

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

PROJECT COVER SHEET

COUNTRY	INDONESIA	IMPLEMENTING AGENCY	UNDP
PROJECT TITLE	Phase-out Management Plan for CFCs in the Refrigeration (Servicing) Sector in Indonesia		
PROJECT IN CURRENT BUSINESS PLAN	Yes		
SECTOR	Refrigeration (Servicing)		
SUBSECTOR	All sub-sectors (except MAC & Chillers)		
ODS USE IN SECTOR	Baseline (Average of 1995-97)	2,818	MT ODP (Refrigeration Sector)
	Current (2000)	2,252	MT ODP (Excl. MAC/Chillers)
	Covered by Refrig. (Mfg) Sector Plan	1,180	MT ODP (in Refrig. Mfg)
	Net covered by this Plan	1,072	MT ODP
PROJECT IMPACT	1,072 MT ODP		
PROJECT DURATION	5 years		
PROJECT COSTS	Incremental Capital Costs	US\$	4,551,000
	Contingencies (10%)	US\$	361,300
	Incremental Operating Costs	US\$	0
	Total Project Costs	US\$	4,912,300
LOCAL OWNERSHIP	100%		
EXPORT COMPONENT	0%		
REQUESTED GRANT	US\$	4,912,300	
COST EFFECTIVENESS	US\$/kg/y	4.58	
IMPLEMENTING AGENCY SUPPORT COSTS	US\$	TBD	
TOTAL COST OF PROJECT TO MULTILATERAL FUND	US\$	TBD	
STATUS OF COUNTERPART FUNDING	N/A		
PROJECT MONITORING MILESTONES	Included		
NATIONAL COORDINATING BODY	Ministry of Environment		

PROJECT SUMMARY

This project will facilitate elimination of all the remaining eligible CFC consumption in the Refrigeration (Servicing) Sector in Indonesia, except in the MAC and Chiller sub-sectors, upon completion. The Phase-out Management Plan will be implemented through five annual implementation programmes and together with the implementation of the approved ongoing projects in the Refrigeration Sector, is expected to result in the complete phase-out of CFCs in the Refrigeration Sector in Indonesia in five years. The Phase-out Management Plan will address the conversion requirements in the Refrigeration (Servicing) Sector for ensuring a timely, sustainable and cost-effective phase-out, through a combination of investment, technical support and policy/management support components. The plans for phase-out of CFCs in the MAC and Chillers Sectors are being submitted separately by the World Bank. The total eligible incremental costs and the requested grant for the Phase-out Management Plan for the Refrigeration (Servicing) Sector excluding the MAC and Chiller sub-sectors are US\$ 4,912,300.

IMPACT OF THE PROJECT ON THE COUNTRY'S MONTREAL PROTOCOL OBLIGATIONS

The approval of this project will help Indonesia in meeting its Montreal Protocol obligations, such as the phased reductions in ODS consumption as per the agreed schedules.

PREPARED BY UNDP (in consultation with LH and World Bank)

DATE 27 August 2002

PROJECT OF THE GOVERNMENT OF INDONESIA
Phase-out Management Plan for CFCs in the Refrigeration (Servicing) Sector in Indonesia

1. PROJECT OBJECTIVES

The objectives of this project are:

- a) Together with the Refrigeration (Manufacturing) Sector Phase-out Plan approved at the 37th ExCom Meeting, to achieve complete phase-out of CFCs in the Refrigeration Sector in Indonesia within five years by implementing the phase-out management plan for CFCs in the Refrigeration (Servicing) Sector.
- b) To enable Indonesia to meet its obligations of phased ODS reductions in accordance with the control schedule of the Montreal Protocol.
- c) To ensure timely, sustainable and cost-effective CFC phase-out in the Refrigeration (Servicing) Sector, through development and implementation of a combination of investment, technical support and policy/management support components.

2. BACKGROUND

2.1 Introduction

Indonesia is the world's largest archipelago, comprising about 16,000 islands and located between the Indian and Pacific oceans. The total area is about 1.9 million sq. km. with a land area of about 1,8 million sq. km and a coastline of about 54,000 km. With about 23 million, it has the fifth largest population in the world. The country is administratively organized into 32 provinces, 2 special regions and one special capital district. The 357 subdivisions of the provinces, called regencies, have become key administrative units following the implementation of the decentralization legislation from January 2001.

The key economic sectors in Indonesia are petroleum and natural gas, mining, textiles and footwear, cement, chemicals and fertilizers, plywood, rubber and tourism. Manufacturing and services contribute about 55% of the size of the economy. The main concentration of population and industrial/commercial centers is in Java (Greater Jakarta, Surabaya, Semarang, etc), Sumatera (Medan, Padang, etc) and to a lesser extent in Sulawesi, Kalimantan and Irian Jaya regions.

2.2 Montreal Protocol Activities

Indonesia ratified the Vienna Convention and the Montreal Protocol in June 1992. The per capita consumption of ODS in Indonesia being less than 0.3 kg, Indonesia is classified under Article-5 of the Montreal Protocol. In 1994, Indonesia prepared a Country Programme incorporating the national strategy and action plan to phase out ODS in line with the Montreal Protocol control schedule. The action plan proposed to address each of the ODS consuming industry sectors, through six elements, namely, institutional measures, regulatory measures, incentive and disincentive measures, awareness and information dissemination, investment and technical assistance and monitoring. With the assistance of the Multilateral Fund, several investment and non-investment activities were implemented by Indonesia, from 1993 to 2000. Complete ODS phase-out was initially targeted ambitiously for 1998.

The Government initiated preparation of the Country Programme Update in 1998 with the assistance of the World Bank, UNDP and the industry, under which, the ODS consuming sectors were resurveyed. The updated country programme renewed and reinforced Indonesia's commitment, strategy and action plans to eliminate ODS and is intended to serve as a guideline for future activities related to meeting Indonesia's obligations under the Montreal Protocol. Realizing the needs of the industry and the economy, the updated Country Programme revised the target date for complete ODS phase-out to the end of 2007.

2.3 Institutional Framework

The activities related to ozone layer protection and implementation of the Montreal Protocol, are coordinated through the Ozone Unit, within the Climate Change and Atmosphere Department of the Ministry of Environment.

