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EXECUTIVE COMMITTEE OF  
THE MULTILATERAL FUND FOR THE  
IMPLEMENTATION OF THE MONTREAL PROTOCOL  
Seventy-fourth Meeting  
Montreal, 18-22 May 2015

**BILATERAL COOPERATION**

The Fund Secretariat received the following request for bilateral cooperation:

<b>PROJECT TITLE</b>	<b>BILATERAL AGENCY</b>
HCFC phase-out management plan (stage I, second tranche) in Lao People's Democratic Republic	France
HCFC phase-out management plan (stage I, fourth tranche) (refrigeration servicing sector) in the Islamic Republic of Iran	Germany
HCFC phase-out management plan (stage I, second tranche) in Liberia	Germany
Preparation for a demonstration project on the use of hydrocarbons in air-conditioning systems in the Philippines	Germany
HCFC phase-out management plan (stage I, fourth tranche) (refrigeration servicing sector including enabling programme) in China	Japan
Preparation of a regional centre of excellence for demonstration and training of low-global warming potential ozone-safe alternative technologies in the Europe and Central Asia region (ECA)	Russian Federation

1. This document provides an overview of requests from bilateral agencies, and whether these are eligible for approval by the Executive Committee in light of the maximum level of bilateral cooperation available for 2015. It cross-references relevant meeting documents that include a discussion on the bilateral requests, and contains the recommendation on the year of assignment for bilateral cooperation.

### Overview

2. A total of six projects for bilateral cooperation with a value of US \$712,871 (including agency fees) has been submitted to the 74<sup>th</sup> meeting as shown in Table 1.

**Table 1: Projects for bilateral cooperation, submitted to the 74<sup>th</sup> meeting**

Bilateral Agency	Amount Requested (US\$)*	Number of Projects
France	45,765	1
Germany	520,206	3
Japan	90,400	1
Russia Federation	56,500	1
<b>Total</b>	<b>712,871</b>	<b>6</b>

\* Including agency support costs

### Request from the Government of France

3. Table 2 provides a summary of the request for bilateral co-operation from the Government of France. The value of France's request (US \$45,765) does not exceed the 20 per cent of France's 2015 bilateral contribution of US \$2,260,651.

**Table 2: Project submitted by the Government of France**

Project Title	Country	Amount Requested (US\$)	Amount Recommended (US\$)
HCFC phase-out management plan (stage I, second tranche)	Lao People's Democratic Republic	40,500	(*)
Agency support costs		5,265	
<b>Total</b>		<b>45,765</b>	

(\*) UNEP/OzL.Pro/ExCom/74/37

Lao People's Democratic Republic: HCFC phase-out management plan (stage I, second tranche) (US \$40,500)

4. The comments and recommendations of the Secretariat are found in document UNEP/OzL.Pro/ExCom//74/37.

### Request from the Government of Germany

5. Table 3 provides a summary of the requests for bilateral co-operation from the Government of Germany. The value of Germany's requests (US \$520,206), combined with the amount approved<sup>1</sup> at the 73<sup>rd</sup> meeting but assigned to Germany's bilateral contribution for 2015, does not exceed the 20 per cent of Germany's 2015 bilateral contribution of US \$2,886,342.

<sup>1</sup> An amount of US \$659,452 was assigned to 2015 Germany bilateral contribution

**Table 3: Projects submitted by the Government of Germany**

<b>Project Title</b>	<b>Country</b>	<b>Amount Requested (US\$)</b>	<b>Amount Recommended (US\$)</b>
HCFC phase-out management plan (stage I, fourth tranche) (refrigeration servicing sector)	Iran (Islamic Republic of)	288,582	(*)
HCFC phase-out management plan (stage I, second tranche)	Liberia	126,000	(**)
Preparation for a demonstration project on the use of hydrocarbons in air-conditioning systems	Philippines (the)	50,000	(***)
Agency support costs		55,624	
<b>TOTAL</b>		<b>520,206</b>	

(\*) UNEP/OzL.Pro/ExCom/74/33

(\*\*) UNEP/OzL.Pro/ExCom/74/39

(\*\*\*) Individual consideration

The Islamic Republic of Iran: HCFC phase-out management plan (stage I, fourth tranche) (refrigeration servicing sector) (US \$288,582)

