GOBIERNO DE CUBA
PROGRAMA DE LAS NACIONES UNIDAS PARA EL DESARROLLO.
Proyecto del Gobierno de la República de Cuba.

Resultados esperados del MANUD (UNDAF)**:** No se aplica a este proyecto.
Indicadores del MANUD (UNDAF)**:** No se aplica a este proyecto.
Resultado esperado del Marco de Resultados Estratégicos del PNUD: Eliminado el 85% del consumo de CFC con respecto a la línea base (625 ton.) del período 1995-1997 (consumo promedio).
Indicador del Resultado esperado: % de toneladas de CFC eliminadas con respecto al consumo de la línea base
Entidad Ejecutora: MINVEC.
Entidad Implementadota: CITMA – Oficina Técnica de Ozono.

Período del Programa Nacional: 2003 – 2007 Componente del Programa Nacional: Mejora de la Calidad de Vida: Medio Ambiente. Nombre del proyecto: "Apoyo al Plan Nacional para la Eliminación de CFC: Asistencia Técnica para el sector de la refrigeración comercial" Número del proyecto: *Por definir.* Duración del proyecto: 3 años, a partir de 2007.	Presupuesto del Proyecto: USD 411,000 Honorarios por Servicios de Gestión General: USD30,825 Presupuesto total: USD 441,825 Recursos asignados: • Fondo en Fideicomiso: USD 441,825 (Protocolo de Montreal) **En el 2006, se recibió una asignación de 250,000 USD. En un segundo depósito, se asignará el resto del presupuesto para los años 2007, 2008 y 2009*

Aprobado por el MINVEC:

Nombre	Cargo	Fecha
[signature]	Directora	9/04/07

Aprobado por el PNUD:

Nombre	Cargo	Fecha
[signature]	RR.	16/04/07

NATIONAL ODS PHASE OUT PLAN – TECHNICAL ASSISTANCE FOR THE COMMERCIAL AND DOMESTIC REFRIGERATION SECTORS: PROJECT COVER SHEET

COUNTRY:	Cuba
SECTORS COVERED:	Commercial Refrigeration Sector
PROJECT TITLE:	National ODS Phase Out Plan – Technical Assistance for the Commercial Refrigeration Sector
IN CURRENT BUSINESS PLAN	YES
PROJECT DURATION:	3 years
PROJECT IMPACT:	(1)
MP baseline (Annex A Group I)	625.7 ODP tons
Selected remaining unfunded consumption as per Excom Decision 35/57	585.7 ODP tons (Option 1 based on MP baseline)
Current consumption (2003)	481.04 ODP tons
Sector consumption (2002)	176 ODP tons (Commercial Refrigeration Sector)
PROJECT COST:	US$ 411,000
GOVERNMENT COUNTERPART	In kind
REQUESTED GRANT TO MLF	US$ 411,000
GRANT COST EFFECTIVENESS	To be calculated after new scope of the project is estimated
IMPLEMENTING AGENCY SUPPORT COSTS	US$ 30,825 (7.5% as per Decision 38/68)
TOTAL COST OF PROJECT TO MLF	US$ 441,825
LOCAL OWNERSHIP	100%
EXPORT COMPONENT	0%
MONITORING MILESTONES	Included in the project
IMPLEMENTING AGENCY:	UNDP
NATIONAL COORDINATING AGENCY:	National Ozone Unit

PROJECT SUMMARY

This project is part of the National CFC Phase out Management Plan of Cuba, and aims to accelerate the phase out of CFC-containing equipment for commercial refrigeration application by providing technical assistance to the users of such equipment, to permanently retrofit it to use zero-ODP, or low-ODP refrigerants, or provide training, tools and/or recommendation to replace it with new equipment based on zero-ODP refrigerants.

IMPACT OF THE PROJECT ON THE COUNTRY'S MONTREAL PORTOCOL OBLIGATIONS:

This project will contribute to reduce Cuba's CFC consumption between 2006 and 2009, in order to enable compliance with the 2007 and 2010 CFC reduction obligations under the Montreal Protocol.

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PROJECT OBJECTIVE

The project has the objective to reduce CFC consumption in the commercial refrigeration and AC service sectors by promoting the conversion of CFC-based equipment from CFC to alternative refrigerants.

The initial scope for the project will depend on the local cost of goods and services, the conversion of approximately a total of 400 systems in the commercial sector and recover the domestic refrigerators can be expected as a result of this project. The amount of funds to be allocated to each sub-project will be US $ 411,000 for the commercial and domestic sectors.

1. BACKGROUND

The survey of CFC consumption carried out as part of the preparation of the National Phase Out Plan has determined a consumption of 176 ODP tons in the commercial sector.

