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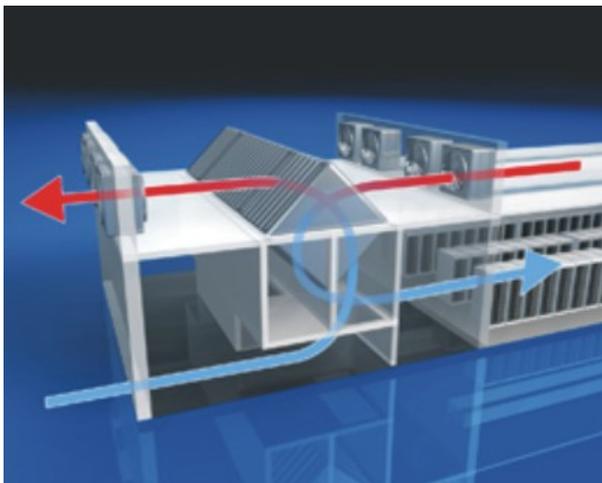
Saturday, September 24, 2011

Environment

# Green cooling for warming world

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Dr. S.k. Purkayastha

The year 2010 was a momentous one in the history for international collaborative efforts in environmental governance. Under the landmark agreement of the Montreal Protocol countries around the world, in collaboration with industry, have individually and collectively succeeded in eliminating the production and consumption of the most severely damaging ozone depleting substances (ODSs), viz. CFCs, CTC and Halons. As many of these ODSs are powerful green house gases (GHGs) this achievement has also had a substantial contribution in mitigating climate change.

Implementing the second phase of the Montreal Protocol, i.e., the phase-out of Hydro-chlorofluorocarbons (HCFCs) which are nearly 2000 times more potent GHGs than CO<sub>2</sub>, bear the potential for even more significant climate benefits. In addition to emissions reduction from the phase-out of HCFCs, these are potential opportunities to leap-frog to energy efficient alternatives with low or zero global warming potential (GWP) refrigerants. Accelerating the transition to alternative cooling technologies gases used as refrigerants for common applications like air-conditioning, refrigeration, etc, should seek to meet the dual goal of phasing out HCFCs and reducing climate impacts.

The Asia Pacific region is the largest producer and consumer of HCFCs accounting for 90% of global production and consumption. The rising demand for equipment using refrigerants, particularly in developing countries in the backdrop of the phase-out of HCFCs, will inevitably lead to a massive lock-in of Hydrofluorocarbons (HFCs) in the absence of an urgent action to prevent it. This will require coordinated incremental investments by the public and private sector as well as effective partnerships in the areas of technology development, transfer and information exchange on the availability and capacity building in alternative technologies to support developing countries.

In this ongoing global climate debate, in the aftermath of the Cancun Agreement, business as usual growth scenarios will seriously impair the global consensus on taking all necessary steps to limit the global mean temperature rise to 2°C by 2050. The IEA predicts that such unconstrained rise in global fossil fuel use will drive up energy related CO<sub>2</sub> emission, putting the world on a path to an average temperature increase of upto 6°C.

Growing economic growth linked to energy growth, will need to be balanced with climate constraints. Growing energy demand will be propelled largely by use of energy appreciative equipment, in particular air-conditioning, refrigeration, and lighting appliances in commercial as well household sectors. Accelerated phase-out of HCFCs provides an opportunity to adopt energy efficiency and also to integrate refrigerant standards in a manner that the HCFC phase-out does not result in automatic lock-in to HFCs, which will be counterproductive to the overall GHG emission goals, given that their Global Warming Potential (GWP) is thousand times more that that of CO<sub>2</sub>.

The IPCC and the Technology and Economic Assessment Panels (TEAP) in 2005 reported that preventing emissions from ODS banks around the world for the next two decades would be equal to approximately 3-4% of the total radiative forcing from all anthropogenic GHG emissions over the same period. Without immediate action, reachable banks will emit approximately 6 billion tons of CO<sub>2</sub> equivalents by 2015 -- offsetting and surpassing the 5 Gt CO<sub>2</sub> eq reductions sought during the first commitment period of the Kyoto Protocol. The

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2009 TEAP task force also points out the urgency of the action as the timing is a critical factor in this matter.

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#### Technological options

HCFC production and consumption is increasing at a rapid pace in developing countries. The rate of growth is 20% in some countries. HCFC-22 represents more than 80% of total HCFC consumption in developing countries. Actual consumption of HCFCs in MT has already exceeded the peak of consumption by 200% and HCFC baseline could be nearly four times higher than the CFC consumption base line because HCFC-22 operated equipment continue to increase number. Other than HCFC-22, HCFC-141b consumption is also increasing in foam sector. Other reason of HCFC consumption increase is also low price of HCFCs than the alternatives, available now.

#### Alternatives should be :

- Zero ODP (Ozone Depleting Potential);
- Low GWP:
- Enhanced energy efficiency of appliance using low GWP alternatives.

**Alternative cooling substances:** There are five zero ODP, low GWP and energy efficient natural alternatives which can be chosen during selection of HCFC alternatives, these are :

- Hydrocarbons, viz, R-600a, R-290, Cyclopentane
- NH3
- H2O

R-600a can be chosen for refrigerator, R-290 for domestic A.C, and cyclopentane for production of insulation foam. NH3 can be used for large refrigeration system. H2O for large A.C system.

We would require collaborative efforts from industry, governments, implementing agencies and developing partners to adopt strategies of achieving the goal of replacing HCFCs with low GWP and non ODS alternatives.

The writer is Senior Officer, Ozone Cell, Department of Environment, Ministry of Environment and Forests.

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