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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

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UNIDO

Refrigeration Management Plan In the ISLAMIC REPUBLIC OF IRAN

PROJECT NUMBERS
MP/IRA/00/M

Contract Number
01/373

Final Report

April 2002

PROJECT COVER SHEET

COUNTRY: Islamic Republic of Iran **IMPLEMENTING ANGENCY:** UNIDO

PROJECT TITLE:		Refrigerant Management Plan
PROJECT IN CURRENT BUSINESS PLAN:		Yes
SECTOR:		Refrigeration, air-conditioning
ODS USE IN COUNTRY:	Baseline (1997-1999):	2400 ODP tonnes
	Current (2000):	2500 ODP tonnes
PROJECT IMPACT (ODS TO BE ELIMINATED):		750
PROJECT DURATION:		60 months
PROJECT COSTS:	Incremental Capital Cost	US$ **6,044,780**
	Incremental Operating Cost	US$ 0
	Total Project Cost	US$ **6,044,780**
REQUESTED GRANT:		
COST EFFECTIVENESS:		**8.06 US$/kg**
IMPLEMENTING AGENCY SUPPORT COST:		**US$ 785,847**
TOTAL COST OF PROJECT TO MULTILATERAL FUND:		**US$ 6,830,827**
STATUS OF COUNTERPART FUNDING:		N.A.
PROJECT MONITORING MILESTONES INCLUDED:		Yes
NATIONAL COORDINATING AGENCY:		Department of Environment, Ozone layer Protection Unit

PROJECT SUMMARY

The activities outlined in the Refrigerant Management Plan are designed to phase-out the uses of refrigerants, particularly in the service sector. The consumption of this sector constitutes the majority of the total ODS consumption of I.R. Iran. The Government of I.R. Iran is a signatory to the Montreal Protocol, is committed to complying with the phase-out requirements. Financial and technical assistance from the Multilateral Fund will greatly assist the Government in meeting these compliance requirements. The Government is concerned about availability of a supply of ODS to meet the service requirements of existing ODS based equipment to enable them operate to the end of their economic life. Iran's Country Program has outlined a plan for reduction of the domestic use of ODS by 50% before 2005, most equipment will have been retrofitted or replaced with ODS free technology, with some CFC-12 based equipment remaining, and aims to be ODS free by 2010. It will strongly encourage recovery and recycling to meet this requirement. Department of Environment Ozone Layer Protection Unit will act as the focal point, and coordinate and monitor activities towards a complete phase out of ODS. National data collected has been used as the basis for the Country Programme, the Action Plan, and the Refrigerant Management Plan. The RMP will address development and implementation of control measures such as:

- Prohibition of imports of ODS using equipment.
- Establishment of import quotas into the existing licensing system.
- Prohibition of expansion of existing enterprises using ODS
- Training Customs Department and DOE-NOU in monitoring and collection of data.
- Implementation of a national recovery and recycling project.
- Strengthening of a monitoring system for ODS imports and consumption.

The refrigerant management plan consists of three subprojects: Training in Good Refrigeration Practice (US$ 1,015,550), 'Training Customs Officers' (US$ 249,000) and a National Recovery and Recycling Project' (US$4,780,230) and Monitoring and evaluation of project results in particular the recovery and recycling and training programmes (US$ 307,780).

Prepared by: Date: April 2002

Reviewed by: Date: April 2002

1 EXECUTIVE SUMMARY

This Refrigerant Management Plan aims at developing a comprehensive and detailed programme to phase-out a maximum tonnage of CFCs used for servicing refrigeration and air-conditioning equipment in I.R. Iran.

The Islamic Republic of Iran ratified the Montreal Protocol in March 1990. Subsequently, Iran's Country Programme has outlined a plan for the reduction of the domestic use of ODS by 50% before 2005, and aims to be ODS free by 2010

The overall unconstrained CFC consumption in the Islamic Republic of Iran was projected to rise from 2,445 ODP tonnes in 1991 to 7778 ODP tonnes in 2010. This corresponds to an overall annual growth rate of 6.5%. The annual growth rate for the domestic refrigeration sector, however, was estimated to be 12% in the period 1991 to 1995 and 4% between 1996 and 2010.

The revised country programme indicates four sub-sectors within the refrigeration sectors. UNIDO has recently completed a detailed study of the commercial refrigeration sub-sector which identified more than 300 companies currently operating in this sector. Of the total companies identified approximately 150 have been visited and evaluated. Consequently new figures of the consumption of CFCs in this sector have been determined.

This Refrigerant Management Plan has three components, each of which is detailed separately in the annexes to this document:

1. Training programme on good practices in refrigeration and air-conditioning maintenance
2. Recovery and recycling of refrigerants
3. Training of customs officers on control of ODS and ODS containing equipment imports

The total costs of the implementation of the Refrigerant Management Plan are estimated at **US$ 6,044,980**, the combined cost effectiveness of the three components is approximately **8.06 US$ /kg** of ODS phased-out.

2 COUNTRY SITUATION

2.1 Status of I.R. Iran with regard to the Montreal Protocol

The Islamic Republic of Iran ratified the Montreal Protocol in March 1990. Subsequently, Iran's Country Programme has outlined a plan for the reduction of the domestic use of ODS by 50% before 2005, and aims to be ODS free by 2010

The current CFC consumption of the service sub sector is 750 tons. The overall unconstrained CFC consumption in Refrigeration Sector in the Islamic Republic of Iran in year 2000 is estimated to be 1270 metric tons excluding MAC project .

The latest available information indicates four sub-sectors within the refrigeration sectors.

UNIDO has completed in year 2000 a detailed study of the commercial refrigeration sub-sector which identified more than 300 companies currently operating in this sector. Of the total companies identified approximately 150 have been visited and evaluated. Consequently new figures of the consumption of CFCs in this sector have been determined.

Status of Country Program

In 1993 the Islamic republic of Iran together with UNDP Tehran office prepared the draft of Country Program and Montreal Protocol Executive Committee approved it in 1993 at its 10th session, and consequently the country programme was approved at tenth meeting of ExCom meeting in 28-30 June 1993, as document UNEP/OzL.Pro/ExCom/10/24.

The documents consists of ;

a) Evaluation Sheet (Prepared by the Fund Secretariat)
b) Country Programme Cover Sheet (Prepared by the Fund Secretariat)
c) Transmittal letter from the Islamic Republic of Iran
d) The Country Programme

Current ODS to be phase out by implementing agencies (UNIDO and UNDP could be summarized as follows

Total CFC-11 of ongoing and partially completed projects by UNIDO in 2001 = **265.22 Mt.**
Total CFC-12 of ongoing and partially completed projects by UNIDO in 2001= **60.56 Mt.**
Total CFC-11 of ongoing and partially completed projects by UNDP in 2001 = **499.81 Mt.**
Total CFC-12 of ongoing and partially completed projects by UNDP in 2001 = **81.81 Mt.**

UNDP and UNIDO's of ongoing and partially completed projects in 2001 total, 765.03 Mt. CFC-11, and 142.37 Mt. CFC-12 in year 2001

Estimated CFC-12 to be phased out by implementing future MP projects in 2002-2003-2004 at small and medium domestic/commercial refrigerator manufacturers, which were visited and recognized by implementing agencies and NOU = **280 Mt.**

Estimated CFC-12 to be phased out by implementing future MP projects at refrigeration and service sectors such as manufacturers, repair and service shops (RMP)., In 2002,2003,2004 = **1682 Mt.**

CFC and HCFC Consumption in year 2001 in brief

A. CFC-12 Consumed as refrigerant in year 2001 by on going projects.	142 Mt.
B. Estimated CFC-12 consumption in year 2001 at enterprises for Future MP Projects	280 Mt.
C. Estimated CFC-12 Consumed by Service sector mainly at 8250 Repair and Service Shops in year 2001	750 Mt.

D. Estimated CFCs as refrigerant, consumed in year 2001 by different sectors other than Domestic/Commercial and Service Sectors.	510 Mt.
E. Estimated CFCs as refrigerant consumed in year 2001 by all sectors. **(A+B+C+D)**	1,682Mt.
F. Estimated CFC-12 available at importers and distributors stocks in year 2001	150 Mt.
G. Estimated CFC-12 imported according to data received from Department of IR. Iran costumes and Ministry of Commerce and I.R. UNION of refrigeration service shops in 2001.	2,066 Mt.
H. Total HCFC Refrigerant consumption by different sectors in year 2000	1,179 Mt.
I. Total ODS (CFC-12, CFC11 and HCFCs) Consumed in refrigeration sector in year 2001 in I.R. Iran. **(E+H)**	2,861 Mt.

According to NOU Report to MP Secretarial Office in 2000 there are about 200 Craft Workers and Workshops, which they could be considered as Medium and Small Size Domestics and Commercial Refrigerator manufacturers. It is estimated that about 300 enterprises should be surveyed and evaluated for eligibility and considering them in the future Iran business plans.

Number of recognized Enterprises, consuming ODS
With regard to average ODS consumption

	>10 Tons	<10 Tons	<5 Tons	<3 Tons	<1 Tons	Total
Number of Enterprises using CFC-12	10	10	25	71	84	200
Number of Enterprises using CFC-11 in (PU Foam) insulation.	24	15	9	10	4	62
Total ODS Consumption (CFC-12 + CFC-11) Number of Enterprises	41	27	8	50	74	200

2.2 Status of the Institutional Strengthening Project

The government of I.R. Iran and the national stakeholders are committed to the action items that have been presenterd in the Refrigerant Management Plan. The NOU will be responsible for the monitoring, Co-coordinating and successful implementation of the phase activities proposed in the RMP. The different Government ministers and other organizations will also be involved.

