



Government of Costa Rica

United Nations Development Programme

Refrigerant Management Plan

Brief description

The Refrigerant Management Plan (RMP) has the objective of reducing CFC consumption in the refrigeration servicing sector, and enable the country to comply with the 2005 and 2007 CFC MP reduction obligations, and is constituted by seven projects: 1) Incentive Programme for the Commercial and Industrial End-User Sector, 2) Technical Assistance for the Refrigeration Servicing Sub-sector, 3) Technical Assistance for Certification and Licensing of Refrigeration Technicians, 4) Technical Assistance for Training of Customs Officers, 5) Technical Assistance for Strengthening of Legal Framework, 6) Technical Assistance for Information and Awareness, and 7) RMP Monitoring Programme.

Impact of the project on the Country's Montreal Protocol Obligations:

The project will eliminate the consumption of 99.77 ODP tonnes of CFC, thus enabling the country to meet its 2005 and 2007 CFC reduction obligations under the Montreal Protocol.



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Country: Costa Rica

MYFF outcome: Service line 3.6 – National/Sectoral Policy and planning to Control Emissions of Ozone Depleting Substances and POPs.

Strategic Results Framework: G3 – Sub-goal 2 – SAS,2

Implementing partner: MINAE – Ministry of Environment and Energy

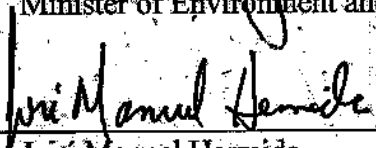
Programme Period:	June 2004 – December 2007
Programme Component:	MYFF Service line 3.6
Project Title:	Refrigerant Management Plan
Project ID:	37193, 37194, 37195, 37196, 37197
Project Duration:	43 months
Management Arrangement:	National Execution (NEX)
Total Budget:	630.000 USD

Agreed by:
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Date: June 9th, 2004

REFRIGERANT MANAGEMENT PLAN

COSTA RICA

PREPARED BY

THE GOVERNMENT OF COSTA RICA

AND

THE UNITED NATIONS DEVELOPMENT PROGRAMME

May 2004

(As approved)

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EXECUTIVE SUMMARY

Costa Rica reported a consumption of 137.32 ODP tonnes of CFC for year 2002. All CFC consumption is concentrated in the refrigeration-servicing sub-sector, with a marginal remaining consumption of 0.8 ODP tonnes in the commercial manufacturing sub-sector. Costa Rica does not produce any ODSs and all its internal needs are met through imports.

The country's efforts to phase out ODSs have succeeded in reducing 47% of CFC consumption, from 267 ODP tonnes in year 1991 to 137.32 ODP tonnes in year 2002, thus enabling the country to comply with the first obligation under the Montreal Protocol for Article 5 countries, the 1999 freeze of CFC consumption. The country has also succeeded in converting all CFC-based manufacturing facilities, except for a marginal remainder in the commercial refrigeration sector.

But Costa Rica will need to reduce CFC consumption by 12.15 and 87.62 ODP tonnes in order to meet the 2005 and 2007 CFC MP reduction obligations, respectively. In trying to achieve these goals the country will face many challenges, such as:

- All CFC consumption is concentrated in the refrigeration-servicing sector, which is more difficult to address.
- There is the persistence of bad servicing practices in the refrigeration sector.
- The fishing sector, which concentrates 53.62% of all CFC consumption for servicing purposes, traverses a very critical economic situation, operating under marginal conditions, and is unable to comply with CFC phase out requirements on its own.
- The pending threat of CFC market changes that may create a surge in illegal traffic of ODS.
- The need to ensure that many complex and interrelated activities within a compliance action plan will produce the expected results leading to MP compliance, and to have the capability to respond to any deviation from these expected results.

In order to respond to these challenges, the Government of Costa Rica will adopt a compliance strategy driven mainly by industry, and supported by the Government through actions directed to provide technical and financial assistance, legislative reinforcement, and building the awareness and information levels of the public and industry sector.

This strategy goes in line with the long-standing Government policies for implementation of the Montreal Protocol in the country and also with the country's tradition of a strong, proactive, and vocal civil society.

The CFC compliance strategy will then be based on the following axis:

- Technical and financial assistance to the industry sector, with the objective of reducing their dependence on virgin CFCs, reducing the unnecessary CFC uses, and reducing CFC waste.

- Legislative reinforcement, in order to improve the ODS Import Licensing System, to stop increasing the dependency on CFC-based equipment, and to regulate the way the servicing sector operates.

Awareness and information of the industry sector, about the country's international commitments in view of protecting the ozone layer, the actions that are being taken at the local level, and the way that each person or organization can contribute to these efforts. This activity will be complementary and undertaken by COGO under the programmed Institutional Strengthening activities.

- Regular monitoring and control of all the elements of the compliance strategy in order to ensure the expected results.

The above strategy will ensure compliance with the 2005 and 2007 CFC reduction obligations under the MP, after which period the present RMP will need to be scrutinized and evaluated to ascertain the possible need for a review of the same.

The CFC compliance strategy adopted by the Government of Costa Rica will be implemented through an RMP Action Plan constituted by seven projects, namely:

- Incentive Programme (IP) for the Commercial, Industrial, and Fishing Fleet Refrigeration End-user Sector, to provide an economic incentive to those end-users in the industrial, commercial, fishing, hospitals and clinics sub-sector, that replace or retrofit their CFC-based equipment.
- Technical Assistance (TA) for the Refrigeration Servicing Sub-sector, to provide assistance to the refrigeration servicing sector through 1) A R&R programme for 50% of the fishing fleet, 2) A complement to the R&R programme for the MAC sector, 3) Strengthening of the R&R project for the domestic and commercial sector, 4) Assistance programme for promoting the use of nitrogen as a flushing agent, and 5) Programme for storage of non-recyclable CFC12 until a permanent solution for CFC destruction is found.
- Technical Assistance (TA) for Certification of Refrigeration Technicians, to establish a "Refrigeration Technician Certification and Licensing System" and its corresponding enforcement system, with the ultimate objective of encouraging refrigeration technicians to use good refrigeration servicing, maintenance and containment practices.
- Technical Assistance (TA) for Training of Customs Officers in the monitoring and control of CFC imports through the better implementation of the CFC Import Licensing System, detection of illegal imports of CFC, and providing the main customs entry points with CFC detection equipment that will facilitate this task. This activity includes a component of Technical Assistance for Strengthening of Legal Framework, in order to support all the projects and objectives within the

Refrigerant Management Plan and specifically achieve a) Better control of CFC imports and exports, b) Reduced dependency on CFCs, and c) Reduced consumption of CFCs through better refrigeration maintenance and servicing practices.

- RMP Monitoring Programme, to ensure the effectiveness of all the projects proposed within the RMP for Costa Rica, by periodic verification of project results, analysis of problems encountered and application of corrective measures.

The RMP Action Plan includes specific information activities for the commercial-equipment manufacturing sub-sector, which is expected to phase out the use of CFCs mainly through information and awareness and legal measures, without any other specific investment assistance.

The consolidated budget for the Action Plan is shown in the table below.

Project	Gov. input (US\$) *	Approved MF grant (US\$)
IP for the Commercial, Industrial, and Fishing End-user Sector		200,000
TA for the Refrigeration Servicing Sub-sector		180,000
TA for Certification of Refrigeration Technicians		100,000
TA for Training of Customs Officers		90,000
TA for Strengthening of Legal Framework (1)		0
TA for Information and Awareness (1)		0
RMP Monitoring Programme		60,000
TOTAL		630,000

* The Government input will be provided by way of staff time and meeting facilities, from Government offices other than the NOU

(1) Includes specific information activities for the commercial-equipment manufacturing sub-sector.

(2) No funds approved by the Executive Committee for this activity

Finally, overall cost effectiveness of the RMP grant would be US\$ 630,000/ 99.77 ODP tonnes, or US\$ 6.31/Kg.

CHAPTER 1. INTRODUCTION

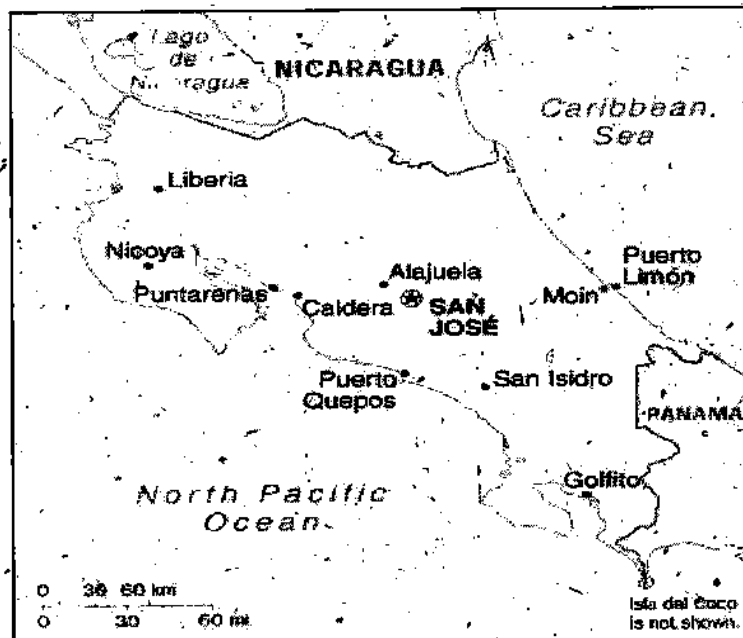
Costa Rica is situated in Central America, between Nicaragua and Panama. It has a surface of 51,100 Km², and 1,290 Km. of coastline both on the Atlantic and the Pacific Oceans. The country has a central mountainous region bordered by coastal plains and the climate is tropical with a dry and a rainy season.

Costa Rica's population was estimated at 3.9 million inhabitants in 2001, and GDP was calculated at US\$ 16.1 billion in that same year. GDP growth has been 2.2 and .9 % for years 2000 and 2001, respectively. The main sectors of the economy are tourism, electronic exports (computer hardware parts) and industrial agriculture (melons, flowers, coffee and banana).

Since the 1990s the country has adopted a policy to open its economy to international markets, has eliminated subsidies to the agricultural sector, and has initiated the privatization of some government services. This has resulted in the diversification of exports and a significant increment of foreign investment in the country.

Figure 1.1 below shows the map of Costa Rica and its most important cities.

Figure 1.1: Map of Costa Rica



CHAPTER 2. COUNTRY SITUATION

1. Status of the country with regard to the Montreal Protocol

Costa Rica acceded the Vienna Convention and the Montreal Protocol on 30 July 1991, and ratified the London and Copenhagen Amendments on 11 November 1998. The process for ratification of the Montreal Amendment was initiated in June 2001, and of the Beijing Amendment in February 2003. Both processes are expected to conclude by the end of year 2003.

The calculated Montreal Protocol CFC compliance baseline for Costa Rica is 250.33 ODP tonnes, and total consumption of Annex A Group I CFCs has been 152, 106, 144.56 and 137.32 ODP tonnes in years 1999, 2000, 2001 and 2002, respectively, thus placing the country in compliance with the 1999 freeze of consumption of Annex A Group I CFCs, the first Montreal Protocol (MP) obligation for Article 5 countries.

As per Decision 35/57 of the Executive Committee of the Multilateral Fund (Excom), Costa Rica has chosen Option 1, which uses the MP baseline as a starting point and determines a remaining unfunded consumption of 152.9 ODP tonnes for the country. No other projects with direct attributable CFC reduction have been approved for Costa Rica since December 2000, but in July 2002 the project "Phase out of CFC in the manufacture of commercial refrigeration equipment at Quena S.A."; with direct attributable CFC reduction of 10 ODP tonnes was cancelled. This amount must be added to the remaining unfunded consumption calculated through Decision 35/57, thus increasing it to 162.9 ODP tonnes.

2. Status of Country Programme

The Country Programme for the Phase out of ODS in Costa Rica was approved at the 8th Meeting of the Excom, in October 1992. It proposed to achieve an accelerated phase out as per the MP schedule for Article 2 countries, through refrigerant recovery and recycling, and workshops and seminars for the remaining sectors, along with a programme for institutional strengthening of the government bodies in charge of MP implementation. This reduction schedule proved to be unrealistic due mainly to scarcity of resources to implement all the industry and Government actions that were needed.

Up to now, 26 projects have been approved for Costa Rica by the Excom, for a total funding of US\$ 3,818,680 and an expected phase out of 181 ODP tonnes of ODS. Four manufacturing companies from the refrigeration sector have been converted to non-CFC technologies.

Out of the 26 projects approved, 22 projects, accounting for a direct reduction of 58 ODP tonnes, have already been completed. One project, accounting for a direct reduction of 10 ODP tonnes, was closed. Of the three remaining, one is of an ongoing nature (the Institutional Strengthening project), one will be completed by mid 2003 (the preparation of this RMP), and the remaining one (the sectoral plan for phase out of MB) accounts for a direct reduction of 84 ODP tonnes of MB during the first tranche, and is scheduled to finalize in year 2007.

CFC consumption, which stood at 267 ODP tonnes in year 1991, now stands at 137.32 in year 2002, which represents a total reduction of 126.44 ODP tonnes or 47% of total consumption, against only 66 ODP tonnes of direct reduction accounted for by the 22 already successfully completed projects. This additional reduction of 60.44 ODP tonnes may be attributed in part to the awareness raising and regulatory efforts carried out by the COGO within the Country Programme implementation.

As mentioned in section 2.1, this important reduction has enabled the country to thoroughly comply with the 1999 freeze, and has put it well in its way to comply with the 2005 CFC reduction obligation.

Table 2.2.1 below presents a summary of the projects approved for Costa Rica under the Multilateral Fund, grouped by sector.

Table 2.2.1: Summary of projects approved for Costa Rica under the MF

SECTOR	PROJECTS	FUNDING	ODP (1)	ODP (2)
Refrigeration	9	1,403,698	97.00	66.00
Foams	1	21,120	0.00	
Solvents	1	21,120	0.00	
Several	8	662,421	0.00	
Fumigants	7	1,710,321	84.00	
TOTAL	26	3,818,680	181.00	66.00

Source: Consolidated Progress Report from MF

(1) ODP tonnes to be phased out as per approval

(2) ODP tonnes actually phased out, even though completed projects were expected to phase out 97 ODP tonnes. The difference is explained by the cancellation of the project for "Quena S.A." (10 ODP tonnes), the lower reduction from the project for "R&R" (18 instead of 37 ODP tonnes), and the lower reduction from the project for "MAC R&R" (8 instead of 10 ODP tonnes, which is wrongly reported as 0 in the Consolidated Progress Report from MF).

3. Status of Institutional Strengthening project

The Institutional Strengthening project for Costa Rica was approved for the first time in October 1992 and is now going through its Phase IV. There have been 4 approvals for a total funding of US\$ 537,421.

From its inception, the Institutional Strengthening project helped sponsor a National Ozone Commission (COGO, by its initials in Spanish) reporting directly to the National Meteorological Institute, within the Ministry of Environment and

Energy, in charge of the implementation of the MP and the management of ODS phase out in the country. This office has played a central role in the implementation of the CP.

Apart from the achievements concerning project implementation and CFC reduction mentioned previously, the Institutional Strengthening project has also enabled the COGO to carry out consistent efforts towards improving the legal framework to support the phase out initiatives, to implement a regular programme for awareness raising, and to build a wide network of national partners from Government and the private sector, for the implementation of the MP in the country.

There is a "Regulation for the Control of ODS" waiting for Ministerial signature which will create the COGO reporting directly to the Ministry of Environment and Energy. This is one of the elements of a previous "Super Decree" that did not receive approval. The internal reorganization of the Ministry in this respect has already been in effect since May 2003.

4. Institutional framework

National Ozone Office

Initially, the Ministry of Foreign Affairs and the Ministry of Health were responsible for all activities related to the problem of ozone depletion and its international agreements. In year 1993, the local responsibilities for implementation of the Montreal Protocol in the country were assigned to the Meteorological Institute under the Ministry of Environment and Energy. The Governmental Ozone Commission (COGO, by its initials in Spanish) was then created, reporting directly to the Meteorological Institute, to discharge these responsibilities, jointly sponsored by the Government and the Institutional Strengthening project funded under the MF.

In its more than 10 years of operation, the COGO has established permanent working relationships with the private sector, namely, the ODS importers, the Chamber of Industries of Costa Rica, the Chamber of Commerce, the refrigeration equipment manufacturing sector, the Melon Growers Association, the University Braulio Carrillo, and the vocational schools "Colegio Técnico Profesional El Roble", "Colegio Técnico Vocacional" of Limón, and "Fundación Samuel".

It has also established working links with other governmental organizations related with the implementation of the MP in the country, namely, the Ministry of Foreign Affairs, the Ministry of Health, the Ministry of Industry, the Ministry of Trade, the Ministry of Finance, the Ministry of Agriculture, the Ministry of Treasure, with its Customs Department, the National Institute of Learning (INA, by its initials in Spanish), and the University of Costa Rica.

In May 2003, due to perceived delays in signature of agreements and approval of proposed laws, the Minister of Environment reorganized the COGO in order to provide it with more visibility and efficiency. By this reorganization, the COGO is now reporting directly to the Vice-Minister and has improved its access to the decision-making levels. There is still a formal decree to be signed by the Minister that will formalize this reorganization vis-à-vis other government organizations.

Customs Department

The Customs Department is a partner of special importance for the COGO, due to its role within the implementation of the ODS Import Licensing System, now and in the future.

The customs points of entry are distributed across the country, in the country borders with the most significant commercial trade. The most important of these points are: Central, Limón, Puntarenas, Paso Canoas and Peñas Blancas. The least important in terms of possible CFC trade are Santa María (airport), Anón (airport) and Golfitó (free port near Paso Canoas). There are also 53 customs deposits, privately managed, which handle all merchandise that has not been processed within 15 days of arrival into the country.

There are a total of 628 employees working for the Customs Department. The ones dealing directly with import controls are:

- 105 Technicians in customs operations, level 1, who assign the customs duties, and have followed a college degree of at least 4 years,
- 37 Technicians in customs operations, level 2, same as above,
- 62 Customs handlers, who verify the merchandise.

