

INTELLECTUAL PROPERTY RIGHTS AND TECHNOLOGY TRANSFER

HFO IPR – Challenges and Opportunities Side Event
The 37th Meeting of the Open-ended Working Group of
the Montreal Protocol
World Bank Montreal Protocol Operations
Geneva, Switzerland
April 4, 2016

OUTLINE OF THE PRESENTATION

- Challenges to HFC Phase-Down;
- Objective;
- Intellectual Property Protection;
- Technology Transfer Experiences;
- HFO Patent Landscape;
- Developed and Developing Country Industry Perspective; and
- Further Consideration.

CHALLENGES TO HFC PHASE-DOWN

- One challenge formally identified by Parties to the Montreal Protocol is technology transfer and technology availability;
- There are a large number of patents on HFOs and HFO technology and there is concern that an exclusive market will be created which could make compliance with a future HFC amendment extremely costly and prohibitive to developing countries; and
- Decision XXVII/1 specifically recognizes the need to address these challenges and intellectual property rights (IPR) were specifically identified.

OBJECTIVES

- To provide a basic understanding of intellectual property rights (patents in particular), their objectives, and coverage;
- IPR landscape of a key HFO (HFO-1234yf) currently considered by industry as a substitute for HFC-134a with an emphasis on patent implications for chemical producers in developing countries, consistent with the Parties' additional request to address production sector challenges; and
- Areas and scenarios where technology transfer could be promoted;

INTELLECTUAL PROPERTY PROTECTION

- IPR provide inventors with a time-limited monopoly to recoup investments.
- The process involved in securing intellectual property rights using public disclosure plays an important role in fostering a more rapid increase in competition for the next generation invention.
- Intellectual property rights and technology transfer have become a basic part of business in today's modern markets.

PATENTS

- Patents represent significant corporate assets. They confer upon their owner the “*exclusive right to control the use of an invention*”, as outlined in the patent’s claims, within “*a defined geographic area and limited timeframe*”;
- Products - to prevent third parties not having the “*owner’s consent*” from the acts of: making, using, offering for sale, selling, or importing for these purposes;
- Process - to prevent third parties not having the “*owner’s consent*” from the act of using the process, and from the acts of: using, offering for sale, selling, or importing for these purposes at least the product obtained directly by that process; and
- Anyone found to be making, using, offering for sale or importing a patent owner’s invention without a license is referred to as an ‘infringer’, and can be sued, *in accordance with local laws where a patent is filed*, both to force a stop to the infringement and to pay damages to the patent owner.

PATENTS

- **Duration** - The term of protection applied to patents is limited, in general, to 20 years from the date of filing of the patent application;
- Once a patent expires, the owner no longer holds exclusive rights to the invention and thus, the information contained in the patent enters the public domain, thereby becoming available for commercial exploitation by other interested parties;
- **Coverage** - Inventions, either processes or products, may be eligible for patent protection so long as they fall within the scope of patentable subject matter and meet the patentability conditions of:
 - Novelty;
 - Inventive step; and
 - Industrial applicability stipulated under TRIPS Article 27.

PATENTS

- **Geographic Coverage** - Patents are territorial-specific, with rights granted by national or regional patent offices. Exclusive rights they confer are only applicable in the country or region in which a patent has been filed and granted, in accordance with specific national or regional laws;
- Every country has the sovereign right to grant, or to refuse to grant, patent applications;
- **Patent Granting Processes** – National, Regional, and/or Global. It is not always desirable to file a patent globally (widest coverage) since the owner is required to “practice” or make use of the patent to keep it valid, and this takes time and effort.