To provide regulatory and policy support for enabling the industry to eliminate ODS, the Government of Indonesia has taken the following initiatives and actions:

- a) Establishing a licensing system for import of ODS from 1998.
- b) Ban on imports of goods containing ODS from 1998.
- c) Monitoring the use and import of ODS to minimize illegal trade and capacity-building of customs officials in line with ASEAN agreements
- d) Active monitoring of the progress of implementation of projects funded by MLF
- e) Formulating guidelines and regulations as necessary for policy implementation
- f) Supporting public awareness initiatives and campaigns for promoting ozone layer protection at the consumer level.
- g) Regular interaction with other ministries and departments, industry representatives and implementing agencies for information dissemination related to impact of policy measures
- h) Promoting research and use of ozone-friendly technologies
- i) Providing incentives and rewards for development and use of ozone-friendly technologies

3. SECTOR BACKGROUND

3.1. Industry Structure

The Refrigeration Sector in Indonesia has experienced significant growth in the past decade due to the consistent growth in the per capita incomes, the predominance of the tourism and service industry and the relatively low market penetration of refrigeration appliances and equipment in the past. CFCs are consumed as blowing agents (CFC-11) and refrigerants (CFC-12, R-502, etc) in the manufacture of refrigeration and air-conditioning products.

In the Refrigeration Sector, CFCs are presently consumed in Indonesia, in manufacturing of new products and for servicing of existing appliances, equipment and systems.

The range of products manufactured, imported and serviced in the sector includes household refrigerating appliances such as domestic refrigerators and freezers, commercial refrigeration equipment such as display cabinets, bottle coolers, chest freezers, hot and cold water dispensers, visi-coolers, reach-in refrigerators, walk-in coolers and freezers, supermarket systems, etc.; industrial refrigeration equipment such as process chilling/freezing systems, cold storages, hospital refrigeration systems (mortuary cabinets, blood-bank refrigerators, etc) and transport refrigeration equipment (refrigerated trucks and trailers) and commercial appliances such as mobile air conditioning units for cars, vans and buses.

3.1.1 Supply Industry

Production

There is no production of CFCs in Indonesia. The entire domestic demand is met through imports from mainly from India, China and Europe. There is also no production of refrigeration compressors and the same are imported from North America, Europe, Japan and Southeast Asia. Other refrigeration system components, such as evaporators, condensers, etc. are partly imported and partly manufactured indigenously.

Imports

The Government of Indonesia has designated certain importers for CFCs, who are licensed to import CFCs, mandated through the licensing regulation.

Distribution

The CFCs imported are sold to the users directly by the importers or indirectly through secondary distributors or retailers. Since the CFC consumption in Indonesia in the Refrigeration and Air Conditioning Sector is significantly high, CFCs are also supplied through service establishments and contractors.

Considering the geography and size of the country, the availability of upstream supplies in general is satisfactory, however the quality and level of customer service and technical support is quite limited, mainly due to inadequate infrastructure and due to insufficient availability of trained and qualified staff.

3.1.2 User Industry

Manufacturing

There are several manufacturers in the Refrigeration Sector, in the domestic, commercial, industrial and transport refrigeration sub-sectors. The manufacturers of domestic refrigeration equipment are only a few, are large and are organized. The enterprises engaged in the manufacture of commercial, industrial and transport refrigeration equipment, are predominantly small and unorganized, with modest or low investments in plants and machinery. They also lack adequately trained and knowledgeable manpower.

Servicing

There is a significant existing population of domestic, commercial, industrial and transport refrigeration appliances, equipment and systems, and also of automobile air conditioning units, requiring servicing. Also, due to rapid economic growth in the past two decades, there are a significant number of office buildings and complexes served by central air conditioning centrifugal chillers, which require servicing. As a result, there is a large and fast growing servicing sector comprising of a large number of servicing establishments.

Most of the large-sized service establishments are predominantly a part of the network of servicing centers owned or managed by the major domestic and commercial refrigeration equipment manufacturers or a part of the network of local offices of the main dealers/distributors of refrigeration raw materials, components, consumable, etc. The medium-sized servicing establishments are predominantly independent and cater to small and medium-sized end users in the respective local markets. There are in addition, a large number of small servicing shops and freelancing service technicians.

End-users

The end-users of products containing CFCs are in the domestic (household refrigerators/freezers and hot/cold water dispensers), commercial (small shops and other small commercial establishments, mini markets, departmental stores and supermarkets), industrial (process refrigeration systems, cold stores, etc) and transport refrigeration sub-sectors (refrigerated trucks and trailers) and in the mobile air conditioning (passenger cars and buses) and chiller (centrifugal chiller plants) sub-sectors.

3.2 CFC Phase-out Scenario

The overall baseline ODS consumption for all sectors in Indonesia, as reported by the Government of Indonesia is as tabulated below:

Table-1
Indonesia: Baseline ODS Consumption (1995-97)

SECTOR	1995 (MT)	1996 (MT)	1997 (MT)	Average (MT)
Aerosols	1,800	1,500	800	1,367
Foams	3,609	4,627	3,936	4,057
Refrigeration	2,780	2,786	2,889	2,818
Solvents	474	473	255	401
Tobacco	90	35	35	53
Halons	134	51	15	67
Methyl Bromide	254	182	242	226

The breakdown of CFC consumption in Indonesia as reported by them for the various CFC-consuming sectors for CY 2000 is tabulated below:

Table-2
Indonesia: CFC Consumption Data for CY 2000

Sector	Baseline Consumption (1995-97 Avg.) (ODP MT)	Consumption covered by approved projects (ODP MT)	Consumption from approved unimplemented projects (ODP MT)	Consumption for CY 2000 (ODP MT)
Aerosols	1,367	460	460	700
Foams	4,057	3,751	1,950	2,282
Refrigeration	2,818	819	49	2,603
TOTAL	8,242	5,030	2,459	5,585

The Refrigeration and Air Conditioning Sector in Indonesia accounts for about 34% of Indonesia's baseline CFC consumption, which comprises of CFCs consumed in both manufacturing and servicing of refrigeration and air conditioning equipment. The following table depicts the CFC consumption scenario within the Refrigeration and Air Conditioning Sector:

Table-3
Indonesia: CFC Consumption breakdown for the Refrigeration Sector for CY 2000

Substance	Refrigeration Manufacturing (ODP MT)	Refrigeration Servicing (ODP MT)	MAC Servicing (ODP MT)	Chillers Servicing (ODP MT)	TOTAL (ODP MT)
CFC-11	674	0	0	35	709
CFC-12	591	905	262	35	1,793
Other CFCs	10	23	0	5	38
TOTAL	1,275	928	262	75	2,540

The current CFC phase-out status in the Refrigeration and Air Conditioning Sector is as below:

