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Distr.
GENERAL

UNEP/OzL.Pro/ExCom/76/38
14 April 2016

CHINESE
ORIGINAL: ENGLISH

执行蒙特利尔议定书
多边基金执行委员会
第七十六次会议
2016 年 5 月 9 日至 13 日，蒙特利尔

项目提案：科威特

本文件包括基金秘书处就以下项目提案提出的评论和建议：

销毁

- 空调用途中无氟氯烃低全球升温潜能值技术绩效的示范项目 开发计划署

项目评价表 一 多年期项目
科威特

项目名称	双边/执行机构
(a) 空调用途中无氟氯烃低全球升温潜能值技术绩效的示范项目	开发计划署

国家协调机构：	科威特工业和科学研究所

最新报告的项目所涉消耗臭氧层物质消费数据

A: 第 7 条数据（ODP 吨，2014 年，截至 2015 年 10 月）

氟氯烃			336.17

B: 国家方案行业数据（ODP 吨，2014 年）

HCFC-22	187.00
HCFC-123	0.05
HCFC-141b	80.85
HCFC-124	71.50
进口预混多元醇中的 HCFC-141b	59.95

仍符合供资资格的 HCFC-22 消费量（ODP 吨）	179.25

本年度业务计划分配款		资金 美元	淘汰 ODP 吨
	(a)	不详	不详

项目名称：	
企业所使用的 ODS（ODP 吨）：	不详
将淘汰的 ODS（ODP 吨）：	不详
将使用的 ODS（ODP 吨）：	不详
项目期限（月）：	36
原申请数额（美元）；	343,000
最终项目费用（美元）：	293,000
增支资金成本：	不详
应急费用（10 %）：	不详
增支经营成本：	不详
项目总费用：	293,000
地方所有权（%）：	100
出口成分（%）	0
申请赠款（美元）：	293,000
成本效益（美元/公斤）：	不详
执行机构支助费用（美元）：	20,510
多边基金总共支付费用（美元）：	313,510
对应供资情况（有/无）：	无
所包括项目监测进度指标（有/无）：	有

秘书处的建议：	个别审议

项目说明

背景

1. 开发计划署作为指定执行机构，代表科威特政府向第七十六次会议提交了空调用途中无氟氯烃和低全球升温潜能值技术绩效的示范项目的供资申请，原提议的金额为343,000美元，外加24,010的机构支助费用。[1] 项目提案作为本文件的附件一随附于后。

项目目标

2. 高环境温度国家的空调设备需求量很大，大多数是使用 HCFC-22 制冷剂的空调设备。例如，在科威特 2014 年消费的 HCFC-22 中，45%主要用于空调设备的维修。对氟氯烃的这种日益增加的需求，说明需要展示现有非氟氯烃低全球升温潜能值空调设备的绩效。

3. 鉴此，示范项目提议评价现有的两类空调设备的绩效：8 吨容量的 HFC-32 空调系统；以及使用 HC-290 的 40 吨容量的小型冷风机。这些设备将在 4 个地点安装，地点将在与技术专家、国家臭氧机构和科威特工业和科学研究所（KISR）协商的情况下进行选择。两种设备的绩效将根据压缩机、冷凝器、蒸发器的绩效和能源效益和耗电量等进行监测和评价，并与类似规模和容量的使用 HCFC-22 和 R-410a 的设备进行比较。

4. 项目完成后，期结果可以在科威特和所有高环境温度国家进行复制。为便利通过示范设备和支持与在高环境温度国家使用这些设备相关的政策和条例，提出了关于举办区域技术讲习班来提供详细的产品绩效情况的建议。

项目执行情况

5. 示范项目将按以下步骤实施：

(a) 在四个不同地点（即：一座清真寺、沿海一商业设施、科威特工业和科学研究所以及一个家庭）安装使用 HC-290 的冷风机以及使用 HFC-32 的空调设备，包括监测设备；