PATENT FAMILIES

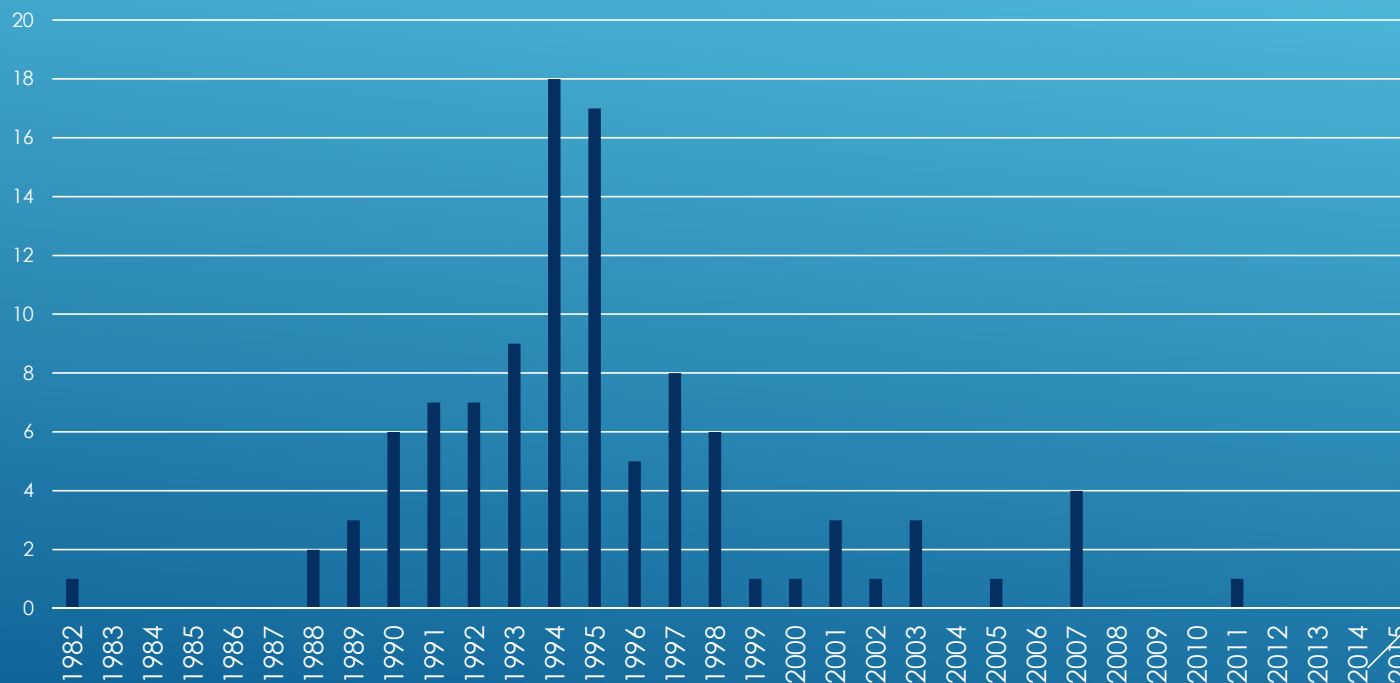
- Patents that are filed build upon the inventions claimed in a previous filing from the same patent holder. These are referred to as patent families;
- Patent families can include multiple generations with new patents further extending the claims or new knowledge contained in prior related filings;
- Patent applications can claim priorities of earlier applications;
- Patent families are significant because the patents filed subsequently after a parent patent typically take the priority date of that parent patent. The priority claims of patent family member's application that reference supporting descriptions in a parent patent are treated as if filed on the date of their **parent application**.
- That is, their effective filing date, or priority date, will be the filing date of the parent application.

TECHNOLOGY TRANSFER EXPERIENCE

- It is important to make a distinction between technology transfer and intellectual property rights. IPR or patents only describe new products or processes of making new products. Generally, patents do not include specific know-how which is considered as confidential information.
- Access to patents is critical as it allows interested parties to use them to develop specific production and/or manufacturing parameters for making final products with good quality and cost-effectiveness.

