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Tipping the Balance

Towards Climate Protection through the HCFC Phase-Out

CONTENTS

HCFC Phase-Out, Energy Efficiency and Climate Benefits

Prof. Dr. Balthasar Kambuaya, Minister of Environment, Indonesia

Energy Efficiency Concept

The Montreal Protocol is the only universally ratified[1] international treaty and provides an outstanding example of shared responsibility, transparent and equitable governance, an efficient financial mechanism, measurable results and market transformation through cooperative actions by governments and industry for protecting the environment. It also demonstrates exemplary collaboration between developed and developing countries and could well serve as a blueprint for a future climate treaty.

Due to the high global warming potential of ozone-depleting substances, their phase-out not only protects the ozone layer, but with prudent technology and policy interventions, can also result in significant reductions in direct and indirect CO_2 equivalent emissions, thereby protecting the climate system.

Indonesia has assumed voluntary reductions in CO_2 intensity of 26 per cent from business as usual to be achieved by 2020 with financing from its pure state budget. Recognizing the role and potential of the Montreal Protocol to protect the ozone layer and climate system simultaneously, Indonesia's recently approved HCFC Phase-out Management Plan (Stage-I) for meeting the 2013 and 2015 control targets was developed through a close collaboration between government and industry stakeholders, international organizations and bilateral partners.

Due to the expansion of the middle class and rising incomes, the demand for air conditioners in Indonesia has skyrocketed over the past decade. This has resulted in proliferation of the population of air conditioners with HCFC-22 technology and an increase in the demand for HCFC-22 in servicing. Air conditioners are also significantly energy intensive. Indonesia therefore prioritized actions to phase out use of HCFC-22 in air conditioners from 2015. While doing so, we had to ensure that the alternative technologies that would replace HCFC-22 would not only have a low global warming impact, but would also provide significant improvements in energy efficiency. Further, we needed to ensure that forward-looking, effective and enforceable regulations would be in place, which would encourage voluntary compliance without market distortion and sustain the phase-out actions.

We are pleased that in cooperation with our industry and with support from the international community, implementing agencies and our bilateral partners, we are taking this important step towards achieving significant climate benefits, while phasing out ozone-depleting substances.

We would also like to express our appreciation to the Executive Committee of the Multilateral Fund for the recent approval of Indonesia's HPMP (Stage-I) and for acknowledging it as an exemplary strategy.

Going forward, we are aware that the hard work begins now, with technology conversions to be carried out and important policy and regulatory interventions to be enacted in a relatively short time-frame. Indonesia however has full confidence in the solid foundations and strong partnerships which the HPMP (Stage-I) has been built upon.

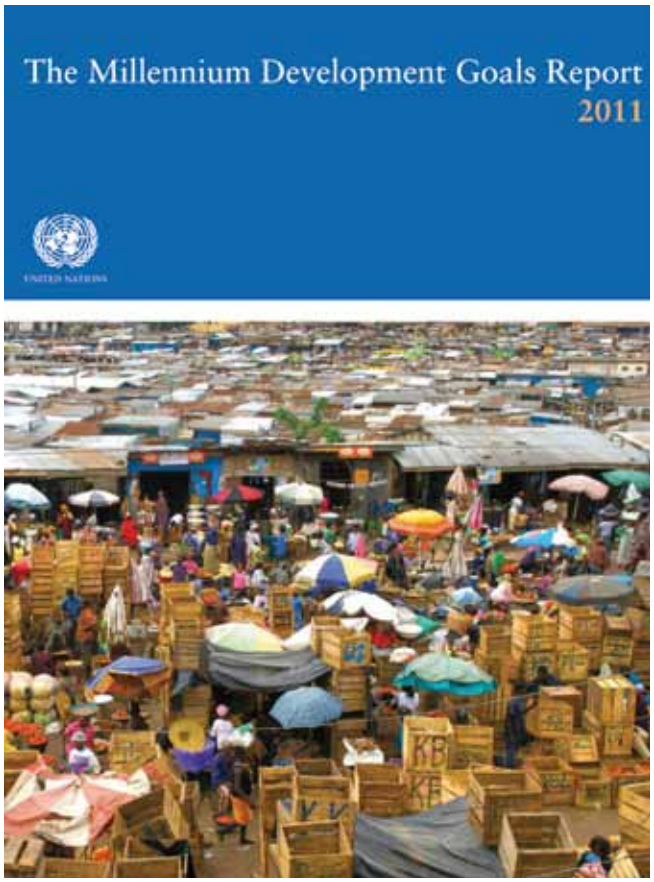
With the support of all our partners, we hope to achieve success and sustainability of actions to protect the ozone layer and the climate.