Sector	Sub-sector	Status
Manufacturing	Domestic, commercial, industrial and transport refrigeration	All the seven existing manufacturers of domestic refrigerators effected CFC phase-out with assistance from the Multilateral Fund. There is no known further remaining unfunded manufacturing capacity in this sub-sector. There are six enterprises with ongoing individual projects (approved in December 2001). A Phase-out Management Plan covering this sector was approved in July 2002, which targets eliminating all the remaining ODS consumption in this sector by end-2007.
	Residential and commercial air conditioning	This sub-sector does not consume CFCs, but predominantly uses HCFCs and HCFC blends, mainly HCFC-22.
	MAC	The two indigenous manufacturers of MAC equipment converted to HFC-134a between 1993 and 1997. There is no further CFC consumption in this sub-sector
	Chillers	There is no manufacturing capacity for central air conditioning centrifugal chillers in Indonesia.
Servicing	Domestic, commercial, industrial and transport refrigeration	Comprises of service establishments serving the existing population of domestic and commercial refrigeration appliances and equipment. The estimated number of such establishments is about 10,000.
	Residential and commercial air conditioning	As noted above, this sub-sector does not have CFC consumption.
	MAC	One technical assistance project has been completed covering about 50 MAC repair shops eliminating 41 MT/y CFC consumption. There are an estimated 1.3 million vehicles with CFC-based air conditioning systems.
	Chillers	There is a substantial population of CFC-based central air conditioning centrifugal chillers. Due to the constraints imposed by the economic crisis in 1997, most owners of chillers have postponed their retrofitting/replacement decisions.

3.4 Survey of the Refrigeration (Servicing) Sector

With a view to address the CFC phase-out in the Refrigeration Sector through a sector-wide approach, the Government of Indonesia, through the Ozone Unit, requested UNDP to assist them in conducting surveys of the Refrigeration (Manufacturing and Servicing) sectors to enable the preparation of sector-wide Phase-out Management Plans for these sectors.

The survey of the Refrigeration (Manufacturing) Sector was carried out in early 2002, leading to the preparation of the Refrigeration (manufacturing) Sector Phase-out Management Plan, which was submitted to and approved at the 37th Executive Committee Meeting in July 2002

Considering the magnitude of the task of surveying the Refrigeration (Servicing) Sector, and with the agreement of the Government, Institut Teknologi Bandung (ITB), a reputed technical university with a strong background in the Refrigeration and Air Conditioning field and with prior experience in designing refrigerant management plans (such as for Bandung) and a local consultancy firm familiar with the Refrigeration Sector in Indonesia, were retained to carry out the survey. The survey was jointly conducted by these entities in conjunction with the Ozone Unit. The survey and identification work covered the servicing establishments, training establishments, technicians and end-users in the Refrigeration (Servicing) Sector and also upstream suppliers of raw materials, components and consumables in the refrigeration sector, as well as manufacturers of refrigeration equipment related to the servicing of domestic, commercial, industrial and transport refrigeration sub-sectors. The servicing in the MAC and Chiller sub-sectors was excluded from this survey.

3.4.1 Survey Methodology

The survey methodology comprised of the following steps:

- Interaction with upstream suppliers of refrigerants, components and accessories
- Interaction with manufacturers of refrigeration equipment
- Interaction with major servicing establishments
- Interaction with training establishments
- Interaction with selected representative samples of technicians
- Interaction with customs units/offices
- Interaction with major end users
- Interaction with statistics bureaus and other government departments

The interaction was carried out through meetings and visits. Through these interactions, lists of entities involved in servicing of refrigeration equipment, were obtained. For the purpose of obtaining baseline information on the establishments, a questionnaire developed by UNDP and the Ozone Unit was used. Based on the lists obtained, interaction with establishments in the Refrigeration (Servicing) Sector was carried out. About 25% of the major establishments surveyed were physically visited through field trips by the surveyor teams. The remaining were surveyed through either meetings or by phone and fax. The CFC consumption figures obtained through the survey were verified at the establishment-level through procurement records and were then correlated with the records of sales from distributors and traders and checked for overall consistency with the information available from the statistical bureaus (Biro Pusat Statistiks Indonesia) and other government departments, to the extent available.

The survey of the Refrigeration (Servicing) Sector covering the domestic, commercial, industrial and transport refrigeration sub-sectors, was conducted and organized so as establish the structure of the sector and CFC consumption patterns as below:

A. End use and equipment population

- Estimation/identification and classification (by size, by end-use, by location) of the existing population of CFC-based equipment in the domestic, commercial, industrial and transport refrigeration equipment, and assessment of their servicing requirements and CFC usage in servicing
- Estimation of the remaining economic life of the CFC-based equipment

B. Service Providers

- Identification of Refrigeration service stations and their classification (by size and by location) and assessment of their baseline capabilities and capacities in terms of equipment, training and manpower availability and also assessment of CFC usage in servicing
- Estimation of the existing population of refrigeration service technicians and their existing level of competences
- Identification of existing training and educational establishments providing vocational training and education for refrigeration technicians and their existing level of competence and capacity.

C. General

- Assessment of the prevailing average prices of CFCs and substitutes
- Assessment of the current levels of recovery and recycling and other practices in servicing
- Assessment of capabilities and capacities for monitoring CFC imports at the customs entry points and at major distributors

3.4.2 Survey Findings

The survey findings are summarized as below:

A. End use and equipment population

Domestic Refrigeration

The estimated population of domestic refrigeration appliances (household refrigerators and freezers and hot and cold water dispensers) in Indonesia is 17,576,541. The servicing requirement is tabulated below:

Type of equipment	Estimated total population (Units)	Proportion of CFC-based population (%)	Estimated CFC-based population (Units)	Proportion of CFC-based units serviced annually (%)	CFC-based population serviced annually (Units)	Average CFCs used in servicing (Kg/Unit)	Total CFCs used in Servicing (MT/y)
Household refrigerators/freezers	16,041,667	60	9,625,000	20	1,925,000	0.35	673.75
Hot and cold water dispensers	1,534,874	60	920,924	20	184,185	0.30	55.26
Total	17,576,541	60	10,545,924	20	2,109,185	0.39	729.01

Commercial Refrigeration

The estimated population of commercial refrigeration appliances, systems and installations in Indonesia is 495,648. This comprises of about 450,000 small-sized unitary systems, such as chest freezers, bottle coolers, water coolers, visicoolers, vending machines, etc. and 45,468 medium sized systems such as large display cabinets and counters, reach-in refrigerators and freezers, super market refrigeration systems with single or multiple compressors, etc.