(b) 绩效评估和在两个夏季中对设备进行测试；以及

(c) 通过区域和国际会议传播示范项目的结论。

6. 示范项目将在国家臭氧机构的监督下，由科威特工业和科学研究所予以执行和监测，预期将于 36 个月内完成。

[1] 编制本项目的供资在第七十四次会议上获得核准，金额为 20,000 美元，外加 1,400 美元的机构支助费用，但有一项谅解，即这一核准并不意味着核准提交时的该项目或其资金数额（第 74/26 号决定）。

项目预算

7. 如表 1 所示，估计项目的总费用为 343,000 美元，另有政府的 25,000 美元的实物捐助。

表 1. 拟议项目费用

活动	预算（美元）
设备的采购和安装	
HFC-3 示范单位	18,000
HC-290 示范小型冷风机	40,000
监测设备（例如数据记录器）	60,000
座舱至房屋监测系统	25,000
执行和监测	
项目管理和监测的培训	10,000
测试的技术支助（包括一名研究员，一名专业人员，一名技术员和一名管理人员）	100,000
专家	40,000
信息传播	
讲习班（次区域，有 15 个国家）	50,000
总计	**343,000**
请多边基金提供的资金	**343,000**
实物捐助（工作人员和等地协调）	25,000

秘书处的评论和建议

评论

8. 正如开发计划署解释的，技术的选择是根据与设备制造商的讨论进行的，所选择的设备类型显示的是实验室条件下的良好绩效，但尚未在高环境温度条件下进行过测试或使用。项目核准后，将对规格作出规定。设备的采购将根据这些规格通过投标程序进行。

9. 项目审查过程意识到该国缺乏使用易燃制冷剂的标准；但该国政府认为，示范项目将有助于制定此种标准，包括与采用低全球升温潜能值制冷剂的设备相关的标准。这种办法可能较容易地在海湾国家进行复制，该区域的合作非常强。

10. 关于项目费用的进一步的合理化，[2] 开发计划署调整了项目的费用，减少了 30,000 美元的技术支助和 20,000 美元的讲习班费用。向多边基金申请的最终项目费用为 293,000 美元，外加机构支助费用。

[2] 第 74/21 号决定(c)段请各双边和执行机构将示范项目的费用合理化，以确保根据第 72/40 号决定，现有 1,000 万美元供资下的大批示范项目获得核准，并进一步探讨其他补充资金的来源。

结论

11. 示范项目同制定科威特氟氯烃淘汰管理计划第二阶段维修行业的更好的战略具有潜在的联系。如取得成功，该项目将为在所有高环境温度国家实行低全球升温潜能值的空调设备提供潜力。

建议

12. 谨建议执行委员会考虑：

(a) 在讨论关于项目审查期间所查明问题概览的文件（UNEP/OzL.Pro/ExCom/76/12）所述氟氯烃全球升温潜能值代用品的示范项目提案时，审议评价科威特空调用途中无氟氯烃、低全球升温潜能值技术绩效的示范项目；

(b) 根据第 72/40 号决定，核准审议评价科威特空调用途中无氟氯烃、低全球升温潜能值技术绩效的示范项目，金额为 293,000 美元，外加给开发计划署的 20,510 美元的机构支助费用；以及

(c) 敦促科威特政府和开发计划署按计划在 36 个月内完成项目，并在项目完成后迅速提交一份全面的最终报告。

MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEPLETE THE OZONE LAYER

Annex I

PROJECT COVER SHEET - NON-MULTI-YEAR INVESTMENT PROJECTS

COUNTRY: KUWAIT

PROJECT TITLE:	**IMPLEMENTING AGENCY:**
Demonstration Project for HCFC-free low-GWP technology performance in air-conditioning applications (capacity above 8 TR)	UNDP

PROJECT DATA			
Sector:	Air-conditioning sector		
Sub-sector:	Residential / Commercial acs (More than 8 TR)		
ODS use in sector (2014 metric tonnes):			**3373.63**
Project impact (metric tonnes : a portion of equv.):			**2500**
Project duration:			36 months
Project Costs:	Incremental Capital Costs(including contingencies):	US$	**343,000**
	Incremental Operating Costs:	US$	0
	Total Costs:	US$	**343,000**
Local ownership:			100%
Exports to non-A5 countries:			0%
Request grant		**US$**	**343,000**
Counterpart fund		**US$**	**NA**
Cost-effectiveness (US$/kg-ODS):			
Implementing agency support costs:		**US$**	**24,010**
Total Cost to Multilateral Fund:		**US$**	**367,010**
Status of counterpart funding (Yes/No):			NA
Project monitoring milestones included (Yes/No):			Yes