The commercial sector has an installed bank of approximately 20,000 cold rooms, display cabinets, and bottle coolers, and AC system using 160 ODP tons of CFC12 per year. There is also a number of deep freezers using 16 ODP tons of CFC115 (contained in R502) per year.

Commercial refrigeration and AC systems are built manly on Russian CFC12 compressors. Bottle coolers, cold rooms, display cabinets and Air Condition are used to a large extend in Government shops and restaurants.

The service shops for domestic and commercial refrigeration are operated by MINCIN, MINTUR, COPEXTEL, DITA, CIMEX , MIP, MINTUR and other Ministries: MINCIN operates a total of 239 workshops with more than 2,000 technicians and engineers, and the Ministry for Food (MINAL) operates one workshop with 50 technicians who offer their services to the other institutions. Other ministries also operate important group of workshops, namely, CUBALSE, CIMEX, MIP, COPEXTEL and MINTUR.

The table below summarizes the survey finding for the commercial refrigeration sector:

Sector	Description	Consumption
Commercial	20,000 cold rooms, display cabinets, and bottle coolers, AC system using 160 ODP tons of CFC12 per year. A number of deep freezers using 16 ODP tons of CFC115 per year (in R502)	176
Total		176

2. PROJECT DESCRIPTION

Within this sub-project, the involved Ministries will nominate a total of 10 enterprises to carry out retrofit and drop-in procedures in commercial systems. Each of the enterprises will set up a brigade with refrigeration technicians. A refrigeration technical group engineer will coordinate all the resulting brigades.

The coordinating technical group engineer will visit companies with pre-selected CFC12 commercial systems. After conducting a technical study, he will advice on a technical solution which will be either to replace the equipment altogether, retrofit the equipment to use an alternative refrigerant, or to use a drop in alternative refrigerant. The brigades will then conduct the retrofit or drop in. The following table summarizes the expected recommendations for different categories of systems:

System	Technical recommendation
Systems with up to 3 kg of refrigerant charge and not in public exposure	Retrofit with LB12
Systems with more than 3 kg of refrigerant charge and/or in public places	Drop in with LC
System too old and/or too damaged	Replacement of unit

Each member of the brigades will receive training on retrofit and drop in procedures, and a set of refrigeration tools, posters and leaflets for the promotion of the campaign. The set of "retrofit and drop-in tools" will include a vacuum pump, recovery equipment a manifold, various tools (screwdriver, wrench, pliers), a charging balance, and an electronic leak tracer and will be provided through another component of the National Phase – Out Plan.

For each retrofitted cold room, consoles, chillers R12 with non CFC refrigerant, the project will provide a "retrofit /drop-in kit" including new refrigerant, lubricant, spare parts, and which will cover the retrofit costs.

In summary the activities to be developed under this sub-project (not necessarily in the same order) are:

- Calculation of local costs,
- Detailed design of sub-project (strategy, approach, scope, among others)
- Selection of 10 enterprises to carry out the technical assistance for drop-in or retrofits
- Selection of the technicians members of each brigade
- Training of 100 technicians from the brigades, on retrofit and drop-in procedures
- Purchase and allocation of sets of "retrofit /drop-in kits"
- Evaluation visits to end-users by engineer in charge of brigades
- "Retrofit /drop-in" visits to end-users by brigades
- Follow up of results of the project

3. TECHNOLOGY OVERVIEW

The following three options to eliminate CFC12 consumption are potentially available to an end-user in the commercial and industrial refrigeration sector:

- Replacement of the existing CFC-12 based refrigeration system with a system designed to use a zero-ODP, or low-ODP refrigerant. This option requires investment in new equipment based on zero-ODP refrigerants. HFC-134a, R-404A, R-507, R-290, R-600, R-600a, hydrocarbons, ammonia and mixtures thereof are commercially available and can be considered as permanent replacements with no further change in refrigerant necessary for the lifetime of the equipment. New equipment based on the use of a low-ODP HCFC refrigerant such as HCFC-22 is also commercially available. While this may currently be an environmentally acceptable solution, it should be regarded as an interim solution that will require a further change to a zero-ODP refrigerant at some future date and is therefore not recommended for new equipment.

- Retrofit of existing refrigeration equipment to use a zero-ODP refrigerant. This option that will eliminate the CFC bank in the equipment is technically feasible for some, but not all, existing equipment. The age of the equipment, and the economics of retrofit versus replacement must be considered. The retrofit option should only be selected if the evaluation of the initial cost and operational costs over the anticipated remaining lifetime of the equipment is substantially lower than the initial and operating costs of a new installation. For newer equipment, the initial cost of the retrofit option should be quite low as such equipment is usually designed for use with either CFC or HFC refrigerants and the procedure is thus simplified. Retrofit from a CFC-containing refrigerant to a zero-ODP refrigerant such as HFC-134a, R-404A, R-507, or a hydrocarbon, may be regarded as a permanent solution with no further conversion of refrigerant necessary during the remaining lifetime of the equipment.