5. Legal framework

The following instruments constitute the legal framework that governs the implementation of the Montreal Protocol in Costa Rica:

- Law 7228 and 7223 of May 1991 that approved the country's adhesion to the Vienna Convention and the Montreal Protocol, respectively,
- Law 7808 of July 1998, by which the London and Copenhagen Amendments were approved,
- Technical note # 38 of year 1998 from the Customs Department, requiring a license from the COGO for imports of ODS. This Import Licensing System does not include a quota system, which is being implemented by the COGO in a discretionary way.

Since year 2000, COGO designed a "Super Decree" by the Ministries of Environment, Health, Treasure, Agriculture and Public Works, which would enact the following instruments:

- Creation of the COGO depending directly from the Ministry of Environment,
- Creation of an ODS Import Licensing and Quota System,
- Ban on imports of refrigeration equipment, old or new, containing or constructed using CFC12 or CFC11,
- Ban on imports of air conditioning equipment, old or new, independent or installed in cars, that uses CFC12 as refrigerant or CFC11 as insulating material,
- Ban on imports of chemical, medical or cosmetic products containing CFCs as propellant, except for MDIs,
- Ban on registration of new companies that produce, import or export ODSs,
- Creation of the Consultative Ozone Committee, constituted by representatives from the Ministries of Environment, Health, Agriculture, Public Works, Foreign Affairs, Foreign Trade, Treasure, and Customs Department,
- Regulation of the use of refrigerants,
- Regulation of the use of aerosols,
- Regulation of the use of Methyl Bromide, including an Import Quota System,
- Ban on assembly of equipments that function with Annex A substances,
- Import quotas for CFC12 compressors,
- R&R courses mandatory in technical schools,
- Ban on CFC manufacturing and emissions,
- Creation of Committee for MB elimination, formed by representatives from the Ministries of Environment and Agriculture, and from the Grower's associations,
- Creation of the "Ozone Friend" Prize for the refrigeration, agriculture and aerosol sectors.

The above decree has had many difficulties for its approval, mainly because of its complexity. The COGO is now in the process of dividing the decree and establishing a formal process for consultation with the specific sectors involved.

COGO has also submitted for review of the Ministry of Environment a Decree for banning the import of used vehicles that are older than 5 years, with the three-fold purposes of reducing CO₂ and CFC emissions into the atmosphere and reducing the increment of installed base of CFC12-based MACs.

CHAPTER 3. STATUS OF CFC CONSUMPTION IN THE COUNTRY

Costa Rica does not produce any ODSs and all its internal needs are met through imports. No exports of ODSs have been identified as well. There are 3 identified ODS importers in Costa Rica, shown in table 3.1 below. In addition to these 3 official CFC importers licensed by the COGO, the companies Clima Ideal S.A. and Multifrio S.A. have import licenses to import HCFC22.

Table 3.1: ODS importers and ODS imports (metric Kg.) in Costa Rica, for year 2002

IMPORTER	CFC11	CFC12	R-502
Refrigeración Beirute	7,605	87,373	11,843
Refrigerantes de Costa Rica	3,468	24,640	1,795
Sociedad Anónima Sauma	1,088	8,285	2,177
TOTAL	12,161	120,298	15,815

Source: ODS Import Licensing System and Customs records

CFC imports are obtained from the following companies and countries:

- o Dupont Mexico S.A., Mexico,
- o Quimobasicos S.A., Mexico,
- o Hard International Limited, UK,
- o Carrier International Corporation S.A., USA, and
- o Innovair Corporation, USA.

The CFC distribution chain is formed by the importers themselves, who sell the refrigerant retail and wholesale, and the different stores, which buy the refrigerant from the importers and sell it along with equipments, parts and supplies for the sector.

Table 3.2 below summarizes Annex A CFC consumption in Costa Rica for year 2002, by substance, sector and sub-sector. All CFC consumption is concentrated in the refrigeration-servicing sub-sector, with a marginal remaining consumption in the commercial manufacturing sub-sector.

Table 3.2: Annex A Group I CFC consumption in Costa Rica in year 2002 (ODP t.)

SECTOR	SUB-SECTOR	CFC11	CFC12	CFC115	TOTAL
Refrigeration	Servicing	12.16	119.50	4.86	136.52
	Manufacturing	0.00	0.80	0.00	0.80
TOTAL		12.16	120.30	4.86	137.32

Source: ODS Import Licensing System and Customs records

Table 3.3 below shows Annex A Group I CFC consumption in Costa Rica since 1995 and its calculated CFC MP baseline level. Graph 3.1 below helps identify some slight increases in CFC consumption within a strong decreasing trend during the period 1995-2002. CFC consumption for the last four years shows some signs of stabilization.

This trend coincides with the fact that all remaining CFC consumption is in the refrigeration servicing sector, which, if not assisted otherwise, will only decrease at the

rate of substitution of CFC-based equipment. It is well known that refrigeration equipment have very long useful life times, which in developing countries are even longer due to over-use for lack of purchasing power.

Another cause for concern are the increases in CFC consumption that have occurred in year 1998 and 2001, may be due to small economic rebounds, which might re-occur in the future.

As mentioned before, Costa Rica is in compliance with the 1999 freeze of consumption of Annex A group I CFCs, but will need to take measures to reduce the consumption by approximately 12.15 and 87.62 ODP tonnes of CFC in order to be able to meet the 2005 and 2007 CFC MP reduction schedules, respectively.

Table 3.3: Historic Annex A Group I CFC consumption in Costa Rica (ODP t)

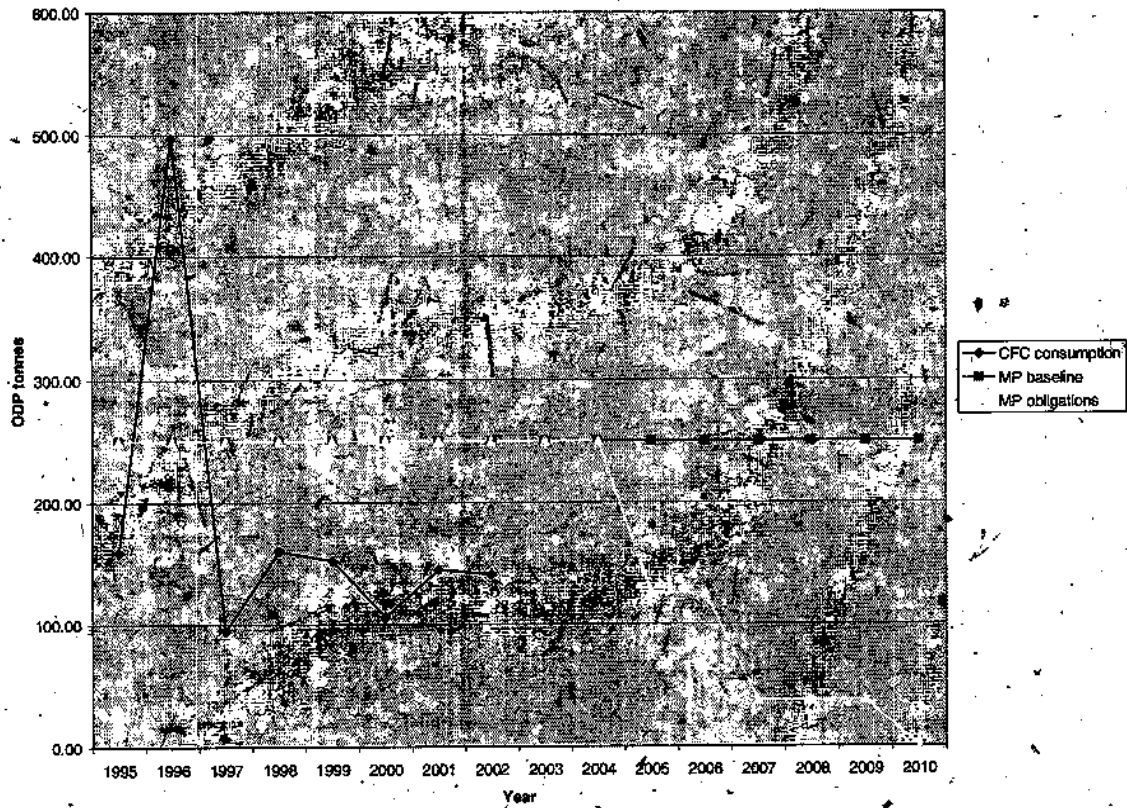
YEAR	CONSUMPTION ANNEX A GROUP I	MP obligations for Annex A CFCs
1995	159.00	
1996	497.00	
1997	95.00	
AVERAGE 95-97	250.33	
1998 (1)	160.00	
1999	152.00	250.33
2000	106.00	250.33
2001	144.56	250.33
2002	137.32	250.33
...		250.33
2005		125.17
...		125.17
2007		37.55
...		37.55
2010		0.00

Source: Production and Consumption of ODS under the MP, Ozone Secretariat, and NOU records

(1) There is a mistake in the Ozone Secretariat records concerning 1998 consumption. The NOU will write to the OS requesting modification to the figure shown in this table, which is the correct one

Figure 3.1: Historic Annex A Group I CFC consumption in Costa Rica

Costa Rica Annex A Group I CFC consumption



CHAPTER 4. INDUSTRY STRUCTURE

As indicated previously, all CFC consumption in Costa Rica, is concentrated in the refrigeration-servicing sub-sector, with only a marginal consumption of .80 ODP tonnes of CFC12 in the manufacturing of commercial and refrigerated transport refrigeration equipment made on command. The individual consumption for this purpose is very small and scattered and cannot be further characterized.

The national RMP survey has provided a more detailed breakdown of CFC consumption among the different refrigeration-servicing sub-sectors, which is shown in table 4.1 below.

Table 4.1: Refrigerant installed base and annual consumption by sector in Costa Rica

Sector	Installed refrigerant (m. Kg.)	Annual consumption (m. Kg.)	Percentage of total consumption
Domestic refrigeration	110,344	11,034	9.25%
Commercial refrigeration	43,306	10,827	9.07%
Mobile air conditioning	106,869	32,060	26.87%
Fishing fleet	14,369	63,977	53.62%
Refrigerated transport	1,939	274	0.23%
Industrial refrigeration	2,080	1,153	0.97%
TOTAL	278,907	119,325	100.00%

Source: National RMP survey

The difference between this figure and the one obtained through the ODS Import Licensing System and Customs records is attributed to the margin of error that is inherent to this type of survey, and the reluctance of local enterprises to provide information, but this serves to provide an idea of the relative importance of each sub-sector with regard to CFC consumption.

One factor that may partly explain industry's structure concerning refrigerant choices is the behavior of refrigerant prices in the last few years. Table 4.2 below summarizes refrigerant prices in Costa Rica since year 1999.

Table 4.2: Refrigerant prices in Costa Rica, in US\$

Year	CFC11	CFC12	HCFC22	HFC134a	R404a	R502	R401B
1999	2.81	2.90	3.66	8.39	14.17	14.56	-
2000	2.81	2.69	3.66	7.28	14.17	13.00	-
2001	2.60	2.69	3.48	7.12	13.00	12.84	-
2002	2.60	2.69	3.35	6.24	12.35	12.84	-
2003	3.25	3.25	2.67	6.24	11.98	12.35	10.14

Source: National RMP survey

-: Not available

Even though the price of alternative refrigerants has always been higher than that of CFCs, there are some signs in year 2003 that this trend may be starting to reverse at least with HCFC22. This has been due to the entrance of HCFC22 from China, which caused a price war. The prices of CFC11 and CFC12 have also gone up by approximately 25% in year 2003, due to the expectation of a lower import quota. And although the price of HFC134a is still almost twice as high as that of CFC12, it has been decreasing steadily since at least 1999. The COGO also envisages that the coming years, when the CFC import quota starts to tighten, will be critical to further this reversal of trend, and that this will be a key factor to promote and maintain CFC phase out.

The following sections include a more detailed description of each industry sub-sector. The mention of "RMP Implementation Reference Document" refers to hard copy information available with the COGO for project implementation.

1. Domestic refrigeration

This sector comprises all refrigeration systems intended for domestic use at homes. The National census conducted by INEC in year 2000 provides the most recent estimate of number of homes equipped with domestic refrigerators, which is 91% of the total of homes in Costa Rica. Table 4.1.1 below shows the details.

Table 4.1.1: Number of domestic refrigerators in Costa Rica

Province	Number of homes	Number of refrigerators
San José	325,441	299,672
Heredia	83,422	78,948
Alajuela	159,601	146,733
Cartago	96,208	87,398
Guanacaste	54,970	48,351
Limón	71,744	62,084
Puntarenas	75,231	64,983
Total	866,617	788,169

Source: National 2000 census by INEC

It is estimated that 70% of all domestic refrigerators in the country are old models, and hence, run on CFC12. The remaining 30% run on HFC134a. Table 4.1.2 below shows the estimated base of installed refrigerant in the domestic refrigeration sector and the annual refrigerant needs for maintenance purposes, which are only 10% of the installed base for old refrigerators and 5% for new ones. This service rate is low compared to other countries in the region and it is due to a very stable energy supply with few service interruptions, which in turn is explained by a Government policy to promote foreign investment through high-quality industry infrastructure. Appendix 6 presents the details of these estimations.

The most common reason for repairs in the domestic sector is the puncturing of the refrigerated circuit by the housewife when cleaning the freezer with knives, as reported by the refrigeration technicians.

Table 4.1.2: Installed equipment base and annual refrigerant consumption in the domestic refrigeration sector in Costa Rica, in metric kilograms

Sector	Installed refrigerant*(Kg.)		Annual consumption (Kg.)	
	CFC12	HFC134a	CFC12	HFC134a
Domestic refrigeration	110,344	47,290	11,034	2,365

Source: National RMP survey

2. Mobile air conditioning (MAC)

The use of mobile air conditioning in Costa Rica has increased in the last 12 years due to the import of brand new and used cars that have air conditioning equipment as a standard feature. Additionally, all models made since 1995 come with HFC134a-based systems.

The National Public Registry of Personal Property reports 472,670 vehicles of models between 1985 and 2002 in the country. Table 3.2.1 below calculates the amount of refrigerant needed to maintain the CFC-based MAC systems in the country, assuming a servicing rate of 30% per year. The servicing rate has been calculated based on information provided by the MAC servicing workshops themselves during the National RMP survey, and a separate study carried out on behalf of COGO.

Table 4.2.1: CFC used* for maintenance of MAC systems in Costa Rica

Vehicles model 1985-2002	472,670
Vehicles with CFC12 MACs 1985-1993	133,454
Installed base of CFC12 in metric Kg.	106,869
Amount of CFC12 used for servicing in metric Kg./year	32,060

Source: Calvo Coin, Otto. Informe Parque Automotor Nacional y consumo de CFC en los aires acondicionados. Comisión Gubernamental del Ozono. MINAE

3. Fishing sector

The fishing sector is the most important CFC consumer within the refrigeration-servicing sector. Its importance was not identified during the preparation of the CP due, most probably, to a combination of reasons, such as incomplete custom records, poor recording practices in the CFC marketing sector, and the reluctance of CFC users to provide accurate information.

The fishing activity in Costa Rica is concentrated in the coasts of the Pacific Ocean and is classified according to the type of vessel as follows:

- Manual, small scale (APE)
- Manual, medium scale (AM)

- Manual, advanced scale (AA)
- Semi-industrial (SI)
- Industrial fleet (FI)

Table 4.3.1 below shows the number of fishing ships registered in the Costa Rican Institute of Fishing (Incopesca, by its initials in Spanish), according to region and type.

Table 4.3.1 Number of ships in the fishing fleet by region and type

Region	APE & AM	FI & SI	AA	Total
El Coco	365	0	38	403
Puntarenas	1302	73	125	1500
Quepos	230	0	20	250
Golfito	153	0	2	155
Caribe	209	0	1	210
Total	2,259	73	186	2,518

Source: Incopesca

The ships type SI, FI and AA, are the only ones that have refrigeration systems installed (see Appendix 9 for details).

The SI fleet is concentrated in Punta Arenas and its refrigeration systems have an average charge of 57 Kg. of refrigerant per unit, of which 95% are based on CFC12. These refrigeration systems are in a very bad condition, almost always requiring a full recharge of refrigerant after each operation, due to leaks. Approximately 5% of this fleet is already converted to HCFC22 in response to internal policies of the fishing companies.

The AA fleet has the biggest autonomy, with off shore operations of up to 60 days, and its refrigeration systems have an average refrigerant charge of 70 Kg. The operation conditions of this fleet are better than for the SI fleet and approximately 80% of the systems run on GFC12 and 20% on HCFC22.

In general, the conditions of the fleet are critical in terms of their physical structure and the installation of their refrigeration equipment. Between off shore operations, the ships are in port only for the time necessary to unload the catch, refurbish with supplies and correct major problems. It is not possible to say that they perform any maintenance on the ships since overhead costs have been reduced to a minimum due to the critical economic situation of the sector.

According to interviews with different ship operators and confirmed by members of the Fishermen's Chamber of Puntarenas, the refrigeration systems installed in fishing ships do not have any devices to mitigate vibrations; which makes leaks very common.

These ships do not carry a refrigeration technician on board during fishing operations, and all procedures performed on the refrigeration systems, including refrigerant recharge, have to be performed by the crew. As there are no maintenance or improvement programmes, it is common that the refrigeration systems require a full refrigerant recharge very often.

When the ships are at port, approximately 10 independent technicians, who are poorly trained, perform all repairs and servicing to the refrigeration equipments. Bad servicing practices are commonplace, including the use of CFC11 for cleaning purposes.

Table 4.3.2 below summarizes the refrigerant installed base and annual consumption for maintenance in the fishing sub-sector in Costa Rica.

Table 4.3.2: Refrigerant installed base and annual consumption for maintenance in the fishing sub-sector in Costa Rica in metric Kgs.

Type of ship	Installed refrigerant (Kg.)		Consumption per year (Kg.)	
	CFC12	HCFC22	CFC12	HCFC22
FI y SI	3,953	206	62,415	100
AA	10,416	2,604	1,562	390
TOTAL	14,369	2,810	63,977	490

Source: Inopesca and National RMP survey

The RMP Implementation Reference Document # 6 includes the registry of ships type SI.

4. Commercial refrigeration

This sub-sector consists of all those refrigeration equipments that are intended to serve the consumers at the final points of grocery sale to the public, and that are used for handling and storage of food products such as dairy products, meat, fish and poultry; pre-processed food, fruits and vegetables, etc.