Type of equipment	Estimated total population (Units)	Proportion of CFC-based population (%)	Estimated CFC-based population (Units)	Proportion of CFC-based units serviced annually (%)	CFC-based population serviced annually (Units)	Average CFCs used in servicing (Kg/Unit)	Total CFCs used in Servicing (MT/y)
Small-sized unitary systems	450,000	40	180,000	30	54,000	0.60	32.40
Medium-sized systems	45,648	40	18,259	30	5,478	10.00	54.78
Total	495,648	40	198,259	30	59,478	1.47	87.18

Industrial Refrigeration

The estimated population of industrial refrigeration equipment, systems and installations in Indonesia is 69,470. This comprises of:

Small-sized systems	Walk-in coolers and freezers, small cold rooms and chilling and freezing plants, etc (average charge of about 25 kg)
Medium-sized systems	Medium-sized cold rooms, small/medium chilling and freezing systems, etc. (average charge range about 50 kg – 75 kg)
Large-sized systems	Large central refrigeration systems, large cold stores, process refrigeration systems, etc. (average charge range of 100 kg or higher)

Type of equipment	Estimated total population (Units)	Proportion of CFC-based population (%)	Estimated CFC-based population (Units)	Proportion of CFC-based units serviced annually (%)	CFC-based population serviced annually (Units)	Average CFCs used in servicing (Kg/Unit)	Total CFCs used in Servicing (MT/y)
Small-sized systems	45,800	40	18,320	30	5,496	25	137.40
Medium-sized systems	21,700	25	5,425	30	1,628	60	97.65
Large-sized systems	1,970	15	296	30	89	100	8.90
Total	69,470	34.60	24,041	30	7,213	33.82	243.95

Transport Refrigeration

The estimated population of transport refrigeration equipment and systems in Indonesia is 5,510. This comprises of about 5,060 refrigerated trucks and trailers and about 450 marine and other mobile refrigeration systems.

Type of equipment	Estimated total population (Units)	Proportion of CFC-based population (%)	Estimated CFC-based population (Units)	Proportion of CFC-based units serviced annually (%)	CFC-based population serviced annually (Units)	Average CFCs used in servicing (Kg/Unit)	Total CFCs used in Servicing (MT/y)
Refrigerated trucks and trailers	5,060	60	3,036	30	911	10.00	9.11
Marine and other mobile refrigeration	450	40	180	30	54	50.00	2.70
Total	5,510	58	3,216	30	965	12.23	11.81

Summary

The summary of the CFCs used in servicing for the various sub-sectors is tabulated below:

Table-4
Indonesia – Summary of CFC consumption in servicing of Refrigeration Equipment

Sub-sector	CFC Consumption (MT)			Total (MT)
	CFC-11	CFC-12	Other	
Domestic refrigeration equipment	0.00	729.01	0.00	729.01
Commercial refrigeration equipment	0.00	86.18	1.00	87.18
Industrial refrigeration equipment	0.00	236.15	7.80	243.95
Transport refrigeration equipment	0.00	10.56	1.25	11.81
Total	0.00	1,061.90	10.05	1,071.95

There expected to be additional quantities of CFCs held as stocks. The stocks likely are a result of unsold imports made up to the import quotas.

B. Service Providers

The findings related to the assessment of the baseline conditions of service providers are summarized as below:

Service Establishments

The estimated population of establishments providing servicing for the Refrigeration (Servicing) Sector in Indonesia, covering the domestic, commercial, industrial and transport refrigeration sub-sectors, distributed by provinces (the newly added 5 provinces and 3 special regions are listed as a part of the 27 provinces listed below) is tabulated as below:

No	Province	Number of Service Establishments
1	Aceh	376
2	North Sumatera	1,263
3	West Sumatera	54
4	Riau	145
5	Jambi	10
6	South Sumatera	81
7	Bengkulu	19
8	Lampung	45
9	DKI Jakarta	1,021
10	West Java	1,964
11	Central Java	1,328
12	Yogyakarta	294
13	East Java	1,964
14	Bali	289
15	West Nusa Tenggara	96
16	East Nusa Tenggara	61
17	West Kalimantan	182
18	Central Kalimantan	130
19	South Kalimantan	157
20	East Kalimantan	334
21	North Sulawesi	174
22	Central Sulawesi	66
23	South Sulawesi	319
24	Southeast Sulawesi	75
25	Maluku	51
26	North Maluku	33
27	Papua	97
Total		10,627

Of the above, 135 service establishments are organized, with affiliations either to major manufacturers of refrigeration equipment for product sales, service and support, or to major distributors of refrigeration raw materials, components and consumables. They are dedicated to and specialized in providing service to the Refrigeration Sector and have relatively large-sized operations, handling about 65% of the total CFC usage in servicing. These establishments handle about 5 MT/y of CFCs at an average and typically employ 5-10 technicians each and have some baseline equipment available for meeting the servicing requirements of existing CFC-based systems. Of the remaining establishments, about 300 are classified as medium-sized (average CFCs handled about 0.5 MT/y). These establishments are independent, without major affiliations to any suppliers; relatively less organized, have modest capability in terms of personnel or equipment, but predominantly engaged in refrigeration service. The medium-sized establishments employ about 1-5 technicians each, and account for about 15% of the CFCs used this sector.

The remaining 10,192 establishments are predominantly small-sized and account for the balance CFC usage. These small-sized establishments may or may not be catering exclusively to the refrigeration sector. In these establishments, the individual level of CFCs handled is relatively small. With not much equipment and training, the baseline capacity and capability in these small establishments is quite modest. About 30% of these establishments claim to be formally registered. Of this group, those establishments, which have a relatively sound baseline and which do cater to the Refrigeration Sector and have considerable CFC usage in servicing, number about 500, and will be addressed in this Plan. The details of each of the large-sized and medium sized service establishments, such as names, locations, individual CFC consumption data, etc. are available with the National Ozone Unit and can be provided upon request.

Training Establishments

There are about 20 government-operated vocational training institutes (Balai Latihan Kerja) in Indonesia, which deliver refrigeration and air conditioning training courses and curricula on a regular basis, for prospective technicians. In addition, there are about 10 government-recognized or operated universities and polytechnic institutions engaged in providing similar regular training courses. In addition, there are about 100 private institutions engaged in these activities. Most establishments are not adequately equipped with demonstration equipment for hands-on training or field-experienced staff. Details of these training establishments are available with the Ozone Unit and can be provided upon request.