The Ozone Office of Iran has a great role in implementation of MP projects. The office is using most expertise in Ozone office are in the field of CFC phase out project for years. The office is supplied with normal equipment and consumables. This set-up enables the office to run the normal administrative and co-ordination business, reporting etc. The Office has been successful in backstopping investment and none investment projects. The recent and ongoing activities of the Ozone Office are as follows:

- Maintaining the legal framework related to the Montreal Protocol regulatory and control measures.
- Preparation on phase-out projects now under implementation.
- Reporting to the Ozone Secretariat, Multilateral Fund and Implementing Agencies.
- Development of a ODS database.
- Promoting awareness on ODS issue
- Preparation of a survey covering Halons, Solvents and methyl bromide and etc.
- Collecting background material for training, & recycling programmes

Since 1994 the Ozone Office has prepared and facilitated the implementation of 57 investment phase-out projects, several demonstration projects on different ODS phase out and training project:

Projects implementing by UNIDO and UNDP are listed below

CURRENT STATUS OF MP PROJECTS IN IRAN WITH REGARD TO THEIR ODS

Consumption year 2000/ 2001

UNIDO PROJECTS

ExCom Project Approval/Year			1998, 1999		2000		2001	
Enterprise Name	Project Number	Status Code Year 2001	ODS Metric Ton		ODS Metric Ton		ODS Metric Ton	
			R11	R12	R11	R12	R11	R12
Arj, Azmayesh, Bahmani, Iran Pouya, and Pars Pamco	MP/IRA/94/403	COM	0	0	0	0	0	0
Gadook, Lorestan,Iran Fariz, Pars Monark, Pars Machine, Movalled	MP/IRA/97/041	COM	0	0	0	0	0	0
Electro Steel	MP/IRA/97/196	COM	85	Av. 20	0	0	0	0
Zagross II	MP/IRA/97/197	COM	14	20	0	0	0	0
Yakhsaran	MP/IRA/97/199	PCOM	21	13	13		13	
Yakhchavan	MP/IRA/97/201	PCOM	27	14.7	27	0	27	0
Sabouhi	MP/IRA/98/086	COM	17	13	0	0	0	0
First Commmercial Umbrella	MP/IRA/98/087	COM	20	28.8	0	0	0	0
Emerson	MP/IRA/99/109	PCOM	52.2	11.52	52.2	11.52	52.2	0
Ghandil	MP/IRA/99/110	PCOM	29.4	6.80	30	7	30	0
Second Commercial Umbrella	MP/IRA/99/122	COM	22.3	19.4	22.6	0	0	0
Toulidy Bard	MP/IRA/99/161	PCOM	18.7	4.34	4.2	0	4.30	0
Fourozan	MP/IRA/99/162	PCOM	19.1	5.67	5.6	0	5.670	0
Minavand	MP/IRA/99/163	PCOM	15.5	4.75	4.7	0	4.760	0
Saiwan Sanaat	MP/IRA/99/164	PCOM	17.8	4.02	1.0	0	4.020	0
Himalia & Barez	MP/IRA/00/111	PCOM	27.8	12.5	27.8	12.5	12.50	0
Novin Enjemad	MP/IRA/01/133	ONG	9	6	9.4	6.5	9.4	6.5
Takran Mobared	MP/IRA/01/134	ONG	8.3	3	8.6	3.1	8.8	3.2
Arjah Broudat	MP/IRA/01/137	ONG	15	5	14.5	5	14.7	4.8
Zarifan	MP/IRA/01/138	ONG	5.9	16.3	17	6.1	16.7	6.2
Tehran Shirak	MP/IRA/01/139	ONG	15.8	6.1	16	5.9	15.6	5.8
Avaj Sarma Co.	MP/IRA/01/140	ONG	5.3	16	5.2	15.6	5.2	15.6
Gasso Co.	MP/IRA/01/141	ONG	12.1	7.1	12.5	7.3	12	7
Donyayeh Mojdeh	MP/IRA/01/143	ONG	14.6	6.5	14.7	6.7	14.7	6.7
Roshan Ind. Grp.	MP/IRA/01/145	ONG	13.8	4.1	14.6	4.7	14.67	4.76
Total			481.6	248.6	300.6	91.92	265.22	60.56

Legend: "ONG" Ongoing
"COM" Completed
"PCOM" Partially Completed

References: UNEP Oasis 2000, and NOU letter no. 3012 Dated 30 Dec. 2000

CURRENT STATUS OF MP PROJECTS IN IRAN WITH REGARD TO THEIR ODS

Consumption year 2000/2001
UNDP Projects

ExCom/Year			1998, 1999			2000, 2001		
Enterprise Name	Project Number	Status Code Year 2001	ODS Metric Ton			ODS Metric Ton		
			R11	R12	Total	R11	R12	Total
Movalled Sarma	MP/IRA/99/G61	PCOM	59.7	22.9	82.6	60	0	60
Foroughmanesh	MP/IRA/99/G62	PCOM	28.40	9.73	38.13	29	0	29
Behsarma	MP/IRA/99/G63	PCOM	22.31	13.21	35.53	23.2	0	23.2
Tahvieh Sard va Garm	MP/IRA/99/G64	PCOM	17.30	4.70	22.00	18.2	0	18.2
Electro Shargh	MP/IRA/99/G65	ONG	26.11	2.21	28.32	26.12	0	26.12
Khozestan Technic	MP/IRA/99/G67	ONG	7.8	2.48	10.28	8.9	0	8.9
Sardkaran	MP/IRA/99/G98	ONG	5.56	20.2	25.76	5.8	0	5.8
Electrosard Azna	MP/IRA/99/162	ONG	17.98	2.22	20.20	18.2	0	18.2
Baharan Far	MP/IRA/00/G61	ONG	15	2.5	17.5	15.07	2.9	17.97
Zhaleh Negin	MP/IRA/00/G62	ONG	18.4	6.7	25.1	18.49	6.73	25.22
Seyyed Saleki	MP/IRA/00/G63	ONG	7.2	2.5	9.7	7.28	2.58	10.37
Fadak	MP/IRA/00/G64	ONG	14	4	18	14.04	4.42	18.46
Fraidouni	MP/IRA/00/G65	ONG	8.5	2.4	10.7	8.59	2.41	11
General	MP/IRA/01/G11	ONG	27.7	5.3	33.0	27.77	5.39	33.16
Gol Sarma	MP/IRA/01/G12	ONG	23.9	6.1	30	23.96	6.13	30.09
Hanzad	MP/IRA/01/G66	ONG	16.5	4.4	20.9	16.58	4.47	21.05
Sana	MP/IRA/01/G67	ONG	9.3	2.74	12.04	9.3	2.74	12.04
Ghaynar Khazar	MP/IRA/01/G69	ONG	14.6	3.2	17.8	14.63	3.25	17.88
Yakhchal Sazi Yazd	MP/IRA/01/G70	ONG	26.1	5.6	31.7	26.18	5.7	31.88
. Electro Ara	MP/IRA/01/G72	ONG	11.22	2.63	13.85	11.21	2.61	13.82
Bolorin Yazd	MP/IRA/01/G73	ONG	17.65	4.15	21.80	17.66	4.17	21.83
Sarmaye Sepahan	MP/IRA/01/G74	ONG	9.20	2.26	11.46	9.22	2.25	11.47
Zenooz Sanaat	MP/IRA/01/G77	ONG	8.65	2.14	10.79	8.66	2.15	10.81
Sepand Afrooz	MP/IRA/01/G78	ONG	10.16	3.15	13.31	10.16	3.15	13.31
Shaghayegh Borudat	MP/IRA/01/G68	ONG	8.23	2.27	10.65	8.38	2.20	10.58
Ojan Cooling Industries	MP/IRA/01/G65	ONG	6.17	1.79	7.96	6.17	1.79	7.52
Ideal Sardsyr	MP/IRA/01/G13	ONG	13.1	3.9	17.0	13.2	3.98	17.18
Sanayeh Part	MP/IRA/01/G80	ONG	6.8	1.8	8.6	6.85	1.85	8.70
Mersun Co	MP/IRA/01/G79	ONG	9.82	2.70	12.52	9.84	2.72	12.56
Rezwan Co.	MP/IRA/01/G71	ONG	10.63	3.39	14.02	10.65	3.38	14.03
Parsa Sazan Co.	MP/IRA/01/G76	ONG	16.3	4.7	21.0	16.5	4.77	21.27
Total			494.3	157.97	652.22	499.81	81.81	581.62

Legend: "ONG" Ongoing
"COM" Completed
"PCOM" Partially Completed

References: UNEP Oasis 2000, and NOU letter no. 3012 Dated 30 Dec. 2000

Refrigerant Usage

Estimated Consumption of Refrigerants by Use and Application
At Refrigeration and Air conditioning Sector

METRIC TONS IN YEAR 2000

Description	CFCs Refrigerants			HCFCs Refrigerants		
	Manufacturing	**Repair/ Purge**	**Total**	**Manufacuturing**	**Repair/ Purge**	**Total**
Domestic Ind.	142	12	154	0	0	0
Commercial Ind.	250	20	270	418	12	430
Service Sector	0	750	750	0	139	139
Transportation	30	82	112	160	40	200
Different Sectors such as end user, industries etc.	284	112	396	390	20	410
Total	706	976	1682	968	211	1,179

Remarkable increase in use of CFCs during 1998 - 2001 in refrigeration sector is due to:

- Strong and sustained economic expansion, which resulted in high usage of refrigeration equipment.
- More accrued inventory for all small users of CFCs due to following effective information campaigns.
- A better quality data is now possible because of import monitoring for CFCs.

