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Executive Committee of
the Multilateral Fund for the
Implementation of the Montreal Protocol

Fifteenth Meeting
Montreal, 13-16 December 1994

COUNTRY PROGRAMME: BARBADOS

This document consists of:

- Comments and Recommendations of the Fund Secretariat
- Country Programme Evaluation Sheet (prepared by the Fund Secretariat)
- Transmittal Letter from the Government of Barbados
- Country Programme Cover Sheet
- Country Programme

COMMENTS AND RECOMMENDATIONS OF THE FUND SECRETARIAT

COMMENTS

1. The Country Programme conforms to the format of the approved guidelines. The Country Programme includes the following four project proposals as annexes:

- Establishment of the Ozone Unit (institutional strengthening);
- Training programme for service technicians in the refrigeration and air conditioning sector;
- Conversion to non-CFC refrigerant of cold chambers in fishing complexes and markets; and
- Project preparation for a national programme for recovery and recycling of refrigerants.

2. Consumption of ODS (38.8 ODP tonnes) is almost exclusively CFC for servicing refrigeration and air-conditioning systems and halon used in portable extinguishers (3.8 ODP tonnes) and in fixed installations (2.8 ODP tonnes) within power-generation stations, and computer and telecommunication facilities.

3. The phase-out schedule proposes a complete phase out in the consumption of halon by the end of 1997 and CFC by the end of 2005. The implementation of the action plan will be supported by public awareness and education campaigns in conjunction with non-governmental organizations, establishing a legislative framework, including regulation of imports and issuing of licenses, banning new installations, equipment or appliances using controlled substances.

4. The Government of Barbados is proposing to phase out the consumption of controlled substances used in the refrigeration of cold chambers in the fishing industry by retrofitting with HCFC-22 refrigerant when feasible; by introducing appropriate alternative technologies for systems where retro-fitting is not a viable option; and by training service technicians in the handling and recovery of CFC refrigerants. The estimated cost of the project is US \$261,000.

5. An amount of US \$146,000 is being requested for institutional strengthening, including US \$10,000 for technical advisors for a three-year period. It is recommended that the request for technical assistance be made at a project level.

RECOMMENDATIONS

6. The Fund Secretariat recommends as follows:

7. To approve the Barbados Country Programme. Approval of the Country Programme does not denote approval of the projects identified therein or their funding levels.

8. In accordance with the Executive Committee decision on implementation of country programmes (UNEP/OzL.Pro/ExCom/10/40, para 135), to request the Government of Barbados to provide information annually to the Executive Committee on the progress of implementation of the country programme. Using the approved format, the initial report, covering the period 16 December 1994 to 31 December 1995, should be submitted to the Fund Secretariat not later than 31 March 1996.

9. To approve the amount of US \$136,000 and US \$17,680 support costs for institutional strengthening, to be included in UNEP's 1994 Work Programme, subject to the following:

The Government of Barbados will report to the Ozone Secretariat its consumption data in accordance with Article 7 of the Montreal Protocol.

10. To request to the Government of Barbados, with the assistance of an implementing agency, to review and, where necessary, redevelop the project proposals contained in the Country Programme in accordance with the relevant Executive Committee guidelines.

BARBADOS COUNTRY PROGRAMME EVALUATION SHEET

National Implementing Agency: Ozone Unit, Ministry of Tourism, International Transport and the Environment

Status of ratification of the Vienna Convention and the Montreal Protocol

	Signature	Ratification	Entry Force
Vienna Convention (1985)		16/Oct/92	14/Jan/93
Montreal Protocol (1987)		16/Oct/92	14/Jan/93
London Amendment (1990)		20/Jul/94	18/Oct/94
Copenhagen Amendment (1992)		20/Jul/94	18/Oct/94

Production of controlled substances: 0 metric tonnes (mt)

Consumption of controlled substances (1993): 35.8 metric tonnes
(excluding methyl bromide) 39.3 weighted tonnes (ODP)

Substance (ton)	CFC						Halon			Solvents			M-Br
	11	12	113	114	115	Total	1211	1301	Total	CTC	MCF	Total	
ODS	5.5	24.1			4.6	34.2	1.3	0.3	1.6				
ODP	5.5	24.1			2.8	32.4	3.9	3.0	6.9				

Source: Country Programme (1994)

Distribution of ODP by substance:

CFC: 82.4% Halon: 17.6% CTC, MCF:

Distribution of ODP by sector:

Sector:	Aerosol	Foam	Halon	Refrig.	Solvent
Consumption (tonnes):			6.9	32.3	
Percent of total:			17.6%	82.3%	

Country Programme

Duration of country programme: 11 years (1994-2005)

ODS phase-out target:

Complete phase out of halons by 1998. Complete phase out of CFC by 2005

Phase-out priority area:

Refrigeration and halon sectors

Cost of activities in country programme: \$30,000,000

Strategy:

The Govt. is committed to phase out ODS within the deadlines established in the Protocol. The strategy will be guided by the high proportion of ODS consumed in the refrigeration sector, and is as follows: (i) informing consumers of the commitment to phasing out ODS and using alternative substances and technologies, (ii) implementing fiscal and regulatory measures to meet the objectives, and (iii) establishing the institutional framework to facilitate the transition to non-ODS alternatives and the overall coordination of ODS phase out activities.



Ref. No.

GOVERNMENT OF BARBADOS

MINISTRY OF TOURISM, INTERNATIONAL TRANSPORT AND THE ENVIRONMENT

ENVIRONMENT DIVISION

November 3, 1994

The Chief Officer
Secretariat of the Multilateral
Fund for the Implementation of
the Montreal Protocol
1800 McGill College
27th Floor
Montreal, Canada H3A 3J6

Dear Sir,

I have the honour to submit herewith the Country Programme of Barbados for the consideration and approval of the Multilateral Fund for the Implementation of the Montreal Protocol.

Barbados adhered to the Protocol on the 16th October, 1992 and became a Party on 14 January 1993. It is classified as operating under paragraph 1 of Article 5 of the Protocol.

I would like to place on record the appreciation of the Government of Barbados for the assistance extended to it through the UNEP IE OzonAction Programme for the preparation of the Country Programme which started during February 1994. I am pleased to advise that the Government is committed to the implementation of the actions contained in the Country Programme.

I further assert that it is the Government's intention to monitor compliance with the Protocol. If necessary, further and different actions from those specified in the Country Programme will be updated and submitted to the Executive Committee of the Multilateral Fund.

It is hoped that the Executive Committee will approve the request for assistance made in respect of the following actions:

- (a) Institutional Strengthening
- (b) Training of refrigeration and air-condition service technicians

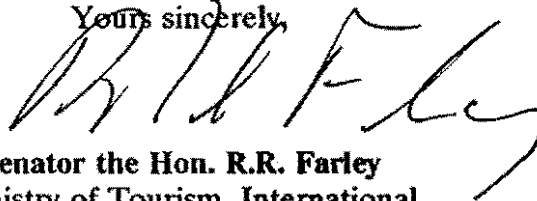
ENVIRONMENT DIVISION

SIR FRANK WALCOTT BUILDING, CULLODEN ROAD
ST. MICHAEL, BARBADOS
TEL. NO. (809) 431-7400 - FAX (809) 437-0077

In addition a third action, Cold Chambers: Fishing Complexes and Markets, will be submitted under the supervision of UNIDO.

Please accept, Sir, the assurance of my highest consideration.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'R.R. Farley', written in a cursive style.

Senator the Hon. R.R. Farley
Ministry of Tourism, International
Transport and the Environment (Ag)

BARBADOS COUNTRY PROGRAMME

COVER SHEET

Country: Barbados

Lead National Agency: Ministry of Tourism, International Transport and the Environment

Participating Local Agencies: Ministry of Finance
: The Ministry of Agriculture, Food and Fisheries

Implementing Agencies: UNEP IE/PAC
: UNIDO

Table I: PHASE-OUT SCHEDULE

Substance	Current consumption (tonnes X ODP) in 1993	Cumulative consumption until phase-out (ODP tonnes)		Proposed year for complete phase-out
		Article 5 schedule (1)	Accelerated schedule (2)	
ANNEX A Group I				
CFC-11	5.45 X 1.0 = 5.45			2005
CFC-12	24.09 X 1.0 = 24.09			2005
CFC-115	4.55 X 0.6 = 2.73			2005
Subtotal	32.27	488.0	263.0	
ANNEX A Group II				
Halon-1211	1.26 X 3.0 = 3.78			1997
Halon-1301	0.283 X 10.0 = 2.80			1997
Subtotal	6.58	80.0	15.6	
ANNEX B Group III				
Methyl chloroform	0.00 X 0.1 = 0.00	8.0	0.5	1997
TOTAL	38.85	576.0	279.1	

BARBADOS

COUNTRY PROGRAMME

for

THE PHASE OUT

OF OZONE DEPLETING SUBSTANCES

**MINISTRY OF TOURISM, INTERNATIONAL TRANSPORT
AND THE ENVIRONMENT**

October 1994

EXECUTIVE SUMMARY

S.1 INTRODUCTION

Barbados acceded to the Vienna Convention for the Protection of the Ozone Layer and The Montreal Protocol on Substances that Deplete the Ozone Layer on the 16th October 1992 and the instruments came into force 90 days later on the 14th January 1993. In fulfillment of its obligations under The Montreal Protocol, Barbados has executed a National Survey as the basis for completion of its Country Programme for the phasing out of Ozone Depleting Substances (ODSs).

S.2 PRODUCTION OF ODSs

No producers of ODSs were identified in Barbados.

S.3 IMPORTATION OF ODSs

Of the twenty substances listed in Annexes A and B of The Montreal Protocol and its London Amendment, six were identified as being imported by Barbados in any significant quantity; during the period 1986 to 1993. These substances are listed below.