Technicians

The estimated population of technicians engaged in servicing of domestic, commercial, industrial and transport refrigeration equipment, distributed by provinces, is tabulated as below:

No	Province	Number of Technicians
1	Aceh	1,171
2	North Sumatera	3,898
3	West Sumatera	290
4	Riau	788
5	Jambi	57
6	South Sumatera	434
7	Bengkulu	102
8	Lampung	238
9	DKI Jakarta	9,635
10	West Java	9,358
11	Central Java	6,336
12	Yogyakarta	1,399
13	East Java	13,767
14	Bali	3,088
15	West Nusa Tenggara	584
16	East Nusa Tenggara	370
17	West Kalimantan	1,112
18	Central Kalimantan	793
19	South Kalimantan	959
20	East Kalimantan	2,040
21	North Sulawesi	1,062
22	Central Sulawesi	404
23	South Sulawesi	1,953
24	Southeast Sulawesi	460
25	Maluku	310
26	North Maluku	198
27	Papua	590
Total		61,396

About 20% of the above have undergone some formal training. About 60% are skilled and/or field experienced. The remaining 20% are semi-skilled and/or relatively inexperienced. Most technicians lack knowledge and experience on CFC-free technologies and practices.

C. General

Prevailing prices of CFCs and substitutes

There is a variation in the availability and prices of CFCs and substitutes in the various provinces and markets in Indonesia. The average prevailing retail prices of CFCs and substitutes employed in servicing of refrigeration equipment are tabulated as below:

Refrigerant	Average retail price (US\$/kg)
CFC-11	2.91
CFC-12	3.05
HCFC-22	2.28
R-502	13.07
HFC-134a	4.50
R-404a	14.30

Servicing Practices

Predominantly due to the lack of awareness, equipment, training and economic incentive, due to the relatively convenient and economic availability of CFCs and absence of specific regulations on venting and other practices, there is virtually no recovery or recycling of CFCs in servicing of refrigeration equipment. CFCs are routinely used in flushing of equipment. CFCs may also be used for servicing of non-CFC-based equipment, due to the prevailing price differentials.

3.5 Analysis of Survey Data

The projection of future CFC consumption trends in Indonesia will need to be made based on the impacts of the market forces, regulation, progress in retrofitting, good practices and economic life of existing equipment. A realistic assessment of the future CFC consumption trends would facilitate assessment of the constraints likely to be faced by the government and the industry in Indonesia for effecting CFC phase-out and the level and scope of assistance needed to accomplish the same.

3.5.1 Market forces

The lower prices of CFCs with respect to substitutes by about US\$ 1.00 to US\$ 2.50/kg, is one of the major barriers in retrofitting or replacement of existing CFC-based equipment. The prevailing prices of various refrigerants indicate that market forces alone are not sufficient to drive down CFC consumption and that the market forces have not yet reconciled fully to the CFC phase-out objectives an important reason for which, is the continued availability of CFCs at lower prices than the substitutes, from both Article-2 and Article-5 countries.

3.5.2 Economic life of equipment

The useful economic life for all equipment is considered at 15 years, although most well maintained equipment can be used for more than 20 years.

Unless dictated by the age of existing CFC-equipment, market forces alone will not be effective in curtailing CFC consumption in servicing. However, replacement of the equipment due to the end of its economic life, by non-CFC-based equipment provides an opportunity for sustainable reductions in the CFC consumption in servicing.

It appears unlikely that domestic refrigeration equipment would be retrofitted to a level that would significantly affect the CFC consumption in servicing in this sub-sector. Typical consumer preferences are to replace the appliances upon retirement.

In the commercial refrigeration sub-sector, retrofitting existing equipment is economically not feasible, as in domestic refrigeration equipment. The equipment will more likely tend to be replaced at the end of its economic life.

In the industrial refrigeration sub-sector, the relatively high price of R-502 has precipitated retrofitting or replacement decisions by end-users of R-502 based equipment, typically cold stores, freezers and other low temperature equipment, which have tended to convert to R-22, ammonia or R-404a based systems. In case of the remaining users in this sub-sector, retrofitting or replacement decisions are constrained by the relatively high investments required.

In the transport refrigeration sub-sector, since most equipment is imported from Article-2 countries, CFC-free equipment has been introduced more quickly and the proportion of CFC-based equipment with a significant balance economic life is quite small (about 25%). The overall contribution of this sub-sector in presenting a constraint for reduction of CFC use in servicing is quite small.

The following table summarizes the estimated remaining economic life of existing CFC-based equipment in various sub-sectors:

Table-5
Indonesia: Economic life and projected CFC usage in servicing refrigeration equipment

Sub-sector	Existing population of CFC-based equipment	Estimated proportion of population more than 15 years of age (%)	Estimated proportion of population less than 15 years of age (%)	Projected annual CFC usage in servicing of population less than 15 years of age (MT/y)
Domestic refrigeration	10,545,924	50	50	364.51
Commercial refrigeration	198,259	60	40	34.87
Industrial refrigeration	24,041	70	30	73.19
Transport refrigeration	3,216	75	25	2.95
Total				475.52

* Independent of market forces and regulations and at the current handling practices

In view of the foregoing, it is clear that in the short/medium term, retrofitting with technically suitable drop-in substitutes may be a relatively more feasible and cost-effective solution. However, it is also clear that independent of regulatory constraints and conducive market forces, the CFC consumption in servicing would continue at the level of at least around 475 MT/y excluding growth, if replacement or retrofitting of existing CFC-based equipment is not implemented in the short term. This indicates a major constraint in compliance by the industry to the prevailing and future regulations.

3.5.3 Good practices

The introduction of containment, good housekeeping practices and recovery/recycling/reuse will result in significant reduction of CFC consumption for servicing. In order to obtain significant reductions in CFC consumption through good practices, it will be necessary to introduce equipment, training, awareness and technical support.

3.5.4 Regulation

The introduction of appropriate regulations on handling of CFCs in servicing and proper enforcement of the import controls through strengthening of the customs and other enforcement agencies, in conjunction with the implementation of retrofitting/replacements and introduction of good practices, would be a critical factor in limiting CFC imports and indirectly making CFCs economically unattractive, thereby reducing CFC consumption in servicing in the Refrigeration Sector sustainably. Since the Government of Indonesia aims to eliminate CFC use in the country (including the Refrigeration Sector) from 2008, the government and the industry will need to take expeditious actions now, to minimize the economic impact to the country in the future.

4. PROJECT DESCRIPTION

The Phase-out Management Plan for CFCs in the Refrigeration (Servicing) Sector in Indonesia will be implemented through a combination of Investment, Technical support and Policy/Management support components.

