Supporting Developing Countries in Shifting away from Ozone Depleting Substances

ATMOsphere 2010

September 28

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UNIDO promotes natural refrigerants… (1/2)

Launch of first domestic refrigerators using natural refrigerants in Germany

First Projects in China completed with significant positive impact on ozone layer (794 ODP) and climate (3.3 mil. GWP)

1990 **1995** **1999** **2010**

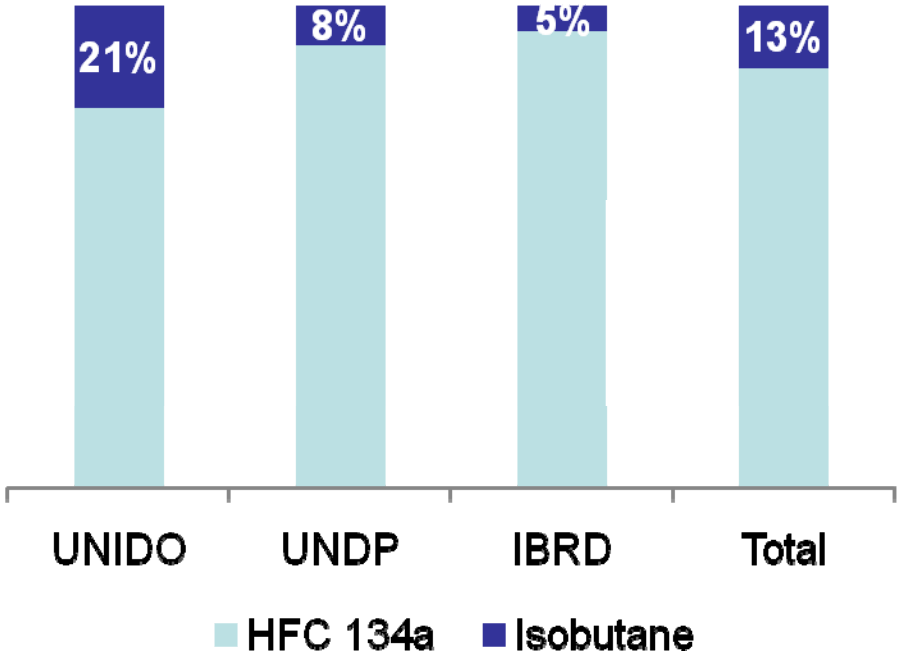
UNIDO initiates the introduction of novel refrigerator manufacturing technologies using HC refrigerants & foaming agents in Article 5 countries – China as a pilot

UNIDO has 71 projects (completed and ongoing) using natural alternatives in the refrigeration sector

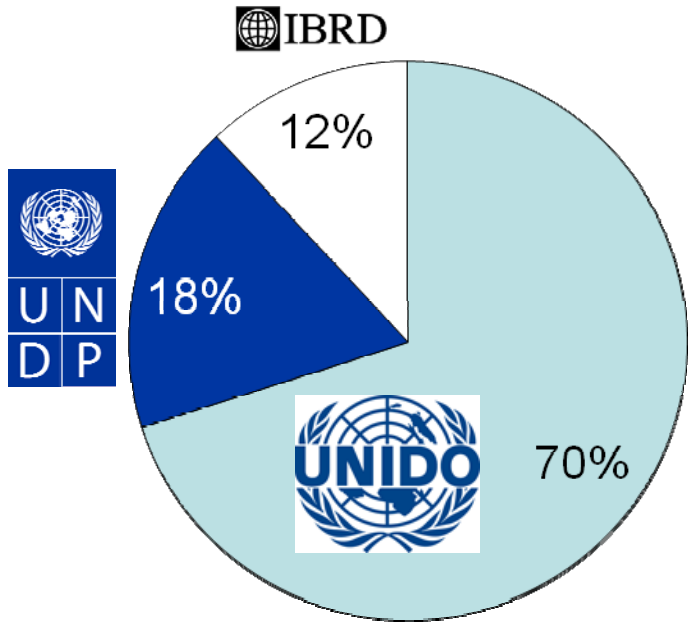
Source: UNIDO MP Database

UNIDO promotes natural refrigerants… (2/2)