PROJECT SUMMARY

This demonstration project, upon successful completion, will establish the suitability of HCFC-free low-GWP technology performance in air-conditioning applications (capacity above 8 TR) in high ambient temperature conditions. The capacity of equipment are chosen in accordance with the type of existing equipment used in Kuwait. The project will cover installation of equipment using HFC-32 and R-290 based technology in Kuwait in identified locations and testing their performance over time. The project would be implemented by the National Ozone Unit of Kuwait with technical support from experts and Kuwait Institute of Scientific Research. Input from other projects in the regional will be used while structuring the implementation modality of this project.

If successful, the demonstration project will contribute towards reduction in consumption of HCFC-22 based air-conditioning installations besides reduction in installation of R-410A based equipment. This will have an impact on approximately 50,000 households consuming 50 TR each (approx.) of air-conditioning that would be constructed in the future, besides replacement of existing equipment using HCFCs and HFCs. The consumption in air-conditioning applications in the country in servicing as of the year 2015 is about 2500 MT and a significant portion of this will be addressed by this project.

Prepared by: UNDP in consultation with National Ozone Unit and industry **Date:** March 2016

PROJECT OF THE GOVERNMENT OF KUWAIT

Demonstration Project for HCFC-free low-GWP technology performance in air-conditioning applications (capacity above 8 TR)

Objective

The objective of this proposed demonstration project is to install commercially available of air-conditioning equipment in selected locations in residential areas in Kuwait with HCFC free low-GWP technologies (e.g., HFC-32, R-290), test performance of these equipment in prevailing conditions in Kuwait over two seasons of summer and disseminate test results to other interested stakeholders – both national and international.

HPMP Stage-I is under implementation in Kuwait. While implementing HPMP Stage-I, it was observed that the country faces a significant challenge (like other similar countries in the region and across the globe) on adoption of low GWP ozone friendly air-conditioning equipment. Specific activities to address this are not included in the HPMP Stage-I document as HPMP Stage-I focuses more on compliance with HCFC phase-out targets. Therefore, this demonstration project is expected to be helpful for the Government of Kuwait and other developing countries having similar operating conditions.

Sector Background

Introduction

Air-conditioning is a very important need for countries in the Middle East like Kuwait where ambient temperature can cross 50 degrees centigrade or more during summer months. Currently, HCFC-22 is widely used in this region for their air-conditioning equipment households. Given the larger size of households in Kuwait, the capacity of these equipment is of the range of upto 30 TR or more. On an average, the equipment are much larger in capacity compared to air-conditioners used in other countries in Asia Pacific region.

Technologies air-conditioning applications for high ambient temperature have been a challenge. These have been highlighted and discussed in different for a since 2007. In the recent TEAP report presented in 26th MOP in Paris in November 2014, it has been highlighted that availability of HCFC free alternative technologies in air-conditioning applications is limited. It is known that low GWP safe to use options pose unique challenge. As of date, HFC-32 and R-290 based products are commercially available for high capacity equipment required for this project. There is limited information available on other low GWP options (e.g., HFOs, blends) as of date in terms of commercial availability.

It is known that some of the technology options mentioned in paragraph above are available in Article 5 countries. Their adoption is still limited due to a range of reasons including standards and market promotion of such options.

The market for these air-conditioning equipment is growing at high rate in Kuwait and this growth is mainly on account of increase in number of households in the country. To avoid dependence of HCFC-22 based equipment that would result in prolonged use of HCFC-22 in servicing, it is essential for the country to demonstrate performance of HCFC free low-GWP technologies for adoption in households. The results would be replicable not only in Kuwait but also in other countries in the region and other parts of the world, where high-ambient temperature conditions are experienced during summer months.