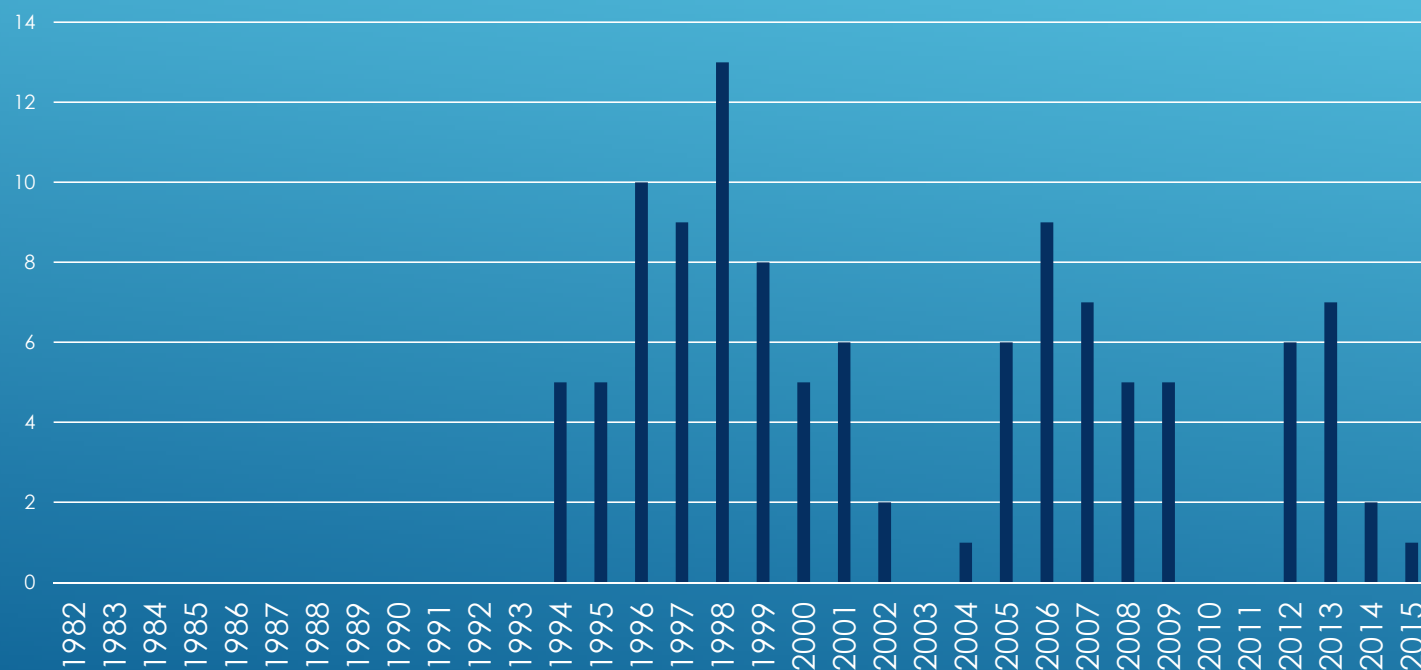
CASE STUDY: TRANSITION FROM CFC-12 TO HFC-134a