- | | | |
|----------------|---------------|--------------|
| i. CFC-11 | ii. CFC-12 | iii. CFC-115 |
| iv. Halon-1211 | v. Halon-1301 | vi. MCF |

For the first three years of the period under consideration, ODSs consumption in Barbados shows a marked increase of 68% from 23.84 metric Tonnes in 1986 to 35.05 metric Tonnes in 1988. The years after 1988 saw the economy of Barbados undergoing a period of recession culminating in the introduction of austerity measures and the entering into an International Monetary Fund (IMF) agreement for structural adjustment in 1991. These measures were lapsed in 1993, giving industry a level of confidence in the economy and so investment and industrial activity began to flourish once again. Thus the general fluctuations in imports of ODSs are consistent with trends in the National economy and reflect the demands in trade and industry. The 1993 estimate of 35.63 metric Tonnes translates into 38.85 ozone depleting Tonnes (ODP Tonnes), and represents approximately a 1.78 fold increase over the 1986 figure for ODP Tonnes.

Summaries of Barbados' consumption levels in metric Tonnes and ODP Tonnes are presented in the tables A and B and the distributions of ODSs within various sectors of industry are outlined in Tables C and D and Figures I and II.

The estimated population for 1993 stands at 263,900 which translates into a per capita consumption of 0.147 Kg. Thus Barbados operates under paragraph I at Article 5 of The Montreal Protocol.

S.4 USES OF ODSs

CFCs:

CFC-12 is the main product used within refrigerators and automotive air-conditioning systems in Barbados, whereas R-502 (containing CFC-115) is employed in cold chambers, blast-freezing systems and for the topping up of chillers. Two hotels and one shopping mall were found to be utilizing CFC-11 in their centralized air-conditioning systems but in general this latter substance is principally used for the flushing of CFC-12 systems during repairs and maintenance.

Halons:

Halon-1301 is employed in fixed fire protection installations in the telecommunications industry and within the computer facilities of banks and insurance companies. A small quantity is used by the sole power generation company but only for its mobile emergency plants. Several portable fire extinguishers using Halon-1211 are present within the Hotel and Manufacturing enterprises; and generally throughout the commercial sector.

Methyl chloroform:

This substance was traditionally exploited within the electronics industry for its excellent solvent characteristics. However, its usage has declined significantly during the period 1986 to 1993 and attempts have been made, and are on-going, to abandon its use totally. This has only been partly in response to the Montreal Protocol.

S.5 PHASE OUT STRATEGY

The Government of Barbados is committed to the phase out of ODSs within the deadlines established in the Montreal Protocol and according to programmes that are technologically and economically viable. This goal will be achieved using a mixture of strategies, in collaboration with the private sector and non-governmental organizations and with support from the Multilateral Fund.

The strategy will be guided by the high proportion of ODS consumption comprised by refrigerants (96% in 1993) and is as follows:

- informing the local consumers of the commitment to phasing out ODS USE AND of appropriate alternative substances and technologies
- taking appropriate fiscal and regulatory measures in meeting the phase out objectives

- establishing the supporting environment of services to facilitate the transition to and use of alternatives, as well as the overall coordination of ODSs phase out activities.

The policy framework within which the action plan will be effected will be a mixture of education, persuasion, incentives and regulation.

S.6 ACTION PLAN

Based on the Government strategy, the Action Plan described in Table E was established. This plan comprises 14 concrete actions. The Action Plan is supported by four (4) projects. These are given in Table F.

S.7 COST TO THE ECONOMY OF BARBADOS

The results of a preliminary macro economic study on the impact of the Montreal Protocol on the economy of Barbados indicates that it is in the order of 30 M US Dollars. The major portion of this cost (about 23 M US\$) is for the forced early retirement of refrigeration equipment.

S.8 CONCLUDING REMARKS

A high level of awareness about The Montreal Protocol and the phasing out of ODSs was observed among both importers and users. Companies engaged in the direct importation of bulk ODSs or ODS-containing products, have all given a commitment towards supporting Government's policies and strategies for the systematic reduction of imported quantities, while promoting the usage of the more environmentally friendly alternatives. Importers of vehicles and domestic refrigerators reported that all future orders will arrive charged with the substitute refrigerants HFC-134a and that some current orders already reflect this change. Further, some business persons have already invested in alternative technologies and/or recovery equipment.

Barbados is well poised to make its contribution towards this global initiative to prevent further destruction of the ozone layer. Proposals have been received for consideration as projects within the framework of The Montreal Protocol; and strategies are being further formulated at the Governmental level to expedite the elimination of ODSs.

TABLE A
Summary of ODSs Consumption in Barbados
(metric Tonnes) for the period 1986 - 1993

	1986	1987	1988	1989	1990	1991	1992	1993
CFC-11	2.15	2.05	1.85	2.35	2.15	1.05	1.75	5.45
CFC-12	14.84	14.65	21.59	22.60	18.70	20.92	18.89	24.09
CFC-113	1.51	2.00	5.53	4.12	4.95	5.65	3.49	4.55
Annex A Group I Subtotal:	18.5	18.7	28.97	29.07	25.8	27.62	24.13	34.09
Halon-1211	1.18	2.41	3.69	1.23	1.52	1.03	1.07	1.26
Halon-1301	0.00	0.04	0.10	0.00	0.00	0.00	0.02	0.28
Annex A Group II Subtotal:	1.18	2.45	3.79	1.23	1.52	1.03	1.09	1.54
Methyl chloroform	4.16	4.16	2.29	0.00	3.60	2.77	4.02	0.00
Annex B Group III Subtotal:	4.16	4.16	2.29	0	3.6	2.77	4.02	0
TOTAL:	23.84	25.31	35.05	30.3	30.92	31.42	29.24	35.63

TABLE B
Summary of ODSs Consumption in Barbados
(ODP Tonnes) for the period 1986 - 1993

	1986	1987	1988	1989	1990	1991	1992	1993
CFC-11	2.15	2.05	1.85	2.35	2.15	1.05	1.75	5.45
CFC-12	14.84	14.65	21.59	22.60	18.70	20.92	18.89	24.09
CFC-115	0.91	1.20	3.32	2.47	2.97	3.39	2.09	2.73
Annex A Group I Subtotal:	17.9	17.9	26.76	27.42	23.82	25.36	22.73	32.27
Halon-1211	3.54	7.23	11.07	3.70	4.56	3.09	3.21	3.78
Halon-1301	0.00	0.41	1.00	0.00	0.00	0.00	0.20	2.80
Annex A Group II Subtotal:	3.54	7.64	12.07	3.7	4.56	3.09	3.41	6.58
Methyl chloroform	0.42	0.42	0.23	0.00	0.36	0.28	0.40	0.00
Annex B Group III Subtotal:	0.42	0.42	0.23	0	0.36	0.28	0.4	0
TOTAL:	21.86	25.96	39.06	31.12	28.74	28.73	26.54	38.85

TABLE C
Sectoral Distribution in metric Tonnes
as a percentage of total consumption
for the period 1986 - 1993

Sector/Activity	1986	1987	1988	1989	1990	1991	1992	1993
Refrigeration	78 %	74 %	83 %	96 %	83 %	88 %	82 %	96 %
Halon	5 %	10 %	11 %	4 %	5 %	3 %	4 %	4 %
Solvent	17 %	16 %	6 %	0 %	12 %	9 %	14 %	0 %

TABLE D
Sectoral Distribution in ODP Tonnes
as a percentage of total consumption
for the period 1986 - 1993

Sector/Activity	1986	1987	1988	1989	1990	1991	1992	1993
Refrigeration	82 %	69 %	68.5%	88 %	83 %	88 %	85.5%	83 %
Halon	16 %	29 %	31 %	12 %	16 %	11 %	13 %	17 %
Solvent	2 %	2 %	0.5%	0 %	1 %	1 %	1.5%	0 %

FIGURE I

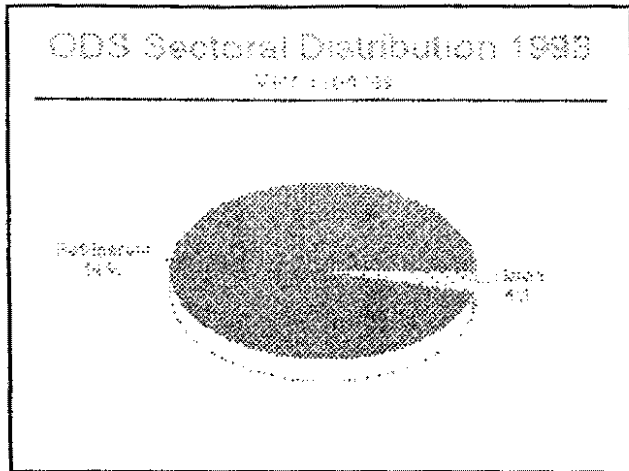


FIGURE II

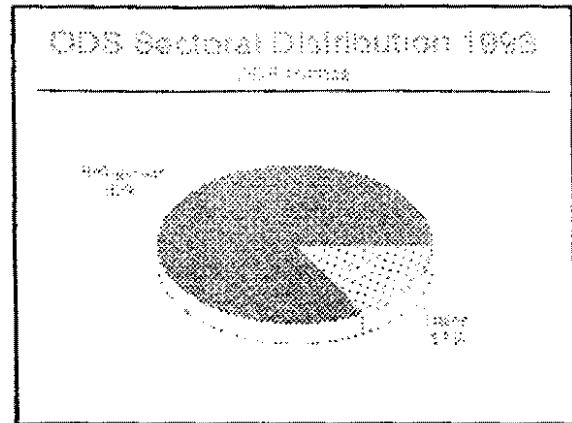


TABLE E
ACTION PLAN

PROJECT NO.	ACTION	STARTING DATE	IMPLEMENTING BODY
1	Public awareness & education campaigns, in conjunction with Non-Governmental Organizations	JAN 1995	Ministry of Environment, Housing & Lands
2	Establishment of Ozone Unit & Steering Com.	JAN 1995	Ministry of Environment, Housing & Lands
3	Retro-fitting of Fishing complexes & Markets to use non-ODS substances	JULY 1994	MINISTRY OF AGRICULTURE, FOOD & FISHERIES
4	Training of Refrigeration/Air-condition service technicians	JUN/JUL 1995	OZONE UNIT / S.J.P. POLYTECHNIQUE
5	Detailed Refrigeration Sectoral Assessment with emphasis on Hotel/Tourism sub-sector	JAN 1995	OZONE UNIT
6	IMPLEMENTATION OF A NATIONAL PROGRAMME FOR RECOVERY AND RECYCLING OF REFRIGERANTS	OCT 1995	OZONE UNIT / S.J.P. POLYTECHNIQUE
7	Setting of import quotas & issuing of licenses	MAR 1995	OZONE UNIT
8	Legislative framework for ODS phase-out	MAR 1995	OZONE UNIT
9	Ban on new installations using ODSs	1995	OZONE UNIT / MINISTRY OF TRADE
10	Ban on Equipment & Appliances containing ODSs	1995	OZONE UNIT / MINISTRY OF TRADE
11	Import concessions & Tax incentives to promote use of substitutes & alternative technologies	1995	MINISTRY OF FINANCE
12	Total ban on use of MCF	DEC 1997	OZONE UNIT / MINISTRY OF TRADE
13	Total ban on use of Halons	DEC 1997	OZONE UNIT / MINISTRY OF TRADE
14	TOTAL BAN ON USE OF CFCs	DEC 2005	OZONE UNIT / MINISTRY OF TRADE