Brief project summary

The project would involve installation of air-conditioning equipment in selected locations in residential areas in Kuwait with HCFC free low-GWP technologies (e.g., HFC-32, R-290), testing performance of these equipment in prevailing conditions in Kuwait over two seasons of summer and dissemination of test results to other interested stakeholders – both national and international.

Alternative Technology Options

The following factors need to be considered for selection of the alternative technology:

Technical factors
- Processing characteristics
- Functionality in end-product
- Proven and mature technology
- Energy efficiency

Commercial factors
- Cost-effectiveness
- Reliable availability

Health and safety factors
- Low risk for occupational health
- Low risk for physical safety (flammability, etc.)

Environmental factors
- Direct ozone impacts
- Direct and indirect climate impacts

Some of the zero-ODP alternatives to HCFC-22 currently available for air-conditioning applications are given below.

Substance	GWP	Application	Remark
R-410A		Residential / commercial acs	Widely available commercially. High GWP technology option compared to some of the alternatives available in the market. Energy efficiency is high and improved energy performance models are under development.
R-407C		Residential / commercial acs	Widely available commercially. High GWP technology option compared to some of the alternatives available in the market. Energy efficiency is high and improved energy performance models are under development.
R-32		Residential / commercial acs	Commercially available though not as widely as R-410A or R-407C. Mildly flammable refrigerant and has lower GWP compared to HCFC-22, R-410A and R-407C. Energy efficiency is high and improved energy performance models are under development.
R-290		Residential / commercial acs	Commercially available though not as widely as R-410A or R-407C. Flammable refrigerant and has a very low GWP. Energy efficiency is high and improved energy performance models are under development.

Note: Other options such as Ammonia, HFOs, CO2 and blends are not considered as these products are not commercially available for procurement and testing for Kuwait conditions.

Given the main project objective, the technology options that would be considered for demonstration are HFC-32 and R-290. It is known that:

a. Products suiting Kuwait requirements in terms of capacity and equipment technology are currently being produced in different countries in the region.

b. Equipment using these technologies can be procured from international markets and installed for testing purposes in Kuwait conditions.

c. Technical personnel in Kuwait involved in this project can be trained and equipped to use these equipment and measure performance of this equipment. This includes servicing of these equipment if necessary.

Project Background

The project was developed in close consultation among Kuwait Industrial and Scientific Research, technical experts in refrigeration and air-conditioning, UNDP staff and NOU. The project implementation structure was designed with expertise of KISR and with inputs from NOU and UNDP. Technical experts provided technical inputs relating to the type of equipment to be tested and performance assessment process for the different equipment proposed.

Project Description

As mentioned earlier, the project is designed for testing existing commercially available equipment using HFC-32 and R-290 based technologies. The equipment to be tested will include 8 TR equipment using R-32 and mini chillers with a capacity of 40 TR using R-290. The rationale for choosing the above equipment are:

- Usage characteristics and capacity of equipment typically used in Kuwait
- Availability of equipment in international and local markets using low GWP technologies
- Need for testing roof-top units or equivalent using R-290 based technology – this being helpful in safe operation of equipment
- Feasibility of maintenance and testing equipment using local technicians – this is also an important parameter while disseminating test results on utilisation of equipment.

More detailed specification of equipment would be finalized prior to bidding process. For managing this project, a Project Technical Steering Committee that includes technical experts and NOU will be constituted.

Under the proposed project, the following equipment are proposed to be bought.

Refrigerant	Capacity in TR	No. of units
HFC-32	10 TR	3 equipment or equivalent
R-290	40 TR (Mini Chiller)	1 equipment
Total	**Not applicable**	**4 equipment**

The equipment will be installed in the following sites:

(a) One equipment in one Mosque
(b) One commercial / public establishment close to sea shore
(c) Two other locations including KISR and one in household location as found feasible

These locations have been chosen in consultation with technical experts, NOU and KISR. This would be representative of operational conditions prevailing in Kuwait and project boundary conditions defined for demonstration project in terms of scope and budget.