2.3 Equipment

Servicing concerns all refrigeration and air-conditioning existing equipment which is as follows:

Domestic refrigerators	20,000,000 units
20% of 4,500,000 house in Iran are using different type of coolers, which it is estimated that 20% of them are using window and split type of air/conditioning systems	900,000 units, HCFC is the main refrigerants for this type of air conditioners.
Hotels	59,480 units

There are about 160,000 Central Air Conditioning system buildings, Cold Stores, and Industrial Cooling System in Iran, which it is estimated that 10% of them are consuming CFC-12 and CFC-11 as refrigerant.	Average annual consumption of CFC-12, and CFC-11 for flushing, refilling, charging, and repair is estimated as 20 kg. per unit installed, which comes up with 160,000 x 10% x 20 = 320,000 Kg. = 320 Metric Tons
There are approximately 120,000 registered and non registered Shops, Supermarkets, Restaurants, Butcheries, Coffee shops, Groceries, Milk Products ant etc., which use commercial refrigerator appliances	Average appliances in use in different shops is considered 2 appliances, Total comes up with 240,000 refrigeration appliances units

Sources: Statistical Center of Iran, Iran Annual Statistics for 1998

Number of Cold stores in Iran in year 2000

	Number	Area	Storing Volume Capacity (m3)	Annual capacity Mt.
One circuit bellow zero °	247	67,294	373,398	80,079
One circuit above zero °	1,699	404,298	2,069.711	499,068
Total	1,946	471,592	375,467.711	579,147

Power rating, cooling capacity of cold stores compressors (main & standby) in year 2000

Description	Total	Main compressors	Standby compressors
Engine power(kW)	191,844	115,733	76,111
Cooling capacity(kcal/hr)	242,496,290	165,335,691	77,160,599

Condenser type	No. of cold stores	Cooling capacity (kcal/hr)
Total	321	185,798,004
Arial	130	92,255,050
Evaporated	162	83,537,414
Shell & tube	28	10,005,540

Cold Stores equipment with special equipment in year 2000

Description	With frozen tunnel	Humidifier	Temperature recorder	Humidity recorder

Number	51	172	202	140

Number and type of refrigerant in cold stores in year 2000

Description	Total	Ammoniac	R11,R12,R22	Blend R502
Number	321	150	164	7

Sources: Statistical Center of Iran and Ministry of Jihad and agricultures

The average annual consumption of refrigerant is estimated 200 kg for maintenance & repair. According to our investigation, depending on cooling capacity and net volume of cooling system, average amount of refrigerant which is annually charged to the cooling system varies from 200 up to 3000 kg per unit.

Due to significant cooling properties of R12, this refrigerant is widely used for cold stores above 800 tones of capacity.

It is estimated that 20% of total cold stores are using R12 refrigerant and 80% are using HCFC and blends as refrigerant Ammoniac. Table 13 demonstrate an estimation of R12, R22& blends used in 321 cold stores throughout Iran territory for different purposes, poultry, meat, fruit, vegetables, fish and food product, (Above and below zero degree centigrade refrigeration operating temperature.)

Estimated ODS consumption at different Cold Stores for different applications in Year 2000

	CFC	HCFC	TOTAL (kg)
Maintenance	6,400	158,400	164,800
Chiller/cooling System containing System	38,400	158,400	196,800
Total	**44,800**	**316,800**	**361,600**

Warehouse Categorized by Application and use in year 2000

Item	Description	Units
1	Fish Products	44
2	Poultry Products	37
3	Meat Products	69
4	Industrial Products	120
5	Agricultural Product	149
6	Milk Products	519
	Total	938

Fish Products Units Cold Store

Item	Description	Units	Total Storage Capacity Metric Ton/Year

1	Fish Product Processing	23	22,705
2	Canned Fish	21	11,272
3	Total		33,977

Poultry Products Cold Store Units

Item	Description	Units	Total Storage Capacity Metric Ton/Year
1	Processing and Packing	5	600
2	Poultry Farms and Cooperative Sectors	32	50,200,000,000 pieces of chicken and etc. per year
	Total	37	

Meat Products Cold Store Units

Item	Description	Units	Total Storage Capacity Metric Ton/Year
1	Processing and Packing	56	25,150
2	Canned Meat Enterprises	7	5,500
3	Hamburger and etc.	7	1000
	Total	70	31,650

Industrial Products

Item	Description	Units	Total Storage Capacity Metric Ton/Year
1	Sweets and Chocolate process and packing	8	1,812
2	Ice Cream and Milk Products	19	6,492
3	Ice	25	103,400
4	Meat Freezing Tunnel	2	400
5		66	64,417
	Total	120	176,521

Agricultural Products Colt Store Units

Item	Description	Units	Total Storage Capacity Metric Ton/Year
1	Date Processing enterprises	32	20,375
2	Fruit and Vegetable Package and storage	117	5,000,000
	Total	149	5,020,375

Milk Products

Item	Description	Units	Total Storage Capacity Metric Ton/Year
1	White Cheese	229	
2	Pasteurized Cream	141	
	Yogurt and Water	6	

	Cheese made from whey	1	
	Dried whey	12	
	Cheese Process	4	
	Yogurt	63	
	Pasteurized Milk	24	
	Butter	23	
	Pizza Cheese	15	
	Total	518	

Number of Fishing Boats and Ships

Year	Boat	Launch	Ships	Total
1993	4,899	2,581	122	7,602
1994	7,341	2,710	116	1,0167
1995	6,881	2,882	91	9,854
1996	7,265	2,807	86	10,158
1997	7,174	2,811	80	10,065
1998	7,505	2,876	71	10,452
1999	7,501	2,864	78	10,564

Sources: Statistical Center of Iran and Ministry of Jihad and agricultures

Approximately 20% of different types of (Ships, Boats and Launch) are using cold stores for different purposes, average use of ODS being used at their cooling system is estimated to be 50 kg. Total estimated CFC and HCFC at floating vehicle is 104 metric tons.

New CFC-free, mainly HFC-134a run domestic and small commercial equipment is entering in the market, and starting to have a small effect reducing CFC volumes needed for servicing. However, the servicing requirements of the new equipment are under assessment and review by NOU.

The number of air-conditioning devices are significantly increasing. New window type and split units were manufactured, imported and sold by local manufacturers during recent years. New units run on HCFC-22 and centralized CFC-11 based chiller systems are now very uncommon.

Remaining refrigeration plant installed throughout Iran are in relatively poor condition, particularly in the industrial and commercial sub sectors. Maintenance standards are generally low and refrigerant leakage is very common. Retrofitting of the larger equipment has been discussed for preparation of new investment project document when preparing this document. The completed and ongoing projects are under close monitoring and survey by NOU to insure proper servicing capacity is built.

Quantities and types of imported ODS refrigerants and equipment containing them.

Different ODS refrigerants are mainly imported in three modes.

a) Importing through different customs sites,

b) Importing through special economic zones and/or industrial/commercial free zones and border markets,
c) Un- Official importation through different sea shore and land borders.

According to the I.R. Customs information there are more than 110 customs point located in long land, air and see borders.
From 2001, all ODSs have a national code, which the ODS is being registered and imported under this code at ministry of commerce. The material will be then traced and controlled by the government.

Main land/Air/See and Misc. Borders are:

No.	Name of Costume	3 LOCATION
1.	Abadan	Khoozestan
2.	Abolkheir	
3.	Ahvaz	Khoozestan
4.	Air Taxi	Tehran
5.	Alborz	Ghazvin
6.	Arak	Markazi
7.	Ardebil	Ardebil
8.	Astara	Gilan
9.	Bajgiran	Khorasan
10.	Bandar Abbas	Hormozgan
11.	Bandar Anzali	Gilan
12.	Bandar Emam	Khoozestan
13.	Bandar Genaveh	Booshehr
14.	Bandar Jask	Hormozgan
15.	Bandar kang	Hormozgan
16.	Bandar Khamir	Hormozgan
17.	Bandar Lengeh	Hormozgan
18.	Bandar Rig	
19.	Baneh	West Azarbaijan
20.	Bashmagh	Kordestan
21.	Bazargan	West Azarbaijan
22.	Bilehsovar	Ardebil
23.	Bohl	
24.	Booshehr	Booshehr
25.	Dogharoon	Khorasan
26.	Dokoohaneh	Khorasan
27.	Einak	Sistan & Baloochestan
28.	Esfahan	Esfahan
29.	Germi	Ardebil
30.	Ghasemrash	West Azarbaijan
31.	Gheshm	Hormozgan
32.	Gorgan	Golestan
33.	Hamedan	Hamedan
34.	Hendijan	Khoozestan
35.	Hormoz	Hormozgan