TABLE F
Project Summary

Duration	Project Title	Estimated cost in US\$	Implementing Agency	Remarks
1995 - 1997	Establishment of Ozone Unit	146,000	UNEP	Institutional strengthening for implementation of Action Plan incl. project coordination
1 yr (1995)	Training	61,600	UNEP	Training of refrigeration & Air-condition service technicians
1994 - 1995	Cold Chambers: Fishing Complexes and Markets	260,748	UNIDO	Retro-fitting of CFC based facilities and/or replacement with alternative technologies
1995-1997	PROJECT PREPERATION: IMPLEMENTATION OF A NATIONAL PROGRAMME FOR RECOVERY AND RECYCLING OF REFRIGERANTS	10,000	UNEP	PROJECT PREPARATION TRAINING AND EQUIPMENT FOR RECOVERY AND RECYCLING OF REFRIGERANTS
	TOTAL:	478,348		

1. INTRODUCTION

1.1 Background

Barbados, the most easterly of the Caribbean islands, is a small island developing State (SIDS) with a population of 263,900 (1993) and a land area of 430 km². It can be considered to be a relatively advanced developing country with a per capita gross domestic product, at factor cost, of US \$5250¹.

The Barbados economy has changed markedly over the past three decades from one driven by agriculture activities, in particular sugar cane cultivation, to a tourism dominated base. Agriculture still remains a significant, albeit diminished, sector as does manufacturing. The composition of economic activity and level of development in Barbados is significant in terms of the consumption patterns of ozone depleting substances as will be illustrated.

1.2 Purpose of the Country Programme

Barbados chose to accede to the Vienna Convention for the Protection of the Ozone Layer and The Montreal Protocol on Substances that Deplete the Ozone Layer for the following reasons:

- Barbados recognizes the principle of common but differentiated responsibilities with respect to global environmental issues, including stratospheric ozone layer depletion, and observed that The Montreal Protocol in particular was consistent with this principle.
- The Montreal Protocol, which established extensive control measures and other regulations, recognized that developing countries with relatively low levels of ODS consumption require special consideration regarding the control measures and provided this in the form of a 10 year delay for the requirement of total ODS phase out, relative to industrial countries.
- A financial mechanism, the Multilateral Fund, was also established to assist those party states, which are classified as developing countries with low levels of ODS consumption, in meeting the incremental costs of eliminating that consumption.
- The control measures established under the Montreal Protocol would negatively impact on non-party states through the unavailability of the controlled substances prior to the phase out in party states and secondly, the possible limitations in trade of products made with or containing the controlled substances.

This accession was achieved on the 16th October 1992 and the instruments came into force 90 days later on 14th January 1993. The London and Copenhagen Amendments to The Montreal Protocol were acceded to on 20th July 1994 and came into force on 18th October 1994.

Following the accession to the Vienna Convention and the Montreal Protocol, the Government of Barbados decided to undertake a Country Programme as a means of meeting the nation's short and long term obligations under the Protocol in particular. Additionally, in the absence of a Country Study, the Country Programme was important to determine the level of ODS consumption in Barbados. More specifically, the Country Programme represents:

- a reflection of the commitment of the Government of Barbados to achieve compliance with the obligations as a party to the Protocol;
- an assessment of the consumption of ODSs in Barbados from 1986 to 1993 and an Action Plan to reduce that consumption;
- a basis for monitoring the effectiveness of the Action Plan and the extent to which it is being followed;
- the nature and extent of the assistance sought by the Government of Barbados from the Multilateral Fund in undertaking the Action Plan.

1.3 Status of the Country Programme

The Ministry of Labour, Consumer Affairs and the Environment was the national agency that initiated Barbados' activities with respect to the Vienna Convention and the Montreal Protocol. With the reformulation of Ministry responsibilities in September 1993, the subsequently formed Ministry of the Environment, Housing and Lands took over this responsibility. Under that Ministry, much of the preparation of the Country Programme was undertaken. Following General Elections in Barbados in September 1994, the newly constituted Ministry of Tourism, International Transport and the Environment took responsibility for the Montreal Protocol and related activities, including the preparation of the final report of the Country Programme.

The Permanent Secretary (Environment) in the Ministry of the Tourism, International Transport and Environment is the contact person with respect to the Country Programme and all matters relating to the Vienna Convention and the Montreal Protocol. In addition, he is the chairman of the National Coordinating Team (NCT), a multi-sectoral body comprising representatives of public and private sector agencies and groups involved in the importation or use of ODSs and the regulation of trade. The NCT was convened to advise the Ministry on the preparation of the Country Programme, including strategies and projects to eliminate the consumption of ODSs.

After being reviewed by a number of other agencies, primarily the NCT. The final draft of the Country Programme was submitted to the Cabinet, the highest decision making body of the Government of Barbados, and approved by that body on 1994.

The locally incurred costs of preparing the Country Programme came to US\$12,000.

1.4 Assistance Received

The Executive Committee of the Multilateral Fund at its 9th Meeting granted US \$30,000 for the preparation of a Country Programme for Barbados. This grant was in response to a request transmitted via the United Nations Environment Programme Industry and Environment Programme Activity Centre (UNEP IE/PAC) in March 1993. As part of this arrangement, a UNEP IE/PAC consultant was assigned to Barbados and assisted in the development and review of the country programme.

2. CURRENT SITUATION

2.1 Current Consumption

The strategies employed during the execution of the National Survey allowed for direct contacts with industry personnel. They also afforded opportunities for taking first hand views at operations and facilitated the free interchange of information. These opportunities were also used to gauge the general level of awareness about ODSs, understanding of their effects on the stratosphere and knowledge of substitutes or alternative technologies.

In addition to the preceding methodologies, scrupulous use was made of import/export statistics as compiled by the National "Statistical Services Department" of Barbados and other data within various bodies.

The survey confirmed that there are no ODSs produced in Barbados. Consumption is therefore equal to net importation, and with negligible re-exportation, consumption can be equated to importation. Summaries of Barbados' consumption levels in metric Tonnes and ODP Tonnes for the years 1986 to 1993 are presented in the Tables 2.1 and 2.2 and the distributions of ODSs within various sectors of industry are outlined in Tables 2.4, 2.5 and 2.6 and Figures I and II.

The Survey also revealed that of the twenty substances listed in Annexes A and B of the Montreal Protocol and its London Amendment, six were identified as being imported by Barbados. These are as follows:

- | | | |
|----------------|---------------|--------------|
| i. CFC-11 | ii. CFC-12 | iii. CFC-115 |
| iv. Halon-1211 | v. Halon-1301 | vi. MCF |

The survey, which began in March 1994, has revealed that ODS consumption has ranged from 21.86 ODP Tonnes in 1986 to 38.85 ODP Tonnes in 1993 (Table 2.2). With an estimated population of 263,900 in 1993¹, the per capita ODP consumption was determined to be 0.147 kg (Table 2.3).

The decrease in the consumption of ODSs in Barbados during the late 1980's, followed by the growth in 1993 is largely explained by the performance of the island's economy. During the years immediately following 1988, Barbados' economy underwent a period of recession culminating in the introduction of austerity measures and the entering into

an International Monetary Fund (IMF) agreement for structural adjustment in 1991. These measures were eased in 1993, giving industry a level of confidence in the economy and so investment and industrial activity began to flourish once again. That investment concurred with the growth in ODSs consumption.

Tables 2.1 and 2.2 illustrate a sharp increase in the consumption of CFC 11 in 1993. This rise was explained by the expectation of one of the importers to supply a quantity of the CFC 11 to a foreign cargo ship. This transaction did not materialise and therefore distorted local figures for that year.