It must be noted that climate monitoring equipment is required for measuring local climate close to the location of installation of equipment. This has an impact on performance of air-conditioning equipment both cooling capacity and energy consumption levels.

The main technical parameters that would be monitored for the evaluation of the performance of HFC-32 package should facilitate two methods for cooling load estimation. Hence they include:

1. Outdoor-air dry-bulb temperature,
2. Dry-bulb temperature and Relative humidity of air stream at the upstream and downstream of evaporator or cooling coil,
3. Air flow rate through the evaporator,
4. Liquid-line temperature (downstream of the condenser),
5. Liquid line pressure (downstream of the condenser),
6. Suction line temperature (upstream of the compressor),
7. Suction line pressure (upstream of the compressor),
8. Refrigerant mass flow rate downstream of the condenser,
9. Power consumption of the whole unit.

On the other hand, the performance of the R-290 mini chiller will be monitored by means of the following parameters:

a. Outdoor-air dry-bulb temperature,
b. Chilled water temperature upstream of the chiller,
c. Chilled water temperature downstream of the chiller,
d. Chilled water flow rate upstream or downstream of the chiller, and
e. Power consumption by the chiller.

The dynamic cooling load calculated by means of the above parameters will be compared to that presented by the chiller's built-in monitoring system.

Parameter	Instrumentation for measurement	No. of Units	Variable Index
Data Acquisition	OMB-DAQ-3000 Series: 1-MHz, 16-Bit USB Data Acquisition Modules	4	All ACs
	OMB-PDQ30: Analog input expansion module, adds 48SE/24DE channels to OMB-DAQ-3000 Series	3	All Packages
	OMB-CA-96A: OMB-DAQ-3000 Series to OMB-PDQ30 cable, 0.6 m	3	All Packages
	OMB-CA-179-5: USB cable, 5 m	4	All ACs
	OMB-CN-153-12: Spare terminal block	3	All Packages
	OMB-TR-2U: External power supply	4	All ACs
	OMB-PDQ10: DIN rail mounting adaptor for OMB-DAQ-3000	4	All ACs
Thermocouples	SA2C-K-120: Type K, 15 x 50 mm curved surface sensor, 3 m lead wire, stripped ends	14 (8+6)	4,6,b,c

Parameter	Instrumentation for measurement	No. of Units	Variable Index
Air Velocity (i.e. flow rate)	HHF-SD1: Data logging airflow meter with SD card-hot wire type	1	3
	SC-SD: Soft carrying case	1	3
	ADAPTER-SD: AC adaptor	1	3
	2GB-SD: Spare 2 GB SD memory card	1	3
Temperature/RH Transmitters	HX93BV0: Wall mount temperature / Relative Humidity Transmitter, 0 to 1 volt.	4	1,a
Temperature/RH Transmitters	HX93BV2-RP1: Remote Probe Temperature / Relative Humidity Transmitter, 0 to 10 volt output with 3 m (10') cable.	6	2
	PSR-24L-230: Regulated power supply, European plug, 230 Vac input, 24 Vdc output, 400 mA, stripped leads, CE	10	1,2,a
Pressure Transducers	PXM309-070G10V: Cable model, 70 bar range, gage pressure, 0 to 10 Vdc output	6	8,10
	PXMW-4: Sealing washer for G 1/4 thread, Stainless steel with FKM seal	12	5,7
Flow Meter	FDT-35: 18 to 830 LPM (5 to 220 GPM) range, 1-1/2' ANSI carbon steel/stainless steel pipe (check Pipe Size)	1	d
	FDT-31-C: 2 to 100 LPM (0.5 to 25 GPM) range, 1/2' copper pipe (check Pipe Size)	3	8
	FDT-30-PC CABLE: PC Communications Cable (recommended for first time buyers allows programming of the FDT-30 series with a PC)	1	8,d
	FDT-30-CABLE CLAMP: Water tight cable clamp	4	8,d
	FDT-HT-GREASE: Acoustic couplant for sensor mounting, max temperature 200°C (392°F) 56.7 g (2 oz) tube	1	8,d
Watt Transducer	PC5-114C: 3Ø3W AC WATT XDCR 0-600V/0-20A, 0-10Vdc, SELF PWR	4	9,e

Note: The monitoring equipment may need to be redesigned after the approval taking into consideration.