6. The comments and recommendations of the Secretariat are found in document UNEP/OzL.Pro/ExCom/74/33.

Liberia: HCFC phase-out management plan (stage I, second tranche) (US \$126,000)

7. The comments and recommendations of the Secretariat are found in document UNEP/OzL.Pro/ExCom/74/39.

The Philippines: Project preparation for a demonstration project to convert commercial air-conditioning products and associated production line from HCFC-22 to HC-290 at Koppel Inc. (US \$50,000)

#### *Project description*

8. The Government of Germany, on behalf of the Government of the Philippines, submitted a funding request for the preparation of a demonstration project to convert commercial air-conditioning products and associated production line from HCFC-22 to HC-290 in one enterprise in the Philippines, in the amount of US \$50,000, plus agency support costs of US \$6,000. The project was submitted in line with decision 72/40.

9. The project preparation request included information on the concept of the project, the activities to be undertaken during project preparation and associated costs and an estimate of the total cost of the resulting demonstration project. The Government of Germany also submitted endorsement letters from both the Government of the Philippines and the potential recipient enterprise. The project proposed is attached as Annex I to the present document.

#### *Secretariat's comments*

10. At the 72<sup>nd</sup> meeting, after consideration of the overview of approved HCFC demonstration projects and options for additional projects to demonstrate climate-friendly and energy-efficient alternative technologies to HCFCs<sup>2</sup> under agenda item 10, the Executive Committee decided *inter alia* to

<sup>2</sup> UNEP/OzL.Pro/ExCom/72/40.

consider at its 75<sup>th</sup> and 76<sup>th</sup> meetings proposals for demonstration projects for GWP alternatives to HCFCs within the framework established, and provided criteria for such projects (decision 72/40).

11. At the 73<sup>rd</sup> meeting, the Executive Committee further discussed the low-GWP demonstration projects and feasibility studies on district cooling in the context of the consolidated business plan of the Multilateral Fund<sup>3</sup>. Further to discussions, additional guidance was also provided in order to ensure that the best proposals for demonstration projects were submitted<sup>4</sup>.

12. In order to assist the Executive Committee in selecting the best demonstration project proposals submitted pursuant to this decision, the Secretariat had prepared an analysis of all these proposals only with regard to their concepts and how they comply with the guidelines provided by the Executive Committee. This analysis is contained in the document on the Overview of issues identified during project review<sup>5</sup>.

*Secretariat's recommendation*

13. The Executive Committee may wish to:

- (a) Consider the proposal for the preparation of a project in the refrigeration and air-conditioning sector in the Philippines that would demonstrate climate-friendly and energy-efficient alternative technologies to HCFCs, in the context of its discussion on proposals for demonstration projects for low global-warming potential (GWP) alternatives to HCFCs as described in the document on the Overview of issues identified during project review (UNEP/OzL.Pro/ExCom/74/13); and
- (b) Approve the project preparation request mentioned in sub-paragraph (a) above, in case the Executive Committee selects this proposal.

**Request from the Government of Japan**

14. Table 4 provides a summary of the request for bilateral co-operation from the Government of Japan. The value of this request (US \$90,400) does not exceed the 20 per cent of Japan's 2015 bilateral contribution (US \$4,378,622).

**Table 4: Project submitted by the Government of Japan**

<b>Project Title</b>	<b>Country</b>	<b>Amount Requested (US\$)</b>	<b>Amount Recommended (US\$)</b>
HCFC phase-out management plan (stage I, fourth tranche) (refrigeration servicing sector including enabling programme)	China	80,000	(*)
Agency support costs		10,400	
<b>Total</b>		<b>90,400</b>	

(\*) UNEP/OzL.Pro/ExCom/74/24

<sup>3</sup> UNEP/OzL.Pro/ExCom/73/18.

<sup>4</sup> The suggestions made by Executive Committee members are contained in paragraph 97 of document UNEP/OzL.Pro/ExCom/73/62.

<sup>5</sup> UNEP/OzL.Pro/ExCom/74/13.

China: HCFC phase-out management plan (stage I, fourth tranche) (refrigeration servicing sector including enabling programme) (80,000)

15. The comments and recommendations of the Secretariat are found in document UNEP/OzL.Pro/ExCom/74/24.

### **Request from the Government of the Russian Federation**

16. Table 5 provides a summary of the request for bilateral co-operation from the Government of the Russian Federation. The value of Russia's request (US \$56,500) does not exceed the 20 per cent of Russia's 2015 bilateral contribution of (US \$985,422).