TABLE 2.1
Summary of ODSs Consumption in Barbados
(metric Tonnes) for the period 1986 - 1993

	1986	1987	1988	1989	1990	1991	1992	1993
CFC-11	2.15	2.05	1.85	2.35	2.15	1.05	1.75	5.45
CFC-12	14.84	14.65	21.59	22.60	18.70	20.92	18.89	24.09
CFC-115	1.51	2.00	5.53	4.12	4.95	5.65	3.49	4.55
Annex A Group I								
Subtotal:	18.5	18.7	28.97	29.07	25.8	27.62	24.13	34.09
Halon-1211	1.18	2.41	3.69	1.23	1.52	1.03	1.07	1.26
Halon-1301	0.00	0.04	0.10	0.00	0.00	0.00	0.02	0.28
Annex A Group II								
Subtotal:	1.18	2.45	3.79	1.23	1.52	1.03	1.09	1.54
Methyl chloroform	4.16	4.16	2.29	0.00	3.60	2.77	4.02	0.00
Annex B Group III								
Subtotal:	4.16	4.16	2.29	0	3.6	2.77	4.02	0
TOTAL:	23.84	25.31	35.05	30.3	30.92	31.42	29.24	35.63

TABLE 2.2
Summary of ODSs Consumption in Barbados
(ODP Tonnes) for the period 1986 - 1993

	1986	1987	1988	1989	1990	1991	1992	1993
CFC-11	2.15	2.05	1.85	2.35	2.15	1.05	1.75	5.45
CFC-12	14.84	14.65	21.59	22.60	18.70	20.92	18.89	24.09
CFC-115	0.91	1.20	3.32	2.47	2.97	3.39	2.09	2.73
Annex A Group I	17.9	17.9	26.76	27.42	23.82	25.36	22.73	32.27
Subtotal:								
Halon-1211	3.54	7.23	11.07	3.70	4.56	3.09	3.21	3.78
Halon-1301	0.00	0.41	1.00	0.00	0.00	0.00	0.20	2.80
Annex A Group II	3.54	7.64	12.07	3.7	4.56	3.09	3.41	6.58
Subtotal:								
Methyl chloroform	0.42	0.42	0.23	0.00	0.36	0.28	0.40	0.00
Annex B Group III	0.42	0.42	0.23	0	0.36	0.28	0.4	0
Subtotal:								
TOTAL:	21.86	25.96	39.06	31.12	28.74	28.73	26.54	38.85

TABLE 2.3
ODP Weighted Per Capita Consumption of ODS in Kg
for the period 1986 - 1993

	1986	1987	1988	1989	1990	1991	1992	1993
Estimated Population	258.0	258.8	259.4	260.3	260.8	262.5	263.1	263.9
Per Capita Consump.	0.085	0.100	0.151	0.120	0.110	0.109	0.101	0.147

2.2 Use and Application of ODSs

CFC usage occurred exclusively in the Air-condition\Refrigeration sector; whereas the Halons were employed for fire protection in portable extinguishers for miscellaneous applications (Halon-1211) or in fixed installations within power-generation, computing and tele-communications facilities (Halon-1301). Limited use was made of methyl chloroform (1,1,1-trichloroethane), that being as a solvent in the electronics industry.

2.2.1 Domestic Refrigerators and Freezers

The last national population and housing census, conducted in 1990, disclosed that 75,211 occupied dwelling units existed in Barbados, of which 69,630 were connected to the electrical grid².

It was also noted that commercial concerns such as guest-houses, apartments and hotels were often outfitted with domestic type appliances. The 1992 official estimate of such accommodation, excluding guest-houses, stands at 5,714 rooms distributed among 150 establishments². Further, because of the several cottage based industries and a thriving entrepreneurial spirit, many small businesses utilized domestic appliances in addition to, or instead of, commercial equipment.

Based on statistical projections and discussions with personnel in the refrigeration industry, it is estimated that approximately 95% of households with electricity indeed have refrigerators. Thus the 1993 estimate of the number of domestic refrigerators/freezers is approximately 66,000 with another 5,000 being utilized within the commercial sectors; giving an overall estimate of 71,000 units. These systems all utilize CFC-12.

Due to the high saline content of the ocean breezes which sweep Barbados and compounded by usage/handling practices, the useful life span of a domestic refrigerator ranges between 7 to 10 years. During this period minor repairs may be conducted but because of the ready availability of new refrigerators and the generous credit terms offered by retailers, most persons opt to replace their appliance rather than undertake major repairs. However, despite this tendency it is estimated that about 5,680 refrigerators (8% of total refrigerator estimate) are repaired annually, which accounts for about 5.7 metric Tonnes of CFC-12 (Table 2.6). Also assuming that refrigerators are changed once every 10 years, there should be 7,100 new refrigerators a year to give a total annual consumption of 12.8 metric Tonnes of CFC-12 (Table 2.6).

2.2.2 Commercial Refrigerators, Freezers and Mobile Units

An estimated 10,000 commercial refrigerators and freezers were in service in 1993. Due to heavy usage, approximately 3,000 of these will need servicing or topping up annually utilizing approximately 2 kg of refrigerant per unit. Table 2.6 shows the estimated quantity of CFC-12 utilized for these purposes as well as the amount derived from importing 100 new units a year. Given the capital cost of these large systems, it not expected that more than this number would be imported.

2.2.3 Air-conditioned Cars

Data relating to the number of cars imported annually were obtained from one of the local car dealerships from 1988 - 1993. The importation of cars fell from 3310 in 1988 and 4141 in 1989 to 1558 in 1992, recovering to 1867 in 1993. Further information from car dealers suggest that about 30,000 cars are present on the island of which 25% (7,500) are fitted with air-conditioning. The percentage of new cars imported into Barbados fitted with air-conditioning systems has been increasing each year. Industry information indicates that approximately 50% of new cars are fitted with air conditioning systems. If other vehicles such as tour buses are included, a general figure of 1000 vehicles would be a reasonable estimate of new units fitted with these systems. Furthermore, it is estimated that a fifth of the existing number of air-conditioned vehicles would have systems charged/installed per year to give a number of 1,500. As a result, around 3.8 Tonnes CFC-12 are used annually for filling and maintaining these systems.

It should be noted that several of these systems were installed as after sale request and were often conducted by self-taught technicians rather than the local vehicle agents.

2.2.4 Water Fountains

With the daily temperatures averaging between 26 - 32 °C throughout the year, water fountains are popular, if not essential, within Barbados. An estimated 1.4 Tonnes of CFC-12 is utilized servicing these units and other miscellaneous applications.

2.2.5 Centralized Air-conditioning

HCFC-22 is used within most centralized systems. However, three concerns were identified as utilizing CFC-11 for the whole or part of their installations. These were the Barbados Hilton Hotel, the Sandy Lane Hotel and the Sheraton Shopping Centre.

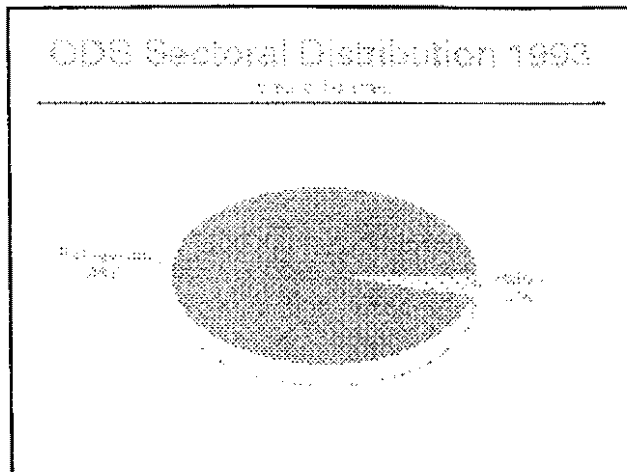
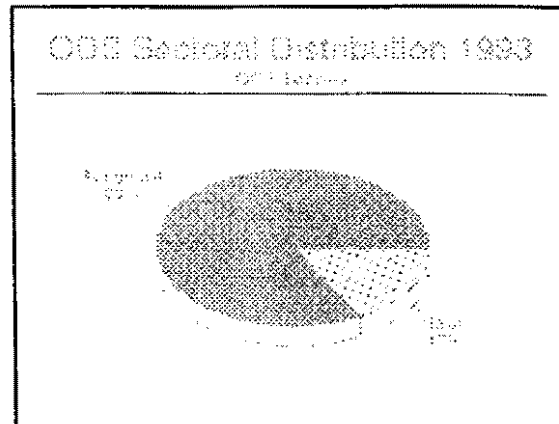
FIGURE I**FIGURE II**

TABLE 2.4
Sectoral Distribution in metric Tonnes
as a percentage of total consumption
for the period 1986 - 1993

Sector/Activity	1986	1987	1988	1989	1990	1991	1992	1993
Refrigeration	78 %	74 %	83 %	96 %	83 %	88 %	82 %	96 %
Halon	5 %	10 %	11 %	4 %	5 %	3 %	4 %	4 %
Solvent	17 %	16 %	6 %	0 %	12 %	9 %	14 %	0 %

TABLE 2.5
Sectoral Distribution in ODP Tonnes
as a percentage of total consumption
for the period 1986 - 1993

Sector/Activity	1986	1987	1988	1989	1990	1991	1992	1993
Refrigeration	82 %	69 %	68.5%	88 %	83 %	88 %	85.5%	83 %
Halon	16 %	29 %	31 %	12 %	16 %	11 %	13 %	17 %
Solvent	2 %	2 %	0.5%	0 %	1 %	1 %	1.5%	0 %

TABLE 2.6
Estimated uses of CFC-12

	New units per year	No. repaired/ charged per year	Kg of CFC-12 used per unit	Total CFC-12 in metric Tonnes
Domestic Refrigerators	7,100	5,680	1.0	12.8
Commercial Refrigerators etc	50	3,000	2.0	6.1
Air-conditioned Cars & other vehicles	1000	1500	1.5	3.8
Misc. eg Water fountains, etc				1.4
Total Tonnes:				24.1

TABLE 2.7
Total Car Sales from 1988 -1993

Year	1988	1989	1990	1991	1992	1993
No. of Cars	3310	4141	3811	3746	1558	1867

2.2.6 Cold Storage Chambers and Ice Makers

In addition to the commercial refrigeration equipment and chillers to be found within the hotel, restaurant, supermarket and service industries, ice making facilities and cold rooms exist to support the agricultural sector and fishing industry. These systems all utilizes R-502.

The most significant actors in this respect are:

- The Ministry of Agriculture, Food and Fisheries (Fishing complexes and Markets)
- Ocean Fisheries Ltd
- Miller Brothers Ltd
- Ice Unlimited
- Fish of Barbados Ltd

2.2.7 Servicing

An estimated 140 technicians are employed in some 40 air-conditioning/refrigeration concerns. Most of these would have initially received formal training at the island's Polytechnic. As the industry advances, further learning is often limited to "experience" or on-the-job demonstrations. In addition, several self-taught entrepreneurs are known to operate, especially in the field of vehicle air-conditioning.