36.	Incheh Broon	Golestan
37.	Int'l Fair	Tehran
38.	Iran & Qatar	Booshehr
39.	Jolfa	East Azarbaijan
40.	choobideh	
41.	Kangan	Booshehr
42.	Kerman	Kerman
43.	Kermanshah	Kermanshah
44.	Khark	Booshehr
45.	Khoda Afarin	Ardebil
46.	Khoramabad	Lorestan
47.	Khoramshahr	Khoozestan
48.	Khosravi	Kermanshah
49.	Khoy	West Azarbaijan
50.	Koohak	Sistan & Baloochestan
51.	Marivan	Kordestan
52.	Mash'had	Khorasan
53.	Mehrabad Airport	Tehran
54.	Mehran	Ilam
55.	Mile 73	Khorasan
56.	Mile 75	Khorasan
57.	Mirjaveh	Sistan & Baloochestan
58.	Mobarakeh	Esfahan
59.	Nakhl Taghi	Booshehr
60.	Nordooz	East Azarbaijan
61.	Noshahr	Mazandaran
62.	Oshnavieh	West Azarbaijan
63.	Parsabad	Ardebil
64.	Parvizkhan	Kermanshah
65.	Payam Airport	Tehran
66.	Piranshahr	West Azarbaijan
67.	Pishin	Sistan & Baloochestan
68.	Pol	Golestan
69.	Poldasht	
70.	Post Co.	Tehran
71.	Razi	West Azarbaijan
72.	Sahlan	
73.	Sanam Belaghi	West Azarbaijan
74.	Sanandaj	Kordestan
75.	Sarakhs	Khorasan
76.	Sardasht	West Azarbaijan
77.	Sarisoo	West Azarbaijan
78.	Sebrik	
79.	Seif	Kordestan
80.	Sero	West Azarbaijan
81.	Shahid Bahonar Port	Hormozgan
82.	Shahriar	Tehran
83.	Sheikh Seleh	Kermanshah
84.	Shiraz	Fars
85.	Shooshmi	Kermanshah

86.	Siranband	Kordestan
87.	Siri	Hormozgan
88.	Sirjan	Kerman
89.	South of Tehran	Tehran
90.	Tab	
91.	Tabriz	East Azarbaijan
92.	Tamarchin	West Azarbaijan
93.	Tiab	Hormozgan
94.	West of Tehran	Tehran
95.	Yazd	Yazd
96.	Yazdan	Khorasan
97.	Zabol	Sistan & Baloochestan
98.	Zahedan	Sistan & Baloochestan
99.	Esfahan Still Mill	Esfahan
100.	Bandar Torkaman	Golestan
101.	Chahbahar	Sistan & Baloochestan
102.	Bandar Deilam	Booshehr
103.	Gomishan	Golestan
104.	Kish	Hormozgan
105.	Lotfabad	Khorasan
106.	Rasht	Gilan
107.	Rafsanjan	Kerman
108.	Salafchegan	Ghom
109.	Sirjan	Kerman

According to our findings, assessment and review of documents and data received from different sources, almost 80 percent of ODS imports are released from different Customs sites either Seaports or land/air custom points.

Related information such as weight and value of the material are recorded, but more detailed information are recorded by Ministry of Commerce during issuance of relevant licensees for official importing and bank formalities for opening L/Cs.

The figures of imported ODS, recorded by ministry of Commerce are 80% accurate and they should be compared with other data received from other sources, such as Ministry of Commerce data bank and etc. The figures should be adjusted in accordance with the facts and figures obtained from different ODS consumers such as Home Appliance Manufacturers, Commercial Refrigerator Manufacturers, Data available in the Ministry of Industries Data bank, and etc.

Name of some major Importers

Majority of different types of ODSs such as refrigerant CFCs are imported by well known traders, union of refrigeration service shops association and large domestics/commercial appliances manufacturers . only five major domestic refrigerator manufacturers (Arj, Azmayesh, Bahman, Iran Poya, and Pars Appliance), produce 80% of total market share of domestic refrigerators and freezers in Iran. It is estimated that 70 manufactures are producing domestic appliances in Iran.

List of well known traders as major importers and distributors of ODS in Iran in year 2001

No.		Address	Telephone Number
1	Alvand Store	Tehran Safiali shah St. No. 113	7523808
2	Kohrang Store	Tehran, Enghelab Ave. No. 98	7536529
3	Mansour Store	Tehran, Tonekabon St. no. 76	7521008
4	Jam Store	Tehran, Enghelab Ave. no.648	7528914
5	Sard Abzar	Tehran Sadi Ave. No. 169	7523362
6	Pars Store	Tehran Hedaiat Ave No. 167	7533314
7	Mahak Sarma Store	Tehran Hedaiat Ave No.163	7523818
8	Pars Store	Tehran Hedaiat Ave. No.147	7523298
9	Himalia Store	Tehran Hedaiat Ave. No.113	7535652
10	Hosein Nakhli	Tehran Hedaiat Ave. No 83	7527072
11	Keahan Store	Tehran Hedaiat St. No.55	7567757
12	Bahman Store	Tehran Hedaiat St. No.53	7520331
13	Ark Store	Tehran Hedaiat St. No.1	751202
14	Darya Store	Tehran Hedaiat nabshe safi ali	7537034
15	Seid Saleh Store	Tehran Hedaiat St. No.11	7522546
16	Nasiunal Store	Tehran Fakhr Abad Cross Road NO.300	7525794
17	Salamat Store	Fakhr Abad Cross Road No.239	7526987
18	Sard Sir Store	Tehran Ghaedi St. No.263	7536677
19	Tavakoli Store	Tehran Tonekabon St. No.77	7537913
20	Armen Store	Tehran Tonekabon St. No.87	7522572
21	Ramko Store	Tehran Tonekabon St. No 91	7534012
22	Jooya Fan Store	Tehran Tonekabon St. No. 30	7536429
23	Pars Tabrid Store	Tehran Tonekabon St. No.93	7501749
24	Peyman Store	Tehran Tonekabon St. No.95	7535346
25	Mohsen Store	Tehran Tonecabon St. No.4	7528082
26	Zarghani	Tehran Tonekabon St. No.118	7502411
27	Alborz Store	Tehran Tonekabon St. No. 96	7528508
28	Mahboob Store	Tehran Tonekabon St. No. 84	7521775
29	Tehran Sarma Store	Tehran Ghaedi ST. No. 164	7536110
30	Hosein poor	Tehran Ghaedi St. No.277	7522151
31	Daryani Store	Tehran Baharestan Ave. No.471	753569
32	Iran Yadak Store	Tehran Behboodi St. No.27	6031345
33	Mehr Yadak	Tehran Behboodi St. No.102	6004102
34	Ziba Store	Tehran Behboodi St. No. 100	6038189
35	Danfoss Yadak Store	Tehran Behboodi St. No.84	6013856
36	Tak Yadak Store	Tehran Behboodi St. No.58	6037551
37	Super Technic	Tehran Behboodi St. No.54	6036565
38	Gold Electric	Tehran Tonekabon St. No. 104	7537741
39	Amooniak Markazi Store	Tehran Tonekabon St. No. 102	7534753
40	Saber Store	Tehran Ghaedi St. No. 286	7534753
41	Rakhshan Store	Tehran Ghaedi St. No.292	7535125
42	Mehrabi Store	Tehran Ghaedi St. No.131	7530938
43	110 Store	Tehran Ghaedi St. No.326	7535522
44	Lavasani Store	Tehran Ghaedi St. No.267	7522727

45	Azadegan Store	Tehran Ghaedi St. No.7	7532737
46	Hedaiat Store	Tehran Ghaedi St. No.376	7535312
47	Sard Saman	Tehran Ghaedi St. Booran Pasaj	7526991
48	Booran Store	Tehran Ghaedi St. No.58	7534210
49	Mokhtary Store	Tehran Tonekabon St. No.72	7523637
50	Sadi Store	Tehran Tonekabon St. No.74	7527374
51	Iran Barfak	Tehran Ghaedi St. No.266	7523758
52	Pooya Store	Tehran Tonekabon St. No. 78	7527060
53	Vakili Store	Tehran Safi Ali Shah Sr. No.256	7524215
54	Vahdat Store	Tehran Tonekabon St. No85	7535139
55	Sard Sazan Jam	Tehran Tonekabon St. No.83	7527227
56	Sarma Saz Joonub	Tehran Tonekabon St. No. 114	7547472
57	Sarmaiesh Store	Tehran Tonekabon St. No.106	7536691
58	Patiran Store	Tehran Ghaedi St. No.272	7527781
59	Mehdi Store	Tehran Hedaiat St. No.187	7532822
60	Techno Sard Nia	Tehran Hedaiat St. No.449	7532161
61	Shafie Store	Tehran Hedaiat St. No.16	7531679
62	Omid store	Tehran, Hedayat No. 126	7532232
63	SardAvaran Store	Tehran, Hedayat No. 134	7535846
64	Tochal Store	Tehran, Hedayat No. 130	7533237
65	Sohany Store	Tehran, Hedayat no. 168	7521922
66	Sardyadak Store	Tehran, Hedayat no. 176	7536295
67	Electrolux Store	Tehran, Hedayat No. 190	7533677
68	Jafari Store	Tehran, Hedayat No. 194	7535301
69	Iran avar Store	Tehran, Hedayat, No. 200	7524411
70	Koohpayeh Store	Tehran, Hedayat No. 204	7536437
71	Poormahmood Store	Tehran, Hedayat No. 208	7520348
72	Sabalan Store	Tehran, Hedayat No 212	7537634
73	Amir Store	Tehran, Hedayat no 216	7522146

According to IR Iran's DOE report to Multilateral Fund Montreal Protocol Secretarial Branch, about 70% of ODS used in domestic refrigerators/freezers are imported directly by following major Domestic Refrigerator/Freezer manufacturers, which produce over 1,500,000 Domestic Refrigerators/Freezers sets per year. The list below indicates names of some known domestic/commercial producers in Iran.

