Refrigerants, Naturally ! Taking Non-HCFC Technologies to the People

About the initiative

Refrigerants, Naturally! Promotes a shift in the point-of-sale cooling technology in the food and drink and retail sectors towards F-gas-free refrigeration technologies. Member companies are reducing their impact on climate change and ozone depletion by replacing HCFC and HFC refrigerants with natural refrigerants, by using HCFC and HFC-free insulation material, and by reducing the energy consumption of new refrigerating equipment. This is done through substantial efforts or investments to progressively replace fluorocarbons with natural refrigerants in point-of-sale cooling applications, including R and D, testing, financial investment, staff time or public engagement. The members are committed to develop prospective timetables to move their operation towards these goals and to periodically share technical information about alternative refrigeration within the initiative via regular meetings, special events/workshops, and bilateral exchanges. Further, data and results are shared with external stakeholders, such as their wider supply chain, their industry peer groups, government decision makers, and the public. Currently, more than 300,000 hydrocarbon-based freezers by Unilever- Ice cream have already been installed throughout Europe, Latin America and Asia, as well as more than 15,000 bottle- coolers and vending machines in China, Europe and Latin America from The Coca-Cola Company, Carlsberg and PepsiCo, either operating with CO_2 or hydrocarbon refrigerants. McDonald's opened a completely HFC-free pilot restaurant in 2004 which allowed it to monitor and test HFC-free equipment and performance.

When launched 4 years back Refrigerants, Naturally! Had three partners, i.e. the Coca-Cola Company, McDonald's and Unilever. Presently three more multinationals have joined-in – Carlsberg, Pepsico, and IKEA.

Greenpeace and the United Nations Environment Programme (UNEP) are official supporters and take an active role in the management of the initiative[1].

Background

Hydrochlorofluorocarbons (HCFCs) and Hydrofluorocarbons (HFCs) are fluorinated gases (F-gases) that are widely used as refrigerants in refrigeration and cooling industry. In particular, HFCs are the most commonly used type of F-gases to replace CFCs and HCFCs—two sorts of gases to be phased out by the Montreal Protocol due to their ozone- destroying properties. But, like CFCs and HCFCs, HFCs are extremely potent greenhouse gases with a very high global warming potential (GWP). They are regulated by the Kyoto Protocol.

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[1]. *It all started with an experts meeting convened in Chicago-USA in which UNEP and Greenpeace were requested to provide advice on commonly available alternatives refrigerants that are ozone as well as climate friendly.*

➔ Next Generation Room Air Conditioners Can Reduce Need for Power Plants, at Least Some of Them!

Currently, electrical consumption in the residential sector in developing counties is low in comparison to developed countries, but this is rapidly changing. For example, in China this is sector accounts for about 10 per cent of total electricity consumption, compared to about 30 per cent in developed countries. However, the use of air conditioners by urban residents has increased from 8 per cent in 1995 to 70 per cent in 2004 and use of refrigerators has increased from 66 per cent to 90 per cent over the same period. As this growth is expected to continue, the consequences for the climate of improvements in energy efficiency of replacement technologies can be expected to be considerable (see box on "Climatic Advantage" on page 7) and the opportunities for saving energy are great. Potential reductions in power requirements for air conditioner units derived from technology transfer from developed countries would therefore have significant effects. For example, based on calculations from Chinese warm provinces[1], these could result in reductions in total power generation of between 15 per cent and 38 per cent in the next 15 years in China[2] , that is of up to 260 TWh – equivalent to the output from about 50 power plants[3] - with corresponding reductions in CO_2 emissions.

The potential for energy efficiency improvements in room air conditioners in developing countries is the subject of a recent information paper prepared by the International Energy Agency (IEA). This paper takes two case studies, one with a manufacturing capacity (China) and without (Ghana), and estimates the potential reduction in electricity usage and CO_2 emissions through market penetration of energy efficient appliances.

The IEA study also considers various barriers to penetration of energy efficient appliances in developing countries and assesses the feasibility of enforcing energy-efficient standards. It concludes that to realise the full potential of these energy saving measures, considerable market transformation is needed in developing countries to facilitate the conversion to energy efficient air conditioners. The paper suggests that the Cleam Development Mechanism (CDM) may have a role to play in financially supporting such initiatives.

The full IEA report «How to Improve Air Conditioner Energy Efficiency in Developing Countries» can be downloaded from:
www.iea.org/textbase/publications/free_new_Desc.asp?PUBS_ID=1982

[1]. *Accounting for some 30 per cent of the population*
[2]. *Energy efficiency of air conditioners in developing countries and the role of CDM. IEA Information Paper. Satoru Koizumi, International Energy Agency, November 2007*
[3]. *Assuming an average output of 5 TWh per power plant*

Landscape - New Zealand

Lambert Kuijpers

The Real Accelerator of the (Developing Country) HCFC Phase-Out: Financing

In order to comply with the accelerated HCFC phase-out schedule as adopted in Decision XIX/6, financial assistance for all Article 5 Parties will be needed and this will be the main subject of negotiations in Doha in November 2008.