The major service companies which were identified during the national survey are:

- TMR Sales and Services Ltd
- Air Tech Co Ltd
- Refrigeration and Electrical Service (RES) Ltd
- Hilly's Electrical and Auto Air-Conditioning Service
- King's Refrigeration Services
- Rtek Services Ltd
- Tech Cooling Ltd

2.3 Forecast Consumption

The projected unconstrained scenarios of ODS consumption up to the year 2010, are expressed in metric Tonnes and ODP Tonnes in Tables 2.8 and 2.9, respectively. Forecast consumption for each substance has been based on past volumes and projected economic growth in the country.

The Gross Domestic Product from 1976 to 1993 was adopted for key areas in the Barbados economy as indicators of growth. An aggregate value of 1.94% was determined using this method. This indicator was then taken as an estimate of the factor by which unconstrained growth was expected. The value for successive years was estimated from the product of the previous years value and the growth factor. 1994's values were determined by multiplying the growth factor by the average over the period 1990 to 1993.

The key areas used for the indicator of growth were:

- electricity and water consumption
- construction
- transportation, storage and communication
- tourism
- general services

TABLE 2.8
ODS Consumption to the year 2010
UNCONSTRAINED SCENARIO
in Metric Tonnes

	1989	1990	1991	1992	1993	1994	1995	1998	2000	2005	2010
CFC-11	2.35	2.15	1.05	1.75	5.45	5.56	5.66	6.00	6.23	6.86	7.56
CFC-12	22.6	18.7	20.92	18.89	24.09	24.56	25.03	26.52	27.56	30.34	33.40
CFC-113	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CFC-114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CFC-115	4.12	4.95	5.65	3.49	4.55	4.64	4.73	5.01	5.21	5.73	6.31
Annex A: Group I Sub-total:	29.07	25.8	27.62	24.13	34.09	34.75	35.43	37.53	39.00	42.93	47.26
Halon-1211	1.23	1.52	1.03	1.07	1.26	1.57	1.60	1.70	1.76	1.94	2.13
Halon-1301	0.0	0.0	0.0	0.02	0.28	0.08	0.08	0.08	0.09	0.10	0.11
Halon-2402	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Annex A: Group II Sub-total:	1.23	1.52	1.03	1.09	1.54	1.65	1.68	1.78	1.85	2.04	2.24
MCF	0.0	3.60	2.77	4.02	0.0	4.64	4.73	5.01	5.21	5.73	6.31
Annex B: Group III Sub-total:	0	3.6	2.77	4.02	0	4.64	4.73	5.01	5.21	5.73	6.31
TOTAL:	30.3	30.92	31.42	29.24	35.63	41.04	41.83	44.23	46.05	50.70	55.81

TABLE 2.9
ODS Consumption to the year 2010
UNCONSTRAINED SCENARIO
ODP Weighted Tonnes

	1989	1990	1991	1992	1993	1994	1995	1998	2000	2005	2010
CFC-11	2.35	2.15	1.05	1.75	5.45	5.56	5.66	6.00	6.23	6.86	7.56
CFC-12	22.6	18.7	20.92	18.89	24.09	24.56	25.03	26.52	27.56	30.34	33.40
CFC-113	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CFC-114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CFC-115	2.47	2.97	3.39	2.09	2.73	2.78	2.84	3.01	3.12	3.44	3.78
Annex A: Group I Sub-total:	27.42	23.82	25.36	22.73	32.27	32.90	33.53	35.52	36.92	40.64	44.74
Halon-1211	3.70	4.56	3.09	3.27	4.62	4.71	4.80	5.09	5.29	5.82	6.40
Halon-1301	0.0	0.0	0.0	0.20	2.80	0.8	0.80	0.80	0.90	1.00	1.10
Halon-2402	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Annex A: Group II Sub-total:	3.70	4.56	3.09	3.27	7.42	5.51	5.60	5.09	6.19	6.82	7.50
MCF	0.00	0.36	0.28	0.40	0.46	0.46	0.47	0.50	0.52	0.57	0.63
Annex B: Group III Sub-total:	0.00	0.36	0.28	0.40	0.46	0.46	0.47	0.50	0.52	0.57	0.63
TOTAL:	31.12	28.74	28.73	26.41	40.15	38.87	39.61	41.11	43.62	48.03	52.87

2.4 Industry Structure

2.4.1 Importers

Ten companies were identified as being regular importers of bulk ODSs; or at least having been involved in the direct importation of significant quantities at some point during the period 1986 to 1993 (Table 2.10). Other enterprises engaged in the importation of ODSs to varying degrees, were dealers in air-conditioned vehicles and refrigerated appliances.

TABLE 2.10
ODS Importers and Sources

Importer	ODS	Status	Supplier/Country of Origin
Barbados External Telecommunications	Halons	inactive	Fireater Systems Ltd/UK
Barbados Light & Power Co Ltd	Halons	inactive	ABD Stal/Sweden
Carib Supply (Barbados) Ltd Nb. formerly Gas Products Ltd	Halons, CFCs	active	Dupont/USA
Carude Ltd	CFCs	active	
George Huthchinson Ltd	Halons, CFCs	inactive	
Ice Unlimited Ltd	CFCs	active	Deane & Wood/UK
King's Refrigeration and Air Condition Service	CFCs	active	Polyurethane Chemicals/USA
Safety Supply Company Ltd	Halons	inactive	Chubb Canada & Incindex/Canada
Servicex Ltd	CFCs	inactive	ICI/UK
Tansitor (Barbados) Ltd	MCF	inactive	Tansitor Electronics Inc/USA

2.4.2 Sources of Imports

Countries from which bulk supplies of CFCs and Halons were directly imported are listed in Appendix I. Sources of other imported quantities contained in vehicles and refrigeration equipment are shown in Appendix II.

2.4.3 Distributors

With the exception of Barbados External Telecommunications, The Barbados Light and Power Co. Ltd and Tansitor (Barbados) Ltd, all major importers of ODSs were involved with large scale distribution. Additionally, one large service company, TMR Sales and Services Ltd, acted as a retailer for refrigerants.

2.5 Institutional Framework - Public and Private Sector

2.5.1 The Ministry of Tourism, International Transport and the Environment

The Ministry of Tourism, International Transport and the Environment is the national focal point for United Nations Environment Programme (UNEP) activities and initiatives, including the Vienna Convention for the Protection of the Ozone Layer, The Montreal Protocol on Substances that Deplete the Ozone Layer and related issues. The Environment Division of the Ministry has the responsibility for facilitating and coordinating the production of the Barbados Country Programme and the implementation of the ODS phase out action plan.

2.5.2 Technical Working Group for the Management of Chemical Substances

Another entity expected to have a major role in the implementation of ODSs phase out is the Technical Working Group for the Management of Chemical Substances which is convened under the chairmanship of the Ministry of the Tourism, International Transport and the Environment. The working group will be charged with developing guidelines and regulations concerning the importation, the handling and transportation, the registration and lastly the storage and disposal of identified chemical substances, particularly those categorized as toxic and hazardous. This body is still in the early stages of its operation. However, it is expected to play an important function in the management of ODSs, including regulating future importation.

2.5.3 The Risk Assessment and Monitoring Committee for Industrial Development

The Risk Assessment and Monitoring Committee for Industrial Development (RAMCID), an advisory body to the Barbados Investment and Development Corporation (BIDC), is another agency that will have a significant part to play. The BIDC is a statutory organization with the mandate to encourage local and foreign investment in Barbados, with emphasis on the development of exports. RAMCID advises on the suitability of activities that have or request assistance from or the facilities of the BIDC. In addition, RAMCID also works with existing and proposed activities to ensure they are compatible with the environmental and industrial policies. Such a committee would therefore be in a position to influence any proposed activities seeking to utilize ODSs and to promote the phase out of such use in current activities benefitting from BIDC assistance.

2.5.4 The Ministry of Finance and Economic Affairs

Decisions regarding the partial or total relief on import duties and taxes on ODSs alternatives, including associated technologies, is still being reviewed as one of the components to enable the phase out of ODSs. The Ministry of Finance will ultimately decide the degree to which this facility will be provided and will administer it as well.

Whereas the Ministry of Tourism, International Transport and the Environment will be the executing agency for the implementation of activities to phase out ODS in Barbados, the Ministry of Economic Affairs will oversee and monitor the use of funds for projects and activities associated with the overall programme.

2.5.5 BHTA

The Barbados Hotel and Tourism Association is a very important organization as its members are probably the most significant group of refrigerant users in the country. The membership encompasses hotels and restaurants with central air-conditioning systems. All of these operations have diverse forms of fire extinguishing equipment, including portable Halon-1211 extinguishers. The BHTA has already sensitized its membership to the Montreal Protocol and its provisions and keeps them abreast of developments by passing on the latest information. The BHTA will also assist in a comprehensive audit of its membership to determine ODS usage and the requirements to effectively achieve the phasing out of these substances.

2.5.6 BCCI, BAS & BMA

The Barbados Chamber of Commerce and Industry, the Barbados Agriculture Society and the Barbados Manufacturing Association are all represented on the National Coordinating Team. As a result, these organizations are well placed to identify the concerns of their members and to inform and educate their memberships of alternative technologies and opportunities to be taken.

2.5.7 BEA & BNT

On a more general level, organizations such as the Barbados Environmental Association and the Barbados National Trust have been identified for information dissemination as they have significant and varied memberships and can inform them through newsletters and other media.

2.6 Policy Framework

There are various mechanisms available to the Government of Barbados to control, limit and prohibit the importation of substances into the country. A summary of the main instruments follows.

2.6.1. Pesticides Control Board

The Pesticides Control Board (PCB) operates under the aegis of the Ministry of Agriculture for the purpose of regulating the importation of pesticides. The PCB is responsible for determining whether substances are appropriate for use in Barbados and for issuing licenses for the importation those substances permitted. The PCB may be transformed into a body with a wider mandate, incorporating all hazardous chemical substances, including ODSs.

2.6.2. Quotas and Licenses

As a result of the restructuring of the Barbados economy, much of the structure involving quotas and licences for imported goods is being removed. However, one of the categories of goods remaining is of environmentally harmful goods. The administration of quotas and licences is largely administered by the Price Control Division under the Ministry of Industry and Commerce. This agency functions under the Miscellaneous Controls Act of Barbados. This Act is described as one *to make provision for the prohibition or restriction of the exportation and importation of goods...* As such, this facility provides another option for the control of ODS importation.