Finally, we also extend a warm welcome to the international community who will join us at the 9th Conference of the Parties to the Vienna Convention for the Protection of the Ozone Layer and the 23rd Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer that will be held in Bali, on 21-25 November 2011. We hope that the Bali conference and meeting will be a success and will continue to support efforts to accelerate the phase-out of HCFCs and thus provide a dual benefit to both ozone protection and climate change.

Rice terrace fields, Indonesia

[1] South Sudan newly recognized by the UN has not yet ratified the Montreal Protocol.

Montreal Protocol's Contribution to Reaching Globally-Agreed MDGs Recognized

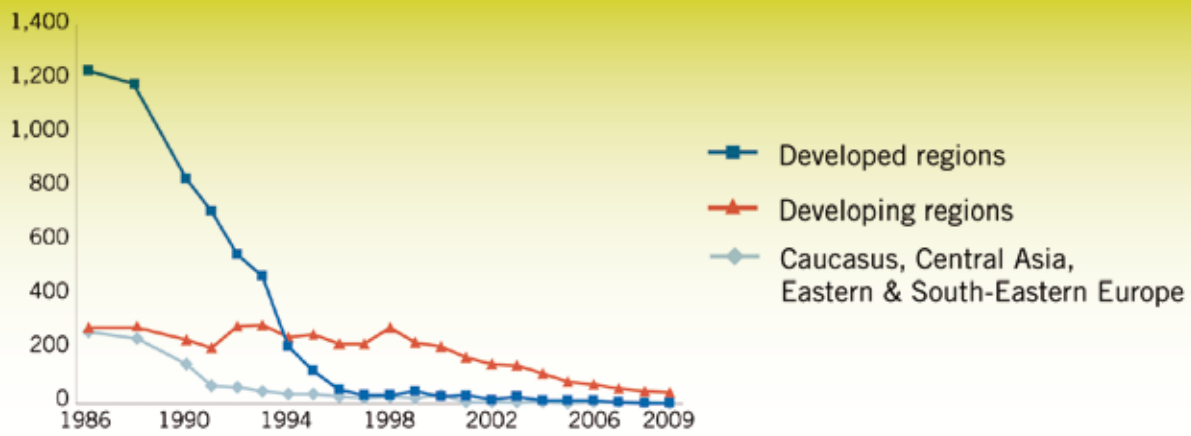


THE MONTREAL PROTOCOL IS NOT ONLY HELPING TO RESTORE THE OZONE LAYER, BUT TO CURB CLIMATE CHANGE.

"Since they were first adopted, the Millennium Development Goals (MDGs) have raised awareness and shaped a broad vision that remains the overarching framework for the development activities of the United Nations." The following is a quote from 2011 MDGs report refering to The Montreal Protocol is an undisputed-but still unfinished-success story. Much more work remains to be done to ensure the protection of the ozone layer for this and future generations. Still, what the parties to the Protocol have managed to accomplish since 1987 is unprecedented, providing an example of what international cooperation at its best can achieve. As of end-2009, the consumption of 98 per cent of all ozone-depleting substances controlled under the Montreal Protocol had been phased out.