**Table 5: Project submitted by the Government of the Russian Federation**

<b>Project Title</b>	<b>Country</b>	<b>Amount Requested (US\$)</b>	<b>Amount Recommended (US\$)</b>
Preparation of a regional centre of excellence for demonstration and training of low-global warming potential ozone-safe alternative technologies	Europe and Central Asia region	50,000	(*)
Agency support costs		6,500	
<b>Total</b>		<b>56,500</b>	

(\*) Individual consideration

Europe and Central Asia Region: Project preparation for the establishment of a regional centre of excellence for demonstration and training of low-global warming potential ozone-safe technologies (US \$50,000)

#### *Project description*

17. The Government of the Russian Federation submitted a funding request in the amount of US \$50,000, plus agency support costs of US \$6,500, for preparation of a technical assistance project to establish a regional centre of excellence to promote low-global warming potential and energy-efficient refrigeration and air-conditioning systems, and to provide support to Article 5 countries, mainly from the Europe and Central Asia (ECA) region. The project will be prepared and implemented by UNIDO, on behalf of the Government of the Russian Federation. The project proposal is attached as Annex II to the present document.

18. The main activities of the centre will be to provide: training for technicians; expert advice on possible re-design of refrigeration and air-conditioning equipment to improve energy efficiency and life cycle climate impact; assistance in policy development to harmonize regulations with the European Union F-gas regulations; establish small demonstration projects to promote ozone and climate safe refrigeration and foam alternatives; and, dissemination of information on new technologies.

#### *Secretariat's comments*

19. The Secretariat noted that this project is the first request for bilateral assistance from the Government of the Russian Federation, which is expecting to fund the centre's operation once the full project is approved, for three years until 2018. The Government of the Russian Federation also submitted a business plan to programme the funds earmarked for this centre.

20. In discussing the overall concept with UNIDO, the Secretariat was informed that several Article 5 countries from the ECA region are being considered to host the centre of excellence (Armenia had expressed interest in hosting the centre), which will be self-sufficient by 2018, and services will be free

for Article 5 countries. The project preparation will focus on defining a business model that will allow the self-sufficient operation of the centre, as well as define costs of the overall centre and its activities.

*Secretariat's recommendation*

21. The Executive Committee may wish to consider approving the request for project preparation for a technical assistance project to establish a regional centre of excellence for demonstration and training of low-global warming potential ozone-safe alternative technologies in the Europe and Central Asia region at the level of funding of US \$50,000, plus agency support costs of US \$6,500 for UNIDO.

**GENERAL RECOMMENDATION**

22. The Executive Committee may wish to request the Treasurer to offset the costs of the bilateral project approved at the 74<sup>th</sup> meeting as follows:

- (a) US \$XX (including agency fees) against the balance of France's bilateral contribution for 2015;
- (b) US \$XX (including agency fees) against the balance of Germany's bilateral contribution for 2015;
- (c) US \$XX (including agency fees) against the balance of Japan bilateral contribution for 2015; and
- (d) US \$XX (including agency fees) against the balance of the Russian Federation's bilateral contribution for 2015.

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## Annex I

### Project concept for request of funding for project preparation from the MLF

#### Converting commercial A/C products and associated production line from HCFC-22 to HC-290 at Koppel Inc. in the Philippines

##### I. Introduction

Koppel, Inc. is one of the largest manufacturers for unitary light commercial air-conditioning in the Philippines, but is also involved in the production and distribution of residential air-conditioners. Koppel was established in 1904, its present manufacturing of air-conditioners was established in 1957. The company's main office and manufacturing is located in ACSIE Km. 16 West Service Road, South Super Highway, Parañaque City, Philippines. Koppel is a mid-sized manufacturer and importer of residential and commercial air conditioning equipment, which is typical for local manufacturers in the region. Koppel's A/C products comprises of floor, wall and ceiling-mounted split air-conditioning units for the commercial sector.

The consumption of HCFC-22 for this production is about 20 Mt per year. The annual production is approx. 6700 units for the last 3 years. The major products in terms of sales are floor and ceiling mounted split A/C units. The company has one production line for their various products.