2.6.3. Differential Taxation

Goods imported into Barbados are subject to the Barbados Export Tariff. This tariff is part of the Common Export Tariff (CET) of the Caribbean Economic Community, CARICOM. The CET gives preferential rates to goods produced in the Caribbean. As a result of the CET, Barbados cannot unilaterally raise the level of duties on imported goods. Additionally, Barbados is only able to reduce the duties on a limited number of goods which are defined in a schedule. Should the ODSs alternatives fall into this latter schedule, the the Government of Barbados would be able to reduce the amount of duties charged on the substances.

2.6.4. Tax Concessions

In the foreign exchange earning and industrial sectors, there exist mechanisms for the duties incurred in capital investments to be refunded in part or in entirety. This facility would be at the discretion of the Minister of Finance. The sectors included in this facility are tourism, agriculture and manufacturing.

2.7 Industry Response

The private sector has also taken specific actions, beyond participation in government initiatives, in response to The Montreal Protocol and its provisions to eliminate the use of ozone depleting technologies. Many of the importers are sole distributors for large suppliers and therefore respond to the policies of the senior partners. As a result, the major importers have advised their clients of the reduction in imports and the availability of ODS alternatives, which though more expensive, are being imported. Additionally, importers and service companies have imported recovery units to facilitate the reuse of ODSs in the likelihood of increasing prices and reduced availability.

A large company was seeking to import a large quantity of halons due to the physical expansion of their building and firefighting facilities. However, these plans were reviewed and alternative systems are being investigated with the direction of the parent company in the United Kingdom.

Currently, all luxury vehicles imported into Barbados use HFC-134a in the air-conditioning systems. All cars imported into Barbados from 1995 will have this alternative system.

Methyl Chloroform was being used as a solvent in the electronics industry. This use appears to have already been phased out, possibly as a result of it being a controlled substance.

2.8 Government Response

2.8.1 Preparation of the Country Report

The Ministry commenced preparations for the undertaking of a Country Programme in October 1993, including the formation and convening of the NCT. The Country Programme, which began in March 1994, consisted of two phases: firstly a national survey and secondly, an analysis and strategy development component. A research assistant was contracted to undertake the survey and to assist in the analysis and strategy development component under the guidance of the NCT.

Prior to the commencement of the national survey the Ministry convened a national seminar, primarily for importers and users of ODSs, outlining Barbados' status regarding the Vienna Convention and the Montreal Protocol, as well as the national obligations involved. The seminar sought to gain the cooperation of the participants for the survey part of the Country Programme as well as for the elimination of ODSs. During the survey, all major actors and most of the others involved with ODS-related activities were contacted. Questionnaires, site visits and telephone interviews were the main methods employed. These were complimented by letters to the actors outlining the initiative and promotion, of the national seminar in particular, in the print and electronic media.

The development of strategies and projects to assist Barbados in the phasing out of ODSs within the period specified by the Montreal Protocol, was undertaken within the NCT with the involvement of those agencies and groups that would be affected by, or participate in, the execution of policy decisions.

2.8.2 Information Dissemination

Government has already taken several measures to inform specific target groups and to a lesser extent the general public of its commitment to phasing out ODSs. This has been achieved through:

- national seminars aimed at importers, distributors and technicians dealing with ODSs as well as major areas in the tourism sector and cold storage facilities

- involving representative organizations such as the Barbados Hotel and Tourism Association (BHTA), the Barbados Chamber of Commerce and Industry (BCCI), the Barbados Manufacturers Association (BMA) and the Barbados Agricultural Society (BAS) in discussions and the development of strategies
- conducting surveys among ODSs users, importers, distributors and technicians
- informing the general public, through print and electronic media, of Barbados' obligations and commitments under the Montreal Protocol and some of the strategies to achieve these.

3 IMPLEMENTING PHASE OUT

3.1 Strategy Statement by the Government

The Government of Barbados in the 1993 to 2000 Development Plan States *"the protection, conservation and enhancement of the environment are prerequisites for sound and proper development of a country."*

As a result, Government is in the process of developing a National Sustainable Development Plan consistent with its obligations under Agenda 21 and other international instruments and initiatives. This process will stress the need for sound environmental management to facilitate sustainable development.

More specifically, Government is committed to the phase out of ODSs within the deadlines established in the Montreal Protocol and according to programmes that are technologically and economically viable. This goal will be achieved using a mixture of strategies, in collaboration with the private sector and non-governmental organizations and with support from the Multilateral Fund.

The strategy will be guided by the high proportion of ODS consumption comprised by refrigerants (96% in 1993) and is as follows:

- informing the local consumers of the commitment to phasing out ODS use and of appropriate alternative substances and technologies
- taking appropriate fiscal and regulatory measures in meeting the phase out objectives
- establishing the supporting environment of services to facilitate the transition to and use of alternatives, as well as the overall coordination of ODSs phase out activities.

The policy framework within which the action plan will be effected will be a mixture of education, persuasion, incentives and regulation.

One component of the policy framework would involve wide participation in the action plan supported by a comprehensive public awareness programme focussing on specific groups. This process has already begun with the formulation of the NCT, the promotion of the Country Programme at the national level and the convening of seminars at the national level and for specific target groups.

A major incentive to facilitate the change in technology from ODS consuming to suitable alternatives will be the relaxation of duties on the importation of ODS alternatives and associated technologies. Such a facility may only exist for a limited period of time so as to encourage the phase out at an early stage.

Regulations to be employed to ensure phase out may include limitation of imports through licensing and eventually, the prohibition of any imports after a specific period, most likely, 2005. The further development of these regulations and the mechanisms of their implementation will be further influenced by the work of the Technical Working Group in the Management of Chemical Substances.

TABLE 3.1
PHASE-OUT SCENARIO ODSs to the year 2010
ODP Weighted Tonnes

	1989	1990	1991	1992	1993	1994	1995	1998	2000	2005	2010
Annex A: Group I	27.42	23.82	25.36	22.73	32.27	35.4	36.09	25.05	17.69	0.0	0.0
Annex A: Group II	3.70	4.56	3.09	3.41	6.58	5.28	5.38	0.0	0.0	0.0	0.0
Annex B: Group III	0.0	0.36	0.28	0.40	0.0	0.26	0.20	0.0	0.0	0.0	0.0
TOTAL:	31.12	28.74	28.73	26.54	38.85	40.98	41.67	25.05	17.69	0	0

3.2 ACTION PLAN

Several specific and discrete but nonetheless inter-related actions are planned to ensure the phasing out of ODS use by the year 2005, five years ahead of schedule. These are summarized as follows and in Table 3.2.

3.2.1 Steering Committee

Under the aegis of the Ministry of Tourism, International Transport and the Environment, several entities and cooperative arrangements are being established to implement the Action Plan specified in the Country Programme. A steering committee, based on the varied composition of the current National Coordinating Team (NCT) shall be convened in order to provide policy advice and technical support in the implementation of the Action Plan. This steering committee will review progress with respect to the Action Plan at least once a year and make recommendations regarding any modifications deemed necessary. This committee shall report on findings and recommendations to the executive Ministry. Additionally, the steering committee shall meet as necessary to review any elements that need to be addressed. This committee will also be an important means of sharing information and keeping the various parties updated on any local or international developments.

3.2.2 Institutional Strengthening

The National Ozone Action Plan also requires the institutional strengthening of the Ministry of the Tourism, International Transport and the Environment in order to facilitate the implementation of the remainder of the action plan. The strengthening involves the commitment of human and financial resources as well as equipment to the national programme with costs to be shared between UNEP and the Government of Barbados over the first three years. The unit created will serve as the operational focal point and local secretariat for ozone issues in Barbados, and in particular, the action plan to phase out national ODSs consumption.

3.2.3 Regulations

The Technical Working Group for the Management of Chemical Substances will be the agency to advise and administer the establishment of limitations in the importation of ODS through a licensing or quota system followed eventually by a ban on further imports. The cooperation and full involvement of the Customs and Excise Department is a given. In addition, there will be the need for new legislation to facilitate this mechanism, but this is already recognized and accepted with respect to the operation of the Working group. Such a system will aim to ensure that imports for the year 2000 are no more than 50% of the average for the years 1995 to 1997 and these are eliminated by the year 2005. This represents an advancing of the schedule by five years. Specific measures to be adopted to eliminate ODS use in Barbados include:

- introducing a licensing system to regulate and systematically reduce the importation of ODS with the complete banning of this activity at least 5 years prior to the deadlines for phasing out of specific activities;
- utilising existing agencies with responsibility for approving new developments and advising on the suitability of industrial and commercial ventures to discourage and prohibit the installation of new ODS consuming activities;
- seeking support in the first instance and followed by prohibition in the short term of the importation of consumer appliances and equipment using ODSs.

3.2.4 Import Concessions

To encourage and lessen the impact of the transition to the alternatives, concessions on duties incurred for ODS alternatives will be offered where this is feasible. The concessions may only extend until 2005, at which point no further ODSs will be imported into Barbados. Specific measures to be adopted will include:

- utilising incentives designed for the major productive sectors of tourism, agriculture and manufacturing such as waiving of import duties on equipment to favour alternative technologies and discriminate against ODS using ones;
- providing relief on income and corporation tax for investment in alternative technologies in replacement of ODS ones;
- reviewing tariff structures for ODS and their alternatives where possible in order to favour the alternatives.

3.2.5 Training

The training of maintenance, installation and service technicians in the handling and properties of the alternatives is another key element of the overall action plan. These individuals are currently versed in the ODS. For there to be a phase out of the ODS, there will need to be the technical support to facilitate the utilization of the alternatives, and the training programme proposed in Annex I seeks to address this.

3.2.6 Voluntary Actions

The major importers of the ODSs have vowed to reduce and eventually cease any further trading in ODSs themselves. This action is based upon the policy positions of major international suppliers and the recognition of future limitations on the world market.