Number of HFC-134a Patents by Publication Date



CASE STUDY: TRANSITION FROM HCFC-141b TO HFC-245fa

Number of HFC-245fa Patents by Publication Date

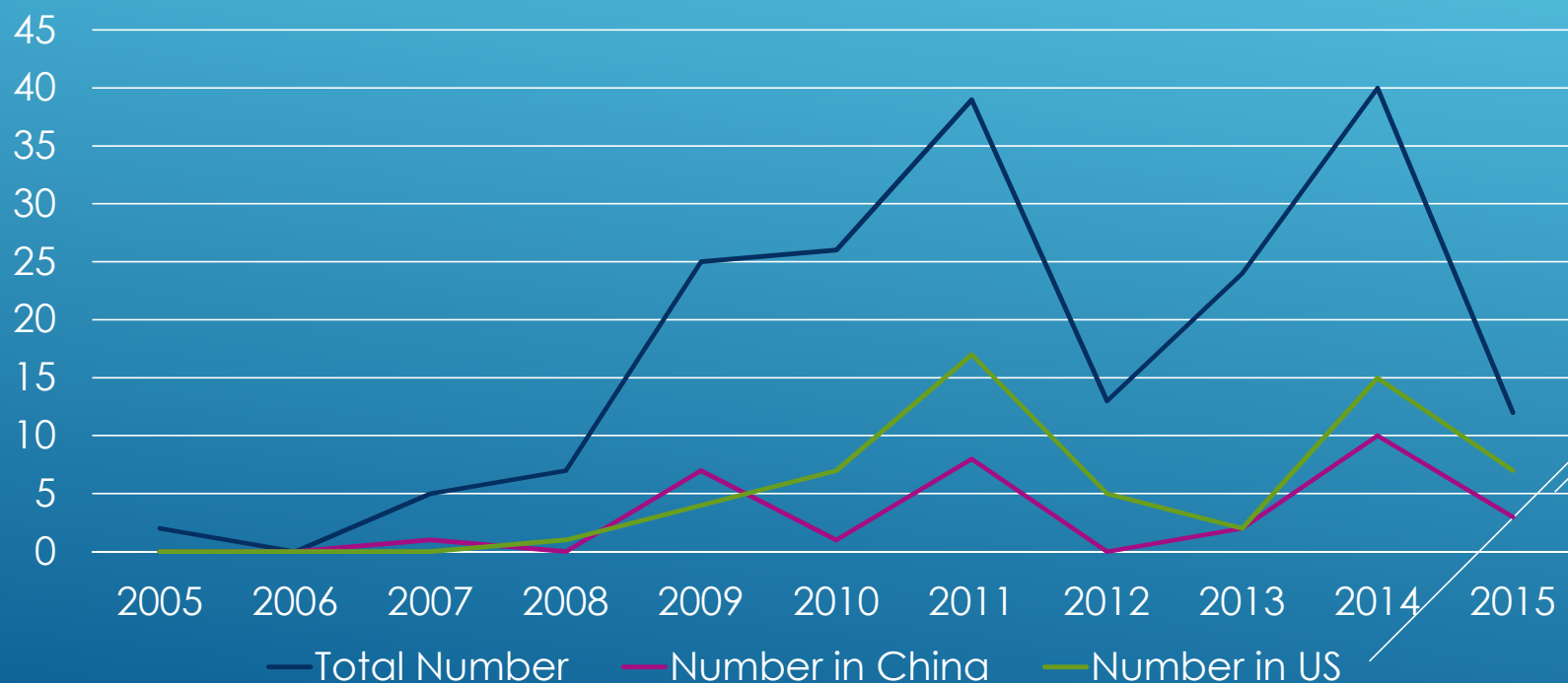


HFO PATENT LANDSCAPE

- To gain understanding of the landscape of HFO patents, a patent search was conducted using the World Intellectual Property Organization's database (PATENTSCOPE). The World Bank search focused on HFO-1234yf but the search method employed could be extended to other HFOs such as HFO-1234ze, HFO-1233zd and HFO-1336mZZ;
- Due to the large number of patents, it is not possible for this paper to review each individual database result. No formal classification of HFO patents exists but patents can be separated into three broad categories. These are:
 - Production Process Patents;
 - Composition Patents; and
 - Use of Application Patents.