- "Drop-in" Ternary Blend Replacement Refrigerants containing HCFCs. It should be noted that there exists no 100% drop-in refrigerant. By definition, a "drop-in" refrigerant implies minimal system changes up and above replacement of one refrigerant with another. The objective of this option is to eliminate the CFC bank of the existing equipment but at lower initial cost than with zero ODP refrigerants. This can be achieved in some equipment by the use of ternary refrigerant blends typically containing HCFCs and HFCs, and sometimes some hydrocarbons (propane). Blends with different properties are available to replace CFC-12, R-500, and R-502 over a wide range of operating conditions. However, in some equipment the use of these blends will require similar system changes as in retrofit, namely change of the compressor oil and the filter dryer, as well as adjustment or replacement of the expansion device. While the lower initial cost than retrofit to a HFC refrigerant for some equipment may be attractive, both the operating cost and availability of the refrigerant blend must be considered. Conversion from a CFC refrigerant to a low-ODP refrigerant blend that contains HCFCs must also be considered as an "interim" conversion that will require a further change to a zero-ODP refrigerant at some future date.

In developed countries, the trend is to use "drop-in" replacement technologies. The incentive to use these substances is based on the very high price of CFCs as compared to the replacements.

On the other hand, there are very special conditions that need to be taken into account in the case of Cuba, namely:

- Cuba produces the environmentally friendly refrigerant LB12 (mixture of propane, butane and iso-butane)
- There is no easy access to foreign currency or imported goods in the country.

The above considerations make the selection of HC refrigerants an obvious choice in the case of Cuba.

4. PROJECT COSTS

The table below presents the total budget allocated to each project after taking into account the reductions requested by the Multilateral Fund:

The detailed costs must be worked out during the detailed re-design of the project, taking into account the reductions made to the original project budget, and the current local costs of the related goods and services. The tables below present the cost elements that must be taken into account, some of which have been pre-estimated, based on average prices of goods and services in the region:

Incentive programme for drop-in and retrofit, and provision of service tools in the commercial refrigeration and AC sector:

Item	*TRANCHES 1 and 2*			*TOTAL US $*
	2007	*2008*	*2009*	
Training of 200 technicians on retrofit and drop-in (1)	17,664	0	0	17,664
International Workshop. Training of technical group, it visits to fairs.	18,500	0	0	18,500
National Monitoring (including transport costs)	6,545	2,500	1,500	10,545
400 "retrofit /drop-in kits" for cold rooms and AC with refrigerant cost included (2)	322,291	21,500	20,500	364,291
Sub-Total Year	**365,000**	**24,000**	**22,000**	
TOTAL TRANCHES	***411,000***			***411,000***

(1) Based on 10 courses at US $ 1,200 each, plus cost of technical expert
(2) Based on 40% of estimated total of cold rooms, and an average cost for refrigerant, lubricant, and spare parts
(3) A first tranche of 250,000 USD to be implemented by UNDP has been assigned in 2006 to be used in 2007. A second tranche of 161,000 USD to be implemented by UNDP will be assigned in 2007 to be used in 2007 (115,000 USD), 2008 (24,000 USD) and 2009 (22,000 USD) as mentioned in the table.

All of the above costs are gross estimations and, as mentioned before, must be carefully determined in order to adjust the scope of the project if necessary. The sets of tools and supplies would be the following:

- The Set of "retrofit and drop-in tools" will comprise a vacuum pump (US $ 355), recover equipment, manifold (US $ 225), various tools (screwdriver, wrench, pliers) (US 120), charging balance (US $ 150), and electronic leak tracer (US $ 150), for a total pre-estimated cost of US $2,000 and will be provided by another component of the National Phase-Out Plan.
- The "Retrofit /drop-in kits" for cold rooms, consoles and others will include refrigerant, lubricant, and spare parts.

5. TIMEFRAME AND MILESTONES

The project will be implemented between 2007 and 2009, with the exact details to be completed at that time. The rough timetable is expected as follows:

YEAR	2007				2008				2009			
QUARTER	1	2	3	4	1	2	3	4	1	2	3	4
Detail design of project		x										
Identification of key players		x	x									
Training		x	x	x								
Purchase of tools, etc		x										
Purchase of posters, leaflets			x									
Allocation of kits			x									
Retrofit/ drop-in activities		x	x	x	x	x	x	x	x	x	x	x
Follow up			x	x	x	x	x	x	x	x	x	x
Annual report					x				x			

Milestones

Time*	Milestone
12 months	60% of project objectives achieved, annual report
24 months	75% of project objectives achieved, annual report
60 months	100% of project objectives achieved, annual report

* Time from start of project