1. Arj Corporation,
2. Azmayesh Industrial Factories Company,
3. Bahman Refrigerator manufacturing Company,
4. Iran Poya Company
5. Pars Appliance Manufacturing Company,
6. Movalled Home Appliance,
7. Fariz Iran,
8. Pars Monark,
9. Lorestan Co.,
10. Pars Machine,
11. Emersun Co.,
12. Ghandil Co.,

13. Saiwan Sanaat Co.
14. Bard Refrigerator Manufacturer Co.,
15. Forouzan Co.
16. Electrosteel Co.
17. Yakhsaran Co.
18. Gadook Co.
19. Himalia Co.
20. Sonia Co.
21. Roshan Co.
22. Avaj Sarma
23. Novin Enjemad
24. Behsarma Co.
25. Emersun Co.
26. Dogoal
27. Sohrabi Trading Co.
28. Andi Trading Co.
29. Izadi Trading Co.
30. Pars Ardam Trading Co.
31. Zagross I
32. Zagross II
33. Electrosteel Co.
34. Yakhsaran Co.
35. Yakhchavan Co.
36. Tahvieh Garm va Sard co.
37. Foroughmanesh
38. General Co.

3.1 Maintenance

The current maintenance standards of domestic and commercial refrigeration equipment are generally poor. When refilling equipment, the actual refrigerant volume used is 2-3 times the final charge volume. Maintenance workshops often have no leak detectors and refrigerant is commonly used for component cleaning and system flushing.
Large industrial installations are usually serviced regularly, but commercial difficulties often result in lowering the standards by using non-professional operators. There are no recovery and recycling activities as such and used refrigerants are always vented to the atmosphere even if the charge is recoverable.

There is therefore a definite application for recovery and recycling technology in the servicing sub sector.

Based on Phase one of RMP project (Collection of Data) and survey carried out in 2001. There are approximately 8000 registered refrigeration and air-conditioning service shops with Association and Cooperative bureau of Home and Commercial Appliances center, and about 2000 service shops exist that were not officially registered. The total 10,000 service shops throughout Iran territory employing approximately 25,000 skilled and non-skilled technicians and workers. In addition to domestic/commercial service shops it is estimated that there are approximately 2000 MAC service shops in Iran, which employ 4000 technicians and workers.

Of these employees, including workshop managers, it is estimated that 5000 have a basic refrigeration and air-conditioning related training. The rest have gained what skills they have through on-the-job training and experience or through or in short courses arranged by vocational training centers. However the quality of training is often relatively low because the facilities available at the training centers are poor.

A survey made, when preparing this document, indicated that most workshops are small (20 to 60 m^2) and they employ 2 to 4 people. They are generally not specialized or concerned with any particular type of refrigeration equipment and use only rudimentary equipment. About 90%of service shops do not have vacuum pumps or leak detectors.

The fact that compressors designed for HFC-134a can (at least temporarily) run on CFC-12 has led to confusion as there is a temptation to use HFC-134a in compressors designed for CFC 12 which will quickly lead to a functional failure.

A survey made during preparation of this document that, it was observed that due to lack of training and knowledge some of service shops replaced compressor R134a with R12, which they imposed a great loss to the domestic and mobile users.

However, some of the workshop managers have some awareness of ozone issues but little knowledge of the different characteristics of new refrigerants. The major Iranian home appliance manufacturers conducted several training courses for their own after sale services.

3.2 Training

- Except some seminars and training workshops held by NOU and major domestic refrigerator manufacturer, No investment project documents for training of the service sector were foreseen by MP Executive committee.
- I.R. Iran has 28 major provinces and each province has its own state controlled and private vocational schools, Vocational and Technical Education Center a division of ministry of Labour runs and controls more than 400 Technical Training center in different cities and towns. Many skill courses are annually conducted by these centers and the participants receive licenses from the centers. According to the information received from ministry of Education there are 68 state vocational and 50 Private schools in 28 provinces, which about 450 students are studying Refrigeration and Heating.
- In Tehran 50 student are graduated from vocational schools every year, and Ministry of Labour and Social Affairs also has more than 400 training centers in different cities, which trains Technicians and Workers of the Repair and Service shops, which require official certificates from the ministry.
- The Vocational Training Centers located in all major towns have teaching and instruction capacity, but don't generally have demonstration equipment, as mentioned above.
- Some Training Centers in center of major provinces are equipped with some basic demonstration equipment. Thus the people participating in refrigeration related courses have to learn the actual skills on-the-job.
- It seems that the refrigeration and air-conditioning related training is attractive and the institutions carrying out the training have no problems to recruit trainees. The envisioned employment opportunities in the sector encourage young people to seek formal training.

- It is clear that a complementary training programme is needed for training service technicians by the, already established pool of national trainers.

4 JUSTIFICATION FOR RMP

I.R. Iran has been able to follow the phase-out schedule set in the country Programme. According to the information received from DOE Ozone office I.R. Iran has already phased out **1585.4** metric tons of CFC used in Refrigeration sector and about 1000 Metric tons in rigid foam sector. Phasing out CFCs in foam production and refrigeration manufacturing will be continued through new Investment Projects implemented by UNIDO and UNDP. In general the Refrigerant Management Plan is needed to keep this very positive development going on .The I.R. Iran government has taken regulatory and administrative measures to control the CFCs importation, mostly through the requirement of an import certificate will be issued by the ministry of commerce is being finalized by the Government. The I.R. Iran government is firmly committed to take all regulatory and legislative measures needed for the successful implementation of the RMP,
The 1993 Country Program enumerates the actions to be adopted and implemented to reach the phase-out schedule.

The Government is now starting to implement these actions and the RMP will be an essential tool in this process. A well-defined management plan and supportive government policy will serve as an indicator for private businesses and large users to refrain from any adverse operations in regard of the phase-out. Representatives from industry and maintenance businesses support the necessity of phase-out and agree that I.R. Iran cannot lag behind the development in the region.

The proposed training and recovery & recycling programme are very extensive and provide equipment for 10,000 service shops. It is also envisioned that the opportunity to recover refrigerant presents a financial incentive for many businesses.

The measures proposed in the RMP will enable the Government and refrigeration businesses to continue the phase-out according to the country programme avoiding future set-backs and high economic and social costs.

It is estimated that more than 25,000,000 different type of equipments containing CFCs (20,000,000 units are being used as home appliances and 5,000,000 appliances as commercial, industrial, mobile AC , transport, Chillers, air-conditioning and end users), which are in use in different sectors containing 11,500 metric tons (average 200 grams per units for domestic use and 1,500 grams per unit for other applications) of different ODS. 70% of these substances could be recovered through 10 years average service life time, it means that approximately 8050 metric tons of CFC, HCFC and HFC are recoverable. The remaining ODS (4500 metric tons) should be destructed and incinerated properly. At present there is no incineration technologies of ODS in Iran. A Plant for destructing disposable ODS should be established in Iran to dispose the un-recoverable/recyclable ODS. A separate Project investment document should be prepared

and be submitted to MP executive committee after three years of implementation of RMP project in Iran

5 ASSISTANCE RECEIVED

The compilation of this Refrigerant Management Plan has been supported by UNIDO, through a contract with local consultancy company in I.R. Iran to compile the background information, assess the situation and develop contact with authorities and businesses already involved or to be involved in phase-out actions.

The Ozone Office, high executives of the Department of Environment, as well as private businesses have actively supported the compilation of this Refrigerant Management Plan.

The Customs Department has been consulted by NOU regarding the control and licensing opportunities. Different governmental organization at ministry of education, labour and Social Affairs , Ministry of Finance and Economic Affairs , and commerce have been instrumental in compiling the training and recovery-recycling project proposals. Some maintenance workshop owners and CFC dealers have provided valuable practical details.

6 COMPONENTS OF THE PHASE OUT STRATEGY

6.1 Policy Framework

The NOU will develop and implement control measures such as:

- The Government is prepared to consider increased import duties or taxes on the controlled substances in case the planned (reduced) consumption figures are not reached.
- The Government is prepared to introduce bans on foreign manufactured refrigeration and air-conditioning equipment, if the products are obsolete or banned in their home markets to ODS.
- The Government will be liberal and supportive regarding and permits required by manufacturing and service businesses, which intend to establish for phasing out ODS.
- The Government will introduce a licensing system for refrigeration and air conditioning servicing operators in order to enhance better working practices.
- The Government will actively support training and publicity campaigns using the public media, and will encourage the different branches of public administration to co-operate.
- The Government will encourage the participation of voluntary organizations and citizen groups to support the training.

6.2 Emission Reduction

- Prohibit venting of ODS.
- Implementation of a national recovery and recycling project.

6.3 Training

- Training of trainers in good practices in refrigeration
- Training of refrigeration technicians in good refrigeration practices.
- Training for monitoring and control of ODS and ODS using equipment, aimed at enforcement officers to identify, and at the National Ozone Unit, Customs and Iran Statistical Center to develop techniques for collecting and reporting consumption and import data. (Custom Officers)

The NOU is the main link between the users of ODS and the Government Agencies monitoring the imports, etc. of these substances. The reporting of consumption as obliged under the Protocol; ensuring that freeze and eventual phase-out dates of use of the ODS within the projected timetable are met have to be done by the Unit. The current program for data collection needs to be streamlined and other necessary tasks to be executed by this body. In addition the NOU is active in:

- The creation of the ozone office for the implementing of the action plan (created)
- Establishment of an Import/Export Licensing System
- The introduction of legislative measures
- The introduction of a license for the refrigeration technicians for refrigeration good practice .

6.4 Implementation

The Ozone Office at the Department of Environment will implement the Refrigerant Management Plan and its components supported by the national team for the implementation of the Montreal Protocol. The ministries of Education and Labour, Iran Bureau of Customs and local consultant company will be involved in the training. It is further envisioned that the training can be implemented with initial external technical assistance only. The monitoring will be carried out by the Ozone Office, supported by the national team for training and recovery projects, and by the customs department for the training of customs officials and implementations of improved controls.
World wide well known producers of refrigeration vacuum charging, recovery and recycling equipment and also local suppliers of such equipments will be invited to take part in the implementation of the project.

The Multilateral Fund and UNIDO will receive regular reports on the progress and results.