STATISTICS OF HFO-1234yf PROCESS PATENTS

Number of HFO-1234yf Process Patents by Publication Date

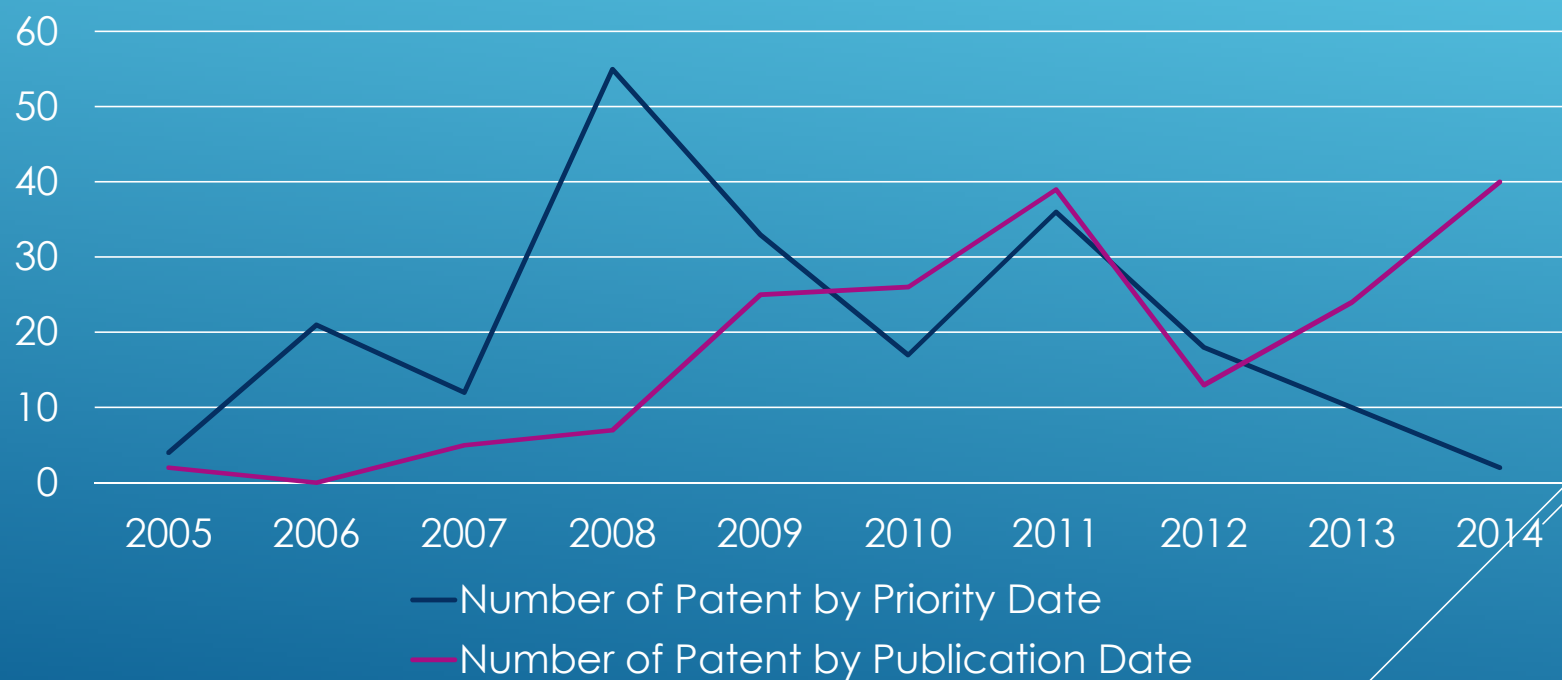


HFO-1234yf PROCESS PATENT LANDSCAPE

- At least 214 patents for the production processes of HFO-1234yf have been published since early 2000s;
- Five multinational companies in developed countries applied for more than 74% of these patents;
- About 100 of these patents have priority dates (dates for which the primary or parent patents to which subsequent patents are associated, were filed) of 2008 or earlier;
- The primary patent protection period and all other subsequent patents associated with the parent patent expire at the same time: 20 years after the priority date; and
- Therefore, by 2028 almost half of the patents published to date will expire.