3.2.7 Monitoring Arrangements

Consumption in Barbados is based purely on imports as there is no local production of the substances. Monitoring of the consumption will involve two main strategies. First will be based on the quotas or licenses issued for importation. A second strategy will involve the cooperation of the major suppliers, who have generally been very open in supplying information during the survey. The second step will be important as any deficits between quotas granted and actual imports will need to be determined. The cooperation of the Customs department will also be necessary, but limitations of the Harmonized System to differentiate between substances will limit the usefulness of the information derived.

The proposed Ozone Unit shall be responsible for compiling and analyzing the information from the various sources and maintaining records for consumption from 1986.

3.2.8 Implementation of Projects Identified in the Country Programme

The Ozone Unit and the Steering Committee will have responsibility for monitoring the implementation of the projects and their success. The Unit will have a more direct responsibility to monitor and report to the Steering Committee.

TABLE 3.2
ACTION PLAN

PROJECT NO.	ACTION	STARTING DATE	IMPLEMENTING BODY
1	Public awareness & education campaigns, in conjunction with Non-Governmental Organizations	JAN 1995	Ministry of Environment, Housing & Lands
2	Establishment of Ozone Unit & Steering Com.	JAN 1995	Ministry of Environment, Housing & Lands
3	Retro-fitting of Fishing complexes & Markets to use non-ODS substances	JULY 1994	MINISTRY OF AGRICULTURE, FOOD & FISHERIES
4	Training of Refrigeration/Air-condition service technicians	JUN/JUL 1995	OZONE UNIT / S.J.P. POLYTECHNIQUE
5	Detailed Refrigeration Sectoral Assessment with emphasis on Hotel/Tourism sub-sector	JAN 1995	OZONE UNIT
6	IMPLEMENTATION OF A NATIONAL PROGRAMME FOR RECOVERY AND RECYCLING OF REFRIGERANTS	OCT 1995	OZONE UNIT / S.J.P. POLYTECHNIQUE
7	Setting of import quotas & issuing of licenses	MAR 1995	OZONE UNIT
8	Legislative framework for ODS phase-out	MAR 1995	OZONE UNIT
9	Ban on new installations using ODSs	1995	OZONE UNIT / MINISTRY OF TRADE
10	Ban on Equipment & Appliances containing ODSs	1995	OZONE UNIT / MINISTRY OF TRADE
11	Import concessions & Tax incentives to promote use of substitutes & alternative technologies	1995	MINISTRY OF FINANCE
12	Total ban on use of MCF	DEC 1997	OZONE UNIT / MINISTRY OF TRADE
13	Total ban on use of Halons	DEC 1997	OZONE UNIT / MINISTRY OF TRADE
14	TOTAL BAN ON USE OF CFCs	DEC 2005	OZONE UNIT / MINISTRY OF TRADE

TABLE 3.3
Project Summary

Duration	Project Title	Estimated US\$	Implementing Agency	Remarks
1995 - 1997	Establishment of Ozone Unit	146,000	UNEP	Institutional strengthening for implementation of Action Plan incl. project coordination
1 yr (1995)	Training	61,600	UNEP	Training of refrigeration & Air-condition service technicians
1994 - 1995	Cold Chambers: Fishing Complexes and Markets	260,748	UNIDO	Retro-fitting of CFC based facilities and/or replacement with alternative technologies
1995-1997	PROJECT PREPERATION: IMPLEMENTATION OF A NATIONAL PROGRAMME FOR RECOVERY AND RECYCLING OF REFRIGERANTS	10,000	UNEP	PROJECT PREPARATION TRAINING AND EQUIPMENT FOR RECOVERY AND RECYCLING OF REFRIGERANTS
	TOTAL:	478,348		

ANNEX I

PROJECTS

PROJECT PROPOSAL:	PROJECT NUMBER 1
PROJECT TITLE:	Establishment of Ozone Unit (Strengthening of the Institutional Capacity Desk Within the Environment Division of the Ministry of Tourism, International Transport and the Environment to Manage and Coordinate Ozone Related Issues at the National Level)
SECTORS COVERED:	All
ODS CONSUMPTION IN SECTOR:	35.63 Tonnes in 1993 (38.85 ODP Tonnes)
PROJECT DURATION:	3 Years - January 1st, 1995 to December 31st, 1997
TOTAL INCREMENTAL COST (USD):	\$146,000
IMPLEMENTING AGENCY:	United Nations Environment Programme
NATIONAL IMPLEMENTING AGENCY:	Ministry of Tourism, International Transport and the Environment

PROJECT DESCRIPTION:

Barbados has committed itself to an Action Plan specified in the Country Programme Report in which ODSs are scheduled to be eliminated by 2005, five years before the deadline date. Integral to the Action Plan is the establishment of a National Ozone Coordinator with the responsibility of monitoring the use of ODS, coordinating the implementation of projects designed to eliminate ODS consumption, compiling data on ODS use for reporting to the OzonAction Programme and addressing ozone issues.

The Ministry of Tourism, International Transport and the Environment has responsibility for matters relating to the Vienna Convention and the Montreal Protocol. Currently, the human and technological resources available to address ozone issues are very limited, which may prove to be a significant handicap in terms of the implementation of projects and strategies identified in the Country Programme. Furthermore, the current staff of the Ministry would be unable to adequately monitor and report on ODS consumption in the Country. The ability to meet obligations established in the Protocol would therefore be inhibited by the limited institutional capacity.

The project specifies the total costs of undertaking the institutional strengthening, and identifies the portion to be met by the Government of Barbados (G.O.B) and that requested from the Multilateral Fund, with UNEP as its implementing agency, Table P.1.

The main objective of the project is to strengthen the national institutional capacity in order to facilitate the efficient and effective coordination and administration of ozone matters. The project would also facilitate a more detailed review of the the current capital investment in ODSs technologies and identify strategies to assist in the replacement of this equipment.

More specifically, the project seeks to:

- i. Establish a national coordinator within the Ministry of the Environment to be responsible for administering matters relating to the Vienna Convention and The Montreal Protocol;
- ii. Upgrade the capacity of the national focal point to coordinate and implement projects designed to reduce and eliminate ODS consumption in Barbados;
- iii. Develop the capacity of the national focal point, including the establishment of a comprehensive database of imports, major uses of ODSs and companies involved, in order to monitor, analyze and report on the consumption of ODSs in Barbados;
- iv. Undertake a comprehensive assessment the ODSs technologies utilised in comercial enterprises and identify strategies to assist in the transition to technologies using alternative substances;
- v. Re-train a selection of Custom Officials to facilitate the implementation of procedures for using tariff classifications within the Harmonized System, to extract and report data on trading in ODSs.
- vi. Monitor ALL projects which are implemented according to the country programme, including the training/re-training activities.
- vii. Develop an effective and efficient documentation centre and information focal point to disseminate information on ozone matters, both on request and via public awareness programmes;
- viii. Develop and coordinate public awareness programmes both aimed at general audiences and targeting specific sectors.

TABLE P.1
Budget proposal for Project 1 (US\$)

ITEM	1995		1996		1997		TOTAL	
	UNEP	G.O.B.	UNEP	G.O.B.	UNEP	G.O.B.	UNEP	G.O.B.
1.0 Personnel								
1.1 National Coordination (Renumeration & expenses)	27,000		27,000		27,000		81,000	
1.2 Secretary	8,000		8,000		8,000		24,000	
1.3 Technical Advisors (economist & engineer)	10,000						10,000	
2.0 Equipment & Supplies								
2.1 Computer with modem	2,500						2,500	
2.2 Inkjet Printer	1,000						1,000	
2.3 Software programmes	2,000						2,000	
2.4 Furniture		2,000						2,000
2.5 Electronic Typewriter		750						750
2.6 Photocopier		3,000						3,000
3.0 Facilities								60,000
3.1 Office Accommodation		20,000		20,000		20,000		
3.2 Telecommunications Cost	2,000		2,000		2,000		6,000	
3.3 Misc.	1,000		1,000		1,000		3,000	
4.0 Operations & Service								
4.1 Stationery & Supplies	2,000		2,000		2,000		6,000	
4.2 Seminars, etc. 3 per year	1,500		1,500		1,500		4,500	
4.3 Preparation and distribution of annual reports	2,000		2,000		2,000		6,000	
TOTAL	59,000	25,750	43,500	20,000	43,500	20,000	\$146,000	\$ 65,750

PROJECT PROPOSAL:	PROJECT NUMBER 2
PROJECT TITLE:	Training
SECTORS COVERED:	Refrigeration and Air-Conditioning
ODS CONSUMPTION IN SECTOR:	34.09 Tonnes in 1993 (32.27 ODP Tonnes)
PROJECT DURATION:	1 year
TOTAL INCREMENTAL COST (USD):	\$61,600
IMPLEMENTING AGENCY:	United Nations Environment Programme
NATIONAL IMPLEMENTING AGENCY:	Ministry of Tourism, International Transport and the Environment

PROJECT DESCRIPTION:

Having acceded to The Montreal Protocol and resolved to systematically phase out the use of ODSs, Barbados must secure sustainable economic activity while maintaining its workforce, by ensuring the viability of individuals and enterprises which may be challenged by the inevitable changes. To this end, decision makers and operatives in all targeted sectors must be kept up-to-date and fully functional. Recognizing that the Refrigeration and Air-condition sector accounts for between 74% - 96% of the total usage of ODSs in any given year (see Table 2.4), it is therefore essential to identify this sector for specific attention in the form of Training Workshops and Seminars. Further, the co-operation and competence of personnel in this sector are pivotal to expedite the phasing-out of ODSs and the successful implementation of alternatives substances and technologies.

Objectives

- i. To raise the level of awareness about Barbados' status and obligations under the Montreal Protocol.
- ii. To solicit and encourage co-operation from the actors within the Refrigeration and Air-condition sector.
- iii. To instruct operatives in the responsible manner of handling and/or recovering of CFC refrigerants.
- iv. To develop the capacity in national institutions training air-conditioning and refrigeration technicians in addressing all aspects of alternatives to ODSs.