- a. Why this particular project is relevant and necessary to HCFC phase-out

While residential A/C units are often imported or produced by foreign owned appliance manufacturers in the region, smaller scale production of commercial units is still a niche market that can be found in many developing countries in the region and beyond. The main issue with such equipment is the higher charge size than residential appliances, making it more difficult to convert production non-HCFC and flammable low GWP alternatives. HC, being the most energy efficient of all alternative technology choices, has been widely introduced in the commercial sector for plug in cabinets and appliances, but yet not for air conditioning. Thus the project reduces the climate impact of both refrigerant and energy use in air conditioning.

- b. Justification/description of project replicability

Demonstration of HC use for larger charge sizes in split and multi-split units is lacking up to now and applicability of standards has yet to be demonstrated. The conversion project is unique in its character, involving an R&D component to develop and design safe application of HC technology similar to the commercial refrigeration equipment with size charges of up to 1 kg HC, which is a very fast growing market segment. Without technically and economically feasible alternatives the demand for manufacturing and servicing will accelerate the introduction of high GWP HFCs. Once the design and in specific the safety engineering has been fully developed for HCs it could be distributed to other countries and replicated in the region and beyond.

##### II. Brief project summary

Converting commercial air-conditioning products and associated production line from HCFC-22 to HC-290.

There are four elements:

- (i) Redesign of products in order to ensure safety and high efficiency
- (ii) Make changes to current production line for safe charging of HC
- (iii) Upgrade of laboratory to make it safe for performance and safety testing of HC products
- (iv) Interventions to infrastructure

Redesign of products will involve minimisation of refrigerant charge, introduction of leak monitoring technique and integral risk mitigation response (e.g., shut-down valves and ventilation). Design will follow the relevant flammability safety principles according to ATEX Directive and rules established in standards such as EN 1127-1. Simultaneously, the design will be optimised for the HC-290 refrigerant in order to exceed the current efficiency levels and to target higher minimum efficiency levels in the surrounding region. Consideration will also be given to system design to both reduce refrigerant charge and also to further minimise refrigerant leakage.

There are several production lines but only one which involves charging of refrigerant. This production line will be modified in order to provide more rigorous leak tightness testing, charging equipment for HC refrigerant, and application of necessary safety system (protected charging area, gas detection, extract ventilation, alarms and warning materials). The installation will receive third party approval. In addition, workers will receive operational and safety awareness training.

A performance test (psychrometric) laboratory is currently being installed. This laboratory will be upgraded in order to suitably handle the use of flammable refrigerants for performance testing. The laboratory will also be modified in order to safely carry out safety tests (e.g., leak simulation tests, leak amount measurements, etc.) that are required for the safe design of the systems. Requirements include addition of protective electrical enclosures, gas detectors and extract ventilation, gas analysers and development of safe working procedures.

The interventions to the after-sales infrastructure include a number of aspects in order to maintain a high level of safety during installation, operation, service and maintenance and end of life of the air conditioners. At a general level this requires technical training to the relevant technicians and awareness instruction for sales engineers and similar staff. In addition, a quality feedback system for installed equipment will be implemented in order to ensure equipment is installed appropriately and to help identify occurrence of faults that can be fed back into design or manufacturing in order to further minimise possible failures.

The products include a diverse range of equipment, including ceiling mounted, ceiling cassette, wall, cabinet and concealed ducted type split systems and 2- and 3-circuit multi-split systems.

The total funding for the project implementation is estimated to be in the range of USD 500.000, the costs are in the range of comparable productions in the region where low GWP alternatives are urgently needed.

### **III. Project objectives**

Project objective: Conversion of manufacturing of HCFC (R22) - based equipment to HC (R290) - based equipment and research in the area of commercial air-conditioning

Project activities:

- Redesign and production of commercial air conditioning products to use HC-290 and to have higher efficiency than current models
- Conversion and improvement of production line
- Modification of laboratory to enable performance testing (and optimisation) of systems using HC and to be able to carry out necessary safety testing
- Provision of suitable training to technicians and other related staff.
- Implementation of quality/safety system for market surveillance