HFC 134a vs. Isobutane

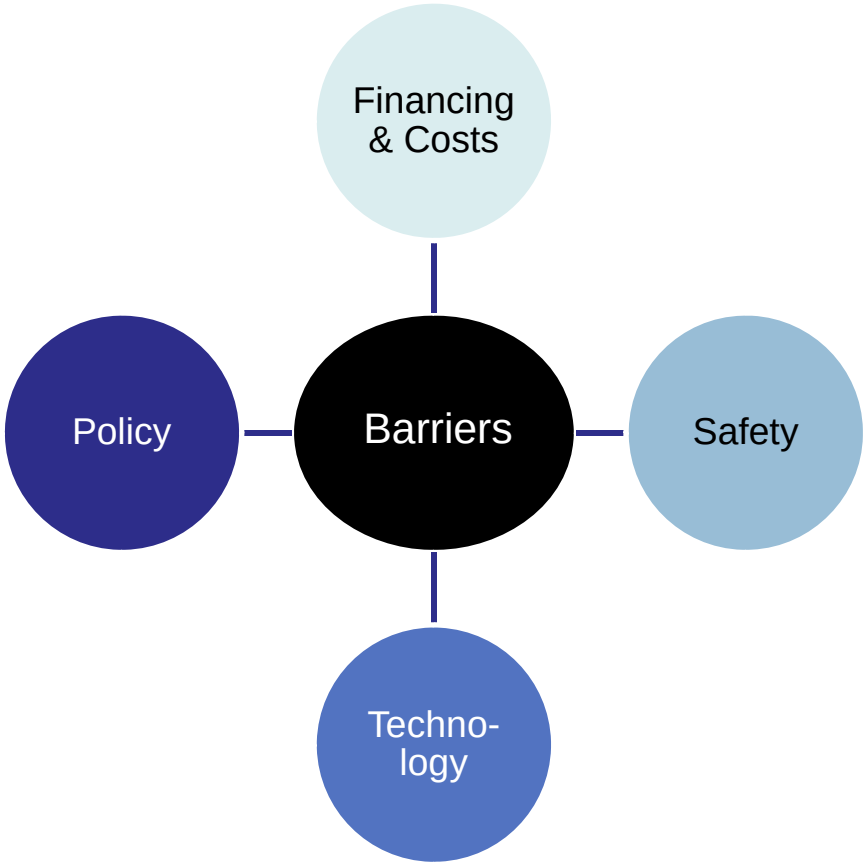


Share of Total Isobutane Conversion



Source: MLF Inventory, data based on all investment projects in the refrigeration sector

…but there can be obstacles to the transition to natural refrigerants



Financing and costs are reduced by more innovative solutions

Barriers

- Higher cost of natural refrigerants (HC, ammonia, etc.)
- Superior cost-effectiveness threshold
  - ➢ especially for SMEs
- Cheap refrigerant alternatives e.g. HFCs already available on the market

Solutions

- Adapted financing programmes e.g. revolving funds
- Access to carbon markets using climate benefit component of natural refrigerants
- Introduction of incentives and disincentives:
  - ➢ Taxes on high GWP alternatives
  - ➢ Tax relief on lower GWP alternatives

Safety issue can be overcome through increased knowhow

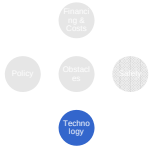
Barriers

- Handling of flammable and toxic refrigerants
- Limited space
- Storage
- Lack of awareness – reluctance to convert to natural refrigerants

Solutions

- Safety precautions (plant layout)
- Mature technology
- TÜV certification
- Promote further demonstration projects on adapting HC technology
- Training for technicians (handling of refrigerants, storage, etc.)
- Awareness raising among company owners and public

Technology processes can be enhanced through partnerships



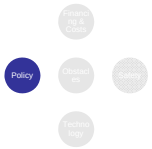
Barriers

- Availability of appropriate technology upstream and downstream of supply chain

Solutions

- Fostering partnerships: Company partnerships and government help
- Promotion of demonstration projects to ensure acceptance of and future investments in natural refrigerant technology
- Stakeholder involvement: key players as first movers

Developing global standards relaxes national anti-HC policies



Barriers

- Lack of national and international policy to promote the adoption of HC
- Safety standards in some countries preventing the opting of HC

Solutions

- Synchronization between Montreal and Kyoto Protocols; especially on HFCs
- Assistance to governments to implement standards incl. tax incentives/disincentives
- Influence on relevant lobbies

China shows momentum to overcome potential barriers to HC

Example

- In **1995,** at the ExCom, the first **two full hydrocarbon-technology projects** were approved for two large Chinese domestic refrigerator manufacturers
- Hydrocarbons used:
  - isobutane as the refrigerant
  - cyclopentane as the blowing agent

Upstream conversion:

The same year, two further UNIDO-designed projects were approved; enabling two Chinese manufacturers of refrigerator compressors to be among the first companies in a developing country to produce the latest hydrocarbon technology.

Compressor Conversion at Jiaxipera Factory

- Employs 900
- Produces 6 different compressor models for domestic refrigerators
- 1994: Annual production = 600,000 units
- 2000: Annual production = 1 million units
- 2007: Annual production over 4 million units
- Increase in sales due to an increased demand in isobutane compressors at local as well as export market.

In brief, today's resistance to natural refrigerants can turn into tomorrow's global acceptance

- 21 per cent of UNIDO refrigeration projects are already using natural refrigerants – this trend is growing
- Actions for a concerted effort have to be taken to overcome actual barriers to natural refrigerant alternatives:
  - Financing and costs are reduced by more innovative solutions
  - Safety issue can be overcome through increased knowhow
  - Technology processes can be enhanced through partnerships
  - Developing global standards relaxes national anti-HC policies

Opting for mature and safe technology of natural refrigerants has a significant positive impact on ozone protection (MP) and climate change mitigation (KP) vs. the use of HFCs