Typical systems run on low and medium temperature and are located in supermarkets, small convenience stores, bars, restaurants, etc. This sub-sector presents a very special characteristic change, since traditionally the refrigeration equipments belonged to the owner of the point of sale; but now, the producing and distributing companies are locating their own refrigeration equipments, mostly new and running on alternative refrigerants, at the points of grocery sale, moved by brand competition and the need to promote their products. These equipments are clearly identified with the brand of the product and table 4.4.1 below summarizes the most important companies following this policy in the country.

Table 4.4.1: Brand related refrigeration systems installed at points of grocery sale

Brand	Company	Number of installed systems
Coca Cola	Panamco Tica S.A.	23,086
Kimby- Pipasa	Rica Foods Inc.	1,675
As de Oros	Rica Foods Inc.	
Dos Pinos	Cooperativa de Productores de Leche Dos Pinos R.L.	8,586
Coronado	Coopcoronado R.L.	203
Hielo Igloo	Hielo Iglo S.A.	75
Vitola	Alimentos Vitola S.A.	7
Numar	Compañía Numar S.A.	432
Coopeleche	Coopeleché R.L.	140
Zar	Embutidos Zar S.A.	260
Imperial	Florida Ice & Farm S.A.	22,611
Cristal	Florida Ice & Farm S.A.	
Hi C	Empaques Asépticos de Centroamérica S.A.	600
Walls	Unisola S.A.	1,000
Pepsi Cola	Embotelladora Centroamericana S.A.	3,650
Coopemontecillos R.L.	Coopemontecillos R.L.	250
Inlátec	Industrias lácteas Tecnificadas	272
Fresquita	Vegetales Fresquita S.A.	14
Total		62,861

Source: National RMP survey

In the case of supermarkets and small convenience stores the refrigeration equipment found is a mix of brand-owned and store-owned equipment.

In the commercial sub-sector there is even greater variety of equipment running on different types of refrigerant such as CFC12, HCFC22, HFC134a, and R404A, with a clear trend to replace CFC12 equipment with HCFC and HFC. This substitution trend is in most cases a response to the unavailability of new CFC12 equipment, than a clear-cut internal policy by the enterprises.

There are companies that do follow an internal policy for CFC12 replacement, but are mainly multinationals.

Structure of points of grocery sale in Costa Rica

The points of grocery sale in Costa Rica can be categorized in two groups according to their size:

- Big stores with more than 2,000 sq. m. in surface, mostly main supermarket stores, in the most important urban centers,
- Small stores with surfaces ranging from 10 to 400 sq. m., considerable in number, and distributed throughout the country.

Supermarkets

In the last decade, supermarket chains in Costa Rica have experienced a rapid expansion, with a clear trend towards establishing mega and hypermarkets targeted to the high and middle income consuming sectors. The super market sector is dominated at present by Corporación Supermercados Unidos with 96 stores, and Grupo Zeta, who recently acquired Consucoop Supermercados, with 71 stores.

Table 4.4.2 below shows all supermarket chains in Costa Rica that have more than one store.

Table 4.4.2 Main supermarket chains in Costa Rica

Group	Supermarket name	Number of stores
Corporación de Supermercados Unidos CSU	Más x Menos	22
	Pali	70
	Hiper Más	2
	Maxi Mercado	2
Grupo Zeta	Mi Mercado	40
	Megasuper	16
Corporación Auto Mercado	Auto Mercado	7
A.M.P.M. Multimercados	A.M.P.M. Multimercados	10
Peribásicos Supermercados S.A.	Periféricos	3
	Peribásicos	12
Price Smart	Price Smart	3
TOTAL		187

Source: National RMP survey

Supermarkets also present a combination of refrigeration equipments that belong to the store or to the product manufacturer. The most commonly used refrigerants are HCFC22, HFC134a, and R404A, while CFC12 is in the process of gradual substitution. Table 4.4.3 below shows the quantity of installed refrigerant reported by the supermarket chains in Costa Rica.

Table 4.4.3 Installed refrigerant in supermarket chains in Costa Rica

Group	Type of refrigerant	Quantity (m. Kg.)
Corporación de Supermercados Unidos CSU	HCFC22	11,744
Grupo Zeta	HCFC22	545
	CFC12	28
	HFC134a	173
A.M.P.M. Multimercados	HCFC22	205
	CFC12	46
	HFC134a	18

Group.	Type of refrigerant	Quantity (m. Kg.)
Peribásicos Supermercados S.A.	HCFC22	5,250

Source: National RMP survey

Appendix 4 shows the characteristics of refrigeration systems in supermarket chains.

Small grocery stores

This category, important because of the big number of establishments, comprises small convenience stores, butcher's shops, fishmonger's shops, restaurants and pharmacies. These establishments also show a mixed configuration of refrigeration systems, some of them owned by the product manufacturers, of recent models and using alternative refrigerants, and some owned by the storeowner himself, mostly old equipments running on CFC12.

The most recent (year 1990) statistics from the National Institute of Statistics and Census (INEC, by its initials in Spanish) estimates the number of these commercial units in 20,588. The natural growth rate of these establishments in the last 12 years has been balanced out by a bigger decrease rate caused by the expansion of supermarket chains. Thus, the net growth rate is considered to be zero.

Panamco Tica, the local Coca-Cola distributor, is considered to have the amplest coverage of the country with its 23,146 units of refrigeration equipment, of which 90%, or 20,832, is estimated to be installed in small stores. This figure is quite close to the one obtained through the INEC, as shown in table 4.4.4 below.

Table 4.4.4 Number of small grocery stores in Costa Rica

Type of store	Number (INEC)	Number (Coca-cola)
Small convenience stores	8,821	20,832
Bars, restaurants and soda fountains.	10,134	
Fishmonger's store	142	
Butcher's stores	1,150	
Pharmacies	341	
Total	20,588	20,832

Source: INEC and Panamco Tica

For the purpose of this study, the number of small commercial stores has been set at 20,500. Each of these small commercial units presents a very similar configuration in terms of refrigeration equipment, as ascertained in the visits during the survey. Table 4.4.5 below shows the typical configuration of store-owned equipment in small stores:

Table 4.4.5: Typical configuration of store-owned equipment in small grocery stores

Type of store	Type and number of equipment
Small convenience stores	1 Horizontal freezer, 4 folding lids 1 Cold room, 3 doors 70 h
Small bars	1 Horizontal freezer, 2 folding lids 1 Horizontal cooler, 1 door
Soda fountains	1 Horizontal freezer 2 folding lids 1 Refrigerator, 11 cubic feet
Restaurants	1 Horizontal freezer, 4 folding lids 1 Vertical cooler, 3 doors, 70 cubic feet
Fishmonger's stores	2 Horizontal freezer, 4 folding lids 2 Horizontal freezers, 1 folding lid
Butcher's stores	1 Horizontal freezer, 4 folding lids 1 Cooler, 2 doors, 30 cubic feet 1 Horizontal freezer, 1 folding lid
Pharmacies	1 refrigerator 11 cubic feet

Source: National RMP survey

The average quantity of CFC12 installed in the refrigeration equipment of each of the small grocery stores or commercial units has been estimated in 2.11 Kg./unit (see Appendix 5 for details). Table 4.4.6 below shows the estimation of installed CFC12 refrigerant and annual consumption for small store commercial sub-sector in Costa Rica.

Table 4.4.6 Installed CFC12 and annual consumption in small grocery stores in Costa Rica

Number of stores	Installed CFC12 (Kg.)	Annual consumption (Kg.)
20,500	43,306	10,827

Source: National RMP survey

The rest of CFC consumption in the commercial refrigeration sector is considered negligible.

5. Industrial refrigeration

This sub-sector comprises all those production units that need refrigeration systems in view of the product or the process they manage. The main industries under this category in Costa Rica are: dairy products; meat products beer and soft drinks, seafood products, frozen products and ice.

In general this sub-sector uses refrigeration systems of various types and sizes. Among the big systems the most commonly used are those operating with refrigerant R717 (ammonia). Among equipments of smaller size, refrigerants HCFC22, CFC12 and R502 are widely used. R404A is just starting to be used.

Appendix 3 shows refrigeration equipment use in the most representative industries within the food-processing sector in the country. This sector experiences the trend of replacing the refrigeration equipments that run on CFC12, therefore, this refrigerant can be expected to be no longer used in this sector in the mid-term.

Table 4.5.1 below summarizes quantities of installed refrigerant and annual refrigerant consumption for maintenance purposes in the industrial refrigeration sub-sector in Costa Rica.

Table 4.5.1 Installed refrigerant and annual refrigerant consumption in the industrial refrigeration sub-sector in Costa Rica (metric Kgs.)

Type of refrigerant	Installed quantity (Kg.)	Annual consumption (Kg.)
R717	48,790	11,195
HCFC22	6,375	2,520
R502	827	746
CFC12	2,080	1,153
R404A	34	42

Source: National RMP survey

6. Refrigerated transport

The refrigerated transport sub-sector includes refrigerated trucks and refrigerated cargo containers of the type "roll on-roll off".

Refrigerated trucks

Refrigerated trucks are mainly used for distribution of perishable food products and are usually part of the fleet of industrial enterprises.

In this type of vehicle, the refrigerated body is generally made locally, and the refrigerated unit, in the majority of cases, is obtained from a well-known international manufacturer such as Carrier or Thermo King. There is also a local company, "Taller. M&R", that manufactures this refrigerated units from independent components bought in the local market. The M&R refrigerated units can be based on CFC12 or HFC134a, depending on the choice of the customer, which is usually based on price. In the case of imported equipment, the use of HCFC22, HFC134a and R404A is predominant (see RMP Implementation Reference Document 3 for details).

Appendix 7 shows the main manufacturers of refrigerated truck bodies in Costa Rica. Table 4.6.1 below shows the approximate number of refrigerated trucks in the country by refrigerant type.

Table 4.6.1: Number of refrigerated trucks by refrigerant type.

Type of refrigerant	CFC12	HCFC22	HFC134a	R404A	R502
Number of vehicles	38	140	56	327	60
Percentage (%)	6.0	22.6	9.0	52.7	9.7
Installed refrigerant (kg)	114	734	147	2,740	312

Source: National RMP survey

The refrigerated truck sub-sector is quite small and fragmented in terms of CFC consumption and thus, very difficult to assist, but it is expected that CFC consumption will be reduced even further through information, awareness, and supporting regulations.

Refrigerated containers

Refrigerated containers are used for the transnational transport of perishable products especially from the agro-industrial sector. These units usually belong to big transport or shipping multinational companies, are registered in foreign countries and are not counted within the national fleet.

The servicing workshops for these units, specially equipped for their maintenance, are located in their terminal stations in the country and have an effect on national ODS consumption. Table 4.6.2 below shows the fleet of refrigerated containers that operate in the country.

Table 4.6.2 Fleet of refrigerated containers operating in Costa Rica

Multinational company	Local company	Port of operation	Units in the country
Chiquita Brands International	Compañía Bananera del Atlántico	Limón	600
Del Monte	Fresh Fruit International Ltd.	Limón	450
Dole	Standard Fruit Company de Costa Rica S.A.	Limón	600
TOTAL			1,650

Source: National RMP survey

In the case of the company "Chiquita Brands", who deals with banana exports, approximately 70% of the containers fleet is operated on HFC134a, and there is still a 30% running on CFC12. At corporate level, this company is planning the conversion of 800 units to alternative refrigerants in year 2003, using the ports of Guatemala, Honduras and Costa Rica.

The company "Del Monte", who transports non-traditional products such as pineapple, watermelon, melon, and mango; estimates that 10% of its fleet still runs on CFC12 but that the change over will be rapid because this company is certified ISO14001.

The refrigerated containers sub-sector is then, under the ownership of companies from A2 countries and is not eligible for MF assistance, but is in its way to rapid conversion to non-CFC technologies.

Table 4.6.3 below summarizes the data on refrigerant used for refrigerated containers and trucks. Appendix 8 includes the considerations used to obtain the data.

Table 4.6.3: Refrigerant installed base and servicing requirements for refrigerated containers and trucks in Costa Rica

Sub-Sector	Installed refrigerant (Kg.)		Annual consumption (Kg.)	
	CFC12	HFC134a	CFC12	HFC134a
Containers	1,825	6,925	274	1,385
Trucks (1)	114	147	0	0
Total	1,939	7,072	274	1,385

Source: National RMP survey

(1) Maintenance needs were estimated at zero for the purposes of this study since this consumption is included in the commercial refrigeration sector¹

7. Air conditioning sector

The air conditioning sector has been divided for the purpose of this study, in two sub-sectors, namely tourism and public buildings, since there is no significant use of air conditioning units in the domestic sector.

Tourism sub-sector

Costa Rica has had a significant development of the tourism sector in the Central American region and has had to maintain very high international standards in order to keep competitiveness. As a consequence the country has a wide transport and hotel infrastructure that extends throughout the country.

Costa Rica has 370 hotels categorized in 5 levels with a total of 14,990 rooms of which 68% have air conditioning units running on HCFC22. Appendix 10 includes relevant details of the sector and related considerations. Table 4.6.4 below shows installed base of refrigerant for the sector.

Table 4.6.4: Installed base of refrigerant in the tourism sector

Number of hotels in Costa Rica	Number of rooms	Rooms with air conditioning	Installed base of HCFC22 (Kg.)
370	14,990	10,151	12,181

Source: Costa Rican Institute of Tourism (ICT)

Public buildings sub-sector

The public building sub-sector includes the stationary air conditioning systems installed in service centers for the general public both from public and private organizations of governmental and commercial type.

This sector has a great dispersion of equipment and the government and private organizations that may have these installations lack centralized records about them. All of this makes it very difficult to determine the exact dimension of the sector and the characteristics of the equipment installed, but it is estimated that most of them run on HCFC22.

In order to provide a point of departure for a future more ambitious study of the sector, tables 4.6.5 and 4.6.6 below provide the list of public and private institutions that have air conditioning systems.

Table 4.6.5: Public institutions with air conditioning systems

Institution	Number of offices
Caja Costarricense del Seguro Social	203
Instituto Nacional de Seguros	56
Instituto Costarricense de Electricidad	106
Banco Nacional de Costa Rica	145
Banco de Costa Rica	85
Banco Crédito Agrícola de Cartago	39
Banco Popular y de Desarrollo Comunal	49
Ministerio de Ambiente y Energía	65
Ministerio de Obras Públicas y Transportes	191
Ministerio de Agricultura y Ganadería	95
Ministerio de Educación Pública	163
Ministerio de Trabajo y Seguridad Social	28
Ministerio de Seguridad Pública	148
Ministerio de Justicia	28
Ministerio de Salud	143
Ministerio de Cultura Juventud y Deportes	38
Ministerio de Economía	1
Ministerio de Ciencia y Tecnología	2
Ministerio de Comercio	1
Ministerio de Hacienda	34
Ministerio de Planificación	1
Ministerio de Relaciones Exteriores	1
Ministerio de Vivienda	1
Universidad de Costa Rica	10
Universidad Nacional Autónoma	6

Institution	Number of offices
Instituto Tecnológico de Costa Rica	4
Universidad Estatal a Distancia	31
Total	1,674

Source: National RMP Survey

Table 4.6.6: Private institutions with air conditioning systems

Institution	Number of offices
Banco San José	15
Banco Cuscatlan	12
Banco Interfin	14
Banco Banex	10
Banco Bancrecen	39
Banco Promerica	12
Scotiabank	14
Centro Comercial Multiplaza	271
Centro Comercial Plaza Mayor	200
Centro Comercial Plaza del Sol	200
Mall San Pedro	250
Mall Internacional Alajuela	100
Mall Real Cariari	100
Outlet Mall	25
Total	1,264

Source: National RMP survey

8. Maintenance and servicing sector

The refrigeration equipment maintenance and servicing sector comprises all the refrigeration servicing workshops that are distributed all throughout the country. There are two areas of specialization that can be identified:

- Domestic, commercial and air conditioning equipment servicing workshops.
- Mobile air conditioning and refrigerated transport servicing workshops.

The maintenance of industrial refrigeration equipment is in the majority of cases, the responsibility of the maintenance department of the industrial company. The refrigeration equipment-servicing sector is not totally organized but there have been efforts to do so through the creation of two professional refrigeration technicians associations. The first one was created in 1997, the "Costa Rican Association of Refrigeration and Air Conditioning Technicians" (ACOTRA, by its initials in Spanish), promoted by the MF project "National Programme for Recovery and Recycling of Refrigerants". This organization worked for approximately one year and is now being reactivated.

The second initiative is the "Association of Air Conditioning Technicians that Protect the Ozone Layer" (ATAPCO, by its initials in Spanish) that was promoted by the MF project "MAC and Refrigerated Transport Demonstration Project".

and was formed by the 14 workshops that participated in the project. At present this association is making efforts to attract new members, including other refrigeration sub-sectors.

There is no official requirement for refrigeration technicians to register with any national authority, and therefore, there are no official registries of refrigeration technicians, it is very difficult to quantify their precise number. Based on the information provided by the servicing workshop owners and the technicians themselves, there are approximately 1,000 active refrigeration technicians in the country, including those that have had a formal education and those that have only had on-the-job training. This also includes, of course, those that work independently and those that work for servicing companies and industries.

The formally constituted servicing workshops handling domestic, commercial, air conditioning and MAC systems, are estimated in 300 countrywide. The MAC servicing sector is concentrated in San Jose, where approximately 50 workshops have been identified.

9. Technical training sector

The formally trained refrigeration technicians have received their training from specialized technical institutes that are located almost exclusively in the port cities of Puntarenas and Limón, besides the capital, San Jose, since those cities are the center of the commercial, industrial and servicing activities in the country.

The National Institute of Learning (INA, by its initials, in Spanish) is the most important and flexible of those institutions, since at the request of industry, can respond to specific demands related to training in refrigeration and air conditioning, using its platform of training sites distributed throughout the country. It is the only institute that imparts training related to refrigerated containers in Limón. It also maintains an update programme for graduates through "Complementary Courses". The majority of students working in the industry are graduates of INA.

The "Fundación Samuel" is another refrigeration technical training institute that prepares MAC technicians by way of a four-module programme that lasts 19 months.

Vocational schools impart the refrigeration specialty starting from the 4th cycle of secondary school. Generally the students continue with their university careers after graduating from these schools.

Table 4.9.1 below shows the main refrigeration technical training institutes and their number of enrolled and graduate students per year.