The Technology and Economic Assessment Panel (TEAP) Replenishment Task Force has calculated the funding requirement for the period 2009-2011 (as well as for periods beyond). It started by estimating the HCFC consumption for the period 2007-2012 for separate Parties or for groups of Parties. The main HCFCs are HCFC-22, used in refrigeration and air conditioning and important for servicing, and HCFC-141b and -142b, used in foam blowing. Cost-effectiveness factors were determined on the basis of US$/kg, using assumptions for capital and operating costs. Second conversions were considered eligible; a cut-off date for eligibility (as for CFCs) was not considered a limiting factor.

A scenario called 'baseline funding' was developed applying two cost-effectiveness factors (based on zero or two years' operating costs). Assuming a three-year implementation period, this scenario mainly addresses the 10 per cent reduction from the freeze year 2013 to 2015. The funding requirement determined for addressing HCFC consumption was determined at US $130-180 million including US $63 million for servicing.

A second scenario not only assumes funding the baseline, but all consumption up to and including the year 2012, which should be considered the maximum possible. This is because funding a reduction from growth occurring up to 2012 in just one reduction step to the freeze level in 2013 is the maximum feasible. Compared to the first scenario, the funding required here would increase to US $306-428 million. In the triennium 2009-2011, no funding is assumed to be required for the production phase-out. For supporting activities such as Institutional Strengthening, the Compliance Assistance Programme of UNEP-OzonAction, the Multilateral Fund Secretariat and The Executive Committee an amount of about US $93 million was calculated[1].

Parties at the 28th Open-Ended Working Group have requested the Task Force to look again, and in a more detailed way, at the impact of cut-off dates, second conversions, costs for conversions from HCFCs to climate-friendly technologies, as well as the impact of exports and multinational shares in companies. On the basis of the funding estimates for the two scenarios and the additional information, Parties are expected to negotiate an amount of funding which should enable Article 5 Parties to comply with the first 10 per cent reduction step of the accelerated HCFC phase-out, by January 2015.

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[1]. *The total funding requirement for the period 2009-2011 also includes about US $120 million for existing commitments and some new projects for (non-HCFC) ODS, as well as for destruction; it could therefore be in the range of US $343 to 640 million.*

➔ "Climatic Advantage" – Further Opportunities to Achieve Climate Benefits

The achievements of the Montreal Protocol over its 20 year history in phasing out the production and consumption of ODS are well known. Its important role in mitigating climate emissions also merits recognition. Since 1990, actions under the Montreal Protocol in phasing out ODS will have had the additional benefit, by 2010, of reducing greenhouse gas (GHG) emissions by about 11 billion tonnes CO_2-equivalent per year ($GtCO_2$-eq/yr) - which is 5-6 times the reduction target of the Kyoto Protocol between 2008 and 2012 - and has delayed climate change by between seven and 12 years[1].

The recently published 2008 UN Millennium Development Goals Report (see pg.2) describes how the annual global CO_2 emissions in 2005 reached 28 billion tonnes, a 30 per cent increase since 1990. The recently agreed HCFCs phase-out presents countries with an historic opportunity to not only reduce the levels of ozone depleting substances in the atmosphere, but also to have a further significant impact on the climate, as many HCFCs are powerful greenhouse gases. For example, the most commonly used HCFC - Monochlorodifluoromethane, or HCFC-22 - has a GWP of nearly 1800 times that of CO_2. If zero or low GWP substitute technologies are adopted by countries to replace HCFC usage, the new controls could deliver cumulative emission reductions of around 12 to 16 billion metric tonnes of carbon dioxide ($GtCO_2$-eq) over the coming decades[2]. There is also an opportunity to gain additional climate benefits from improved energy efficiency and other improvements of the replacement technologies, significantly in appliances, including room air conditioner units using HCFCs.

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[1]. *Guus J.M. Velders, et. al., The importance of the Montreal Protocol in protecting climate, 104 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES 4814 (2007).*

[2]. *12 -15 $GtCO_2$-eq: Guus Velders, Side event of UNEP's Regional Ozone Network for Europe & Central Asia, Belgrade, Serbia - October 11, 2007. The U.S. EPA estimates that, through 2040, the HCFC agreement could reduce emissions by up to 16 billion metric tonnes of carbon dioxide-equivalent. (Previously quoted figures of potential reductions of 18- 25 billion metric tonnes of carbon dioxide ($GtCO_2$-eq) such as in UNEP News Release. 14 September 2007. Ozone Treaty's Role in Combating Climate Change Tops Environment Ministers Meeting in Canada, were based on scenarios proposed by TEAP prior to the agreed HCFC)*