4.1 Investment Component

The investment component of the plan will focus on providing inputs to the service establishments, training establishments and major end users, enabling the industry to physically eliminate the use CFCs in their activities and would comprise of the following elements:

4.1.1 Recovery and recycling equipment

This sub-component will provide recovery & recycling equipment to service establishments, commensurate with their size and baseline conditions (see Annex-1) to ensure the following:

- CFC use is reduced to the extent feasible in servicing operations, by discontinuing venting and flushing and facilitating of reuse of CFCs through recycling
- Reducing the import demand for virgin CFCs
- Enhancing the capacity in the servicing establishments to facilitate early retrofitting of CFC-based equipment at their end-user clients.
- Facilitate creation of an inventory of recovered CFCs to meet to the extent possible, the servicing requirement of existing CFC-based equipment during the remaining economic life

The projected direct impact of introduction of recovery and/or recycling in the CFC usage for servicing in the various sub-sectors is as below:

Sub-sector	Present CFC consumption in Servicing (MT/y)	Present level of recovery & recycling (%)	Projected level of recovery/recycling after equipment inputs (%)	Net savings in usage of CFCs (MT/y)
Domestic refrigeration	729.01	0	20	145.80
Commercial refrigeration	87.18	0	20	17.44
Industrial refrigeration	243.95	5	25	48.79
Transport refrigeration	11.81	5	15	1.18
Total				213.21

4.1.2 Demonstration equipment for Training Establishments

This sub-component will provide demonstration equipment to the existing qualified and recognized training establishments, for strengthening their capacity and effectiveness in imparting hands-on training to prospective technicians on actual field-used equipment. This will result in reducing the technician's learning curve in these operations prior to their entering the field and would supplement the content of the vocational training curriculum.

As identified in the survey, there are 30 government -operated/authorized and about 100 privately operated institutions offering regular curricula in Refrigeration and Air Conditioning. Each of these institutions will be provided with one set of demonstration equipment comprising of recovery equipment, recycling equipment, charging unit, vacuum pump, refrigerant identification kit and accessories, enabling these institutions to provide early and direct hands-on exposure to the technician trainees, as a curriculum supplement.

4.1.3 Pilot Retrofitting and Replacement Program for End Users

It is proposed to select two representative users from each of the typical refrigeration end use applications (cold storages, hospitals, supermarkets, restaurants, etc., but excluding chillers and MAC equipment) for carrying out a retrofitting and replacement demonstration (retrofitting at one end user and replacement at the other end user). The end users would be selected in such a way that one demonstration pair (one retrofitting and one replacement) is available in each province, covering a total of 32 provinces and 3 special regions (total 70 end users: 35 for retrofitting and 35 for replacement). The end users will need to meet the following criteria:

- Should own and be a continuous operator of CFC-based refrigeration equipment installed prior to July 1995 but not earlier than 1990, with a contained CFC charge of at least 10 kg.
- Should be in a stationary business at the particular location since establishment
- Should be financially viable
- Should undertake if selected, to complete permanent retrofitting or replacement (as applicable) of the baseline CFC-based refrigeration equipment within six months, in accordance with the technical guidelines provided and destroy replaced CFC-based equipment (in case of replacement)
- Should undertake to provide to Ozone Unit and/or their authorized visitors, free access to the retrofitted/replaced equipment for demonstration purposes, including advertisement/promotions or similar information dissemination activities, for a period of at least 3 years

The Ozone Unit will carry out the qualification and selection of end users for participating in this pilot program, with technical assistance from the implementing agency. The upper limit of the number of participating end users would be 70 (as described above). The selected end users would then enter into a binding agreement with the Ozone Unit, incorporating appropriate legal, technical and operational provisions. Each end user would be provided financial assistance covering the actual retrofitting/replacement costs (excluding taxes) of up to a maximum of US\$ 5,000 against satisfactory completion of conversion and satisfactory documentation justifying the costs. Any balance funds would be applied towards creating additional such demonstration end users, until exhausted.

The expected outcomes of this pilot program would be:

- Availability of demonstration cases of successful retrofitting and replacement of CFC-based refrigeration systems for information dissemination and awareness
- Confidence building in other end users
- Precipitating early retrofitting and/or replacement decisions at other end users
- Reducing CFC demand for servicing of refrigeration equipment at end users

4.2 Technical Support Component

The sector as a whole will need to be supported through provision of a technical support component for ensuring that their phase-out actions and initiatives are not only technically sound but also sustainable, and consistent with the important priorities of the Government, which are to prevent industrial dislocation, obsolescence and adverse impact to the economy. The Technical Support component will assist the sector as a whole, for the following:

- Technical assistance for retrofitting/replacement of existing CFC-based equipment in all sub-sectors.
- Establishment quality and performance standards for servicing of refrigeration and air conditioning equipment.
- Periodic interaction with the user industry through technical workshops for providing technical assistance to ensure sustainability of retrofitting/replacement actions and refrigerant handling practices

4.3 Training Component

The sustainability of the outcomes of the Phase-out Management Plan would be significantly influenced by the capability and willingness of the large number of refrigeration technicians in this sector (estimated total about 61,000 of which, only about 20% possess formal training) to implement practices that would lead to optimal and economical use of CFCs in servicing. To ensure that this important manpower base is positioned to contribute tangibly to the plan objectives, it is considered essential to deliver to these technicians, the requisite level of classroom and hands-on training pertaining to operation and maintenance of equipment, process and applications involved in CFC-based and substitute refrigerants, technologies and systems, with a specific emphasis on conservation, containment, recovery and recycling of refrigerants during servicing. The Training Component would comprise of the following:

4.3.1 Capacity-building

This sub-component will aim to create a pool of Master Trainers leading to a sustainable local capacity. The candidates for Master Trainers would be drawn from the faculty available in the existing training establishments and also from major service establishments, with the aim of preparing about 150 Master Trainers.

The training of Master Trainer candidates would be delivered through training workshops to be conducted by international experts designated by the implementing agency in consultation with the Ozone Unit. It is proposed to organize a minimum of 10 training workshops, each of five days duration, in a way as to effectively target the geographical distribution of training and servicing establishments. The training curriculum would comprise of classroom presentations, practical demonstrations and field exposure visits. The training courses would include training materials and demonstration equipment and also cover development of curriculum for subsequent technician training (see 4.3.2 below)

4.3.2 Technician training

This sub-component will target the training of refrigeration technicians operating at the field level for their livelihoods, in good practices in refrigeration. Since these technicians are the first-level interface with the users of refrigeration equipment for servicing, it is considered crucial that maximum numbers of technicians are brought under the umbrella of training. While it would not be realistic to cover all existing technicians from the census established in the survey, it is considered feasible to impart training to about 40% of the technician population. This amounts to coverage of about 24,000 technicians.