Table 4.9.1 Main refrigeration technical training institutes

Institution	Location	Enrollment/year	Graduates/year
Colegio Técnico Profesional de Calle Blancos	San José	40	32
Colegio Técnico Profesional del Roble	Puntarenas	24	12
Colegio Técnico Vocacional de Limón	Puntarenas	15	12
Fundación Samuel	San José	120	75
Instituto Nacional de Aprendizaje (INA)	San José	15	10
	Limón	30	20
Total		244	161

Source: National RMP survey

In each one of these institutions the issue of ozone layer protection is treated as a general topic and does not appear in the study programmes as a separate subject. All these institutions have refrigerant R&R equipment for training purposes. In the case of the "Colegio Técnico Profesional El Roble", it has just one very small piece of R&R equipment. The "Colegio Técnico Vocacional" of Limon has 8 R&R equipments in total, 4 for CFC12/HFC134a and 4 for CFG12, in complete abandonment for lack of training on their use. The "Fundación Samuel" has MAC R&R equipments.

CHAPTER 5. JUSTIFICATION FOR RMP

Costa Rica has achieved full compliance with the first obligation under the Montreal Protocol; the 1999 freeze of consumption of Annex A CFCs, but will need to take early actions in order to be able to comply with the forthcoming MP obligations of years 2005 and 2007.

In effect, Costa Rica will need to eliminate the consumption of 12.15 ODP tonnes of CFC from its 2002 consumption; to be in compliance with the 2005 MP reduction obligation, and will need to eliminate a total of 87.62 ODP tonnes of CFC in order to achieve the 2007 MP reduction obligation.

These target reductions are particularly challenging if we take into account that almost all the remaining CFC consumption is in the refrigeration-servicing sector, which has proven to be a difficult sector to address.

Each sub-sector within the refrigeration-servicing sector will require specialized actions specifically tailored to the sub-sector characteristics and requirements, but all of these different initiatives will need to be coordinated and integrated into a coherent strategy that will enable the country to comply with the 2005 and 2007 Montreal Protocol CFC reduction obligations, while permitting the industry to satisfy the demands for products and services that will sustain the economic growth of the country.

This can be accomplished through a Refrigerant Management Plan that would address CFC consumption in each of the refrigeration sub-sectors as indicated below.

Refrigeration equipment manufacturing: The individual consumption for manufacturing of commercial and refrigerated transport refrigeration equipment made on command is too small and scattered, and it is very difficult and not cost-effective to provide individual assistance. The consumption in this sub-sector should be addressed through pertinent legislation, and awareness and information campaigns.

Domestic refrigeration servicing: This sub-sector represents 9.25% of CFC consumption in the refrigeration-servicing sector. Besides supporting the existing R&R Programme in order to increase the amount of CFC being recycled for re-use, the most critical action for this sub-sector would be preventing, through legislation, the import of used or new CFC-based domestic refrigerators.

Commercial refrigeration servicing: This sub-sector represents 9.07% of CFC consumption in the refrigeration-servicing sector. It would benefit from additional support to the existing R&R Programme in order to increase the amount of refrigerant being recycled and re-used, as well as from an incentive programme to increase the rate of CFC-based equipment-retrofitting and replacement.

Mobile air-conditioning servicing: This sub-sector represents 26.87% of CFC consumption in the refrigeration-servicing sector and is the second most important CFC consuming sub-sector in the country. It should benefit from additional support to the existing R&R Programme in order to increase the amount of refrigerant being recycled and re-used, and from specific legislation to prevent the import of new or used cars equipped with CFC-based MACs.

Fishing fleet refrigeration servicing: This sub-sector represents 56.62% of CFC consumption in the refrigeration-servicing sector and is the most important CFC consuming sub-sector in the country. It is also a vital factor of the economy, providing numerous low-skilled jobs. It should profit from an incentive programme to increase the rate of CFC-based equipment retrofitting and replacement, and from an R&R Programme to decrease the amount of virgin CFC being required for servicing.

Refrigerated transport refrigeration servicing: This sub-sector represents 0.23% of CFC consumption in the refrigeration servicing sector and is mostly under foreign ownership and not eligible for MF assistance. The small portion nationally owned should be addressed through legislation and awareness and information programme.

Industrial refrigeration servicing: This sub-sector represents 0.97% of CFC consumption in the refrigeration-servicing sector, and should be included in an incentive programme to increase the rate of CFC-based equipment retrofitting and replacement.

Refrigeration servicing sector in general: In order to eradicate long-engrained servicing practices that cause unnecessary use of refrigerants, and refrigerant venting to the atmosphere, this sector needs a Refrigeration Technician Licensing and Certification scheme and a programme to promote the use of nitrogen as a flushing agent. It also needs a programme to facilitate the storage of irrecoverable CFC12 in order to respond to the concerns expressed by the sector in this respect.

All the above measures should also be supported through complementary legislation, awareness and information campaigns, and a programme to monitor and control all the initiatives in order to ensure their effectiveness.

CHAPTER 6. ASSISTANCE RECEIVED

The Government of Costa Rica, through the Governmental Ozone Commission within the Ministry of Environment, prepared this Refrigerant Management Plan with the technical and financial assistance from the Multilateral Fund through its implementing agency the United Nations Development Programme. Local expertise from the refrigeration sector assisted in developing the local survey and sector plan for the RMP.

The Government also received support from other government bodies involved in the development of the RMP, such as the Ministry of Foreign Affairs, the Ministry of Health, the Ministry of Industry, the Ministry of Trade, the Ministry of Agriculture, and the Ministry of Treasure, with its Customs Department.

Finally, the cooperation of the private sector, industry as well as academic, was invaluable, by allocating their staff time to provide sectoral and technical information, and participate in brainstorming meetings.

CHAPTER 7. COMPONENTS OF THE PHASEOUT STRATEGY

The efforts to phase out ODSs in Costa Rica have succeeded in reducing 47% of CFC consumption, from 267 ODP tonnes in year 1991 to 137.32 ODP tonnes in year 2002, thus enabling the country to comply with the first obligation under the Montreal Protocol for Article 5 countries, the 1999 freeze of CFC consumption. The country has also succeeded in converting all CFC-based manufacturing facilities, except for a marginal remainder in the commercial refrigeration sector.

But Costa Rica will need to reduce CFC consumption by approximately 12.15 and 87.62 ODP tonnes in order to be able to meet the 2005 and 2007 CFC MP reduction schedules, respectively. In trying to achieve these goals the country will face many challenges, such as:

- All CFC consumption is concentrated in the refrigeration-servicing sector, where consumption reduction is only possible through a) abandonment or conversion, when feasible, of CFC-based equipment, and b) reducing the need for virgin CFC through good servicing practices and recovery and recycling of refrigerants.
- Even though the refrigeration-servicing sector is considered to have a fairly good technical level on average, there is the persistence of bad servicing practices in the sector.
- The fishing sector, which concentrates 53.62% of all CFC consumption for servicing purposes, traverses a very critical economic situation, operating under marginal conditions, and is unable to comply with CFC phase out requirements on its own.
- The need to reach out to many persons, since reductions in the refrigeration-servicing sector are ultimately achieved by many people reducing relatively small amounts of refrigerants. Any programme directed to this sector has to count on many people: 1) knowing what to do and how to do it, 2) having an incentive to do what is needed, and 3) having the good will to do what is needed, all of this requiring a well targeted information campaign, and some regulatory measures that will promote the right choices.
- The pending threat of CFC market changes that may create a surge in illegal traffic of ODS, which requires regulatory measures that will promote and enforce the country's strategies for phase out.
- The need to ensure that many complex and interrelated activities within a compliance action plan will produce the expected results leading to MP compliance, and to have the capability to respond to any deviation from these expected results, which will require a comprehensive system for monitoring and control.

In order to respond to these challenges, the Government of Costa Rica will adopt a compliance strategy driven mainly by industry, and supported by the Government through actions directed to provide technical and financial assistance, legislative reinforcement, and building the awareness and information levels of the public and industry sector.

This strategy goes in line with the long-standing Government policies for implementation of the Montreal Protocol in the country and also with the country's tradition of a strong, proactive, and vocal civil society.

The CFC compliance strategy will then be based on the following axis:

- Technical and financial assistance to the industry sector

The technical and financial assistance will be directed to the refrigeration servicing and end-user sector, since there are no more substantial manufacturing activities in the country, with the objective of reducing their dependence on virgin CFCs, reducing the unnecessary CFC uses, and reducing CFC waste. This will be achieved through two projects: "Incentive Programme for the Commercial, Industrial, and Fishing Fleet Refrigeration End-user Sector" and "Technical Assistance for the Refrigeration Servicing Sub-sector".

- Legislative reinforcement

The legal framework will be reinforced in order to improve the ODS Import Licensing System, to stop increasing the dependency on CFC-based equipment, and to regulate the way the servicing sector operates. This will be achieved through the projects: "Technical Assistance for Certification and Licensing of Refrigeration Technicians" and "Technical Assistance for Training of Customs Officers".

- Awareness and information of the industry sector

This element of the strategy has the objective of informing the industry sector about the country's international commitments in view of protecting the ozone layer, the actions that are being taken at the local level, and the way that each person or organization can contribute to these efforts. This activity will be complementary and undertaken by COGO under the programmed Institutional Strengthening activities.

- Regular monitoring and control

All the elements of the compliance strategy will require regular monitoring and control in order to ensure the expected results. This will be attained through the project "RMP Monitoring and Control".

The above strategy will ensure compliance with the 2005 and 2007 CFC reduction obligations under the MP, after which period the present RMP will need to be scrutinized and evaluated to ascertain the possible need for a review of the same.

CHAPTER 8. RMP ACTION PLAN AND CONSOLIDATED BUDGET

The CFC compliance strategy adopted by the Government of Costa Rica will be implemented through an RMP Action Plan constituted by seven projects, namely:

- Incentive Programme (IP) for the Commercial, Industrial, and Fishing Fleet Refrigeration End-user Sector

The project will provide an economic incentive to those end-users in the industrial, commercial, fishing, hospitals and clinics sub-sector, that replace or retrofit their CFC-based equipment.

- Technical Assistance (TA) for the Refrigeration Servicing Sub-sector

The project will provide assistance to the refrigeration equipment servicing sector through 1) A R&R programme for 50% of the fishing fleet, 2) A complement to the R&R programme for the MAC sector, 3) Strengthening of the R&R project for the domestic and commercial sector, 4) Assistance programme for promoting the use of nitrogen as a flushing agent, and 5) Programme for storage of non-recyclable CFC12 until a permanent solution for CFC destruction is found.

- Technical Assistance (TA) for Certification of Refrigeration Technicians

The project will establish a "Refrigeration Technician Certification and Licensing System" and its corresponding enforcement system, with the ultimate objective of encouraging refrigeration technicians to use good refrigeration servicing, maintenance and containment practices.

- Technical Assistance (TA) for Training of Customs Officers

The project will train customs officers in the monitoring and control of CFC imports through the better implementation of the CFC Import Licensing System, detection of illegal imports of CFC, and providing the main customs entry points with CFC detection equipment that will facilitate this task.

This project will also provide technical assistance to modify and expand the existing legal framework in order to support all the projects and objectives within the Refrigerant Management Plan and specifically achieve a) Better control of CFC imports and exports, b) Reduced dependency on CFCs, and c) Reduced consumption of CFCs through better refrigeration maintenance and servicing practices.

- RMP Monitoring Programme

The RMP monitoring programme has the objective of ensuring the effectiveness of all the projects proposed within the RMP for Costa Rica, by periodic verification of project results, analysis of problems encountered and application of corrective measures.

The RMP Action Plan includes specific information activities for the commercial-equipment manufacturing sub-sector, which is expected to phase out the use of CFCs mainly through information and awareness and legal measures, without any other specific investment assistance.

The consolidated budget for the Action Plan is shown in table 8.1 below.

Table 8.1: RMP Action Plan Indicative budget

Project	Gov. input (US\$) *	Approved MF grant (US\$)
IP for the Commercial, Industrial, and Fishing End-user Sector		200,000
TA for the Refrigeration Servicing Sub-sector		180,000
TA for Certification of Refrigeration Technicians		100,000
TA for Training of Customs Officers		90,000
RMP Monitoring Programme		60,000
TOTAL		630,000

* The Government input will be provided by way of staff time and meeting facilities, from Government offices other than the NOU

A full description of the above projects is included in the corresponding Annexes of this document.

CHAPTER 9. INSTITUTIONAL FRAMEWORK FOR RMP IMPLEMENTATION

The implementation of this RMP will be the direct responsibility of the Government of Costa Rica through the Ministry of Environment and Energy (MINAE), with the financial and technical assistance of the MF through its implementing Agency, UNDP. MINAE will delegate responsibility to another Governmental Institution or Entity if deemed beneficial.

The MINAE will assure a consultative and collaborative approach with other Government organizations, such as the Ministry of Foreign Affairs, the Ministry of Health, the Ministry of Industry, the Ministry of Trade, the Ministry of Agriculture, and the Ministry of Treasure, with its Customs Department; as well as with the industry and academic sector, namely, the ODS importers, the Chamber of Industries of Costa Rica, the Chamber of Commerce, the Fishermen's Chambers, the refrigeration equipment manufacturing sector, the technicians associations ACOTRA and ATAPCO, the University Braulio Carrillo, the National Institute of Learning (INA) and the vocational schools "Colegio Técnico Profesional El Roble", "Colegio Técnico Vocacional" of Limón, and "Fundación Samuel".

Some of the specific organizations that will be called upon for the implementation of each of the projects within the RMP are:

- The Ministry of Industry, the Chamber of Commerce, and the technicians associations ACOTRA and ATAPCO, will be called upon for their input and agreement on the detailed design of the projects addressing the general refrigeration-servicing sub-sector, and possible participation in the implementation process.
- Additionally, for the projects directed to the fishing and seafood processing sub-sector, also the Ministry of Agriculture, its institute INCOPECA, and the different Fishermen's Chambers will be called upon for the political aspects of the projects, the first two, and for the technical aspect and implementation of the projects, the latter.
- The participation of the INA and the vocational training schools as well as the National Institute of Technical Norms (Inteco) will be essential for the detailed design and implementation of the Technician Certification and Licensing project.
- The Training of Customs Officers will be carried out with the full support and direct cooperation of the Ministry of Treasure and its Customs Department.
- The Legal Department of the Ministry of Environment will have a leading role in the Project for Strengthening of the Legal Framework, and all the organizations mentioned above will be consulted concerning the measures directly related to their purview.

It is worth stressing that all the above organizations have already participated in the preparation of this RMP, through direct consultations, as well as working meetings, and have endorsed it through a final "Meeting for Presentation of the RMP".

The project will be executed under national execution modality following the guidelines established in Costa Rica for NEX (in line with UNDP standard corporate procedures), and the following structure will be set up:

Project Steering Committee (PSC)

The following members will comprise the PSC:

- Head of the Ministry of Environment and Energy (MINAE) or his/her representative),
- Resident Representative of the UNDP or his/her representative

The PSC will perform the following tasks and meet at least once a year:

- Approve the annual work plans and budget,
- Ensure coordination between project stakeholders,
- Provide guidance and evaluate the recommendations from the Advisory Committee for achieving project objectives,
- Provide information and disseminate project results,
- Make decisions based on what is established in the section on Legal Context.

Advisory Committee (AC)

The Advisory Committee will be composed of:

- COGO
- MAG/ INCOPECA
- MINAE - International Corporation
- INA
- Invite relevant institutions related to the execution of the project,

The AC will meet quarterly, or as may be deemed necessary, to:

- Provide advice to the coordination team about technical and political elements, such as validating proposals, etc.
- Provide recommendations to the PSC for achieving project objectives,
- Provides information dissemination about project performance.

MINAE - Executing Agency (EA)

MINAE will be the EA and their role will be to execute the project. The EA will provide office space for the Project Coordinator and administrative staff hired by the project. The Minister of Environment will designate the National Project Director (NPD), and he/she will guarantee the execution of the Project and its compatibility with the objectives of the Government. The overall role of the NPD is to:

- Assure political support to the project,
- Assure that the execution of the Project components are compatible with the directorates and institutional and management policies.
- Assure the coordination with Ministries and Institutions involved in the Project,
- Supervise the Project Coordinator,
- Serve as the communication link between the PSC and the Project, drafting the minutes with the decisions taken by the PSC.

- Keep the PSC informed about the progress of the Project,
- At the end of the project it will carry out the transfer of inventory indicating its destination, according to UNDP guidelines,
- Obtains the signature for the quarterly Combined Delivery Reports (CDR), budget revisions (mandatory, general, and substantive) according to UNDP guidelines and send them to UNDP CR.
- Notifies UNDP CR about the operational closure of the project,
- UNDP will send for signature to the EA the last CDR and final Mandatory budget revision of the project, in order to declaring the project finished financially,
- Other functions assigned to him by the PSC,

UNDP - Implementing Agency (IA)

UNDP is the implementing agency and UNDP Costa Rica will perform the implementing oversight functions. This implies on behalf of UNDP the following:

- Assists with UNDP personnel on the administrative and financial activities of the project,
- Designates a Programme Officer as the focal point of the project
- Processes payment requests and prepares respective cheque or bank transactions,
- Makes contracts- and their extensions according to the requests received (and overseeing the hiring process),
- Sends accounting, financial and budgetary documentation to the EA,
- Sends photocopy of vouchers including annexes to the EA on a monthly basis.

Additionally, UNDP CR will perform the following tasks:

- Monitors the project,
- Reports periodically to the Montreal Protocol Unit of UNDP on progress towards project's objectives,

UNDP is responsible for the financial management and accomplishment of the programmed outputs before the MP. Additionally, UNDP charges a fee for providing services according to UNDP Corporate Guidelines on Cost Recovery (Mid-High Cost level on the Universal Price list),

COGO – the National Ozone Unit

COGO will be informed about project progress. This is due to the fact that COGO is the agency responsible of reporting about compliance of committed targets under the Montreal Protocol in Costa Rica.