By use of newly established National Codes for all types of ODSs, the Iran Bureau of Customs will have the responsibility to record all the imports and exports of the ODS in their chemical forms and components in these products (refrigerators, aerosol bombs, solutions of foams, isolation sheets, equipment to fight against fire, car air-conditioning). This record is shaped according to the system of classification of the Harmonize System (HS).

The Ozone Office's duty will be to control the use of the ODS by the final user sector using data recorded by customs and the different distributors and users industries.

7 ACTION PLAN

7.1 General

Based on the experience gained since the preparation of the country programme and on further negotiations and discussions with the government and businesses, it is proposed that the Refrigerant Management Plan will consist of the following components:

1. Training programme for Good Practices in Refrigeration
2. Recovery and Recycling Programme
3. Training Programme for customs officers on control of ODS and ODS containing equipment imports
4. Monitoring and evaluation of project results in particular the recovery and recycling

Note: Separate Investment Project Documents for MAC and Destructive Technology of ODS should be foreseen within 2003 to 2005 business plan of I.R. Iran

7.2 Training Programme for Good Practices in Refrigeration

This project aims to provide a training programme by local trainers to approximately 6000 technicians, who service domestic and commercial equipment, industrial installations and refrigerated transport systems

The local trainers will be recruited from the pool of domestic refrigeration maintenance, repair and conversion experts of organization of Vocational and Technical center of ministry of labour social affairs.

The technicians to be trained will be recruited from maintenance businesses. The Training courses (approximately 264 training workshops) will be arranged using the training facilities available at the Vocational Training Centers of ministry of Labour and Social Affairs throughout Iran Territory, which are selected due to their suitable geographically location and accessibility. Selected training locations will be provided with up-to date equipment and tools enabling the continuation of training after the aforementioned 6,600 trainees have passed their courses. The aim is that every regularly working maintenance business will have at least one trained technician or operator after this training exercise is over in more than 6600 training workshops. The participation in the training will be a mandatory requirement for the extension renewal of the commercial license of the maintenance workshops and receiving new equipment which are covered by this project.

The National Ozone Committee will carry out monitoring of the project and the Department of Environment and I.R. Iran ministries of Education and Labour and social affairs will be informed

about the development of the training. The Technical Training Center of ministry of Labour and social affairs will be involved in the long-term development of the training activity.

The estimated long-term phase-out impact is 750 tons of CFC-12 brought about by the reduction in wastage of virgin refrigerant when maintaining and refilling equipment.

7.3 Recovery and Recycling Programme

This project aims at providing 6,600 service shops of total 10,000 personnel, with basic recovery equipment (vacuum pump, recovery cylinders, leak detectors, and training) and establishing 52 recycling centers geographically distributed across I.R. Iran.

The estimated phase-out impact is 525 (70% of total 750 tons of CFC12 used in service sector) tons of CFC recovered and re-used to service existing CFC based equipment.

7.4 Training of customs Officers

This project aims at training a core team of 300 customs officers from 150 customs in the proper recording and detecting of ODS. Refrigerant detecting equipment will be provided. The imports of ODS and ODS containing equipment will be regulated but the measures will be implemented gradually.

The development of regulatory system must be in line with the accepted standards and implemented in a way causing a minimum social cost. The phase-out impact is mainly indirect, but without doubt, the awareness, that strict regulatory measures exist, will discourage unregistered imports and possible malpractice amongst some traders.
Regarding the training of customs officers it should be stated that this activity naturally covers all ODS and ODS containing equipment imports. The impact of this programme is indirect, but supported by a legal framework it will have an important role in phasing out ODS consumption.

7.5 Budget

The following table summarizes the costs of actions;

Component	Objectives	Total Costs US$
Training for good practices in refrigeration	Training of 6600 shop floor technicians	1,015,550
Recovery and Recycling of refrigerants and monitoring	Procurement of recovery and recycling equipment	4,780,230
Training of the customs officers	Monitoring of imports and exports, support to regulatory actions	249,200

Total		**6,044,980**

Funding of **US$ 6,103,560** is sought from the multilateral fund.

Technical assistance is needed for the initiation and implementation of the three projects, including technical assistance supplied by local expertise.

The time schedule of the activities together with the phase-out impact is indicated below.

8 IMPACT

It is expected that the CFC 12 consumption for maintenance purposes will stabilize at the current 750 tons. The timing and estimated impact of the implementation of the refrigerant management plan and its components are indicated in the following table:

	Estimated phase out impact ODP Tones						
Component	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Training for good practices Estimated phase-out impact (tons of ODP)		50	80	190	200	210	220
Training of customs officers for ODS and ODS consuming equipment imports							
Recovery and Recycling Estimated phase-out impact (tons of ODP)		00	150	230	270	280	290
Total impact tons of ODP		**50**	**230**	**420**	**470**	**490**	**525**
Remaining CFC refrigerant consumption for service purposes	750	425	295	105	55	35	15

When implemented the three proposed activities will result in phase-out of 525 ODS tons leaving out a volume of 750 tons, which is needed for service purposes in 2005 and beyond. It is expected that this service tail will be phased out by the end of 2010 by implementing regulatory measures and through scrapping old CFC consuming domestic commercial and industrial equipment.

The combined cost effectiveness of the three projects will be **8.06 US$/kg of CFC** phased-out.

Annexes

9 TRAINING FOR GOOD PRACTICES IN REFRIGERATION

PROJECT COVER SHEET

COUNTRY	:	I.R. IRAN
Name of Project	:	Training for Good Practices in Refrigeration
Sector Covered	:	Refrigeration Maintenance
ODS Consumption	:	750 tons of CFC-12
Duration of Project	:	**3** years
Total Project Cost	:	US$ 955,550
Monitoring of training program on effectiveness of implementation of training policies and the impact on reduction in consumption		US $ 60,000
Amount to be Contributed by Government of I.R. Iran	:	Not financially evaluated
Amount Requested from Multilateral Fund	:	US$1,015,550
National Coordinating Body	:	National Ozone Unit ,Department of Environment
Implementing Agency	:	UNIDO

Project Description

1. Background

This project will provide technical information and training to service, maintenance and repair personnel in the refrigeration sector in order to reduce ODS consumption during the servicing of refrigeration and air-conditioning units. In order to reach the objectives as identified in the country programme action plan and Refrigerant Management Plan. Professional training for hands-on service, maintenance and repair personnel are essential. The servicing of refrigeration

equipment accounts for approximately 750 ODP tons of CFC 12. Therefore, this training project for refrigeration service technicians is critical to the effective ODS phase-out in I.R. Iran.

2. Project Objectives

The project aims at containing and reducing ODS usage in the refrigeration and air conditioning sector by:

- increasing participation awareness of ozone depletion issues
- providing information on conservation techniques and on new ozone friendly refrigerants
- introduction and demonstration of procedures that eliminate refrigerant emissions during preventive or unscheduled maintenance
- selection and guidance in use of retro filling refrigerants such as R134 A, where applicable
- development of a network for information sharing throughout the sector

This project is being proposed to train refrigeration technicians in the country in the proper methods of performing repairs, maintenance and installation of refrigeration and air conditioning equipment to avoid leaks and unnecessary emissions of CFCs. The aim of the project is to improve service and maintenance practices in order to prevent intentional and/or unintentional releases of ODS into the atmosphere, making it possible for refrigeration equipment to operate to the end of its useful life.

The proper and effective recovery will be strongly highlighted since the recovered refrigerants are necessarily a very important source of refrigerants in the future. Training is also needed to support the implementation of the envisioned and rather strict ODS regime.

Even though the conversion of the existing larger refrigeration systems might not present an essential option in the phase-out, the key technical issues related to the conversion will be taught in the training; the characteristics of CFC and non CFC equipment and the main factors to be taken into consideration.

3. EXPECTED RESULTS AND CRITERIA FOR SUCCESS

The training will promote use of good refrigeration service and maintenance practices for systems using ozone-friendly substances, and the correct handling of new replacement refrigerants. This project will be co-ordinate with the Recovery and Recycling project being proposed along with the Government's Refrigerant Management Plan.
It's expected that the following results will be obtained by this project:

- Reduction of ODS consumption due to leaks and poor practices
- Reduction of ODS consumption by enhancing the introduction of alternative substances and non- ODS equipment.

- Training of approximately 6,600 technicians, on good practices, and inclusion of such training as a permanent part of the curriculum of the vocational training centers.

- Reduction in the number of repairs of refrigeration equipment and consequently a reduction in CFC releases into the atmosphere.

- Improved maintenance and servicing practices in the refrigeration sector.

- Improved regulatory framework and licensing for the refrigeration maintenance sector, which will enforce good maintenance and servicing practices, as well as the recovery of refrigerants.

It is expected that the trained technicians themselves, and after being qualified in their skills further in the businesses, will save approximately 525 tons of the estimated 750 tons of CFC, which is currently vented into the atmosphere. The potential saved quantity of CFC is estimated as follows:

- Approximately 1,600,000 domestic units are maintained annually (8% of the total domestic refrigerators in the country) using in average 250 gr. of CFC per operation. The average charge is 250 gr. per unit. Good practices will reduce all the leaks resulting in saving of 150 gr. per unit, i.e. 240 tons P.A.

- Commercial units are maintained regularly but with poor standard. A very clear trend is also the quick replacement of ODS containing units by non-ODS units. Use of recycled refrigerants is easier for commercial units than e.g. for domestic units. It can be estimated that the good maintenance practices will reduce a minimum of 40 tons of ODS, resulting 500 grams per unit emitted to the atmosphere, using average 1,000 grams per unit for charging approximately 80,000 commercial refrigerator units (20% of total 400,000 commercial refrigerator units in the country).