### **IV. Expected demonstration results**



- Demonstrate extension of application of low GWP HC refrigerants into air-conditioning equipment that is of a significant larger capacity range than has been done in other projects (such as India and China).
- Demonstrate safe application of low GWP HC refrigerants to diverse product types of commercial air conditioning.
- Principles can be applied to other sectors such as remote (condensing unit) systems for commercial refrigeration, since the concept is almost identical.
- Illustrate the cost-effective application of risk-reducing and mitigation measures in commercial sized air conditioning products.
- Generation of a multi-media design and assessment guide for use by enterprises producing similar products
- Provide a blue-print of technical design and implementation for this refrigerant for other similar producers across Article 5 countries.
- Improve the overall energy efficiency of the current product range through improved design of systems and selection of components but also reduce lifetime energy consumption through measures to improve leak tightness and appropriate warning methods. Thus, reducing overall climate impact of commercial air conditioning.
- Avoid the consumption and emissions of HCFC and HFC refrigerants and the associated resource and environmental quality benefits associated with this.
- Provide confidence to other consultants and implementing agencies that such equipment can be economically and efficiently converted to use low GWP refrigerants.
- Raising the general quality of the design, production and ongoing improvement of the enterprises products.

## **V. Institutional arrangements**

### **a. Brief information on legal and regulatory support for the demonstration project**

The demonstration project is backed by the Philippines HPMP that is aimed to phase out the use of HCFCs in the following sectors: foam, air conditioning and refrigeration, fire extinguishing and chillers, and servicing sectors. It complies with the revised administration order No. 25 Series 2013 regulating the control of ODS in accordance with the Montreal Protocol.

Philippines, as a Party to the MP and an Article 5 country, will freeze consumption of HCFCs to its baseline consumption (an average of the consumption levels in 2009 and 2010) in 2013 and reduce HCFC consumption by 10% by 2015, 35% by 2020, 67.5% by 2025, and 97.5% by 2030. The proposal on energy efficient, climate friendly air conditioning will also align with Philippines determined contributions and strategies under the UNFCCC.

Under the coordination of the Philippine Ozone Desk as the country's National Ozone Unit (NOU) at the Philippine Department of Environment and Natural Resources the demonstration project will be implemented with technical assistance from Germany. Germany will technically assist Koppel Inc. in undertaking the project activities mentioned under chapter III.

### **b. Description of implementation approach**

The responsible implementation agency for the project will be Germany through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The project will be based on agreements between the Government of the Philippines and the beneficiary company.

The company will agree to finally convert all its production to non-ODS production and receive no additional funding. By end of the project Koppel will depend on HC technology for 90% of their present production. For some minor products alternatives are yet not defined, however, the target remains to finally convert all products to low GWP alternatives by latest in 2018.

- c. Government commitment to complete project in 12 months

See attachment

## **VI. Company Information**

- a. Company letter of commitment

See attachment

- b. Summary of HCFC consumption, at least for the last three years

2012	21,54 tons
2013	20,83 tons
2014	19,53 tons
<b>Total</b>	<b>61,91 tons</b>

## Annex II

### PROJECT PREPARATION FOR

Regional Centre of Excellence for demonstration and training of low-GWP ozone-safe alternative technologies

<b>Duration:</b>	approx. 12 months
<b>Project Preparation Project Budget:</b>	US\$ 56,500 (including 13% Agency Support Costs) US\$ 50,000 excluding 13% Agency Support Costs
<b>Implementing Agency:</b>	Russian Federation bilateral contribution (Executing agency - UNIDO)

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#### Preparation

Preparation of project proposal for establishment of a Regional Centre of Excellence. The project and project preparation to be funded from bilateral contribution of the Russian Federation

The project document on Establishment of the Centre of Excellence that would enhance promotion of climate and energy benefits of energy efficient non-HFC systems and provide support to the respected institutions (Project Budget 980,000 USD) is planned for submission in 2016 to 76<sup>th</sup> ExCom meeting.

#### Outputs

1. Identification of host Article 5 country (possible locations Armenia, Serbia, etc.)
2. Establishment of partnerships (Ref Associations, Universities, Industry, etc.)
3. Sustainability Study – Center operation after project completion
4. Analysis of possible synergies with already ongoing projects and programs

#### Budget

Consultancy services: 25,000 USD  
Travel and meeting with potential partners: 25,000 USD

## PROJECT CONCEPT

<b>Country:</b>	Regional
<b>Sector Covered:</b>	Regional Centre of Excellence for demonstration and training of low-GWP ozone-safe alternative technologies
<b>Duration:</b>	36 months
<b>Project Budget *:</b>	US\$ 980,000 (including 13% Agency Support Costs) US\$ 852,600 excluding 13% Agency Support Costs
<b>Implementing Agency:</b>	Russian Federation (executing agency - UNIDO)
<b>Coordinating Agency:</b>	Ministry of Natural Resources and Environment of the Russian Federation

\* The budget is calculated in USD but it is expected to cover expenses in national currency of the Russian Federation (Rubles) for the Russian Federation contribution to MLF in 2015-2017 is to be proceeded in national currency as an option under the MLF rules and procedures.