The Project Coordinator (PC)

According to the TORs approved by the PSC the PC will be responsible for the day-to-day management, coordination and supervision of the implementation of the project activities. The PC will work in close coordination and collaboration with the executing agency. The overall duties of the PC will be:

- Day to day management of the Project,
- Secures the coordination of all Project activities,

- Keeps the NPD informed about Project progress,
- Controls expenditures and assures an adequate management of resources provided for the project and present it to UNDP and MP,
- Keeps an updated inventory list and guarantees that the goods and services acquired will be utilized in accordance with the objectives of the Project,
- Prepares the reports required by the parts,
- Prepares a detailed work plan for the project at the outset of the implementation,
- Prepares annual work-plans and budgets, directly formulated to reach the project's targets, as defined in the log-frame and indicators.
- Prepares the TORs for the sub-contracts and consultants,
- Supervises, coordinates and facilitates the work of the national and/or international consultants including subcontracts retained for the different activities to be implemented,

Legal context

This project document shall be the instrument referred to as such in the Standard Basic Assistance Agreement between the United Nations Development Programme and the Government of the Republic of Costa Rica PNUD signed by the parties on August 7th, 1973, and enacted by the Law 5878 published in "La Gaceta" on January 31, 1976.

The following types of revisions may be made to this project document with the signature of the UNDP Representative only, provided he or she is assured that the other signatories of the project document have no objections to the proposed changes:

- a. Revisions in, or addition of, any of the annexes of the project document;
- b. Revisions which do not involve significant changes in the immediate objectives, outputs or activities of a project, but are caused by rearrangement of inputs agreed to or by cost increases due to inflation; and
- c. Mandatory annual revisions which rephrase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility.

The Government will provide the Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including MP) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

CHAPTER 10. IMPACT

The overall impact of the RMP strategy and Action Plan will be the country's compliance with the 2005 and 2007 CFC reduction obligations within the MP. Table 10.1 below indicates the expected impact of each of the elements of the Action Plan and its time frame:

Table 10.1 RMP Action Plan expected impact and time frame

Project	Time frame	Expected impact
IP for the Commercial, Industrial, and Fishing End-user Sector	2004-2006	36.50 ODP t.
TA for the Refrigeration Servicing Sub-sector	2004-2006	46.00 ODP t.
TA for Certification of Refrigeration Technicians	2004-2007	Encouraging refrigeration technicians to reduce their use of CFCs by the adoption of good practices
TA for Training of Customs Officers	2004-2005	Better control of ODS imports and exports
TA for Strengthening of Legal Framework	2004-2006	Better control of ODS imports and exports, and reduced dependency on CFCs
TA for Information and Awareness	2004-2007	Increase the effectiveness of all the projects within the RMP by informing and raising awareness of stakeholders
RMP Monitoring Programme	2004-2007	Ensuring the effectiveness of all the projects proposed with the RMP
TOTAL IMPACT		99.77 ODP t.

It should be noted that the total impact of the projects "IP for the Commercial, Industrial, and Fishing End-user Sector" and "TA for the Refrigeration Servicing Sub-sector" in terms of ODP tonnes is only 82.5 ODP tonnes, while the country needs to eliminate 12.15 ODP tonnes before year 2005 and 87.62 ODP tonnes before year 2007, for a total of 99.77 ODP tonnes, for compliance with the 2005 and 2007 CFC reduction obligations.

The Government of Costa Rica intends to reduce the additional 17.27 ODP tonnes of CFC needed for compliance through the other technical assistance activities within the RMP, by stressing supplementary efforts with the importers, the CFC Import Licensing System and by early-starting the awareness and information activities within the RMP.

Table 10.2 below shows the expected schedule of reductions under this RMP (there are no ongoing projects with direct CFC reduction) in order to achieve compliance with the 2005 and 2007 CFC reduction obligations under the MP.

Table 10.2 CFC reduction schedule under the RMP for Costa Rica (ODP t.)

	YEAR							
	2003	2004	2005	2006	2007	2008	2009	2010
Initial total CFC consumption (1)	137.32	137.32	125.17	125.17	37.55			
CFC to be phased out by RMP (2)	0.00	0.00	0.00	82.50	0.00			
CFC to be phased out by CILS (3)	0.00	12.15	00.00	5.12	0.00			
Remaining total CFC consumption	137.32	125.17	125.17	37.55	37.55			
MP obligations	250.33	250.33	125.17	125.17	37.55			

(1) Total initial CFC consumption is assumed to remain the same as in the previous year, and to remain unchanged by factors other than direct phase out by approved projects.

(2) Phase out is assumed to take effect upon project completion.

(3) CFC Import Licensing System supported by early Awareness and information activities under the RMP and separate discussions with importers.

Finally, overall cost effectiveness of the RMP grant would be US\$ 630,000/99.77 ODP tonnes, or US\$ 6.31/Kg.

CHAPTER 11: MFS RECOMMENDATIONS.

The Fund Secretariat recommends blanket approval of the projects at the funding level indicated in Table 8.1, on the understanding that:

(a) The Government of Costa Rica would have flexibility in utilizing the resources available under the incentive programme for end-users and the technical assistance for the refrigeration servicing sub-sector, to address specific needs that might arise during project implementation;

(b) To the extent possible, the incentive programme for end-users and the technical assistance for the refrigeration servicing sub-sector would be implemented in stages so that resources can be diverted to other activities, such as additional training or procurement of service tools, if the proposed results are not achieved; and

(c) UNDP would provide appropriate monitoring throughout project implementation

ANNEX I: Incentive Programme for the Commercial, Industrial, and Fishing Fleet Refrigeration End-user Sector

PROJECT COVER SHEET

COUNTRY:	Costa Rica
SECTORS COVERED:	Refrigeration sector
PROJECT TITLE:	Incentive Programme for the Commercial, Industrial, and Fishing Fleet Refrigeration End-user Sub-Sector
IN CURRENT BUSINESS PLAN	YES
SECTOR/SUB-SECTOR:	Refrigeration/Commercial, industrial, and fishing fleet refrigeration end-user sub-sector
PROJECT DURATION:	36 months
PROJECT IMPACT:	36.50 ODP tonnes
MP baseline (Annex A Group I)	250.33 ODP tonnes
Selected remaining unfunded consumption as per Excom Decision 35/57	162.90 ODP tonnes
Current consumption (2002)	137.32 ODP tonnes
Refrigeration sector consumption	137.32 ODP tonnes
Servicing sector consumption	137.32 ODP tonnes
PROJECT COST:	US\$ 200,000
GOVERNMENT COUNTERPART	In kind
REQUESTED GRANT TO MLF	US\$ 200,000
GRANT EFFECTIVENESS	US\$ 5.48/Kg.
IMPLEMENTING AGENCY SUPPORT COSTS	US\$ 18,000 (9%)
TOTAL COST OF PROJECT TO MLF	US\$ 218,000
LOCAL OWNERSHIP	100%
EXPORT COMPONENT	0%
MONITORING MILESTONES	Included in the project
IMPLEMENTING AGENCY:	UNDP
NATIONAL COORDINATING AGENCY:	Government Ozone Commission, Ministry of Environment

PROJECT SUMMARY: The project will provide an economic incentive to the enterprises in the commercial, industrial, and fishing fleet refrigeration end-user sub-sector, for the elimination of CFC consumption through the replacement or retrofit of their CFC-based refrigeration equipment. The fishing fleet sub-sector will have the highest priority within the project.

IMPACT OF THE PROJECT ON THE COUNTRY'S MONTREAL PROTOCOL OBLIGATIONS: The project will eliminate the consumption of 36.50 ODP tonnes of CFC, thus contributing to the efforts to meet the country's 2005 and 2007 CFC reduction obligations under the Montreal Protocol.

PROJECT DESCRIPTION

1. Objective

The project has the objective of reducing CFC consumption in the refrigeration end-users sub-sectors with the biggest or most critical CFC consumption, by providing an economic incentive to those enterprises or organizations that replace or retrofit their CFC-based equipment. The project will cover the end-users in the industrial, commercial, fishing, hospitals and clinics sub-sector.

The incentives programme encompasses the following sub-programmes:

- Incentive sub-programme for conversion of refrigeration equipment in the fishing fleet sub-sector (for approximately 50% of the fleet),
- Incentive sub-programme for conversion of refrigeration equipment in the commercial sub-sector,
- Incentive sub-programme for replacement of refrigeration equipment in the hospitals and clinics sub-sector,
- Incentive sub-programme for conversion of chillers in the industrial sub-sector.

The programme will only provide incentives for retrofit or replacement of equipments containing CFC12 or R502 as refrigerant, towards the use of HFCs (zero ODP) or HCFCs (lower ODP) as refrigerants. In the case of HCFCs, they will only be accepted as an alternative refrigerant when no other alternative with zero ODP is technically feasible.

The fishing fleet sub-sector will have the highest priority within the project.

2. Background

The national RMP survey has provided an estimate of the use of refrigerants for maintenance purposes in the different refrigeration sub-sectors covered by the incentives programme, as shown in table 2.1 below.

Table 2.1: Refrigerant installed base and annual consumption

Sector	Installed refrigerant		Annual use for servicing	
	CFC12 (kg.)	R 502 (kg.)	CFC12 (kg.)	R 502 (kg.)
Industrial	2,080	827	1,153	746
Commercial (1)	6,480	413	2,948	413
Refrigerated transport (2)	114	312	-	-
Fishing fleet	14,416	-	63,977	-
Total	23,090	1,552	68,078	1,156

Source: National RMP survey

(1) Only the CFC consumption of big industrial companies that also distribute their food products has been taken into account for the project, due to increased accessibility. (See Appendix 3 for details)

(2) Only trucks are considered, since refrigerated containers belong to Multinational companies that are not eligible for MF support.

In the industrial refrigeration sector, the use of refrigeration equipment based on CFC12 is directed to specific processes and applications that cannot be covered with the usual big refrigeration equipments based on R717.

In the commercial sector, in the marketing departments of the industrial companies and supermarkets, there are 12,270 refrigeration systems running on CFCs, destined to product conservation at the points of grocery sale.

The fishing fleet equipped with refrigeration systems is composed of 198 ships concentrated in the Pacific coasts.

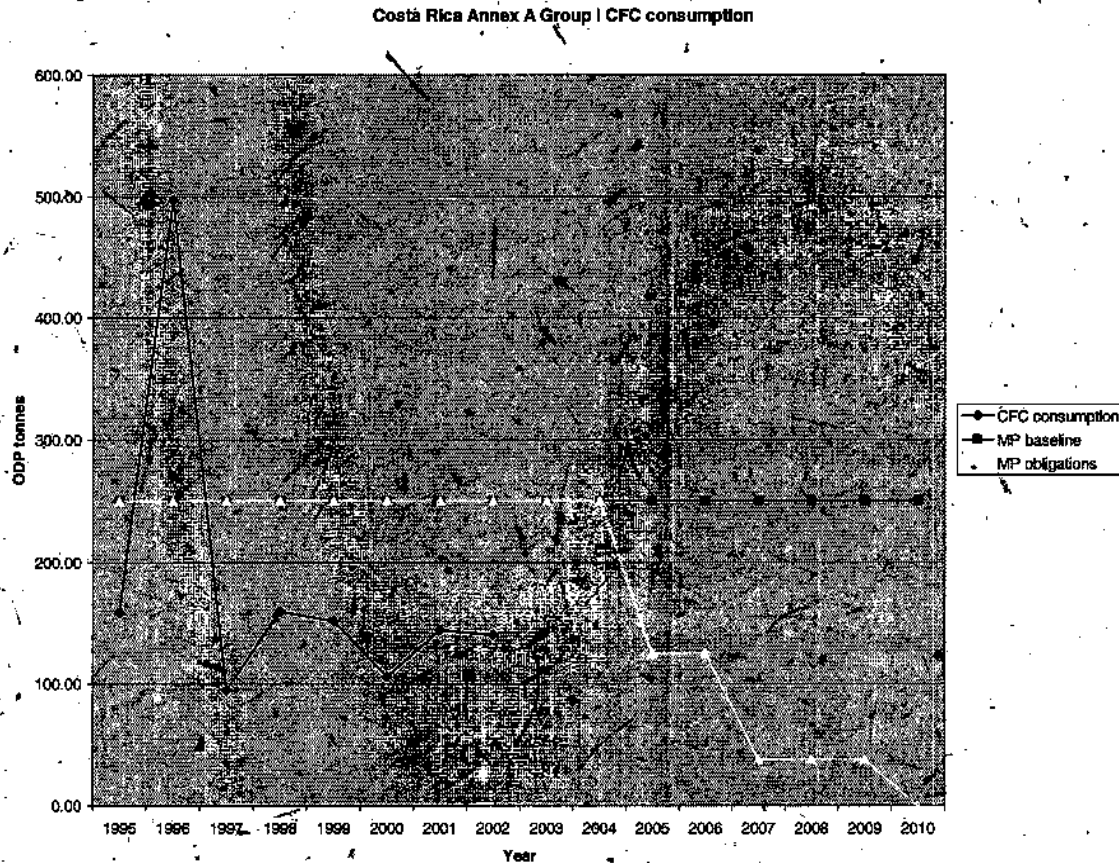
For more information on the sectors please refer to the corresponding sections and appendixes of the main RMP document.

3. Justification of the project

Costa Rica's reported CFC consumption in year 2002 was 137.32 ODP tonnes, almost all (99.46%) concentrated in the refrigeration-servicing sub-sector. Even though the country is in compliance with the 1999 MP CFC freeze obligation, it will have to reduce the consumption by approximately 12.15 and 87.62 ODP tonnes of CFC in order to be able to meet the 2005 and 2007 MP CFC reduction schedules, respectively.

Additionally, although total CFC consumption has decreased greatly in the period from 1995 to 2002, it has shown some signs of stabilization in the last 4 years, coinciding with the fact that the remaining CFC consumption is concentrated almost completely (for all practical purposes) in the refrigeration-servicing sub-sector, which has proven to be very difficult to address.

Basically, if left alone, CFC consumption in the refrigeration-servicing sub-sector would decrease at the natural rate of decommissioning of CFC-containing refrigeration equipment, which, in developing countries, are repaired over and over, well beyond the end of their useful lifetime. This CFC consumption decrease rate is most probably not enough for the country to meet its future MP obligations, as shown by the visual extrapolation of the CFC consumption decrease rate of the last 4 years. The graph of historic consumption trend in Costa Rica is included here for ease of reference.



In order to meet the forthcoming MP obligations Costa Rica is willing to embark in an ambitious Refrigerant Management Plan that would include, among other projects, this incentive programme with the objective of assisting the end-user sub-sector in decommissioning or retrofitting CFC-containing refrigeration equipment that is near reaching the end of its useful lifetime, helping to accelerate this way the CFC consumption decrease rate.

4. Technology overview

The technology options that are available for the replacement of CFC use in the commercial, industrial and fishing refrigeration end user sector are presented in table 4.1 below.

Table 4.1: Options available for replacement of CFC use in the commercial and industrial refrigeration end user sector

OPTION	Refrigerant ODP	COST	CONSIDERATIONS
Equipment replacement	Zero (1)	High	Permanent solution.
	Low (2)	High	Interim solution.

OPTION	Refrigerant ODP	COST	CONSIDERATIONS
Equipment retrofit	Zero (1)	Medium	Permanent solution. Not feasible or cost effective for all equipment, each case must be evaluated.
Refrigerant drop-in replacement	Low (2)	Low	Interim solution when HCFC blends are used. Sometimes difficult to sustain due to operational costs. Fall back to CFC use is easy and possible.

(1) Zero ODP refrigerants: HFC134a, R404A, R507, hydrocarbons (R290, R600, R600a, and their mixtures), and ammonia (R717).

(2) Low ODP refrigerants: HCFCs, and ternary blends of HCFCs, HFCs, and sometimes hydrocarbons.

Taking into account the above technology options and the specific situation of the different refrigeration end users in Costa Rica, the following options are recommended:

- For CFC12 refrigeration equipment in the fishing fleet

This sector requires a series of special considerations that will influence the options that can be taken into account, namely: a) the high humidity of operational conditions, b) the mechanical state of the equipment and c) the age of the fleet and the refrigeration systems.

The level of humidity makes the choice of HFC refrigerants impractical because of the hygroscopic nature of the oils (ester type) that need to be used with HFCs. The average age of the ships is 12 years and they have an expected lifetime of 10 additional years, but the mechanical state of the compressors due to age and lack of spare parts compromises the reliable operation of the systems.

The operational cost of an HFC equipment is high and not the best technical option for this sector, hence the recommended option for this sector is equipment retrofitting to HCFC22, by changing the compressor, the drying filter, and regulation or change of the expansion device. This would allow the fleet to operate until the end of its expected lifetime, with the additional advantage that the cost of the replacement refrigerant is moderate.

- For CFC12 and R502 equipments in points of grocery sale and supermarkets

These systems are generally freezers and coolers, with an integrated refrigeration system. The recommended option is equipment replacement with HFC134a units for coolers and R404a units for freezers. The retrofit of the unit would also be acceptable if the cabinet is in good condition.

- For equipment substitution in clinics and hospitals

In this sub-sector we can find CFC12, R500 and R502 systems used in low, medium and high temperature applications. The recommended option is to

substitute these systems for new units that meet the specific operating requirements. These new units should operate on HFC134a or R404A, or for special applications, R407 and R409.

- For retrofit of industrial chillers

The first option in this case would be the retrofit of the unit to use HFC refrigerants, and only in special cases, when the equipment is very new could the retrofit to HCFCs be considered, if it is the only technical option available.

5. Project description

The project will grant an economic incentive to those end-users in the industrial, commercial or fishing refrigeration sub-sector that will replace or retrofit their CFC12 or R502 refrigeration equipments for refrigerants with zero or low ODP. The fishing fleet sub-sector will have the highest priority within the project.

The activities necessary to implement the project are:

- Project advertising through the media and the trade associations,
- Direct contact with enterprises to provide more detailed information,
- Reception of applications from the enterprises,
- Analysis, and approval or rejection of enterprise application,
- Official signature of contract or agreement to participate in the project,
- Implementation of proposed change,
- Monitoring of change,
- Destruction of old equipment, if applicable
- Payment of incentive,
- Monitoring visits.

A local refrigeration expert will be contracted to carry out the detailed design and implementation of all the refrigeration projects within the RMP, and who will also act as coordinator of all the three projects.

6. Project considerations

Project duration. The project is estimated to run for up to 3 years upon approval by the Executive Committee and depending on the availability of funds, which will be granted on a first-come-first-serve basis.

Eligibility criteria. As per Executive Committee Decision 17/7, only those enterprises created after 25th July 1995 will be considered for participation in the project.