STATISTICS OF HFO-1234yf PROCESS PATENTS

HFO-1234yf Process Patents

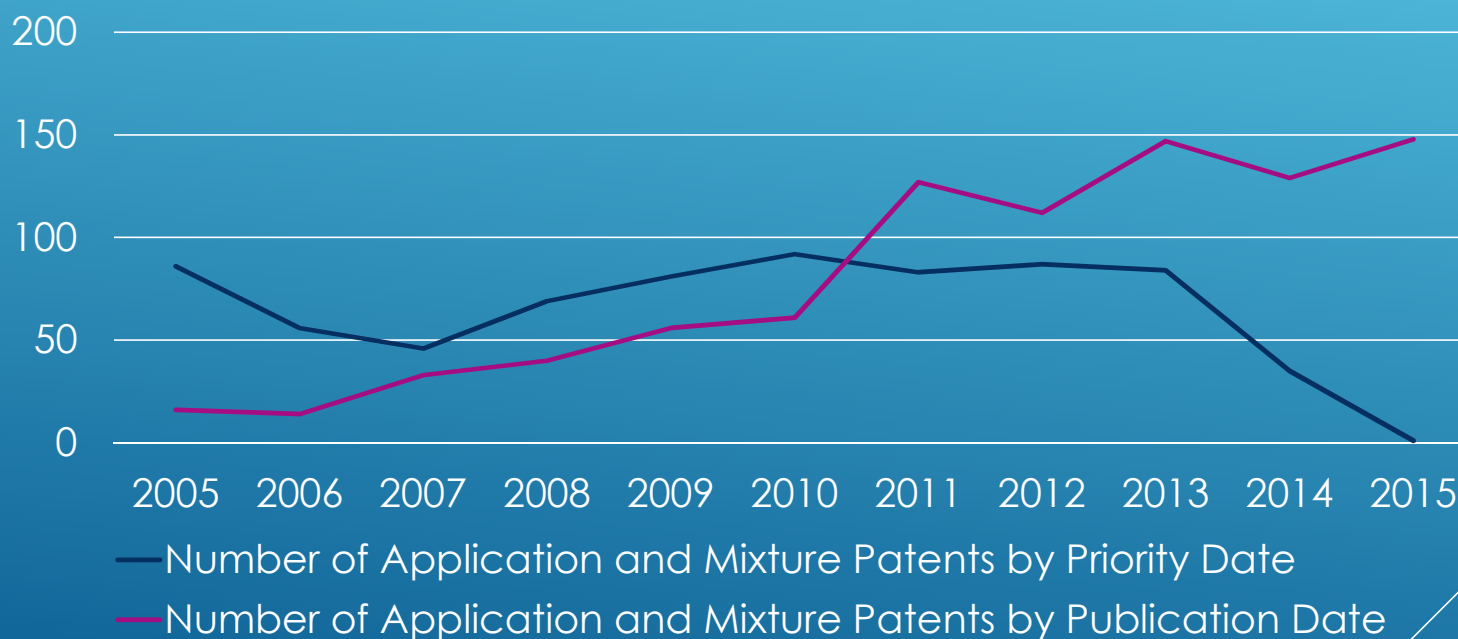


HFO-1234yf APPLICATION AND MIXTURE PATENT LANDSCAPE

- A total of 890 entries including application and mixture patents were identified;
- Five multinational companies filed more than 70% of these entries;
- Most of these patents have priority dates associated with the primary or parent patents which were filed earlier; and
- By 2028 to 2029, more than half of these will become off patent.

STATISTICS OF HFO-1234yf APPLICATION AND MIXTURE PATENTS

Number of HFO-1234yf Application and Mixture Patents



HFO PATENT LANDSCAPE

- In conclusion, a large number of patents appear to have been filed by a limited number of multinational companies; however, protection rights of these patents will expire beginning in 2024 and 2025.
- By 2028 to 2029, half of patents in place today will be released. This means processes or techniques filed in early 2000s would become publically available for global companies.

DEVELOPED AND DEVELOPING COUNTRY INDUSTRY PERSPECTIVE

- Developing country chemical producers recognize the important role of intellectual property privileges and patents as incentives for new inventions. They note the need to balance incentives for new inventions with developing country rights for economic and industrial growth as well as to achieve improved living standards; and
- Multinational companies recognize that many developing countries are potential HFO and HFO technology markets. It appears however that current high costs for certain HFOs will pose a barrier to near-term market penetration particularly without globally mandated HFC phase-down. It is expected that over time, prices of HFOs would come down as has occurred with most new technologies and products.