Global observations have verified that atmospheric concentrations of such substances are declining. With full implementation of the Protocol's provisions, the ozone layer is expected to return to its pre-1980 levels around the middle of this century. The Protocol has also delivered substantial climate benefits, since ozone-depleting substances are also global-warming gases. The reduction in such substances between 1990, when they reached peak levels, and 2000 has yielded a net reduction of about 25 billion tonnes equivalent of CO_2-weighted global warming gasses."

Consumption of all ozone-depleting substances (ODSs), 1986-2009
(Thousands of tonnes of ozone depleting potential)



(Excerpts from pages 3, 50)

The full report can be downloaded from:
www.un.org/millenniumgoals/11_MDG%20Report_EN.pdf

Many Hurdles Ahead but China Determined to Meet HCFC Phase-out Challenges

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The production and consumption of HCFCs in developing countries will be frozen in 2013 at a baseline level, equivalent to the average of the 2009 and 2010 levels, and then reduced by 10 per cent of the baseline level in 2015. As one of the largest developing countries, China is faced with both an opportunity and an enormous challenge in finding effective alternatives to HCFCs.

China has become the largest producer and consumer of HCFCs in the world. The HCFC products made in China not only meet domestic demand, but are also exported to other developed and developing countries. These HCFC products include refrigeration and air conditioning equipment, foam and products which use solvents and process agents. If we regard the HCFC production as ODS, then to fulfill the frozen target and the reduction target of 10 per cent, more than 5,000 tonnes of ozone depletion potential (ODP) will be phased out every year, equivalent to the greenhouse gas (GHG) emissions of 200 million tonnes CO_2-eq (including the collaborative reduction of HFC-23). In other words, by phasing out HCFCs to the fullest extent and fulfilling the reduction target of 10 per cent in 2015, then it is possible for China to reduce GHG emissions by 200 million tonnes CO_2-eq every year if low-GWP alternatives are introduced. Besides, additional reductions in GHG emissions will be achieved by choosing energy-saving technologies.

However, it is a challenge for the enterprises in China to choose appropriate alternative technologies. Firstly, as a developing country, the research on alternatives to HCFCs in China is still far behind that of developed countries. Only about 2 per cent of national GDP is allocated for research and development by national bodies and enterprises, and the researchers and developers lack the required degree of training and experience. Secondly, standards for the environmental and safety performance of the substitutes are getting higher and higher. To fulfill the required criteria, alternative technologies must be energy efficient, cost-effective and safe. Besides, some limitations imposed by new international protocols also have an impact on the development of alternative technology. For example, if hexabromocyclododecane were restricted (a move which is being discussed in negotiations over amendments to the Stockholm Protocol Conventions for Persistent Organic Pollutants), the use of extruded polystyrene (XPS) foam products as an alternative to HCFCs would become more complicated. Moreover, the limitations on HFC technology also make it more difficult to develop HCFC alternatives. Thirdly, to fulfill the frozen target in 2013 and the reduction target of 10 per cent in 2015, there is insufficient time to complete the process of introducing alternative technologies, including development, demonstration and promotion.

In spite of all this, in order to protect the global environment, enterprises in China have chosen and are adopting climate-friendly and environment-friendly alternative technologies. For example, R290 (Propane) is chosen as the substitute for HCFC-22 in the room air conditioner sector; low-GWP alternatives, such as hydrocarbon (HC) and water blown, are chosen as alternatives to HCFC-141b in the Polyurethane (PU) foam sector; HC and CO_2 are chosen as alternatives to HCFC in the XPS foam sector. After low-GWP alternative technologies, such as HC, are adopted, safety becomes the greatest challenge.

It is important that enterprises should make improvements in many areas, including production facilities, security devices, levels of funding, employee quality and technical expertise. To meet these challenges, with the support and assistance of the international community, relevant Chinese government departments, related industry associations and enterprises have simultaneously addressed some important aspects, including co-location to enhance the security aspects of production, process establishment and implementation of safety procedures, amendments to technical standards of the product, and education and training for employees, in order to ensure the safe use and promotion of alternative technologies.