Technician training for good practices in refrigeration would be carried out by Master Trainers (see 4.3.1). The Ozone Unit will organize information dissemination and awareness on the training program, through the major service establishments and training establishments, who would conduct the training course according to the curriculum developed in the capacity-building sub-component, be equipped with demonstration equipment (see 4.1.2) and would also enroll the technicians for the course. The technicians would be provided with classroom and hands-on training, a guide in good practices, documentation and other technical reference materials. Upon completion of the prescribed course they would be provided with a certificate.

4.4 Policy & Management Support Component

The implementation of the Phase-out Management Plan for the Refrigeration (Servicing) Sector will need to be closely aligned and coordinated with the various policy, regulatory, fiscal, awareness and capacity-building actions, which the Government of Indonesia is taking and will need to take in future, in order to ensure that the implementation of the Plan is consistent with the Government priorities and its compliance obligations. Further, in view of the annual CFC reductions needed to be achieved under the terms of the Phase-out Management Plan, the implementation of the Plan will need to be closely and efficiently managed and will introduce additional coordinating, reporting and monitoring activities.

The Phase-out Management Plan will need to be managed by a dedicated unit, comprising of a coordinator to be designated by the Government and supported by representatives and experts from the implementing/executing agencies and the necessary support infrastructure. The Policy & Management Support component of the Plan will include the following activities, for the duration of the Plan:

- a) Establishment and operation of the Plan management and coordination unit for coordinating the Plan implementation with the various Government policy actions pertaining to the Refrigeration Sector
- b) Establishment of a time-bound policy development and enforcement program, covering various legislative, regulatory, incentive, disincentive and punitive actions to enable the Government to acquire and exercise the required mandates in order to ensure compliance by the industry with the phase-out obligations.
- c) Development and implementation of training, awareness and capacity-building activities for key government decision-makers and other institutional stakeholders, to ensure a high-level commitment to the Plan objectives and obligations.
- d) Awareness creation for the Plan and for the Government initiatives in the Sector among consumers and public, through workshops, media publicity and other information dissemination measures.
- e) Preparation of and reporting on annual implementation plans
- f) Verification and confirmation of CFC reductions through site visit and audits.
- g) Establishment and operation of a reporting system of usage of CFCs/substitutes by users
- h) Establishment of a formal regime for licensing of refrigeration technicians, in order to prevent free-lancing technicians without proper training or skills, from offering cheaper CFC-based solutions to prospective customers.
- i) Establishment and operation of a decentralized mechanism for monitoring of Plan outputs, in association with provincial regulatory environmental bodies.

4.4 Action Plan

The implementation of the Phase-out Management Plan will involve actions on part of the Government and industry to achieve the targeted ODS reductions in the Refrigeration (Servicing) Sector, through a coordinated approach combining the inputs to the sector through the investment, technical support and training components, in close alignment with the required policy and regulatory measures. Annex-1 provides details of the actions in relation to the annual ODS reduction milestones and the corresponding funding disbursements.

5. INCREMENTAL COSTS AND FINANCING

The total eligible incremental costs and the requested grant funding is US\$ 4,912,300. Details are provided in Annex-2.

6. IMPLEMENTATION

6.1 Management

The overall management of the Plan will be carried out as described in Section 4.4, by Government of Indonesia and the actual implementation and execution will be arranged by UNDP.

The Ozone Unit within the purview of the Assistant Deputy for Climate and Atmosphere, Deputy Ministry for Environmental Conservation, Ministry of Environment, will be responsible for monitoring of the implementation of the Phase-out Plan. The Ozone Unit will be responsible for tracking the promulgation and enforcement of policy/legislations, the preparation of annual implementation plans and assist UNDP in the preparation of the progress report to the Executive Committee of MLF. UNDP would conduct an annual independent audit for verifying CFC consumption levels including spot checks and random visits; provide assistance for policy, management and technical support and supervise implementation activities.

6.2 Disbursement Schedule

Year	ODS phase-out target (MT)				Remaining ODS Consumption as of 31 December (MT)	Disbursement (US\$)
	From approved ongoing projects	From Refrigeration (Mfg.) Sector Plan	From Sector Phase-out Management Plan	Total		
2002		0	0	0	2,303	2,196,758
2003	90		0	90	2,213	1,805,987
2004	0	300	200	500	1,713	500,000
2005	0	300	300	600	1,113	250,000
2006	0	300	322	622	491	159,555
2007	0	241	250	491	0	0
TOTAL	90	1,141	1,072	2,303	0	4,912,300

6.3 Funding Arrangements

Upon approval by MLF of the Phase-out Management Plan, the Government of Indonesia, through UNDP, requests the Executive Committee to authorize disbursement of US\$ 2,196,758 representing the business plan allocation for this activity for 2002 and 2003 Annual Implementation Programme. The phase-out activities initiated in 2002 and 2003 may not produce results until end of 2004, contributing to the reduction of consumption starting only in 2005. The details of the planned activities under this Plan for 2002 and 2003 and subsequent years are provided in Annex-1 (Action Plan and Monitoring Milestones).

The funds for installments for 2004, 2005, 2006 and 2007 will be provided at the last Executive Committee meeting in the preceding year, in accordance with the disbursement schedule in the above table for the exact amount listed for that year and on the basis of the implementation programme for the year. The funding installments will be released subject to:

- (a) Confirmation that all agreed phase-out targets and consumption limits for the previous year have been achieved;
- (b) The verification that the activities planned for the previous year were undertaken in accordance with the annual implementation programme.

In the unlikely event of Indonesia failing to achieve phase-out targets for a given year (i.e. CFC consumption limit in the Refrigeration Sector exceeds the target for the year), UNDP and Indonesia would agree on remedial actions. New funding requests to the MLF would go forward only after phase-out targets have been met. The approach to remedial action would be to bring the program back on track by the end of the second year so that the combined phase-out targets for the two years could be met. This approach to remedial action would allow the program to maintain momentum and to keep the phase-out schedule on track even if difficulties arise in a particular year. If the program is still not back on track within two years, continued funding of the program could be based on reduced level of compensation. However, if it were established that delays are persistent and the phase-out targets may not be achieved within the schedule set in the approved Phase-out Plan, the Multilateral Fund would reduce funds proportional to the phase-out shortfall.

7. RESULTS

This project will facilitate elimination of CFCs in the Refrigeration (Servicing) Sector in Indonesia by end-2007.