- All industrial/large cold store units (about 1500 units) are recharged twice a year. It is estimates that each recharge operation is wasting 30% of the refrigerant used (average charge per unit 100 Kg.), i.e. one 70% is charged to the equipment and the remaining 30% vented into the atmosphere. This means that the refrigerant consumption can be reduced from 150 tons to 100 tons p.a and 50 tons could be recovered.

- It is estimated that 2000 Lorries, Trucks are equipped with cold room for carrying refrigerated and frozen foods, 20% of these transportation means are equipped with R12 refrigerant. All refrigerated trucks and wagons are recharged at least twice a year. The average refrigerant charge is 5 kg per unit. Good maintenance will reduce the service needs and result in that the coolant needed corresponds the charge volume. The annual savings are approximately 10 kg per 400 refrigerated units, i.e. 4 tons p.a.

- When the training is finalized and basic recovery equipment is on place, a minimum of 25 tons of CFC-12 used due to leaks and poor practices in the other servicing sectors will be saved.

It must be mentioned that the newer equipment supports the phase-out, which use less refrigerants and are more and more ODS-free.

To be successful a deep commitment from the participating companies is needed. The impact of the training will be supported by a certification system. The Institutional strengthening programme will develop a scheme according to which the issuance of new, and extension or renewal of old workshops' commercial licenses will be refused unless there is at least one trained technician among the staff.

4. Target Audience

A complementary training programme is needed for training servicing technicians by the existing pool of national trainers. I.R. Iran has currently more than 25,000 refrigeration and air-conditioning technicians who work in approximately 10,000 different companies and workshops.

The project aims at training minimum of 25,000 technicians who are currently working on the maintenance and have some experience from the practical maintenance business. These people to be trained are recruited evenly throughout the country. It should be mentioned that both the Ozone Office and UNIDO have made detailed surveys on the business and reaching the trainees and their employers is an easy task.

5. Approach

The Technical Training center of Ministry of Labour and Social Affairs and department of Vocational training already established different training centers in different geographical location in 28 provinces will be the main organizer of the training. The centers have equipment and trainers. The programme implementation will be arranged in four phases as follows:

Phase 1

Preparation of a detailed curriculum for the trainees; the curricula will be developed by The Technical Training center of Ministry of Labour and Social affairs and local consultant company. It is further proposed that a local consultant company, familiar with the refrigeration issue in the country will be responsible for a short period to support The Instructors of training Center of Ministry of Labour and Social affairs located in Karaj 45 km. west Tehran to train the trainers all necessary issues in the curricula. The training aids/equipments covered by this project and produced by UNEP's ozone Action Programme will be utilized. 30 selected instructors and trainers will be trained by an experienced local consultant to conduct the training programme for about 6,600 technicians in 36 month time in 25 training centers

The curriculum will include, but not be limited to:

- Background to Ozone Layer, Destruction of the Ozone Layer, the Vienna Convention, the Montreal Protocol and its amendments, the freeze and phase out requirements, and the Government's response as a party to the Protocol.
- Why the refrigeration sector is important
- Installation of equipment

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- System operation and maintenance
- Preventive inspection and maintenance
- Properties of different refrigerants and lubricants
- Handling and storage of refrigerants
- Safety requirements
- Retrofitting, redesign and alternatives
- Retro filling, and selection of alternatives
- Safety requirements
- Recovery, Recycling and reclamation
- Discussion on developing a national code of good practice
- Discussion on certification
- Discussion on the regulations in place and being considered by the Government, including how I.R. Iran can meet its objectives under the Montreal Protocol.
- Equipment demonstration and hands on training in the proper use of equipment and recovery and recycling machines

Phase 2

Identify trainees. The training will be arranged in 25 training centers of Ministry of Labour and Social Affairs in Tehran, Karaj, Isfahan, Kashan, Saveh, Ahwaz, Khoram Abad, Shiraz, Bushehr, Tabriz, Orumieh, Hamadan, Kermanshah, Yazd, Rasht, Sari, Kerman, Khorasan, Birjand, Zahedan and ministry of education and department of vocational schools. The training Centers will be responsible for the recruitment, supported by the Ozone Office.

Phase 3

Actual training will be conducted in the Technical Training centers of Ministry of Labour and Social affairs's training centers in Tehran, Karaj, Isfahan, Kashan, Saveh, Ahwaz, Khoram Abad, Shiraz, Bushehr, Tabriz, Orumieh, Hamadan, Kermanshah, Yazd, Rasht, Sari, Kerman, Khorasan, Birjand, Zahedan. The training will be organized in approximately 264 training workshops, with maximum 25 participants in each. Each training workshop will last one week. Thus the all activities (approximately 6,600 trainees) can be carried out in approximately 16-30 months.

Phase 4

Development and enforcement of a certification regime, and development of criteria for application of licensing; the phase must be initiated in cooperation with the Ozone Office. Only service business whose technicians (at least one person) are trained would be eligible to receive the proposed recovery and recycling equipment and other services. This phase will require the Ozone Office/UNIDO to produce an evaluation report on the results of the programme and suggested corrective measures, if applicable.

6. Time Frame

It is expected that the first phase can start at mid-2002, second phase during the third quarter of 2002. The training courses to train approximately 6,600 shop-floor operators will start in

September 2002 and the activity will last approximately 30 months to be completed by the end of the year 2004. The inclusion of refrigeration training components in the curricula of the Vocational Training Centers will be starting in the year 2002.

Training Plan

Area	Number of Technicians to be Trained	Number of Trainers to be Trained	Number of Courses to be Conducted. Max Number of Participants "25"	Time Months	Training Center Location
Tehran	1,250	6	50	30	Karaj Training Center 1, and Tehran Training Center 6
Isfahan	775	2	31	20	Esfahan and Kashan
Markazi	250	1	10	15	Saveh
Khozestan	700	2	28	18	Ahwaz and Khoramabad
Fars	775	2	31	20	Shiraz and Bushehr
East Azerbayejan	250	2	10	15	Tabriz
West Azerbayjan	150	1	6	12	Oromieh
Ghazwin	125	1	5	12	Hamedan
Kermanshah	275	2	11	12	Kermanshah
Yazd	100	1	4	6	Yazd
Gilan	275	2	11	12	Rasht
Mazandaran	300	2	12	12	Sari
Kerman	475	2	19	18	Kerman
Khorasan	550	2	22	12	Mashahd and Bijand
Sistan and Baluchestan	350	2	14	24	Zahedan
Total	6,600	30	264	238	25

7. CO-OPERATION PARTNERS

The Training will be arranged using the training facilities available at 25 Training Centres of ministry of Labour and Social Affairs. The trainers to be trained and further appointed to train technicians are coming from the Vocational Training Centres, from equipment manufacturers and (some of them) from the maintenance businesses.

The active, practical monitoring of the activity will be carried out by the National Committee The Ozone office of Department of Environment will be informed about the development of the training, its results and certificates issued to draw practical conclusions concerning the business. The Technical Training Center of Ministry of Labour will be involved in the long-term development of the training activity.

The criteria (and regulatory measures) for ODS and ODS containing equipment imports are being developed at the same time as the training activity is carried on. Therefore, the customs

department should be aware of the development regarding training to assess the proper and relevant regulations and their timely implementation.

8. Supporting and Follow-up Action

The National Ozone Unit will be at the core of the programme (giving support, supervising, controlling and coordinating activities).

The licensing / certification procedure for service companies will be developed jointly by the Ozone Office and the National Committee for the implementation of the Montreal Protocol within 6 months from the initiation of the training programme. The content of this licensing is based on short term, and a given service company must have trained technicians on pay-roll in order to obtain a license. Therefore, the participation of the service company in the training is compulsory to participate in the recovery and recycling programme and to receive the necessary equipment. After the training is over, the Ozone Office, a national consultant and the representatives of the Vocational Training Centres will carry out evaluation and enhance the continuation of the training as a normal activity.

The implementation of the activities and results achieved and conclusions will be reported to **UNIDO** and **MF** according to the issued guidelines.

Detailed budget for the Training of Trainers in Good practices in Refrigeration Phase 1

Item	Unit cost	Quantity	Budget (US$)
Consultancy services and International Expert Travel, DSA and fees for 7 days	10,000	1	10,000
Local Arrangement & logistic for training program	2,000	1	2,000
Local Organization 30 persons for 5 days	200	30	6,000
Transport and per diem for outstation participants	100 Per day	30x4 = 120	12,000
Translation and photocopying of Training Material			6,000
Total for Phase I			**37,000**

Detailed budget for the Training for good practices in Refrigeration Phase 2

Item	No Units	Unit Cost US$	Total Cost US$
Local arrangements & logistics for 264 training programs	264	500	132,000
National consultant for monitoring & evaluation of the project	1	10,000	10,000
Fees to Trainers for conducting workshops 264 training workshops	264	500	132,000
Training material	6,600	10	66,000
Travel and per diem for outstation participants (2500 persons out of 6000 total participants x 4 days)	10,000	25	250,000
Sub-Total			**590,000**
Monitoring of training program on effectiveness of implementation of training policies and the impact on reduction in consumption	60,000		**60,000**
Total			**650,000**

Detailed budget of the equipment for the Training for good practices in Refrigeration

Item	Unit cost	Quantity	Budget US$
Training Equipment			
Training rig	1,000	25	25,000
Recovery Equipment:			
Recovery machines	1,000	25	25,000
30 lb ERC refrigerant cylinders	100	25	2,500
Vacuum pumps	400	25	10,000
Service tool kit	600	25	12,000
Recovery bags	50	25	7,500
30 lb. DOT Recovery Cylinders	100	25	2,500
Recycling Equipment			
Recycling machines	7,500	25	187,500
100 lb. Refrigerant cylinders	200	25	5,000
Freight Cost (5% of equipment)			13,850
Equipment total			**290,850**
Contingency			27,700
Total			**328,550**

Grand Total Training for phase 1 ,phase 2 and Training equipment = 37,000 + 650,000+ 328,550=1,015,550 US $.