Additionally, for enterprises from the commercial and industrial sector, the following conditions will be required:

- Detailed proposal for conversion, including complete description of equipment to be replaced or retrofitted, and the considerations for the technology choice,
- Detailed evaluation of the costs of the conversion proposed,
- Detailed evaluation of the new operational costs after conversion,
- Detailed evaluation of performance and efficiency of the refrigeration system after conversion,
- Declaration that all international and national norms and regulations for handling of the new refrigerant were and will be taken into account.

Calculation of incentive

The incentive to be paid will be calculated based on the average CFC consumption for servicing the equipment in question, in year 2002, or the last 3 years of operation, depending on the company's choice and ability to provide satisfactory documentary proof. The ODS consumption will be weighed by its ODP (1 for CFC11 and CFC12, and 0.34 for R502).

Table 6.1 below presents a proposed range for incentives to be paid according to the weighed CFC consumption being displaced.

Table 6.1: Proposed incentive range for commercial and industrial sectors

Weighed ODS consumption (Kg)	Incentive (US\$)	Cost effectiveness US\$/Kg	
		From	Up to
<10	500	50	50
10-20	1,000	100	50
20-50	2,500	125	50
50-100	5,000	100	50
100-200	7,500	75	38
200-300	10,000	50	33
300-400	12,500	42	31
>400	15,000	38	38

The fishing fleet sub-sector will have the highest priority within the project. Under the present plan it could be envisaged that well over half the fishing fleet would be able to replace their CFC-based refrigeration system, if the incentive programme is administered under a prudent approach for optimization of resources, promoting the replacement or retrofitting of several systems per enterprise, as follows:

Weighed ODS consumption (Kg)	Incentive (US\$)	Number of equipments per enterprise (1)	Average incentive per equipment replaced, from	Average incentive per equipment replaced, to	Maximum number of equipments replaced, from (2)	Maximum number of equipments replaced, to (2)
<10	500	0	NA	NA	NA	NA
10-20	1,000	0	NA	NA	NA	NA
20-50	2,500	0	NA	NA	NA	NA
50-100	5,000	1	5,000	5,000	34	34
100-200	7,500	2-3	3,750	2,500	45	68
200-300	10,000	3-5	3,333	2,000	51	85

Weighed ODS consumption (Kg)	Incentive (US\$)	Number of equipments per enterprise (1)	Average incentive per equipment replaced, from	Average incentive per equipment replaced, to	Maximum number of equipments replaced, from (2)	Maximum number of equipments replaced, to (2)
300-400	12,500	5-7	2,500	1,786	68	95
>400	15,000	>7	2,100		81	

(1) Based on an average capacity of 57 Kg. per system

(2) Based on a total incentive fund of US\$ 170,000

The total funds to be allocated for this purpose has been estimated in US\$ 200,000 based on the number of enterprises and the average ODS consumption of each enterprise in the sector.

Applications for incentive

Enterprises submitting applications for incentive will be able to do so only once, in order to increase cost effectiveness of the grant. The application can be done in the form of a replacement plan spread over 4 years at the most, but always within the time of implementation of the project.

Baseline Equipment

Applications for incentives must contain information describing the current refrigeration equipment including nature of the equipment, model, brand, year that the equipment was installed, price at purchase, serial number, capacity, ODS-charge, etc. Copies of the invoice should be attached to the application, if available.

Recovery and recycling of CFC charge in the baseline equipment

The CFCs or R-502 refrigerant charge in the existing equipment that is to be replaced, or retrofitted, must be recovered, and recycled (if feasible). This should be co-coordinated with the National Ozone Unit.

Payment modality

The end users will be paid up to 50% of the agreed incentive once their application has been accepted and the corresponding contract signed. The rest will be paid upon satisfactory completion of the conversion, destruction of the replaced equipment, if applicable, and acceptance of required documentation.

Monitoring

Project monitoring will be done within the RMP Update monitoring project being proposed in Annex IV of the main RMP Update document. The sustainability of this project will be ensured through 1) Destruction of the CFC-based equipment, 2) Periodic monitoring visits to ascertain the use of alternative refrigerants, and 3) Penalty measures for use of CFCs by MF-assisted users, through contractual clauses or ad-hoc legislation.

6. Indicative Project Budget

The budget for the project is indicated in table 6.1 below

Table 6.1: Project costs for incentive programme for commercial and industrial refrigeration sector

Description	US\$
International consultant to provide advice on set up of project	0
Local refrigeration consultant for detailed project design and implementation (3 years, 1/3 time) (1)	18,000
Local technician to design and implement demo projects in fishing sector (1/2 year)	0
Local legal consultant for contracts and other legal arrangements (3 years, conventional time) (2)	0
Local travel and other expenses	5,000
Project advertisement	2,000
Incentives (Substitution of 36.5 ODP Tonnes)	175,000
Contingency	0
TOTAL	200,000

(1) The local refrigeration consultant should be the same for all three refrigeration projects and his cost has been prorated accordingly.

(2) The local legal consultant should be the same for the two refrigeration projects that require legal consultant, and his cost has been prorated accordingly.

7. Time frame and milestones

Following, tables 7.1 and 7.2 present the project timetable and milestones respectively

Table 7.1: End User Incentive Project Timetable

Year	2003				2004				2005				2006				2007				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Project approval					X																
Local contracts, other formalities					X	X															
Project detailed/set up						X	X														
Project advertisement							X														
Demo project in fishing sector							X	X													
Application approvals and contracts							X	X	X			X	X			X	X				
Project implementation									X	X	X	X	X	X	X	X	X				
Annual evaluation					X					X				X							X
End of project																					X
Final report																					X

Table 7.2: End User Incentive Project milestones

Time*	Milestones
12 months	Local contracts awarded, project advertised to the sector and detailed project set up
24 months	2/3 of expected companies with signed agreements
36 months	ODS reduction achieved

* Time from start of project

ANNEX II: Technical Assistance for the Refrigeration Servicing Sub-sector**PROJECT COVER SHEET**

COUNTRY:	Costa Rica
SECTORS COVERED:	Refrigeration sector
PROJECT TITLE:	Technical Assistance for the Refrigeration Servicing Sub-sector
IN CURRENT BUSINESS PLAN	YES
SECTOR/SUB-SECTOR:	Refrigeration servicing sector
PROJECT DURATION:	36 months
PROJECT IMPACT:	46.00 ODP tonnes
MP baseline (Annex A Group I)	250.33 ODP tones
Selected remaining unfunded consumption as per Excom Decision 35/57	162.90 ODP tonnes
Current consumption (2002)	137.32 ODP tonnes
Refrigeration sector consumption	137.32 ODP tonnes
Servicing sector consumption	137.32 ODP tonnes
PROJECT COST	US\$ 180,000
GOVERNMENT COUNTERPART	In kind
REQUESTED GRANT TO MLF	US\$ 180,000
GRANT EFFECTIVENESS	US\$ 3.91/Kg.
IMPLEMENTING AGENCY SUPPORT COSTS	US\$ 16,200 (9%)
TOTAL COST OF PROJECT TO MLF	US\$ 196,200
LOCAL OWNERSHIP	100%
EXPORT COMPONENT	0%
MONITORING MILESTONES	Included in the project
IMPLEMENTING AGENCY	UNDP
NATIONAL COORDINATING AGENCY:	Government Ozone Commission, Ministry of Environment

PROJECT SUMMARY: The project will provide an all-inclusive assistance to the refrigeration equipment servicing sector through 1) A R&R programme for 50% of the fishing fleet, 2) A complement to the R&R programme for the MAC sector, 3) Strengthening of the R&R project for the domestic and commercial sector, 4) Assistance programme for promoting the use of nitrogen as a flushing agent, and 5) Programme for storage of non-recyclable CFC12 until a permanent solution for CFC destruction is found.

IMPACT OF THE PROJECT ON THE COUNTRY'S MONTREAL PROTOCOL OBLIGATIONS: The project will eliminate the consumption of 46 ODP tonnes of CFC, thus contributing to the efforts to meet the country's 2005 and 2007 CFC reduction obligations under the Montreal Protocol.

PROJECT DESCRIPTION

1. Objective

The project's objective is to establish a programme for assistance to the refrigeration equipment-servicing sector, in order to promote reduction of CFC consumption and support the efforts to meet the country's forthcoming MP CFC reduction obligations in years 2005 and 2007.

The technical assistance programme will consist of the following projects:

- Project for Recovery and Recycling of CFC12 that incorporates the following sub-sectors:
 - Fishing fleet: covering approximately 50% of the equipment that use CFC12 and do not qualify for the incentives programme, with an expected impact of 15 ODP tonnes,
 - MAC: complementing the previous programme by US EPA that covered 17 workshops, with an expected impact of 10 ODP tonnes,
 - Commercial and domestic: complementing the previous R&R programme for this sector, with an expected impact of 5 additional ODP tonnes.
- Project for substitution of CFC11 as a cleaning agent for refrigeration equipment through the granting of "nitrogen kits" to 50 workshops, with an expected impact of 10 ODP tonnes,
- Project for temporary storage of irrecoverable CFC12 that necessarily has to be stored until a permanent solution for CFC destruction is found, with an expected impact of 6 ODP tonnes of avoided emissions in the first 2 years.

2. Background

The refrigeration-servicing sector is almost the exclusive consumer of CFCs in Costa Rica, since the manufacturing of refrigeration equipment based on CFCs practically ceased in 1998. Therefore, more than 99 % of CFC consumption is attributed to the refrigeration servicing sector, including consumption of CFC11 for cleaning purposes, as shown in table 2.1 below.

Table 2.1: Annex A Group I CFC consumption in Costa Rica in year 2002 (ODP t.)

SECTOR	SUB-SECTOR	CFC11	CFC12	CFC115	TOTAL
Refrigeration	Servicing	12.16	119.50	4.86	136.52
	Manufacturing	0.00	0.80	0.00	0.80
TOTAL		12.16	120.30	4.86	137.32

Source: ODS Import Licensing System and Customs records

The national RMP survey has determined an approximate breakdown of CFC consumption in the refrigeration-servicing sector, among the different sub-sectors, as shown in table 2.2 below.

Table 2.2: Refrigerant installed base and annual consumption

Sector	Installed refrigerant (m. Kg.)	Annual consumption (m. Kg.)	Percentage of total
Domestic refrigeration	110,344	11,034	9.25%
Commercial refrigeration	43,306	10,827	9.07%
Mobile air conditioning	106,869	32,060	26.87%
Fishing fleet	14,369	63,977	53.62%
Refrigerated transport	1,939	274	0.23%
Industrial refrigeration	2,080	1,153	0.97%
Total	278,907	119,325	100.00%

Source: National RMP survey

The difference between this figure and the one obtained through the ODS Import Licensing System and Customs records is attributed to the margin of error that is inherent to this type of survey, and the reluctance of some companies to provide information, but this serves to provide an idea of the relative importance of each sub-sector with regard to CFC consumption. In order for Costa Rica to be able to comply with its forthcoming obligations under the Montreal Protocol it must concentrate its actions on the activities that are responsible for the highest CFC consumption.

Previous projects

Under the Multilateral Fund

1) The "Implementation Of A National Programme For Recovery And Recycling Of Refrigerant" was approved under the MF in year 1992, and was initially designed to eliminate the use of 37 ODP tonnes of CFC through R&R in the domestic and commercial refrigeration sectors. Annual CFC reduction has been 18 ODP tonnes. The project distributed 120 recovery machines and 6 recycling machines among the workshops handling the highest volume of operations.

Among the lessons learned from this project we can mention:

- a) The recycling centers report that one of the reasons they have not been able to recycle more is the high cost of the filters for acid and humidity in the recycling machines, a problem which is also reported for the recovery operation, and
 - b) The technicians involved in the project also report that the recycling machines selected for the project were all the same model, which was not necessarily the most suitable for each and every type of refrigeration equipment being serviced.
- 2) The "MAC and Refrigerated Transport Demonstration Project" was approved under the MF in year 1996 and has reduced 8 ODP tonnes of CFC per year, out of the

expected 10 ODP tonnes of CFC. The project distributed 17 recovery and recycling machines among equal number of MAC servicing workshops.

The main lessons learned from the project are:

- a) The workshops involved in the project report that the equipment selected for the project responded to all their needs and this suitability has created an incentive for the use of the equipment, which leads to conclude that selection of the appropriate equipment should be a primary concern in the design of this type of projects, and
- b) The workshops also point out that the project should have covered a much bigger number of workshops handling MACs in order to have a more significant and lasting effect.

By Swisscontact Services

Swisscontact Services implemented a "Pilot Umbrella Project for the Use Of Hydrocarbons As Alternative Refrigerants" from 1995 to 1998, which consisted of the following sub-projects:

1) The "Pilot Sub-project for the use of hydrocarbons in domestic refrigeration" was initiated in year 1995 with the objective of demonstrating the functionality of hydrocarbons (Propane-Isobutane 50-50) as an alternative refrigerant in the domestic refrigeration sector. The project achieved the "Drop-in" conversion from CFC to hydrocarbons, of 40 domestic refrigerators, and trained the technical personnel of 10 servicing workshops belonging to the Association of Industrial Maintenance Workshops (APTAMA, by its initials in Spanish).

2) A sub-project for "Refrigerant recovery and recycling with national equipment" was implemented in year 1996, with the objective of providing the small servicing workshops with an economic alternative to recycling. Under the project 40 R&R machines were nationally manufactured; and 60 technicians were trained in the use of HC as refrigerants.

3) A "Pilot sub-project for conversion to the use of HC of a cooling tank at Empresas Dos Pinos" was implemented in year 1997. The project intended to later convert 1,000 cooling tanks for milk containment.

The project concluded in year 1998 and the most important lessons learned were:

- a) The use of HCs in domestic refrigeration is economic and of easy application,
- b) There is no availability in the country of HCs appropriate for use in refrigeration,
- c) There is no legislation in the country that would support the use of HCs as refrigerants, and
- d) Present servicing and maintenance practices of refrigeration technicians are not suitable for the use of flammable refrigerants.

Fishing sector

The fishing fleet requires particular attention since it is, by far, the highest CFC consuming sector in Costa Rica. This is due, to a great extent, to the economic crisis affecting the sector, which in turn explains that the sector counts with an installed base of refrigeration-equipment, which is obsolete and poorly maintained.

According to the authorities of the Fishermen's Chamber of Puntarenas, approximately 50% of the refrigeration equipment in the fishing fleet has reached the end of its useful lifetime but continues to operate. An R&R programme is an option to reduce the unnecessary CFC emissions and waste in these equipments. Figure 2.3 below summarizes the characteristics of the sector.

Table 2.3: Refrigerant installed base and annual consumption for maintenance in the fishing sub-sector in Costa Rica

Type of ship	Installed refrigerant (Kg.)		Consumption per year (Kg.)	
	CFC12	HCFC22	CFC12	HCFC22
FI y SI	3,953	206	62,415	100
AA	10,416	2,604	1,562	390
	14,369	2,810	63,977	490

Source: Inopesca and National RMP survey

(1) Types of ships: Manual, advanced scale (AA), Semi-industrial (SI), Industrial fleet (FI)

Mobile Air Conditioning sector (MAC)

The MAC sector is the second most important CFC consuming sector in Costa Rica. This sector has increased its dependency on CFC in the last few years, due to the import of used cars equipped with CFC-based MAC systems. The import of used cars is the only means by which many Costa Ricans can have access to a vehicle, but the Government is trying to limit at least the age of the vehicles, since cars manufactured after 1994 usually come equipped with HFC-based MACs.

This sector was covered by a small demo project started in year 1996 that had a very limited reach since it only covered 17 workshops. This project should be complemented in order to provide ampler coverage to the sector whose characteristics are presented in table 2.4 below.

Table 2.4: CFC used for maintenance of MAC systems in Costa Rica

Vehicles model 1985-1993	472,670
Vehicles with CFC12 MACs	133,454
Installed base of CFC12 in metric Kg.	106,869
Amount of CFC12 used for servicing in metric Kg./year	32,060

Source: Calvo Coin, Otto. Informe Parque Automotor Nacional y consumo de CFC en los aires acondicionados. Comisión Gubernamental del Ozono. MINAE

Commercial and domestic sector

This sector was also covered by a previous R&R project that established 6 recycling centers distributed throughout the country, and provided 120 recovery machines distributed among approximately an equal number of workshops. At present, its level of operation is low, due mainly to the operational costs of the recycling process.

The servicing sector continues to use CFC11 as a flushing agent. One of the main reasons reported is the expensive deposit fee for the high-pressure nitrogen cylinder and the lack of handy small packaging for portable use in servicing visits.

A common question that has arisen during the interactions with the servicing workshops, particularly in relation with the R&R projects, has been that of what to do with the refrigerant that cannot be recycled or even recovered. A project is being proposed for the temporary storage of such irrecoverable CFC until a permanent solution for CFC destruction is found.

3. Project description

The Technical Assistance for the Refrigeration Servicing Sub-sector is composed of the following projects:

3.1 R&R project for the fishing fleet:

This project is of particular importance for the country in meeting its future MP obligations due to the characteristics of this sector. The project will provide technical assistance to approximately 50% of the fishing fleet that will not be covered by the incentives projects included in this RMP. The objective will be to reduce unnecessary refrigerant emissions and waste by improving the piping, providing R&R equipment, training the technical personnel in its operation, providing electronic equipment for leak detection, and providing high-pressure nitrogen cylinders and regulators.

According to the national RMP survey, there are approximately 10 independent technicians in charge of the maintenance of the refrigeration equipment in all the fishing fleet. Due to economic constraints these workshops are poorly equipped and would need to receive assistance from the project to have the necessary equipment to observe good servicing practices.

The equipment needed to implement the proposed project is shown in table 3.1 below.