ANNEXES

- Annex-1: Action Plan and Monitoring Milestones
Annex-2: Incremental Cost Calculations

ANNEX-1
ACTION PLAN AND MONITORING MILESTONES

Year/ Action	Investment Component	Technical Support Component	Training Component	Policy/Management	Disbursement (US\$)	ODS reduction (MT)
2002	None	None	None	Annual implementation programs prepared and approved.	1,002,745	0
2003	<ul style="list-style-type: none"> • About 135 large, 250 medium-sized and 500 small service establishments and 100 training establishments identified and verified • Purchase orders for recovery & recycling equipment issued for 135 large-sized service establishments • 70 end-users selected for demonstrating pilot retrofitting and replacement program 	2 Technical assistance workshops for selected service establishments, end users and other industry stakeholders	<ul style="list-style-type: none"> • Delivery of training inputs to about 150 Master Trainers • Information dissemination and publicity for enrolling refrigeration technicians • Finalization of arrangements for commencing Technician Training courses 	<ul style="list-style-type: none"> • Recruitment/allocation of coordinating personnel within ozone unit for plan management • Preparation of Annual Implementation Program • 2 Training/capacity building workshops for institutional and government stakeholders • 1 public awareness workshop • Licensing regime for technicians • Reporting system for CFCs • Enforcement of import controls 	1,194,013	0
2004	<ul style="list-style-type: none"> • Recovery/recycling equipment operational at about 135 large-sized service establishments • Purchase orders for recovery & recycling equipment issued for about 250 medium-sized establishments and about 500 small-sized establishments • Completion of pilot end-user demonstration conversions 	2 Technical assistance workshops for selected service establishments, end users and other industry stakeholders	Commencement of Technician Training courses and completion of training delivery to about 6,000 technicians	<ul style="list-style-type: none"> • Reporting on 2003 implementation • Preparation of Annual Implementation Program • Agreements with and commitments from CFC importers for reduced quota • 2 Training/capacity building workshops for institutional and government stakeholders • 1 public awareness workshop • Verification of CFC reductions 	1,805,987	200
2005	<ul style="list-style-type: none"> • Recovery/recycling equipment operational at about 250 medium-sized and about 500 small-sized service establishments 	2 Technical assistance workshops for selected service establishments, end users and other industry stakeholders	Training delivery to about 6,000 technicians	<ul style="list-style-type: none"> • Reporting on 2004 implementation • Preparation of Annual Implementation Program • 2 Training/capacity building workshops for institutional and government stakeholders • 1 public awareness workshop • Verification of CFC reductions 	500,000	300

Annex-1: Action Plan and Monitoring Milestones (Cont'd)

Year/ Action	Investment Component	Technical Support Component	Training Component	Policy/Management	Disbursement (US\$)	ODS reduction (MT)
2006	<ul style="list-style-type: none"> Recovery/recycling equipment operational at about 250 medium-sized and about 500 small-sized service establishments 	2 Technical assistance workshops for selected service establishments, end users and other industry stakeholders	Training delivery to about 6,000 technicians	<ul style="list-style-type: none"> Reporting on 2005 implementation Preparation of Annual Implementation Program 2 Training/capacity building workshops for institutional and government stakeholders 1 public awareness workshop Verification of CFC reductions 	250,000	322
2007		2 Technical assistance workshops for selected service establishments, end users and other industry stakeholders	Training delivery to about 6,000 technicians	<ul style="list-style-type: none"> Reporting on 2006 implementation Preparation of Annual Implementation Program 2 Training/capacity building workshops for institutional and government stakeholders 1 public awareness workshop Verification of CFC reductions 	159,555	250
2008				<ul style="list-style-type: none"> Reporting on 2007 implementation Verification of CFC reductions Final reporting on Plan implementation and conclusion 	0	0

ANNEX-2
INCREMENTAL COSTS

A. Investment Component

1. Recovery & Recycling Equipment/Demonstration Equipment

Type of Establishment	Type of Equipment	Budget (US\$)
About 135 large-sized establishments	Recovery/recycling and charging	1,175,727
About 250 medium-sized establishments	Recovery and charging	750,000
About 500 small-sized establishments	Recovery	750,000
About 100 training establishments	Recovery/recycling and charging	500,000
Sub-total		3,175,727

2. Pilot Retrofitting/Replacement End-user Incentive Program

Activity	Maximum cost per End-user (US\$)	Number of End-users	Budget (US\$)
Total 70 selected end-users (2 each in total 32 provinces and 3 special regions)	3,000	70	210,000
Sub-total			210,000

3. Summary

Recovery & Recycling Equipment/Demonstration Equipment	3,175,727
Pilot retrofitting/replacement incentive program for end-users	210,000
Sub-total	3,385,727
Contingencies (10%)	338,573
TOTAL (A - Investment Component)	3,724,300

B. Technical Support Component

Activity	Inputs	Cost (US\$)
Technical assistance for procurement and overall program implementation	Technical expert costs including all expenses	250,000
Technical assistance for retrofitting and replacement for selected end-users for the pilot program	Technical expert costs including all expenses	50,000
Technical assistance for establishing regulations and codes of practices for refrigeration servicing	Technical expert costs including all expenses	25,000
Technical assistance for workshops for service establishments and end-users	Technical expert costs for content delivery including all expenses	45,000
Workshop for service establishments and end-users		55,000
TOTAL (B – Technical Support Component)		425,000

C. Training Component

1. *Capacity Building*

Activity	Cost (US\$)
Workshop content delivery and conduction	75,000
Workshop arrangements	50,000
Training materials	5,000
Participant attendance expenses	90,000
Development and delivery of training curriculum for technicians	3,000
Total (for capacity building – Master Trainers)	223,000

2. *Technician Training*

Activity	Cost (US\$)
Information dissemination and enrollment expenses	50,000
Training course arrangements	40,000
Training materials & documentation	120,000
One-time logistics preparation costs for participants	90,000
Certification expenses	50,000
Total (for capacity building – Technicians)	350,000

TOTAL (C – Training Component)	573,000
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D. Policy and Management Support Component

Activity	Cost (US\$)
Management, coordination and monitoring, policy implementation, preparation and reporting on annual programs for the Sector Plan	55,000
Policy Development and enforcement program	10,000
Training and capacity-building programs and workshops for institutional and government stakeholders	50,000
Awareness creation and information dissemination programmes and workshops	25,000
Verification and confirmation of CFC reductions	10,000
Establishment of a CFC reporting system for service establishments and end users	20,000
Institution of a Licensing regime for refrigeration technicians	20,000
TOTAL (D – Policy & Management Support Component)	190,000

Summary

Activity	Cost (US\$)
Investment Component	3,724,300
Technical Support Component	425,000
Training Component	573,000
Policy & Management Support Component	190,000
GRAND TOTAL	4,912,300

Notes:

It is understood that the Government of Indonesia will have maximum flexibility for allocating the approved funding in a way that is determined to be the best for achieving the project objectives and compliance obligations.