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### Project Summary

This Concept Note outlines the framework for the establishment of *Regional Centre of Excellence for demonstration and training of low-GWP ozone-safe alternative technologies*. The creation of the Center will demonstrate already existing technologies, and ensure development of certified academic programmes for the refrigeration servicing and manufacturing/assembling sectors with special emphasis on energy efficiency of proposed solutions.

The Russian Federation will provide a bilateral contribution of USD 1.5 mln to cover the operation of the Centre till 2018.

#### Overall objective

This project proposal is a unique opportunity to develop and establish the Regional Centre of Excellence in one of the Article 5 countries, to overcome the barriers to the production, servicing, and marketing of energy efficient refrigeration and air-conditioning systems. Therefore, this project will establish the Centre of Excellence for the HCFC phase out and promotion of energy efficient solutions in the domestic, commercial and industrial refrigeration and air-conditioning sectors. The objectives of the Centre of Excellence will be: organization of training; provision of expert advice particularly in the redesign of refrigeration and air-conditioning systems and their components to minimize life cycle climate impact; development of draft regulatory instruments harmonized with progressive international F-gas legislation for countries participating in the Centre's work; creation of energy efficient demo projects to promote ozone- and climate-safe refrigerants and foaming agents; dissemination of technologies; provision of support to PU foam manufacturers in access low-GWP technologies which are specially adopted for their needs.

## Expected outcomes and outputs

### **Outcome**

Establishment of the Centre of Excellence that would enhance promotion of climate and energy benefits of energy efficient non-HFC systems and provide support to the respected institutions.

### **Outputs**

5. Centre of Excellence established and operational.
6. Academic programmes and technical advisory services of the Centre are certified and internationally recognized.
7. Draft regulatory instruments harmonized with progressive international F-gas legislation.
8. Laboratory for adaptation of non-ODS PU formulations for SME.
9. Energy efficient demo projects for promotion of ozone- and climate-safe refrigerants and foaming agents.

There is a number of certified academic programmes in Article 2 countries, but similar Centers that offer such services, research activities and practical training courses do not operate in Article 5 countries.

In order to foster and provide further support in this area, the sector-wide academic programmes for advanced students developed in conformity with the highest standards would stimulate innovative activities, and sharing of knowledge and information on the basis of the Centre. The programmes will be designed for refrigeration service technicians trained in state institutions of higher and secondary education and colleges, or in private educational centers belonging to industry associations or large enterprises usually without state licenses for educational activities, and for organization of advanced and refresher training courses.

The experience of countries where the F-gas regulations are being implemented to minimize HFC emissions shows that this is a necessary step facilitating the move to new non-HFC refrigerants (such as hydrocarbons and carbon dioxide) where new service practices, theoretical knowledge, practical skills, and standards are required.

This Centre offering training courses, technical advice and scientific excellence will become a platform for the technical expertise exchange among relevant institutions, enterprises, practitioners and academia (relevant technical schools and faculties). It will provide a pool of very skilled and well trained professionals and practitioners to promote climate-friendly and energy efficient alternative non-HFC technologies to replace HCFCs and create new green jobs in the region. The Centre will also involve producers of HVAC equipment and refrigerants, and allow them to introduce and promote new non-HFC refrigerants and the most up-to-date technologies through establishment of a regional association that would join all market players, research and educational institutions, and government officials concerned.

Special attention will be given to disseminating and adapting certified training courses internationally recognized due to cooperation with acknowledged academic partners and in compliance with the latest standards and amendments in the international legal framework regulating F-gases, improving practical and theoretical foundation (e.g. use of natural refrigerants and reduction of refrigerant leakage in existing equipment), exchanging good refrigeration practices, and disseminating innovative energy-efficient green low-GWP technologies and processes to phase out HCFC in the refrigerating and air-conditioning sectors. The Centre will offer technical advisory services to create opportunities to increase activities on development of ozone- and climate-safe products and services in the region. This will also provide a network and cooperation among academia and institutions with multiplication and replication impact to create sustainable employment (green jobs).

In light of the above there is a need to develop the Centre's physical infrastructure that is supply training facilities with necessary equipment to be used as a platform for training primarily of target groups involved in various areas that will apply upgraded knowledge and skills in the region. The Centre will also offer distance modular training tailor-made to meet clients' needs. There will be necessary funding to employ up-to-date technologies with modern learning tools and simulators to turn the Centre into a knowledge and skill base. Based on the needs assessment (analyzing present and future trends, challenges, etc.) it will be tailor made to target groups and their needs.

Although the existing and approved under the ongoing HPMPs training of technicians and customs officers is very comprehensive, there is a number of complex issues related to use of natural refrigerants, green standards and other new regulatory instruments required by regional target groups that already have advanced knowledge and skills. To address this task, new certified academic programmes employing a consolidated and integrated approach to new technological trends and processes as well as legal complexities are necessary.

The created Centre will engage all concerned parties of the foam, refrigeration and air-conditioning sectors (both public and private, like higher educational and research institutions) in climate and energy efficiency issues through dedicated tailor-made certified academic programmes demonstrating use of certain technologies (such as HFO, ammonia, HC, CO<sub>2</sub>, MF, etc.). There will be potential for upgrading skills, creating new professions, and expanding existing business in respective areas, so as to ultimately create new green jobs.

It will allow service engineers, technicians, suppliers and other relevant stakeholders to improve knowledge and upgrade skills in using the most advanced environment friendly technologies and processes.

#### **Justification:**

- In order to develop sector-wide certified academic programmes that ensure sustainable, integrated and comprehensive knowledge and skills development and comply with the existing standards upheld voluntarily in certain areas (EU regulations, European practices of F-gas regulations, ASHRAE, IIR, etc.), it is necessary to create and establish the Regional Centre of Excellence. It will serve as a scientific knowledge base as well as practical training institution, involving all actors concerned, with due regard to gender dimension in the form of wider women involvement in the activities.
- In case the manufacturing industry converts to flammable alternatives such as, inter alia, HC refrigerants, a number of pre-conditions would have to be fulfilled to allow for the sustained introduction of the technology into the market, inter alia:
  - Availability of national regulations and standards covering production, storage, transportation and use of commercial refrigeration equipment based on flammable alternatives, such as HCs, and enforcement of such regulations.
  - Standards for field service of equipment based on flammable alternatives, such as HCs.
  - Training of refrigeration technicians working with flammable refrigerants, such as HCs, to ensure adequate equipment service in the field.
  - Targeted labeling policy to ensure clear identification of all flammable alternatives, such as HCs, by users and technicians.
- The regional approach should ensure wider acceptance and replicability in various countries.
- Most of the technologies had not been addressed under the HPMPs due to their high cost and limited funding provided to the countries due to the relatively "low" ODS base line/consumption.

The Centre will be designed to upgrade knowledge to promote and foster information-exchange opportunities through sharing good practices, applying new training and demonstration models, and providing specialized academic programmes to enhance product and services development at the institutional level thus ensuring

support to target groups. This will provide a network and cooperation among academia, business circles, and governmental institutions with multiplication and replication impact. Ultimately, the Centre will provide business development for creation of sustainable employment (new green jobs).

Within the scope of the Centre's work, it is planned to organize trainings, create and disseminate case studies to overcome critical barriers to energy efficiency investments in the residential, commercial and industrial refrigerating and air-conditioning equipment markets (including a program for small and medium enterprises) and in the public sector (a program for public buildings). These activities will provide information on climate and energy benefits of energy-efficient non-HFC systems and ensure support of the respective Ministry of energy (energy efficiency unit) through dissemination of EE best practices, carrying out of energy efficiency audit, and provision of information on financing options to financial institutions and other stakeholders.

The establishment of the Regional Centre of Excellence will also provide a platform for introducing and promoting new environmentally friendly low-GWP technologies (such as HFO, HC, methyl formate, ammonia, carbon dioxide, etc.) for the refrigeration/air-conditioning manufacturing/assembling and foam sectors, and for introducing new legal and regulatory mechanisms. As a result, it will create a pool of highly qualified professionals in these areas with the aim, inter alia, of promoting climate and energy benefits, green standards.