It is imperative to fulfill the reduction target of 10 per cent in 2015. To meet the target, environment-friendly alternatives must be adopted, especially low-GWP and even zero-GWP technologies, to achieve a maximum direct reduction of GHG emissions. Therefore, China's industry expects to work in collaboration with the global community to develop and adopt low-GWP, high-efficient, energy-saving and safe technologies.

Keeping Cool and Environmentally Safe: A Hot Topic for the Gulf

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In 2007, an important adjustment to the Montreal Protocol triggered another round of technological development for the refrigeration and air conditioning industry. Although the adjustment did not add new controlled substances to the Montreal Protocol and only accelerated phase-out of the hydrochlorofluorocarbons (HCFCs), already known to the industry and international community as a non-viable long-term solution, it did however set new guidelines for choosing alternatives, taking into consideration the climate benefits and global warming-effects of other options.

Up to now, hydrofluorocarbons (HFCs) has failed to demonstrate that they are the most efficient alternatives for air conditioning applications, particularly in high-ambient temperatures. This situation is creating uncertainty with regard to the future of the air conditioning industry, especially in the Gulf Cooperation Council (GCC), and this is placing a burden on one of the most important sectors in the region.

The challenge for the HVAC&R industry and equipment owners is to prepare for an orderly move from HCFC refrigerants to the many alternatives offered in the refrigeration market-place. The future refrigerants should not only have substantial benefits for the environment but they should also provide efficient cooling. The challenges are more pronounced for places such as the Gulf countries which have high ambient temperatures.

The air conditioning sector is considered to be the core of the construction sector in the West Asia region, due to the harsh climatic conditions, where summer temperatures are well into the 40° range in many countries and exceed 50°C in others. The construction sector is the backbone of national development plans and is contributing significantly to the national economies of all West Asian states. In the GCC countries, the air conditioning sector corresponds to an average of 55-65 per cent of the national electrical demand and so is crucial in any strategic planning and development plans.

It is unfortunate that most of the currently commercially available alternatives to HCFC are not as energy efficient as HCFCs. In addition, there are higher cost considerations and other safety concerns associated with use of some flammable and/or toxic long-term alternatives like hydrocarbons and ammonia. HFCs, currently the most prominent alternatives, are also contributing significantly to global warming and also have an indirect global warming impact when operating at high ambient conditions in some applications.

Recent reports from the Technology and Economic Assessment Panel (TEAP), Montreal Protocol, have presented an assessment of the situation in the light of the internationally available alternatives. These reports have supported, to a large extent, the conclusion that there is currently no available long-term and low-GWP alternative that can easily replace R-22 in all air conditioning applications for high-ambient conditions.

As part of its role in supporting developing countries, UNEP has partnered with ASHRAE since 2007 to address key concerns in the refrigeration and air conditioning sectors about the future of alternatives for the air conditioning industry in high-ambient temperatures. UNEP and ASHRAE Kuwait Chapter organized – in cooperation with the Ministry of Electricity and Water (MEW), the Environmental Public Authority (EPA) of Kuwait and the AHRI – the first specialized event on Refrigerants Challenges & Prospects in High-Ambient Temperature Countries; and this was attended by key refrigerants and equipment manufacturers at both international and regional levels.

Countries affected by high ambient temperatures should adopt integrated strategies to ensure smooth transition to non-HCFC and compliance with the Montreal Protocol. However such strategies should include pioneering initiatives to promote research on feasible low or zero-GWP long-term alternatives through building partnerships between national and regional research centres and the air conditioning industry. It should also address staged-approach policies that reduce dependency on HCFC-based technologies wherever alternatives are commercially, technically and economically applicable.