10 RECOVERY & RECYCLING PROJECT

PROJECT COVER SHEET

COUNTRY	:	I.R. IRAN
Name of Project	:	Recovery and Recycling in Refrigeration
Sector Covered	:	Refrigeration maintenance
ODS Consumption	:	750 tonnes of CFC-12
Duration of Project	:	3 years
Total Poject Cost	:	US$ **4,552,600**
Monitoring and evaluation of project results in particular the recovery and recycling		US$ **227,600**
Amount to be Contributed by Government of I.R. Iran	:	Not financially evaluated
Amount Requested from Multilateral Fund	:	US$ **4,780,230**
National Coordinating Body	:	National Ozone Unit, Department of Environment
Implementing Agency	:	UNIDO

PROJECT DESCRIPTION

1. Background

This project will provide approximately 10,000 thousand small workshops with the basic tools needed in recovering the used refrigerant. Currently all used refrigerants are vented into the atmosphere.

I.R. Iran is using approximately 750 tons of CFC to service refrigeration and air-conditioning equipment Out of this volume approximately more than 60 % is vented into the atmosphere due to bad service practices and lacking equipment. Since there is no operational recovery and recycling scheme for technicians, the used refrigerant from the equipment is also vented into the atmosphere. The volume of the used refrigerant wasted is estimated at 525 tons. In case the service operators would have proper equipment for recovery and recycling about 315 tons of

this wasted old refrigerant could be saved and re-used. The use of recycled CFC will provide an alternative source from importer virgin CFC. It is expected that by securing this volume CFC refrigerant, the country's demand for imports of CFC will be reduced.
The first action is under implementation. Training of the technicians is scheduled to start during the first half of 2002. After the training is initiated and distribution of the recovery and recycling equipment to the maintenance companies to be run by trained technicians can be started. The information needed to prepare this project was supported by a survey conducted by local consultant company ,by the National Ozone Unit and national consultant appointed by UNIDO.

2. Objectives

The implementation of the National Recovery and Recycling project in the refrigeration sector will help prevent venting CFC-12 into the atmosphere during maintenance, decommissioning or retrofitting operations.

The recovered refrigerant, when purified to an acceptable technical standard is recycled to keep running old CFC-based equipment until the end of its technical or economical life. The use of recycled CFC-12 will provide an alternative source of refrigerant, it is therefore expected that the country's imports of CFC-12 will decrease.

The project aims at supplying approximately 6,600 service companies with basic recovery equipment (vacuum pumps) recovery cylinders and necessary tools. A further 52 recycling centers will be established in appropriate geographical locations, close to main areas of high CFC usage.

3. Expected Results and criteria for Success

The following are results expected from this programme:

- The recovery of refrigerant before retrofitting or dismantling and scrapping of operations
- Creation of the necessary infrastructure within the Country for the collection, recycling and distribution of all CFC recovered by whatever means.
- Encouragement to service workshops and companies to maintain their own systems and / or equipment, whether directly included in this programme or not, to recover CFC during servicing

The implementation of the training programme for good practices in refrigeration is a prerequisite for successful recovery and recycling. The Ozone Office needs to consult (supported by the National Team for implementation of the Montreal Protocol) the businesses receiving the equipment. The recycling centres should apply reasonable and non-discriminatory policy when receiving and selling back the refrigerant to the workshops.

4. Approach

Number of Repair and Service Workshops, Year 2001					
Category I Refrigerant Consumption	Category II Refrigerant Consumption	Category III Refrigerant Consumption	Category IV Refrigerant Consumption	Category V Refrigerant Consumption	Category V I Refrigerant Consumption

> 1500	>1000	> 500	>150	>70	> 30
25	35	800	3,000	2,800	3,340

The figure in the table above were revised in accordance with official written information received from the Association of Iran Refrigeration Service Shops that have about 10,000 members throughout Iran.

The quantity of CFC recoverable is estimated as follows:

- 5,800 refrigerant bags will recover an average of 0.1 kg of CFC-12 per day per bag, 145 Tons/year
- 800 recovery machines will recover an average of 1kg of CFC-12 per day per machine. 200 tons/year
- The basis is 250 working days per year;
- 80% of recovered gas can be recycled;

On this basis it would be possible to recover 345 tonnes of CFC refrigerant per year. The location of recycling centers with machines and associated kits will be determined by evaluating the most effective locations with regards into their access to the largest and consistent volumes of CFC-12.

The National Ozone Office will be responsible for designing, organizing and establishing this recovery network. 52 recycling center will be designated to recycle reusable refrigerants. Approximately 800 of the largest service workshops and companies, which consume more than 500 kg CFC per year, will receive recovery machines and associated equipment and tools such as vacuum pumps equipment kits. The 2,800 workshops are small service workshops which consume more than 150 kg/year CFC will be provided with maintenance and associate equipment kits/or portable recovery and charger device and recovery bags and associated recovery cylinders, 3000 small service workshops will receive recovery bag and 30 lb. DOT Recovery Cylinder and but it is reasonable to provide them with the other basic equipment and tools. Approximately 6,000 large, medium and small service workshops technicians out of 25,000 technicians will receive necessary skill training.

The conditionals for participation will be; at least one technician certified by the training programme and a signed commitment to recover a determined quantity of refrigerant per year, based on current consumption volumes.

15 demonstration workshops (lasting 3 days each) will be held for the attention of all firms, small shops, and technicians operating in the refrigeration and air conditioning sector at Training Center of 15 selected Areas. An international consultant and a representative of equipment supplier will introduce and explain the recovery recycling programme and infrastructure; hands-on demonstration will be organized.

The National Ozone Office will keep records of the amounts of refrigerant recovered; the quantities of recycled refrigerant stored at their recycling centers and monitor the quality and the price of recycled CFCs

The implementation of the National Recovery and Recycling project is expected to start the 3rd quarter of 2002

5. Equipment

5.1 Recovery Equipment

- Portable CFC-12 recovery machines with oil-less compressors and self-clearing mode, 30lb. DOT refrigerant recovery cylinder and appropriate hoses with tap valves
- 30lb. (ERL) DOT refrigerant recovery cylinder with OFP device and two ports
- Recovery kit consisting of:
  - 1 gauge manifold with hoses
  - 1 weighing scale
  - 1 electronic hand held leak detector
  - 2 service couplings
  - 1 piercing pliers
  - 2 pairs of goggles and 2 pairs of gloves
  - 1 thermometer
  - 1 set of service hoses
- Refrigerants recovery bags with associated equipment (hoses with tap valves, sight glass)
- Spare parts and consumables

5.2 Recycling Equipment

- Separation chamber recycling machines equipped with moisture filters
- Refrigerant identification kit to identify mixed refrigerants
- 100lb. Refrigerant cylinder with OFP and dual ports
- 100lb refrigerant cylinders with OFP and dual ports
- Spare parts and consumables

5.3 Schedule of Equipment

The following table indicates the number of equipment to be supplied.

Equipment	Domestic Commercial Service	Commercial Industrial Service	Recycle Centers	TOTAL
Recovery Equipment				
Recovery machine with appropriate spares and consumables	600	200	0	800
Vacuum Pump	600	200	52	852
Equipment Kit with appropriate spares and consumables	1800	1000	52	2,852
30 lb. ERC Refrigerant Cylinders	2400	1200	0	3,600
Recovery Bags	4400	2200	0	6,600
30 lb. DOT Recovery Cylinder (for use with recovery bags)	2000	1000	0	3,000
Recycling Equipment				
Recycling machine with appropriate spares and consumables			52	52
100 lb. Refrigerant Cylinders			52	52
2,000 lb. Refrigerant Cylinders			52	52

5.4 Budget;

Detailed budget of the equipment ;

Item	Unit cost	Quantity	Budget (US$)
Recovery Equipment:			
Recovery machines	1,000	800	800,000
30 lb ERC refrigerant cylinders	100	3,600	360,000
Vacuum pumps	400	852	340,800
Service tool kit /or portable refrigerant recovery, charger kit	600	2,852	1,711,200
Recovery bags	30	6,600	198,000
30 lb. DOT Recovery Cylinders	100	3,000	300,000
Recycling Equipment			
Recovery/Recycling machines	7,500	52	390,000
100 lb. Refrigerant cylinders	200	52	10,400
2000 lb. Refrigerant Cylider	1200	25	30,000
Total			4,240,400
Consumables and Spare Parts for all equipment above for 1 year operation			100,000
Freight Cost (5% of equipment)			212,200
Equipment total			**4,240,400**
TOTAL			**4,434,851**

5% Monitoring and evaluation of project results in particular the recovery and recycling			**227,630**
Amount requested from Multilateral Fund			**4,780,230**

In order to reasonably recycle CFC recovered from the workshops having basic recovery equipment, 40 recycling centers will be established. The actual composition of the recycling equipment should be determined during the initial stage of the training in consultations with the external expert, local trainers and the Ozone Office.

Recovery and Recycling Center Area

Area	Number of Recycling Centers	Name and Location of Recovery and Recycling Center
Tehran	6	Service Shops Cooperative Center, Moshirieh Center 1, Iran Association of Service Sops Society, Koshtargah center 5, Yaft Abad Center 4, