



# PROMOTING LOW-GWP REFRIGERANTS FOR AIR-CONDITIONING SECTORS IN HIGH-AMBIENT TEMPERATURE COUNTRIES (PRAHA)



## BACKGROUND

During the preparation of HCFC Phase-out Management Plans (HPMPs) in West Asia, the air-conditioning industry expressed concerns regarding meeting the freeze and reduction targets, as set by the Montreal Protocol, where alternatives to HCFC-22 in residential and light commercial size air-conditioning applications are not yet introduced and verified by local markets. Additionally, governments started to implement new Minimum Energy Performance Standards (MEPS), for placing air-conditioning units into markets given the fact that air-conditioning constitutes more than 50 % of the energy demand in some high-ambient countries.

The current commercially available technologies, used as replacements for HCFCs, not only perform less efficiently in high-ambient conditions but may also possess high-GWP characteristics which do not provide optimum alternatives in the context of the HCFC phase-out programmes in this sector. This exceptional project is designed to respond to some of the challenges related to the availability of low-GWP alternative refrigerants that are sustainable in the long term and their associated technologies including final products, components, and accessories in high-ambient temperature countries.

## KEY ELEMENTS OF THE PROJECT

The project was approved at ExCom 69 (April 2013) and now has a planned date of completion of end 2015. The project key elements are:

**1. Assess available technologies:**

- Study the availability of current and low-GWP alternative refrigerants that are sustainable in the long term;
- Involve research institutes, international panels, and industry experts

**2. Assess relevant Energy Efficiency (EE) standards and codes:**

- Development and upgrade of existing national/ regional standards

- Potential impact of selecting short-term alternatives

**3. Economic comparison of alternative technologies:**

- Compare initial and operating costs of low-GWP technologies
- Identify technology and regulatory gaps

**4. Promoting technology transfer:**

- Identify commercial opportunities and fiscal implications of facilitating technology transfer

Project Components		
<p><b>Building and testing prototypes</b> 7 regional meetings + 6 technology providers will build and test at least 66 prototypes</p>	<p><b>Study on long-term feasible technologies</b> (two pilot studies under preparation in Kuwait and Qatar)</p>	<p><b>Coordinating phase-out requirements with Minimum Energy Performance Standards (MEPS) programmes</b></p>

## STAKEHOLDERS

- The companies participating in the project are seven local manufacturers (Alessa, PETRA and Zamil from Saudi Arabia, Awal Gulf from Bahrain, RIC from Kuwait, GAMI and SKM from UAE) and six international technology providers (Daikin, DuPont, Emerson, GMCC, Shanghai Hitachi & Honeywell);
- A joint declaration was created with AHRI- AREP (Low GWP Alternative Refrigerants Evaluation Programme (AREP) of the Air-Conditioning, Heating, and Refrigeration Institute (AHRI)

for the promotion of low-GWP alternatives and exchange of relevant technical information;

- An International Technical Review Team was selected to review the draft and final report based on nominations from concerned countries and suggestions from international partners. The team selection was made based on specific criteria of knowledge, neutrality and relevant expertise.

## ON-GOING EFFORTS

- A working mechanism between environmental and standardisation authorities is being promoted through the project activities/functions for coordinating the work of phase-out of HCFC and Energy Performance Standards;
- Building of prototypes by local manufacturers, in cooperation with technology providers, is ongoing and expected to be completed by the end of 2014;
- The regional air-conditioning industry is involved in attending several international and regional conferences and symposiums and uses these fora to promote participation in the project, conduct coordination meetings with the project stakeholders and discuss the technology development with key technology providers;
- Developing the initial report outline and table of contents as well as chapters where work is already concluded.

### Categories and Prototypes

	60 Hz		50 Hz	
	Window (18 MBH)	Decorative (24 MBH)	Ducted (36 MBH)	Packaged (90 MBH)
R32				
HFO1				
HFO2				
HC				
R22				
HFC base				

- Prototypes selected
- Prototypes not selected

## MEETINGS & FIELD TRIPS:

- Meeting with AHRI for cooperation between PRAHA & AHRI-AREP (August 2013) and draft cooperation agreement is under review for sharing information and exchange of experience between the two projects;
- Third Symposium on Alternatives for High-Ambient was organised in Dubai 10-11 September with attendance and participation of all local/international respective industries and associations;
- Field trip to local manufacturers for HC & HFC-32 technology plants in China and Japan was organised (30 October- 6 November): Facilitated technology-transfer tour visit for seven local manufacturers to counter-part industries in China and Japan that are pioneering the use of low-GWP refrigerants;
- AHRI Symposium on AREP project, January 2014, New York, USA;
- UNEP-UNIDO Seminar at ASHRAE Winter Conference on Challenges in promoting low-GWP alternatives in hot-climates, January 2014, New York, USA;
- First regional symposium on District Cooling; Saving Energy and Environment in cooperation with ASHRAE and Kuwait during 20-21 May 2014;
- Fourth symposium on alternatives for 2014 high ambient countries convened during 28-29 October in Dubai, UAE with attendance of more than 200 international and regional experts and governments' representatives. The event focus was Risk Assessment of Future Refrigerants.

## OUTLINE OF THE KEY FINDINGS OF PRAHA TESTING

Industrial Development		
Full system re-design is required to adopt low-GWP refrigerants	Component and product development is concentrated in few countries	Energy Efficiency programmes to be linked to selection of alternatives
Safety		
All relevant low-GWP alternatives are flammable, comprehensive risk assessment needed	Higher cooling capacity requirements per area leads to larger refrigerants charge	Flammability impact goes beyond technical considerations and impact on trade issues
Technology Transfer		
Conversion projects to increasingly focus on technology transfer	Intellectual Property Rights considerations	Economic impact on public and private budgets

### Sources:

- Multilateral Fund Secretariat
- UNIDO
- UNEP

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