Finally, the availability of standards for the safe design, use and handling of hazardous refrigerants is essential for facilitating the introduction of long-term alternatives, because the next generation of refrigerants is a group that has some flammability characteristics. These potentially hazardous substances include unsaturated HFCs also known as hydrofluoroolefins (HFOs) as well as the hydrocarbons (HCs) that are gaining ground day by day.

It seems likely that the future of the refrigeration and air conditioning industry will rely on reviving the first generation of refrigerants, introduced more than 100 years back.

Buildings and marinas in the Emirate Of Dubai

Australia in Fast Lane for HCFC Phase-Out

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Steve Anderson, Executive Director, Refrigerants Australia

Map of Australia

Australia's accelerated HCFC phase-out programme will use only 40 per cent of the allowance provided under the Montreal Protocol and effectively cease consumption of HCFCs in Australia by 2016.

In 1994, the Australian Government and industry developed a joint HCFC phase-out strategy. This collaborative approach enabled Australia to set an ambitious timetable that set targets for significant HCFC reductions and at the same time provided industry with long-term certainty.

To achieve the 2016 target, Australia progressively adopted a combined approach including an import licensing and quota system, licenses for the businesses and technicians that used HCFCs, a ban on most HCFC equipment and on disposable cylinders.

Australia's quota system is designed to be simple and efficient and to provide certainty. The quota is established by law and reduces by 30 ozone-depleting potential (ODP) tonnes every two years between 1996 and 2015, with HCFC consumption essentially phased out by 2016, apart from a small servicing tail.

The quota is allocated to importers based on their share of imports in the previous quota period. This approach provides certainty to the industry and assists enforcement, as the quota is restricted to a small number of companies. The impact on competition has been minimal because the quota is readily tradeable, and considerable trading has taken place.

Australia's quota system allows HCFC quota holders to decide which species of HCFCs to import. The quantity of HCFCs that can be imported in each two-year quota period is set as a maximum level prescribed in ODP tonnes.

This has been based on availability of alternatives and the time it will take for industry sectors to move to alternatives. HCFC imports are now used almost exclusively for refrigeration and air conditioning applications, apart from a very small quantity for fire protection.

The import and use of disposable cylinders was banned to reduce the opportunity for illegal trade and to reduce emissions from disposed cylinders. The ban was implemented before disposable cylinders had a significant presence in the Australian market, and therefore market disruption was kept to a minimum.
The ban on disposable cylinders ensures that all imports arrive in isotanks. This approach assists compliance by minimising the effort to account for and verify import quantities. The ban also reduces emissions, as normally unrecoverable quantities of HCFCs in 'empty' cylinders are recovered when the cylinders are returned for refilling.

To assist the HCFC phase-out, Australia has banned the import and manufacture of air conditioning equipment containing HCFCs. The ban was introduced in 2010 when alternatives were well established for most applications, and is in step with similar controls in other developed economies. It is expected that the ban will be extended to refrigeration equipment in the future.

The Australian Government and industry have also developed a range of end-use controls to assist the HCFC phase-out and to reduce HCFC, CFC and HFC emissions.

A national permit scheme has been established; this will limit supply of HCFCs and HFCs in the refrigeration and air conditioning and fire protection industries to authorised businesses and restrict handling of HCFCs, HFCs and CFCs to properly trained and licensed technicians. There are some 80,000 businesses and technicians licensed under the scheme.

Refrigerant Reclaim Australia, an industry-funded product stewardship scheme was established in 1993 to recover and destroy refrigerants at end of life. To date it has destroyed some 4000 metric tonnes of waste refrigerant. Refrigerant recovery in Australia continues to increase, with 508 metric tonnes destroyed in the year to June 2011.

A collaborative government and industry approach to the HCFC phase-out has paid long-term dividends. By any measure Australia's programme has been very successful, with importers remaining within their quotas in all quota periods and a smooth transition to non-HCFC alternatives. Also, no HCFC shortages have occurred, which reflects industry's commitment to the phase-out and the wide availability and uptake of alternatives.

The Uses and Benefits of Informal Prior Informed Consent (iPIC)

Aléxandros Kiriazis, Assistant Policy Officer, European Commission, Directorate General Climate Action

IPIC, launched in 2005, is a voluntary and informal mechanism to exchange information between importing and exporting countries to assist them in implementing licensing systems effectively. Participation in iPIC is open to all Parties to the Montreal Protocol. The initiative was originally developed and is managed by the OzonAction Compliance Assistance Programme.

At the end of every good fairytale the Prince marries his bride and they live happily ever after. However, every successful marriage requires some work to keep it alive and to overcome unwelcome obstacles. This truism also applies to the Parties to the Montreal Protocol that have endeavoured to protect the ozone layer and are now approaching the silver anniversary of their pledge. The illegal trade in ozone depleting substances is an unwelcome obstacle to the success of their endeavours but the informal Prior Informed Consent (iPIC) procedure can help to overcome the problem.

From a modest start in 2005, utilisation of iPIC has grown significantly and by 2010 more than a third of all Parties had participated. There must be some good reason for this success.

Certainly iPIC helps to prevent illegal trade. Dozens of unwanted trades have been detected or prevented since 2005. Looking only at European Union (EU) data between 2007 and today, 54 cases of unauthorised trades have been detected, representing 545 metric tonnes of ODS (equalling 144 ODP tonnes). In as many as 25 per cent of the requests, the trade turns out to be unauthorised or unwanted. These figures are impressive enough, but there is more.

UNEXPECTED BENEFITS

The real success of iPIC lies beyond its originally intended task. It has turned out that it can also assist in domestic enforcement, for example by identifying gaps in the licensing systems or by pinpointing companies that are unintentionally unaware of the requirements.

Furthermore, iPIC has brought enhanced networking. Since it is applied globally, cooperation goes beyond existing regional networks. iPIC has brought National Ozone Units and licensing officers into contact and this has resulted in better relationships and cooperation between Parties. The informal dialogue that has developed on a working level between the European Union and China on their licensing systems and enforcement actions is just one example. Such exchanges provide useful feedback for policy development, both domestically and under the Montreal Protocol

the upcoming meetings is the monitoring of sales to sea-going vessels. iPIC requests have helped to shed light on a sector that was previously often overlooked.

Participation in iPIC can contribute to add ressing even higher objectives. For example, one of the guiding principles of environmental policy in the European Union is to minimise the impact of goods originating from the EU on the global environment. As one of the major sources of ozone-depleting substances, the EU's participation in iPIC assists in putting this overall approach into practice. At the same time, the domestic enforcement of measures that are more stringent than required under the Montreal Protocol is strengthened.

EVEN MORE POTENTIAL

Many Parties are not yet exploiting iPIC to the maximum. While countries from most regions are already using iPIC successfully, there are still some regions which are under-represented. In particular, there is more potential in the upcoming phase-out of HCFC, methyl bromide and 1,1,1-trichloroethane. Communicating existing bans in the iPIC licensing sheet is an effective measure to prevent incoming trade. This facilitates the domestic enforcement of bans and National Ozone Units that have to cope with less sophisticated monitoring systems can benefit greatly.

Furthermore, under Decision XVII/16, the Ozone Secretariat compares annually the data that a Party reports as "exports to other parties" with the data reported as "imports by those parties". Every year, a large number of discrepancies are discovered and many of these could be prevented if more Parties were using iPIC.

At the same time iPIC is a very simple process. Unlike other prior informed consent procedures such as those established under the Basel and the Rotterdam Conventions, iPIC is informal and voluntary. Most cases can be dealt with by simply consulting the licensing sheet of the source or destination country before issuing a license. The remaining cases can be solved by consulting informally with the licensing officer of the source or destination country.

SIMPLE BUT SO USEFUL

In summary, iPIC is a very simple but valuable tool. It can help enforce licensing systems, reduce data discrepancies, enhance networking, contribute to higher policy objectives and good policy