



ECA Ozone protection Award 2014 for Customs & Enforcement Officers

The information note on seizures of ozone depleting substances (ODS) and ODS equipment which were reported in the context of the Europe Central Asia (ECA) Ozone Protection Award (3rd edition) .It will also include the list of informal Prior Informed Consent (iPIC) consultations which resulted in the prevention of illegal / unwanted ODS trade.



National Ozone Officers Guide. This guide introduces and summarises the many important issues about the Montreal Protocol on Substances that Deplete the Ozone Layer that Ozone Officers (NOOs) need to know to perform their job effectively. Presented in an easy to understand format, the guide is designed to provide new NOOs and their assistants with the critical knowledge needed to quickly understand the Montreal protocol system and the country's obligations under the Montreal Protocol.



Training Manual for Customs Officers: Saving the Ozone Layer - Phasing out Ozone Depleting Substances in Developing Countries - Third Edition.

This version takes into account the developments in international trade and provides new material to reflect changes in the Montreal Protocol, Harmonised System codes, licensing systems and other relevant information since its original publication in 2001 and its second edition in 2008.

V i d e o s



Cooling Without Warming the Planet. Produced by UNEP OzonAction ROLAC and the Colombian NOU (English, Spanish and Portuguese, aprox. 30 mn) unveils successful alternative cooling experiences with natural refrigerants for domestic and industrial applications in five Latin American and Caribbean countries. These technologies have been taken up as energy-efficient and low-GWP alternatives in the HCFC-based equipment.



Protecting Our Atmosphere for Generations to Come: 25 Years of the Montreal Protocol. The signing of the Montreal Protocol in September 1987 launched an unprecedented global effort in the protection of the environment. To this day, the Vienna Convention and the Montreal Protocol are the only universally ratified treaties, uniting 198 countries in taking on the fight against man-made ozone depleting substances. This short documentary was produced for the United Nations Environment Programme Ozone Secretariat and OzonAction Programme, on the occasion of the Protocol's 25th anniversary. This documentary tells its story; how it started, how it grew stronger and stronger with time, how its unique mechanism of funding and assistance has turned it into the success.



Alternatives to HCFCs in the Foam Sector: Taking on the Challenge. A 15 min short documentary developed by UNEP OzonAction Branch that seeks out answers from the technical and scientific experts closest to the issue and showcases some inspiring conversion projects. With financial assistance and technology transfer facilitated by the Protocol's Multilateral Fund, developing countries are already taking on this uphill battle, thus paving the way for the adoption of ozone and climate friendly alternatives to HCFCs.



The Arctic & the ozone layer: stabilizing our environment and climate. In 2011, extremely low-ozone levels were recorded in the Arctic region. This episode at the North Pole - the Arctic- has triggered concerns on the trend of the ozone layer's recovery, expected to fully happen by mid century. With the support of the government of Norway, UNEP is investigating the causes of this depletion and the scientific explanations for such unexpected episode in the Arctic. This 16 minute-documentary reports the impacts on the region's ecosystem and the foreseen risks of the changes in the Arctic that may affect human life also in mid-latitudes. This video output is jointly branded by the WMO (World Meteorological Organization) and brings to light some of the so much discussed inter-linkages between the climate and ozone issues on the voices of internationally known scientists.

O z o n A c t i o n O n l i n e

You can find OzonAction on the Internet here:

The OzonAction Website: <http://www.unep.org/ozonaction/>



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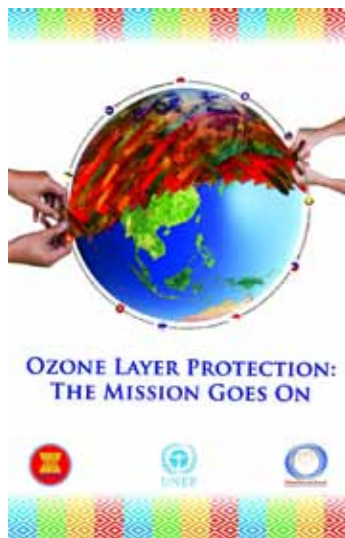
OzonAction News Drops channel: <https://www.youtube.com/channel/UCfhy-IHB52NxC1GMkUU7qkQ>

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New Posters 2014:



<http://ozone.unep.org/images/UNEP-Ozone-poster-A3.pdf>



http://ozone.unep.org/images/Ozone-day_2014_ASEAN_Poster_c.jpg



Please visit:

UNEP Ozone Voices: <https://www.youtube.com/playlist?list=PLZ4sOGXTWw8EAlwyLbZI2bmTUDxMJhaLe>

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The OASI was supervised by:
Shamila Nair-Bedouelle, Head of OzonAction Branch
Anne Fenner, Information Manager of OzonAction Branch

Review team:
Jim Curlin, Network and Policy Manager
Barbara Huber, Programme Assistant
Jo Chona, Administrative Assistant

Editor: Nalaka Gunawardene

Designer: Aurélie Ek, Consultant

Credits for photos and graphics: Shutterstock
Page 11: Jana Mašíčková
Page 15: Marta Pizano

Please send comments and material for publication to:

Ms. Anne Fenner
OzonAction Branch
United Nations Environment Programme
Division of Technology, Industry and
Economics (UNEP DTIE)
15, rue de Milan - 75441 Paris Cedex 09,
France
Tel: +33 1 44 37 14 50
Fax: +33 1 44 37 14 74
ozonaction@unep.org
www.unep.org/ozonaction

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