For each outdoor AC unit, a small air-conditioned cabin should be installed near to it in order to accommodate its associated monitoring system. Furthermore, a PC is required for each monitoring system in order to be linked with the data acquisition unit. The costs of the air-conditioned cabins and PCs should be considered. Similarly, the main duct section of each HFC-32 package unit should be equipped with a fire damper and its cost should be considered in the budget. The supplier of the HFC-32 package units should make provision for pressure sensors (downstream of the condenser and downstream of the evaporator).

For providing quality information on performance of the equipment, multi-channel data logger with transient unit measuring key parameters every 5 minutes) is proposed to be used. It is also proposed to have an on-line data monitoring system for this project.

To ensure that the product performance is tested in an effective manner, a training program will be conducted with the project technical team mainly from KISR. This training program would be conducted in close association with technical experts and equipment supplier technical personnel.

The project performance would be reviewed on a quarterly basis by PTSC which would be established for the project. The PTSC would report its findings to the higher Government authorities and UNDP.

Dissemination of project findings is an important element of this project. As a part of this project, the following information outreach activities are planned.

- Dissemination of findings of this project during the regional network meetings and international meetings (as found appropriate).

- Regional workshop on results of the demonstration project in terms of product performance and additional supportive interventions relating to policies and regulations for facilitating adoption of the technologies.

Project Costs and Financing

The total funding request from MLF amounts to US $ 343,000. Details are provided in Annex-I. The project envisages co-financing from industry and technical experts which is in-kind (i.e., time and resources spent for the project).

Implementation

Project Monitoring Milestones

The project milestones and timelines from the date of receipt of funds is given in the table below. The estimated period over which the project would be completed is 30 months i.e., 10 quarters.

MILESTONE/MONTHS	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Start-up of project activities	X											
Procurement of equipment	X	X										
Installation and training		X	X									
Performance monitoring (over 2 seasons)			X	X	X	X	X	X	X	X	X	
Results information dissemination – network meetings								X	X	X	X	X
Sub regional workshop											X	X

Management

The project will be under the overall management and coordination of the National Ozone Unit, Government of Kuwait. UNDP will be the implementing agency for the project, which will provide international coordination and technical assistance as needed. KSIR would be the technical executing agency which would undertake installation monitoring, commissioning, technical performance monitoring of test equipment in this project and management of sub-regional technical workshop for this project. KSIR would work under direct supervision of NOU.

The project would employ Performance-based Payment (PBP) mechanism in its implementation. Under the PBP mechanism, the project activities would be assessed on achievement of different milestones and payments would be made against those milestones.

The procurement shall be organized fully in line with procedures followed by Government, so that the goods and services procured are high quality, most reasonable price and suitable for the purposes of the project activity. The detailed arrangement on procurement will be defined in the contract between Government of Kuwait and UNDP.

Verification

1) **Periodical Performance Verification.** Before each payment, NOU of Kuwait and UNDP will review the progress of activities based on documents and site visits/site visit reports. Upon satisfactory completion of the project.

2) **Technical Assessment.** Before the last installment of payment, NOU and UNDP will invite independent expert(s) to verify the project outcomes.

Impact

The successful implementation of this demonstration project will provide information on performance of an environmentally safe and cost-effective alternative for enabling replication of the technology in Kuwait in air-conditioning applications for the indicated capacity. This project would specifically show product performance results of HFC-32 and R-290 based technologies which are currently available in the market. Further, any additional information on technology performance with other low GWP technologies (e.g., HFOs, low GWP blends etc.) would be carefully reviewed by technical experts and disseminated to the national stakeholders during the workshops held during this project.

For each equipment using HFC-32 in place of HCFC-22, the direct GHG emission reduction impact on initial charge and recharge assumed at 2 times in the initial charge over the life of equipment is given in the table below.