DEVELOPED AND DEVELOPING COUNTRY INDUSTRY PERSPECTIVE

- The broader industry also recognizes the patent holder or inventor needs to recover HFO research and development costs. There is also acknowledgement of a more limited market volume potential than what exists with current fluorochemical options. That volume trend commenced with CFCs and has continued through the HFC transition.
- Moreover, the HFO domestic demand in developing countries will be limited for at least the next five years because countries are only starting now to transition from HCFCs as per Montreal Protocol requirements.

HFO TECHNOLOGY TRANSFER TO DATE

- HFO technology transfer has already taken place through
 - Joint-ventures for which new companies are formed and both patent holders and developing country companies owning stakes. The only major variation is the arrangement for HFO sales:
 - Joint-venture company produces and sells HFO products within agreed quantities and specific markets/regions.
 - Joint-venture company produces and is compensated on production costs by the patent-holding partner company and the partner company sells all products manufactured by the joint-venture company.
 - More recently, an arrangement allowing a developing country manufacturer to produce HFO-1243yf and sell it exclusively to the patent holder was reached. This is another option that could be considered in the future.

DEVELOPED AND DEVELOPING COUNTRY INDUSTRY PERSPECTIVE

- A few developing country chemical producers are conducting their own HFO production/process research and development. They were hopeful that new processes could be found. However, they were not certain whether their products could enter the market due to application patents on HFO use;
- Since some developing countries do not recognize application or use patents, this may allow developing country producers to develop new HFO production processes for domestic sales. Application patent restrictions may still apply for exported products containing HFOs; and
- Industry reported on current legal challenges in Europe, Japan, South Korea, and the United States, mostly involving HFO-1234yf application patents.

DEVELOPED AND DEVELOPING COUNTRY INDUSTRY PERSPECTIVE

- Long term technology transfer arrangements were discussed with various developed and developing country enterprises alike. The concept of a technology transfer commitment today, but not executed until there is HFO demand for the developing country industry to meet the increasing domestic and export markets of alternative products which is expected to happen over time was introduced.
- Responses to the concept were mixed. Where companies have access to technology, there was little incentive to create another technology transfer vehicle. But where companies did not have current access to these new technologies there was support for the concept.

FURTHER CONSIDERATION

- To promote access to process and application patents, the concept of long term technology transfer agreement/framework, and other innovative options should be further explored;
- The MLF could play an important facilitative. The MLF could require HFC production phase-out plans to cover not only HFC production closure but also production conversion strategies. National HFO demand and supply and cost-effective action plans could be included. This kind of support could help to maintain a more comprehensive view on the overall global supply and demand to avoid excess production capacity;
- MLF production sector action plans would contain policy and regulatory measures as well as technical assistance activities. Adequate implementation and compliance monitoring systems, and long-term agreement/framework enforcement would also have to be included. This would give assurances that patent arrangements financed by the MLF are properly executed and enforced;

FURTHER CONSIDERATION

- HFC producers should demonstrate their ability to meet international environmental and health norms. Innovative schemes such as the reverse auction program could be considered as a financing model for MLF-supported HFO production conversions or for other low-GWP alternatives. Producers winning the bids could negotiate licensing agreements with patent holders, within the long term agreement/framework mentioned above;
- Identification of suitable technologies or patents to support conversions in the consumption sector could be daunting for developing countries. Information clearinghouses similar to the one established in the early 1990s by UNEP could be replicated as a first step to help elucidate technology options and associated patents. Some industry respondents felt that additional steps could be considered to help broker this process even more; and
- It might be useful to consider experiences in patent pooling (whereby two or more patent owners license one or more of their patents to one another or to third parties), from the electronics industry and determine whether it could be replicated.

THANK YOU.

For more information, please contact wbmontrealprotocol@worldbank.org.