The Centre will become a platform for cooperation of a created regional association of market players with large global companies — producers of refrigerants, foaming agents, refrigerating, air-conditioning, and foaming equipment (DuPont, Honeywell, Maxichem, SAIP, Cannon, Gree, Midea, Godrej group, GEA Refrigeration, Bitzer, Danfoss, Mayekawa, Johnson Controls, etc.), associations engaged in respective sectors (AHSRAE, IAR, Eurammon, etc.), academic institutions, which ultimately would create a scientific knowledge base, and foster research activities, including practical application of testing results (environmentally-safe techniques of handling refrigerants), energy-efficiency performance and many other issues incorporated into certified academic programmes.

The project will also provide support to development of national strategies for upgrading the refrigeration and air-conditioning service sectors in terms of training specifications, codes of practice and infrastructure required to deliver long-term support to the refrigeration sector in the adoption of a non-HFC approach to HCFC phase out. This will include the establishment of educational centers for training refrigerating and air-conditioning equipment service technicians and the development of codes of practice suitable for harmonization with European directives governing the use of hydrocarbon refrigerants.

In this context, it will develop a service sector strategy to support HCFC phase out activities and strengthen the current infrastructure to enable ongoing improvements in operating and service practice without introduction of high-GWP alternatives.

### **Problems to be addressed:**

- It is not possible to prevent the private sector from adopting HFC solutions through self-funded conversion, especially taking into account that the number of eligible enterprises does not cover the total ODS consumption which can be directly addressed under the HPMPs. However the capacity building, awareness and stakeholder engagement activities in this project will aim to promote non-HFC solutions. The technologies funded by investment could include HC, HFO, methyl formate, ammonia and carbon dioxide for refrigeration, foam and air-conditioning manufacturing.
- There is a need to best address the safe use of ammonia, CO<sub>2</sub> or hydrocarbons in refrigeration and air-conditioning equipment.
- There is also a need to address problems of adaptation of MF, Ecomate and other new alternatives in the foam sector for SMEs.
- Regional capacities should be strengthened to adequately equip the Centre (equipment for technical service of refrigerating and air-conditioning systems based on new refrigerants, including HC) and to

enable promotion of use of the most advanced training methods, materials and manuals and sharing knowledge among various stakeholders involved in these areas.

- Existing technicians will have to acquire new skills and know-how required to deal with new systems using non-HFC solutions such as hydrocarbons and carbon dioxide, in addition to new trainees. This will be done partially through the activities supported by this project but also significantly through enterprises and their foreign counterparts that will adopt new technologies in the manufacture and installation of refrigeration and air-conditioning equipment and systems.
- There is a need of improvement of cooperation between regional authorities, associations, the residential, commercial and industrial equipment markets (including a program for small and medium enterprises), and the public sector. To this end, it is essential to create a well-functioning network of stakeholders, trained professionals and experts. In this regard, cooperation and linkages with other similar centers and institutes worldwide will be extended.
- Refrigeration service technicians are trained in state institutions of higher and secondary education and colleges, or in private educational centers belonging to industry associations or large enterprises usually without state licenses for educational activities.
- The majority of state educational institutions does not have modern technical and laboratory facilities for training students in practical skills of servicing the new generation of refrigerating and air-conditioning equipment. Both the training syllabus and infrastructure will have to be updated to take account of the developments in refrigeration and air-conditioning systems.

### **Expected Project beneficiaries:**

- Service engineers;
- technicians with advanced education;
- institutions of higher and secondary education;
- educational centers belonging to industry associations and participants of the refrigerating, air-conditioning, and foam markets;
- national and regional standards bodies;
- SME of the foam sector;
- commercial and training centers, suppliers and producers of refrigerating and air-conditioning equipment, refrigerants, professional associations and other related institutions in the refrigeration and air-conditioning sectors;
- others who would like to start up or expand their businesses or work individually in those areas (development of business and individual professionals).

### **Counterpart organizations**

The counterpart organizations involved are the industry associations, educational institutions, producers and suppliers of refrigerants, foaming agents, refrigerating, air-conditioning, and foaming equipment, ministries of environmental protection and energy of participating countries, particularly National Ozone Units (NOU) working, together with the implementing agencies of the Montreal Protocol, on the development of strategies, policies and regulations governing production, import and consumption of ozone-depleting substances and equipment containing such substances.

It is also planned to involve installation and service organizations of the refrigerating, air-conditioning, and foam sectors in Article 5 countries, chambers of commerce, and construction associations and unions.