Particulars	**In. ch.**	**GWP**	**Tons CO2 eqv.**
HCFC-22 for 10 TR	6 kg	1810	10.86
HFC-32 for 10 TR	4.2 kg	675	2.86
Savings (initial charge)			8.00
Savings (recharge equal to two times initial charge)			16.00
Total			**24.00**

For each equipment using R-290 in place of HCFC-22, the direct GHG emission reduction impact on initial charge and recharge assumed at 1.5 times in the initial charge over the life of equipment is given in the table below.

Particulars	**Initial charge**	**GWP**	**Tons CO2 eqv.**
HCFC-22 for 40 TR	24 kg	1810	43.44
R-290 for 40 TR	12 kg	0	0
Savings (initial charge)			43.44
Savings (recharge equal to 1.5 times initial charge)			65.16
Total			**108.60**

Depending upon the market adoption rate for the above products, the total savings of equivalent can be determined.

In addition to this, the project will yield the following additional benefits:

- Greater understanding of technical issues relating to HFC-32 and R-290 based air-conditioning equipment tested through the demonstration project.
- More hands-on knowledge on operations and maintenance of these equipment.
- Definition of appropriate policies and regulations for adoption of refrigerants with low and high flammability.
- Reduced demand for HCFC-22 in approx. 50,000 households (each household consumes about 50TR) that would be constructed in the next 8 years in Kuwait and strategic planning support to Government to adopt alternatives that are environmentally friendly in air-conditioning applications.

Annex 1
Project costs and funding request from MLF

Particulars	**Unit cost (USD)**	**Units**	**Total**
HFC-32 demonstration units – 10 TR capacity	6,000	3 units	18,000
R-290 demonstration unit – mini chiller (40 TR)	40,000	1 unit	40,000
Data logger along with monitoring equipment for 5 units	60,000	1 lot	60,000
Cabin for monitoring system near outdoor unit with air-conditioners	5,000	5 units	25,000
Training for staff for project management and monitoring	10,000	1 lot	10,000
Technical support for collating and analyzing test results (involving 1 Researchers, 1 Professionals, 1 Technicians and 1 Administrator)		1 Lot	100,000
Technical support from experts	500	80 units	40,000
Workshop – sub regional involving 15 countries	50,000	1 lot	50,000
Grand total			**343,000**
Funds requested from MFS			**343,000**
In-kind contribution from Government of Kuwait (in terms of time involvement of staff and local coordination)			25,000

Annex 2

Check on conformance with decision 72/40 on demonstration project

MFS criteria	Remarks relating to the project
In terms of a low-GWP alternative technology, concept or approach or its application and practice in an Article 5 country, representing a significant technological step forward;	Yes – the project promotes the technology options relating to R-32 and R-290 which are new to the market and have a potential to replace HCFC-22 and high GWP impact R-410A.
The technology, concept or approach had to be concretely described, linked to other activities in a country and have the potential to be replicated in the medium future in a significant amount of activities in the same sub-sector;	Replication potential exists in Kuwait and other countries with high Ambient temperature conditions. The project results will facilitate adoption of these technologies in a large area – both in middle east region and in other regions with similar conditions.
For conversion projects, an eligible company willing to undertake conversion of the manufacturing process to the new technology had been identified and had indicated whether it was in a position to cease using HCFCs after the conversion;	Not applicable – testing at site. Products are available and are proposed to be procured through international competitive bidding. From our understanding of the market, there would be interested companies in supplying these equipment.
The project proposals should prioritize the refrigeration and air-conditioning sector, not excluding other sectors;	Yes – air-conditioning sector
They should aim for a relatively short implementation period in order to maximize opportunities for the results to be utilized for activities funded by the Multilateral Fund as part of their stage II HCFC phase-out management plans (HPMPs);	Timeframe for implementation is driven by test results requirement. Testing is proposed over two summers and hence, a 36 month time-frame is proposed for the project
The project proposals should promote energy efficiency improvements, where relevant, and address other environmental impacts;	The project performance parameters include energy performance of the equipment. Given that the focus of the project is on performance of equipment, energy efficiency impact is directly measured and the results will be shared. Any ideas of improvement of energy efficiency will also be shared as an output from this project.