- v. To introduce the participants to alternative substances and technologies and instruct them in the appropriate handling methods.
- vi. To highlight the differences in the new products, pointing out incompatibilities, precautions and changes in the requirements during installation and in tools/equipment needed.

Target Audience

The target audience for this training initiative are personnel within the Refrigeration and Air-condition sector. In the first instance, the teachers at the institution that trains the majority of servicemen in the sector; trainers in the private sector; technicians in service companies; and the engineering and maintenance personnel in large companies using ODSs.

Approach

The project would be based at the Samuel Jackman Prescod Polytechnic (SJPP), the national institution responsible for the training the majority of the air-conditioning and refrigeration technicians in Barbados, as well as from other in the Caribbean. Further the project would provide the technology to the SJPP to facilitate the training and would have three distinct elements.

The first element would involve one or two experts coming to Barbados to undertake the first training exercise of directed at those individuals responsible for training others. The first to be trained would be staff of the refrigeration department of the SJPP and senior personnel in large service and installation companies and departments also responsible for conducting on the job training would be involved in the first exercise.

The second element of the project would involve a series of training seminars at the SJPP using the trained staff and individuals from the first seminar as resource persons. These seminars would offer re-training to existing technicians as a means of raising standards and competence particularly in the use of alternatives to ODSs.

The final element would follow from the first in particular. This component is the upgrading of the training programme at the SJPP to ensure that future graduates are well versed in the techniques of handling all refrigerants.

Expected Results

The direct results of the project would be the elevation of standards and ability of industry personnel in the use ODSs alternatives thus facilitating the introduction of these technologies into the country and enabling phase-out schedules to be met. Additionally, the personnel would be more proficient in the re-use of ODSs. The specific direct and in-direct results of the programme would include:

- upgrading existing personnel and training future ones to be proficient in the use and reuse of ODS technology and alternative technologies;

- the development and/or upgrading of training and reference manuals for alternative technologies and substances to ODSs;
- facilitating the phase out of an annual consumption of over 30 ODP Tonnes of refrigerants constituting over 80% of the national ODP by providing the necessary service infrastructure to meet the needs of the alternative technologies;
- encouraging the efficient use of existing ODS stocks through recycling and the discouragement of "venting" during installation, maintenance and repair activities.

Supporting Actions

- The Samuel Jackman Prescod Polytechnic would be expected to integrate the training seminar in the use of the alternative technologies to ODSs and the efficient uses of ODSs into its regular training programme.

Follow up Actions

- The Ozone Unit in the Ministry of Tourism, International Transport and the Environment will evaluate the training exercises along with the SJPP with regard to level of attendance.
- The Ozone Unit will coordinate a survey of the project participants 6 months after the project to determine the extent to which the alternative technologies are replacing ODS ones, and what limitations if any still exist to the introduction to the alternatives. The Ozone Unit would then be in a position to facilitate the removal of those limitations.

Time Frame

The project is expected to commence in June/July 1995 and consist of three distinct segments.

- The first segment would involve the training of the trainers, in which approximately 10 participants would be involved in a week long seminar.
- The second segment would consist of a series of re-training seminars for existing technicians, on a part time basis lasting 1/2 weeks. It is expected that there would be approximately 15 such seminars with 10 participants each.
- The third segment involves the adaptation of the existing training programmes to integrate the use and management of ODSs alternatives.
- The preparation of training and reference manuals will also be a part of the project. This element will be in support of three other main components of the project.

TABLE P.2
Budget for Project 2 (US\$)
Training Project

PROJECT COMPONENTS	UNEP	GOB
Personnel		
International Experts - 2 x 10 days @ \$400 per day	8,000	
Local Experts - 2 x 10 days @ \$150 per day	3,000	
Sub - Total	11,000	
Local Administration		
Documentation - training/reference manuals & teaching materials	5,000	1,000
Equipment		
(1) Refrigeration Training Unit	7,500	
(2) Vacuum pumps	3,000	
(2) Recovery unit	3,000	
(6) 1.5 HP Refrigeration condensing units	9,000	
(8) Manifold gauges	500	
(6) 1.5 HP Semi hermetic compressors	6,000	
(1) HFC-134a Refrigerant	500	
(6) 1 Ton expansion valves	900	
(1) 7.5 HP Water cool condensing units	3,000	
(2) Set of Refrigerant pressure/temperature charts	100	
(2) Refrigeration charging stations	3,500	
(2) Electronic leak detectors	500	
(1) Set of conversion kits and accessories	2,500	
Sub-Total	40,000	
Contingencies at 10%	5,600	600
TOTAL	61,600	6,600

PROJECT PROPOSAL:	PROJECT NUMBER 3
PROJECT TITLE:	Cold Chambers: Fishing Complexes and Markets
SECTORS COVERED:	Refrigeration
ODS CONSUMPTION IN SECTOR:	5 Tonnes in 1993 (5 ODP Tonnes)
PROJECT DURATION:	1 year
TOTAL INCREMENTAL COST (US\$):	262,698
IMPLEMENTING AGENCY:	
NATIONAL IMPLEMENTING AGENCY:	Ministry of Tourism, International Transport and the Environment

PROJECT DESCRIPTION:

Barbados, being surrounded by bounteous seas, has a vibrant fishing industry which supports the major foreign exchange earner, Tourism, as well as stimulates employment and business activity across the economic brackets.

The Ministry of Agriculture, Food and Fisheries (MAFF) is mandated to manage and maintain several Fishing Complexes and Public Markets throughout the island. Further, Government, through MAFF, provides a service of supplying ice to ocean-going vessels and fish vendors as well as blast freezing, chilling and cold storage facilities on the port side. In addition, there are several private concerns which offer similar services or are otherwise involved in the fishing industry.

ODSs are the current refrigerants utilized by these operations and this accounts for between 3 to 5 Tonnes annually. Examination of these facilities revealed that though some retrofitting and upgrading is possible, in some instances it will prove to be more economically feasible to change to alternative technologies.

It is therefore proposed to systematically phase out the use of ODSs in this sector as follows:

- i. Where feasible, conduct the retro-fitting of all Ice Making Systems, Ice Bin Compressor Systems, Blast freezers, Cold Storage and Chiller Rooms with HCFC-22 refrigerant gas.
- ii. Introduce appropriate alternative technologies for systems where retro-fitting is not a viable option.

- iii. To instruct operatives in the responsible manner of handling and recovering of CFC refrigerants.
- iv. To provide specific training for all maintenance and engineering personal who are charged with the upkeep of these new (and unfamiliar) technologies.

Three locations managed by MAFF are covered by this current project. An overview of the Bridgetown Fishing Complex component is presented in Appendix III. It should be noted that this sub-project consists of two distinct phases these being: (a) the phasing out of CFC refrigerant and (b) the conversion from a water-cooled to an air-cooled system. Only those cost which relate directly to the phasing out of ODSs have been included in the budget presented in Table P.4.

TABLE P.3
Budget for Project 3 (US\$)

Sub-Project	Description	Cost	Sub-total	Project Total
Bridgetown Fish Complex: Ice Making System	Equipment and Refrigerant	39,276	66,083	
	Design and Labour	13,627		
	Accessories	13,180		
Bridgetown Fish Complex: Ice Bin System	Equipment and Refrigerant	24,025	34,435	
	Design and Labour	10,000		
	Accessories	410		
Bridgetown Fish Complex: Blast Freezer & Cold Storage	Equipment and Refrigerant	51,401	79,992	
	Design and Labour	22,111		
	Freight	6,480		
Oistins Fish Complex:	Equipment and Refrigerant	50,455	72,208	
	Design and Labour	12,948		
	Modifications to existing equipment	8,805		
Fairchild Street Market:	Equipment and Refrigerant	2,335	2,980	
	Design and Labour	000*		
	Accessories	645		
Miscellaneous Project expenses:	22.7 kg Recovery Unit and cylinders	1,800	5,050	
	Specific retraining for in-house technicians	3,250		
TOTAL:\$			260,748	

* In-house technicians

PROJECT PROPOSAL:	PROJECT NUMBER 4
PROJECT TITLE:	Project Preperation: Implementation of a National Programme for Recovery and Recycling of Refrigerants
SECTORS COVERED:	Refrigeration and Air-Conditioning
ODS CONSUMPTION IN SECTOR:	34.09 Tonnes in 1993 (32.27 ODP Tonnes)
PROJECT DURATION:	
TOTAL INCREMENTAL COST (USD):	\$10,000
IMPLEMENTING AGENCY:	United Nations Environment Programme
NATIONAL IMPLEMENTING AGENCY:	Ministry of Tourism, International Transport and the Environment

PROJECT DESCRIPTION:

The project is to identify the national requirements to implement a comprehensive programme for recovery and recycling of refrigerants in the refrigeration and air conditionoing sectors. These are the main sectors using ODS in this tourist island state. The project would establish the required number of recovery, recycling units and training seminars for the technicians who repair and maintain refrigeration and air conditioning equipment.

REFERENCES & SOURCES OF INFORMATION

1. Barbados Economic Report 1993
Ministry of Finance
2. Statistical Services Department
Government of Barbados
3. Customs and Excise Department
Government of Barbados
4. Barbados Hotel and Tourism Association
5. Barbados Chamber of Commerce and Industry

APPENDICES

APPENDIX I

Countries of origin for bulk supplies of ODSs

<u>Refrigerants</u>	<u>Fire protection (Halons)</u>	<u>Solvent (MCF)</u>
USA	USA	USA
UK	UK	
Brazil		
Fed. Rep. of Germany		

APPENDIX II

Countries of origin equipment and vehicles containing ODSs

<u>Vehicles</u>	<u>Refrigeration & Air Condition</u>	
USA	USA	New Zealand
UK	UK	St. Lucia
Brazil	Canada	St. Vincent & Grenadines
Japan	Guyana	Trinidad & Tobago
Germany	Hong Kong	Netherlands
	France	Denmark
	Italy	Japan
	Singapore	China Peo. Rep
	Sweden	Netherland Antilles
	Turkey	Korea Rep. of
	Indonesia	Switzerland
	Grenada	

APPENDIX III

Overview of Bridgetown Fisheries Complex Project and estimated cost

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