Table 3.1 Equipment for R&R project in the fishing fleet

Quantity	Description	Estimated cost US\$
1	CFC12 Recycling machine, 110 volts, 60Hz (1)	6,000
5	100 lbs. Cylinders, with OFP, for recycling centers.	1,200
1	Refrigerant purity identifier (CFC12)	1,500
1	Set of spare parts for recycling equipment for 4 years of operation.	1,500
10	Portable recovery machine, CFC12, 110 volts, 60 Hz. (2)	20,000
30	30 lbs. Cylinders with OFP. 3 for each recovery machine.	3,000
10	Set of spare parts for recovery machine for 4 years of operation.	5,000
10	Set of manometers for high and low pressure with hoses, for CFC12, graded in psig.	1,000
10	10 Nitrogen cylinders, 220 ft ³ with regulator and hoses (3)	5,000
10	Electronic leak detectors for CFC12	3,000
10	Vacuum pumps 110 volts, 60 Hz 6CFM.	4,000
	Total	51,200

(1) The normal cost of R&R equipment is around US\$ 3,000, but due to the high volumes of refrigerant handled in each operation in this sector, there is the need for a heavy-duty machine, with higher capacity and higher speed of operation. The price quoted is for a Robinair equipment of such characteristics, available in Costa Rica.

(2) The normal cost of portable recovery machines is around US\$ 950 to 1,200, but considering the volume of refrigerant contained in refrigeration systems in ships, an equipment with higher capacity has been quoted.

(3) Besides its cleaning applications, nitrogen can be used in this type of systems for equipment pressurization for leak detection.

3.2 Complement to R&R project for the MAC sector

The MAC sector is concentrated in San Jose, where there are an estimated 50 MAC workshops. The project intends to address the very high consumption reported in this sector by incorporating 20 additional workshops to the R&R programme.

The project will furnish 20 MAC workshops with equipment for recovery, recycling and recharge of CFC12, including the training of technicians in equipment operation and handling procedures. The 17 MAC workshops that already have the equipment will also receive operating supplies and re-training on the equipment. It is advisable to buy the same type of equipment that was used for the previous MAC project since the workshops have reported that these have worked satisfactorily and are the appropriate model for the type of application. The equipment required for the project is shown in table 3.2 below.

Table 3.2: Equipment for R&R project in the MAC sector

Quantity	Description	Estimated cost US\$
20	CFC12 Recovery, recycling and recharging machine, 110 volts, 60Hz (1)	50,000
40	30 lbs. cylinders with ODP	4,000
20	Set of spare parts for recovery machine for 4 years of operation	10,000
20	Electronic leak detectors for CFC12	6,000
	Total	70,000

(1) Same type of equipment used in the first phase of the project

3.3 Complement to R&R project in the commercial and domestic sector

Although CFC consumption in these sectors is not as significant as in other sectors, it is considered that the original R&R system should be reinforced in order to help sustain its results. The project intends to provide technical assistance for the re-assignment of recycling equipment (according to most common type of refrigeration equipment being serviced, and suitability of R&R equipment), refreshing the R&R operating skills of technicians involved, and donation of a set of spare parts and materials necessary for the correct operation of the equipments, including additional oil filters that will be placed before the filters for acid and humidity in order to increase the duration of the latter. Table 3.3 below indicates the cost of the materials and equipment needed for this project.

Table 3.3 Equipment for complement to R&R project in the commercial and domestic sector

Quantity	Description	Estimated cost US\$
6	Set of spare parts for recycling machine for 4 years of operation	3,000
120	Set of spare parts for recovery machine for 4 years of operation	12,000
	Total	15,000

3.4 Project for substitution of CFC11 as a cleaning agent

The servicing sector continues to use CFC11 as a cleaning and flushing agent for refrigeration equipment and the procedure itself requires that the gas be vented to the atmosphere. In year 2002 CFC11 consumption was 12.16 ODP tonnes, all of it used for this purpose.

This project will provide technical and financial assistance to the refrigeration-servicing sector in order to substitute the use of CFC11 for nitrogen as cleaning agent. The project will provide, on a contractual loan basis, a "nitrogen kit" to an

estimated 50-servicing workshops. The workshops will be selected among those with the highest reported use of CFC11, and lowest purchasing power.

The "RMP Monitoring Programme" will include the corresponding verification of actual use of nitrogen and non-use of CFC11 in the workshops, and the contract with each beneficiary will include clauses that will entail equipment relocation in case of non-compliance.

The "nitrogen kit" will consist of: the deposit fee for a high-pressure nitrogen cylinder, the initial nitrogen charge of the cylinder, the high-pressure regulator, and the hoses. The approximate cost of this kit is indicated in table 3.4 below.

Table 3.4: Equipment for project for substitution of CFC11 as a cleaning agent

Quantity	Description	Estimated cost US\$
50	Deposit fee for 220-foot ³ high-pressure cylinders.	6,000
50	Initial N ₂ charge	1,000
50	Manometer and hoses	18,000
	Total	25,000

The success of this project will require regular monitoring of the use of CFC11 for cleaning purposes as described in the "RMP Monitoring Programme" included in Annex VII of this document.

3.5 Project for temporary storage of irrecoverable CFC12

As a result of previous R&R projects the servicing sector has identified the need to establish a system for recollection and storage of irrecoverable CFC12, since approximately 10 to 15 % of the refrigerant cannot be recycled with conventional equipment available in the country.

The project will establish storage centers located preferably in the recycling centers, specific servicing workshops or points of sale for spare parts and refrigerants across the country. The main ODS importers will not be considered since their role in the previous R&R project was not successful.

The project will cover the cylinders for storage, the equipment and tests needed to determine the suitability of the gas for storage, the equipment needed to transfer the refrigerant to the storage cylinders and the storage space for the cylinders.

It is estimated that there is the need for 10 storage centers and that the space needed to house two 1000 lbs. cylinders is 6 sq. m. The cost of storage space is approximately US\$ 10 to 12 per sq. m. per month. The costs for the elements of this project are included in table 3.5 below.

Table 3.5: Elements for project for temporary storage of irrecoverable CFC12

Quantity	Description	Estimated cost US\$
10	Storage space - 4 years	35,000
30	1000 lbs cylinders	30,000
10	Transfer pump	5,000
10	Test equipment	25,000
	Total	95,000

The storage centers will study the possibility of ensuring the continuity of the programme through possible sale of the gas to reclaiming centers in nearby countries such as Venezuela, or Brazil.

4. Indicative Project Budget

A local refrigeration expert will be contracted to carry out the detailed design and implementation of all the refrigeration projects within the RMP, and who will also act as coordinator of all the three projects.

The budget for each of the projects within the programme is indicated in the tables below.

Table 4.1: Costs for R&R project for the fishing fleet

Description	US\$
National consultant for technical assistance, training and project implementation (3 years, 1/3 time, 1/5 portion) (1)	3,600
Legal consultant for contract handling and others (3 years, conventional time) (2)	0
Local travel	1,900
Equipment	51,200
Sundries	0
Government counterpart*	
Contingencies	0
Total	56,700

Table 4.2: Costs for Complement to R&R project for the MAC sector

Description	US\$
National consultant for technical assistance, training and project implementation (3 years, 1/3 time, 1/5 portion) (1)	3,600
Legal consultant for contract handling and others (3 years, conventional time) (2)	0
Local travel	2,000
Equipment	70,000
Sundries	0
Government counterpart*	
Contingencies	0
TOTAL	75,600

Table 4.3: Costs for Complement to R&R project in the commercial and domestic sector

Description	US\$
National consultant for technical assistance, training and project implementation (3 years, 1/3 time, 1/5 portion) (1)	3,600
Legal consultant for contract handling and others (3 years, conventional time) (2)	0
Local travel	2,000
Equipment	14,000
Sundries	0
Government counterpart*	
Contingencies	0
TOTAL	19,600

Table 4.4: Costs for Project for substitution of CFC11 as a cleaning agent

Description	US\$
National consultant for technical assistance, training and project implementation (3 years, 1/3 time, 1/5 portion) (1)	3,600
Legal consultant for contract handling and others (3 years, conventional time) (2)	0
Local travel	1,500
Equipment	9,000
Sundries	0
Government counterpart*	
Contingencies	0
TOTAL	14,100

Table 4.5: Costs for Project for temporary storage of irrecoverable CFC12

Description	US\$
National consultant for technical assistance, training and project implementation (3 years, 1/3 time, 1/5 portion) (1)	3,000
Legal consultant for contract handling and others (3 years, conventional time) (2)	0
Local travel	2,000
Equipment and space	9,000
Sundries	0
Government counterpart*	
Contingencies	0
TOTAL	14,000

* Government counterpart is by way of staff time and meeting facilities, from Government offices other than the NOU

(1) The local refrigeration consultant should be the same for all three refrigeration projects and his cost has been prorated accordingly

(2) The local legal consultant should be the same for the two refrigeration projects that require legal consultant, and his cost has been prorated accordingly

Table 4.6 Consolidated budget for TA for Refrigeration Servicing sector

Project	Gov. input (US\$)*	MF grant (US\$)
R&R project for the fishing fleet		56,700
Complement to R&R project for the MAC sector		75,600
Complement to R&R project in the commercial and domestic sector		19,600
Project for substitution of CFC11 as a cleaning agent		14,100
Project for temporary storage of irrecoverable CFC12		14,000
TOTAL		180,000

* The Government input will be provided by way of staff time and meeting facilities, from Government offices other than the NOU

5. Cost effectiveness of projects

The cost effectiveness of the 5 projects that constitute the programme is presented in table 5.1 below

Table 5.1: Cost effectiveness of projects within the Technical Assistance for the Refrigeration Servicing Sub-sector

Project	Cost US\$	CFC Kg.	CE US\$/Kg.
R&R project for the fishing fleet	56,700	15,000	3.78
Complement to R&R project for the MAC sector	75,600	10,000	7.56
Complement to R&R project in the commercial and domestic sector	19,600	5,000	3.92
Project for substitution of CFC11 as a cleaning agent	14,100	10,000	1.41
Project for temporary storage of irrecoverable CFC12	14,000	6,000	2.33
Total	308,200	46,000	3.91

6. Time frame and milestones

Following, tables 6.1 and 6.2 present the project timetable and milestones respectively

Table 6.1: Timetable

Year	2003				2004				2005				2006				2007			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Project approval					X															
Local contracts, other formalities					X	X														
Project detailed set up					X	X														
Project advertisement						X														
Reception of applications							X													
Selection of participating workshops							X	X	X											
Signature of agreements							X	X	X											
Project implementation								X	X	X	X	X	X	X	X	X	X	X	X	
Annual evaluation							X			X				X						X
End of project																				X
Final report																				X

Table 6.2: Milestones

Time*	Milestone
12 months	Project set up in detail, all participating workshops selected and agreements signed
24 months	First year of implementation plan successfully implemented
36 months	CFC reduction achieved

* Time from start of project

ANNEX III: Technical Assistance for Certification and Licensing of Refrigeration Technicians

PROJECT COVER SHEET

COUNTRY:	Costa Rica
SECTORS COVERED:	Refrigeration servicing sector
PROJECT TITLE:	Technical Assistance for Certification and Licensing of Refrigeration Technicians
PROJECT DURATION:	48 months
PROJECT IMPACT:	Encouraging refrigeration technicians to reduce their use of CFCs by the adoption of good practices
MP baseline (Annex A Group I)	250.33 ODP tonnes
Selected remaining unfunded consumption as per Excom Decision 35/57	162.90 ODP tonnes
Current consumption (2002)	137.32 ODP tonnes
Refrigeration sector consumption	137.32 ODP tonnes
Servicing sector consumption	137.32 ODP tonnes
PROJECT COST:	US\$ 100,000
GOVERNMENT COUNTERPART	In kind
REQUESTED GRANT TO MLF	US\$ 100,000
IMPLEMENTING AGENCY SUPPORT COSTS	US\$ 9,000 (9%)
TOTAL COST OF PROJECT TO MLF	US\$ 109,000
IMPLEMENTING AGENCY:	UNDP
NATIONAL COORDINATING AGENCY:	Government Ozone Commission, Ministry of Environment

PROJECT SUMMARY: The project will promote the establishment of a "Refrigeration Technician Certification and Licensing System" by way of technical and financial assistance, with the objective of encouraging the use of good refrigeration servicing, maintenance and containment practices. The "Refrigeration Technician Certification and Licensing System" will, at the same time, facilitate the monitoring and enforcement of such practices.

IMPACT OF THE PROJECT ON THE COUNTRY'S MONTREAL PROTOCOL OBLIGATIONS: Through the establishment of the "Refrigeration Technician Certification and Licensing System" and its respective enforcement system, refrigeration technicians will be compelled to reduce their use of CFCs by the adoption of good maintenance, servicing and containment practices, thus contributing to the efforts to meet the country's 2005 and 2007 CFC reduction obligations under the Montreal Protocol.

PROJECT DESCRIPTION

1. Objective

The project will provide technical and financial assistance to establish a "Refrigeration Technician Certification and Licensing System" and its corresponding enforcement system, with the ultimate objective of encouraging and or mandating refrigeration technicians to use good refrigeration servicing, maintenance and containment practices, which in turn will reduce unnecessary consumption of virgin CFC. The "Refrigeration Technician Certification and Licensing System" will, at the same time, facilitate the monitoring and enforcement of such practices.

The ultimate objective of the "Refrigeration Technician Certification and Licensing System" is to make good servicing practices mandatory for all refrigeration technicians, through a Technician Licensing Scheme that would license or authorize technicians to perform business practices, including purchase of refrigerants, under a set of agreed rules. The Technician Licensing Scheme would also include sanctions for those technicians that do not comply with the agreed rules. It is envisaged though, that in order to avoid undue harm to the informal sector of the economy, the Technician Licensing Scheme will have to be combined with a less restrictive Certification Scheme, which only encourages and promotes good practices.

The project will train 60%, that is 600 out of the 1,000 refrigeration technicians in the country. This will cover approximately 180 out of the 300 refrigeration-servicing workshops in the country.

2. Background

As there is no official requirement for refrigeration technicians to register with any national authority, and therefore, there are no official registries of refrigeration technicians, it is very difficult to quantify their precise number. Based on the information provided by the servicing workshop owners and the technicians themselves, there are approximately 1,000 active refrigeration technicians in the country, including those that have had a formal education and those that have only had on-the-job training. This also includes, of course, those that work independently and those that work for servicing companies and industries.

The formally constituted servicing workshops handling domestic, commercial, air conditioning and MAC systems, are estimated in 300 countrywide.

Even though the formally trained refrigeration technicians have a very good technical level, there is a persistence of bad practices in the field, such as, among others, a) unnecessary flushing of equipments, which is done as a standard practice during maintenance, b) flushing with CFC11, and, in some sub-sectors more than others, c) topping up the refrigerant contents without repairing the leaks.

The lack of adequate equipments and tools and the bad servicing and maintenance practices are characteristic of this sector, thus causing a higher CFC consumption through unnecessary refrigerant emissions and waste. This situation is expected to continue unless the sector receives the necessary technical and financial assistance.

As there are at least two incipient refrigeration technicians associations, the project will try to involve them in the implementation process, thus contributing to the formalization of these associations. There are also several good technical training institutes which should be academically involved in the certification seminars, specially the INA, and perhaps also in the certification procedures, along with the National Institute of Technical Norms (Inteco, by its initials in Spanish).

3. Activities planned

In order to establish the "Refrigeration Technician Certification and Licensing System", the following activities will be necessary:

- Adaptation of standard "Codes of Good Practices in Refrigeration" to the special needs and characteristics of the country,
- Formal consultation with the sector on proposed "Codes of Good Practices in Refrigeration" for Costa Rica,
- Detailed design of "Refrigeration Technician Certification and Licensing System", including normal procedures and enforcement measures,
- Formal consultation with legal experts in charge of redesigning legal framework for CFC phase out,
- Formal agreement with refrigeration servicing sector on modalities for implementation of "Refrigeration Technician Certification and Licensing System",
- Start of "informal" implementation of "Refrigeration Technician Certification and Licensing System",
- Start of process for legal inclusion of "Refrigeration Technician Certification and Licensing System" in legal framework for CFC phase out in Costa Rica (included in the project "Technical Assistance for Strengthening of Legal Framework", in Annex IV of this document).

The detailed design of the "Refrigeration Technician Certification and Licensing System" will require foreign expertise from a country where a system of this type is already under operation, such as the US. It is envisaged that the cooperation of US EPA will be sought. The foreign expert will need several missions to the country in order to first advice local experts on the adaptation to local conditions, and later to advice on details of system set up and implementations. Translation of standard information and documents on the subject will also be needed.

The process for implementation of the "Refrigeration Technician Certification and Licensing System" will require the following activities:

- Initial 2-day seminar and examination (Maximum 20 participants),
- Award of certification or license to the technician,

- Yearly review of technician compliance with "Codes of Good Practices in Refrigeration".
- Ratification or revocation of certification or license.

There will be a total of 30 seminars, lasting two days each and with a maximum of 20 participants per seminar, for a total of 600 technicians certified or licensed. The local refrigeration consultant in charge of the project, in cooperation with a professional instructor, possibly from INA, will conduct the first seminar in order to train the trainers of the remaining seminars.

The seminars for technician certification or licensing will address the following issues:

- Overview of ozone issues,
- Presentation of projects being implemented within the RMP for Costa Rica,
- Presentation of present and future legal framework for CFC phase out in Costa Rica,
- Review of general good maintenance, servicing and containment practices in refrigeration,
- Effective use of nitrogen as cleaning and flushing agent,
- Effective use of R&R techniques,
- Effective use of reporting and monitoring forms necessary for the projects and systems being implemented for the sector.

A local refrigeration expert will be contracted to carry out the detailed design and implementation of all the refrigeration projects within the RMP, and who will also act as coordinator of all the three projects.

4. Indicative Project Budget

The budget for the project is indicated in table 4.1 below

Table 4.1: Indicative project budget

Item	Government input* (US\$)	MLF grant (US\$)
Foreign expertise on Technician Certification Licensing Systems detailed design and set up, including translation costs		15,000
Local refrigeration consultants for detailed project design and implementation ((3 years, 1/3 time, plus one year full time)) (1)		31,000
Local travel and other expenses		5,000
Technician Licensing and Certification seminars and procedures (30 in total)		45,000
Project advertisement		4,000
Government input *		
TOTAL		100,000

* The Government input will be provided by way of staff time and meeting facilities, from Government offices other than the NOU
 (1) The local refrigeration consultant should be the same for all three refrigeration projects, and his cost has been prorated accordingly

5. Time frame and milestones

Following, tables 5.1 and 5.2 present the project timetable and milestones-respectively.

Table 5.1: Timetable

Year Quarter	2003				2004				2005				2006				2007			
	-1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Project approval						X														
Local contracts, other formalities							X													
Project advertisement								X												
Project detailed set up						X	X													
Certification seminars and exams									X		X		X		X		X		X	
Annual evaluation										X		X		X		X		X		X
End of project																				X
Final report																				X

Table 5.2: Milestones

Time*	Milestone
12 months	Local contracts awarded, project advertised to the sector, project set up in detail, first evaluation report
24 months	100 technicians certified, second evaluation report
36 months	100 additional technicians certified, third evaluation report
48 months	100 additional technicians certified, fourth evaluation report

* Time from start of project

ANNEX IV: Technical Assistance for Training of Customs Officers**PROJECT COVER SHEET**

COUNTRY:	Costa Rica
SECTORS COVERED:	Refrigeration servicing sector
PROJECT TITLE:	Technical Assistance for Training of Customs Officers
PROJECT DURATION:	24 months
PROJECT IMPACT:	Better control of ODS imports and exports
MP baseline (Annex A Group I)	250.33 ODP tones
Selected remaining unfunded consumption as per Excom Decision 35/57	162.90 ODP tonnes
Current consumption (2002)	137.32 ODP tonnes
Refrigeration sector consumption	137.32 ODP tones
Servicing sector consumption	137.32 ODP tones
PROJECT COST:	US\$ 90,000
GOVERNMENT COUNTERPART	In kind
REQUESTED GRANT TO MLF	US\$ 90,000
IMPLEMENTING AGENCY SUPPORT COSTS	US\$ 8,100 (9%)
TOTAL COST OF PROJECT TO MLF	US\$ 98,100
IMPLEMENTING AGENCY:	UNDP
NATIONAL COORDINATING AGENCY:	Government Ozone Commission, Ministry of Environment

PROJECT SUMMARY: This project will assist in improving the skills of customs officers in better monitoring and control of ODS imports through the correct implementation of the CFC Import Licensing System and prevention of illegal imports of CFCs, with the purpose of assisting the country in its efforts to comply with the MP obligations.

IMPACT OF THE PROJECT ON THE COUNTRY'S MONTREAL PROTOCOL OBLIGATIONS: This project will help ensure that the country's CFC quota imports are respected, thus contributing to support the efforts to meet the country's 2005 and 2007 CFC reduction obligations under the Montreal Protocol.

PROJECT DESCRIPTION**1. Objective**

The Technical Assistance for Training of Customs Officers has the objective of training customs officers in the monitoring and control of CFC imports through the better implementation of the CFC Import Licensing System, detection of illegal imports of CFC, and providing the main customs entry points with CFC detection equipment that will facilitate this task.

2. Background

The cooperation between the COGO and the Customs Department has been quite efficient to the point that it has been able to implement a way to license ODS imports, through a technical note from the Customs Department, without a lengthy formal procedure by any Ministry. COGO organized a set of informal seminars for the Customs Department in 1998 in order to start the implementation of the technical note # 38.

On the other hand, the formal procedure is now necessary in order to enforce the quota system, and the COGO will create a formal CFC Import Licensing System through a Ministerial Decree, as part of the project "Technical Assistance for Strengthening the Legal Framework" included within this RMP. The Customs Department personnel in charge of directly with monitoring and control of imports will need specialized training on this new system, and on the special considerations needed during the compliance period.

The customs points of entry are distributed across the country, in the country borders with the most significant commercial trade. The most important of these points are: Central, Limon, Puntarenas, Paso Canoas and Peñas Blancas. The least important in terms of possible CFC trade are Santa Maria (airport), Anexión (airport) and Golfito (free port near Paso Canoas). There are also 53 customs deposits, privately managed, which handle all merchandise that has not been processed within 15 days of arrival into the country.

There are a total of 628 employees working for the Customs Department. The ones dealing directly with import controls are a total of approximately 204 customs officers, as follows:

- 105 Technicians in customs operations, level 1, who assign the customs duties, and have followed a college degree of at least 4 years,
- 37 Technicians in customs operations, level 2, same as above,
- 62 Customs handlers, who verify the merchandise.

3. Activities planned

The training programme will be developed in four phases:

- 1) A Train-the trainers phase, carried out by an international expert for 20 selected customs officers supervisors,
- 2) A second phase for training the remaining 184 customs officers,
- 3) A third phase, in parallel with the second phase, for equipping the selected sites with CFC detection equipment, and
- 4) A monitoring phase, carried out within the project "Technical Assistance for Monitoring and Control" included within this RMP.

The courses will develop around the following subjects:

- The problem of ozone depletion;
- The MP, the MF, and the national activities for implementation of the MP in the country, including the RMP;
- The legal framework for implementation of the MP in the country;
- Other international conventions related to ODS and regional trade agreements;
- The new CFC Import Licensing System, related forms and reporting requirements;
- Harmonized System custom codes;
- Illegal trade worldwide on ODS and ODS-containing equipment and products;
- Proper use of CFC detection equipment; and
- Identification of ODS and ODS-containing equipment and products.

The programme will try to institutionalize this training in the two universities that form customs officers, the Universidad de Costa Rica and the Universidad Braulio Carrillo (private) and who will be invited to participate in the train-the-trainers courses.

The programme will include equipping the most critical entry points, a customs lab, and the two universities with CFC detection equipment, requiring a total of 15 CFC detection equipment.

The training programme material utilized will be the Customs Training Manual produced by UNEP under the MF.

Additionally, the project will include the preparation of pocket-size leaflets that will include all the information required by the customs officers to discharge the duties efficiently, such as the HS custom codes for ODSs, the ODS Import Licensing System directives, ODSs most common commercial names, cylinder colors, etc. These leaflets will be distributed initially to all customs officers and will be re-printed periodically.

4. Technical Assistance for Strengthening Legal Framework

In addition to the Custom Training activities, this project contains a component of Technical Assistance to modify and expand the existing legal framework in order to support all the projects and objectives within the Refrigerant Management Plan and specifically achieve: better control of CFC imports and exports, reduced dependency on CFCs, and reduced consumption of CFCs through better refrigeration maintenance and servicing practices.

a) Background

The Import Licensing System presented in the Legal Framework of Costa Rica (Chapter 2, section 5) does not include a quota system, but the quota is being enforced by COGO in a discretionary way. Another problem that needs to be addressed is that the installed base of CFC12 in MAC systems is increasing by 4

tons per year, due to the fact that used CFC-based domestic refrigerators and cars are being imported into the country, thus creating an increased dependency on CFCs.

COGO has tried unsuccessfully to establish a more comprehensive legal framework through an all-inclusive decree, and has concluded that there is the need for more consultation with the private sector, in order to obtain support for the measures proposed, and the need to design simpler and more targeted measures that will be much easier to analyze and agree upon by the different Government authorities involved.

All of the above makes it necessary to modify the legal framework, and the following measures, among others, will be considered for implementation:

- Modification and reinforcement of the CFC Import Licensing System,
- Adoption of a "Refrigeration Technician Certification and Licensing System" and corresponding standard "Codes of Good Practices in Refrigeration", as part of the legal framework for CFC phase out in the country,
- Ban on imports of CFCs that are no longer used in the country,
- Ban on imports of refrigeration equipment, old or new, containing or constructed using CFC12 or CFC11,
- Ban on imports of air conditioning equipment, old or new, independent or installed in cars, that uses CFC12 as refrigerant or CFC11 as insulating material,
- Ban on registration of new companies that produce, import or export CFCs,
- Creation of the Consultative Ozone Committee, constituted by representatives from the Ministries of Environment, Health, Agriculture, Public Works, Foreign Affairs, Foreign Trade, Treasure, and Customs Department,
- Regulation of the use of refrigerants,
- Ban on assembly or manufacturing of equipments that function with Annex A substances,
- Import quotas for CFC12 compressors,
- R&R courses mandatory in technical schools,
- Ban on CFC manufacturing and emissions,
- Creation of the "Ozone Friend" Prize for the refrigeration sector.

b) Activities planned

Traditionally, COGO has relied on the Legal Department of the Ministry of Environment for the design of any legal instrument, but this approach has proved lengthy and inefficient, since this Legal Department has to respond to the many demands from all other departments within the Ministry, according to pre-established priorities. In view of the above limitations, and the time constraints imposed by the Montreal Protocol compliance period, a local legal consultant will be contracted to design the laws and regulations needed to support the CFC phase out efforts and counteract the problems that have been identified. COGO will seek the cooperation of customs experts to ensure that the modifications to the

CFC Import Licensing System are viable, and the cooperation of the legal staff of the Ministry of Environment in order to endorse the proposed measures.

The detailed design of the "Refrigeration Technician Certification and Licensing System" will be carried out separately under the project "Technical Assistance for Certification and Licensing of Refrigeration Technicians" which is also included within this RMP, but the insertion within the legal framework will be done under this project once the "Refrigeration Technician Certification and Licensing System" is fully designed and approved by the sectors concerned.

The consultant will also organize the consultative process with the Government and industry sectors concerned with each specific measure, until an agreement is reached and political support is secured. This consultative process will entail:

- Meetings with industry sector representatives to discuss the details of the measures and projects proposed for the refrigeration sector, and propose and draft agreements for cooperation.
- Meetings with Government representatives to discuss the details of the measures and projects proposed for the refrigeration sector, and propose and draft agreements for cooperation.
- Joint meetings of Government and industry representatives to finalize agreements for cooperation.
- Meetings with main technical schools and universities to agree on curricular changes in order to include ozone related issues into their study programmes.

After the process for adoption is started, the consultant will be needed on a conventional basis to follow up on and expedite the process.

5. Indicative Project Budget (Customs Training and Legal Component)

The budget for the project is indicated in table 4.1 below

Table 4.1: Indicative project budget

Item	Government input (US\$) *	MLF grant (US\$)
International customs expert (fees and travel)		10,000
Organization of training courses (10 courses)		20,000
Legal Assistance		10,000
CFC Detection equipment (15 units) (1)		45,000
Preparation of custom leaflets		5,000
TOTAL		90,000

* The Government input will be provided by way of staff time and meeting facilities, from Government offices other than the NOU

(1) The equipment quoted has the capability of identifying the type of refrigerant and the composition of mixtures. Other lower-priced detection equipment can only detect the level of purity of CFC12 for

recycling purposes (>98%). This type of equipment is definitely not suitable for detection of illegal ODS traffic.

6. Time frame and milestones

Following, tables 5.1 and 5.2 present the project timetable and milestones respectively

Table 5.1: Timetable

YEAR QUARTER	2003				2004				2005				2006			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CUSTOMS																
Project approval						X										
Project organization							X									
Equipment procurement								X	X							
Training courses										X	X	X	X	X		
End of project																X
Final report																X
LEGAL ASSISTANCE																
Design of legal measures						X	X	X								
Consultation of legislation with Stakeholders						X	X	X								
Start of enactment process										X	X					
Follow up of enactment process											X	X	X	X		
Enactment															X	

Table 5.2: Milestones

Time*	Milestone
12 months	Project organized and equipment procured
12 months	New legal measures designed and endorsed by stakeholders
24 months	Project completed and all customs officers trained
24 months	Enactment process initiated and well under way
30 months	New legal measures enacted

* Time from start of project

ANNEX-V: RMP Monitoring Programme

PROJECT COVER SHEET

COUNTRY:	Costa Rica
SECTORS COVERED:	Refrigeration servicing sector
PROJECT TITLE:	RMP Monitoring Programme
PROJECT DURATION:	4 years
PROJECT IMPACT:	Ensuring the effectiveness of all the projects proposed with the RMP
MP baseline (Annex A Group I)	250.33 ODP tonnes
Selected remaining unfunded consumption as per Excom Decision 35/57	162.90 ODP tonnes
Current consumption (2002)	137.32 ODP tonnes
Refrigeration sector consumption	137.32 ODP tonnes
Servicing sector consumption	137.32 ODP tonnes
PROJECT COST:	US\$ 60,000
GOVERNMENT COUNTERPART	In kind
REQUESTED GRANT TO MLF	US\$ 60,000
IMPLEMENTING AGENCY SUPPORT COSTS	US\$ 5,400 (9%)
TOTAL COST OF PROJECT TO MLF	US\$ 65,400
IMPLEMENTING AGENCY:	UNDP
NATIONAL COORDINATING AGENCY:	Government Ozone Commission, Ministry of Environment

PROJECT SUMMARY: The RMP monitoring programme will ensure the effectiveness of all the projects proposed with the RMP, by periodic verification of project results, analysis of problems encountered and application of corrective measures.

IMPACT OF THE PROJECT ON THE COUNTRY'S MONTREAL PROTOCOL OBLIGATIONS:
The project will ensure the effectiveness of all the projects proposed with the RMP, thus contributing to the efforts to meet the country's 2005 and 2007 reduction obligations under the Montreal Protocol.

PROJECT DESCRIPTION

1. Objective

The RMP monitoring programme has the objective of ensuring the effectiveness of all the projects proposed within the RMP for Costa Rica, by periodic verification of project results, analysis of problems encountered and application of corrective measures.

2. Background

The Government of Costa Rica will undertake an ambitious Refrigerant Management Plan consisting of 7 different projects. These projects are: 1) Incentive Programme for the Commercial and Industrial End-User Sector, 2) Technical Assistance for the Refrigeration Servicing Sub-sector, 3) Technical Assistance for Certification and Licensing of Refrigeration Technicians, 4) Technical Assistance for Training of Customs Officers, 5) Technical Assistance for Strengthening of Legal Framework, 6) Technical Assistance for Information and Awareness, and 7) RMP Monitoring Programme.

The RMP is tightly designed to ensure compliance with the 2005 and 2007 CFC reduction obligations under the MP. A permanent monitoring programme is needed on a regular basis in order to ensure that corrective actions are taken on time so that the RMP achieves its expected results to enable the country to meet its 2005 and 2007 MP obligations.

3. Activities planned

The RMP monitoring programme will require different types of activities to monitor each of the different sub-projects within the RMP, namely:

- Incentive Programme for the Commercial, Industrial, and Fishing Fleet Refrigeration End-user Sector
 - This project will require few visits to the benefited end users, since monitoring can be done at the project administrative center in order to crosscheck equipment actually destroyed with project registers for equipment replacement. It will require monitoring visits, though, to the benefited end users, in order to check operation conditions of the retrofitted equipment, and actual use of alternative refrigerants.
- Technical Assistance for the Refrigeration Servicing Sub-sector
 - The project for replacement of CFC11 will require a sector consultant to perform quarterly verification of sales of CFC11 to ascertain that the workshops benefited by this programme are not using this substance. It will

- also require visits to the benefited workshops to crosscheck and verify non-use of CFC11.
- The recovery of CFC12 will require a sector consultant to carry out quarterly visits to the service workshops that are participating in the R&R programme, and the recycling centers, to verify, compile and crosscheck the recovered and recycled gas being reported by these workshops. This consultant should be the same for all the programmes directed to the refrigeration-servicing sector.
- The storage of unrecoverable CFC12 will require visits to the storage centers to verify levels and conditions of operations.
- Technical Assistance for Certification of Refrigeration Technicians
 - The certification of technicians will require visits to the servicing workshops in order to verify working modalities, tools used, quantity and type of refrigerants, etc.
- Technical Assistance for Training of Customs Officers
 - A customs expert will monitor the functioning of the CFC Import Licensing System by crosschecking CFC import licenses against customs records and actual bills of lading in order to detect any inconsistencies. The consultant will also participate in the control meetings between the COGO and the Customs Department.
 - The same customs expert will monitor the modified legal framework by completing the verification of customs records concerning the import of used CFC-based cars and refrigerators with a crosscheck at selected points of grocery sales of these articles. Other legal instruments will require specific monitoring activities.

The monitoring activities present many opportunities for economies of scale due to the fact that most of the visits need to be done to the same locations. The key will be a clever design of the activities, data collecting and reporting instruments.

All the monitoring activities should start from the moment of approval of this project, in order to design in detail the monitoring activities, and reporting and evaluating formats, and also to monitor the activity of the sectors before and after the new systems are fully operational for better comparison of results.

4. Indicative Project Budget

The budget for the project is indicated in table 4.1 below

Table 4.1: Indicative project budget

Item	Government input (US\$) *	MLF grant (US\$)
Servicing sector monitoring (Local expert) (1)		45,000
Legal framework monitoring (Local expert) (2)		9,000
Meetings, local travel, etc.		6,000
TOTAL		60,000

(1) Approximate workload will be full time the first year and 1/2 time during 3 more years,

(2) Approximate workload will be 2 weeks every quarter, during 4 years

* The Government input will be provided by way of staff time and meeting facilities, from Government offices other than the NOU

5. Time frame and milestones

Following, tables 5.1 and 5.2 present the project timetable and milestones respectively.

Table 5.1: Timetable

Year	2003				2004				2005				2006				2007			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Project approval					X															
Detailed design of monitoring programme						X	X	X	X											
Monitoring of servicing sector						X		X	X	X	X	X	X	X	X	X	X	X	X	X
Monitoring of legal framework						X		X	X	X	X	X	X	X	X	X	X	X	X	X
End of project																				X
Final report																				X

Table 5.2: Milestones

Time*	Milestone
12 months	First monitoring report
24 months	Second monitoring report
36 months	Third monitoring report
48 months	Fourth monitoring report

* Time from start of project

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APPENDIX 11: GLOSSARY

AC	Air-conditioning
ACOTRA	Costa Rican Association of Refrigeration and Air Conditioning Technicians (1)
ATAPCO	Association of Air Conditioning Technicians that Protect the Ozone Layer (1)
CP	Country Programme for the Phase out of Ozone Depleting Substances
COGO	National Ozone Commission (1)
Excom	Executive Committee of the Multilateral Fund
GDP	Gross Development Product
HCFC	Hydrogenated Chlorofluorocarbon
INA	National Institute of Learning (1)
INCOPESCA	Costa Rican Institute of Fishing (1)
INEC	National Institute of Statistics and Census (1)
INTECO	National Institute of Technical Norms (1)
IS	Institutional Strengthening Project
MAC	Mobile Air conditioning
MLF or MF	Multilateral Fund for the Implementation of the Montreal Protocol
MP	Montreal Protocol
NGO	Non-Governmental Organization
NOU	National Ozone Unit
ODP	Ozone Depleting Potential
ODS	Ozone Depleting Substance
OEM	Original Equipment Manufacturer
PRP	Project preparation project
RMP	Refrigerant Management Plan
R&R	Recovery and Recycling
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USA	United States of America
US EPA	United States Environmental Protection Agency

(1) By its initials in Spanish

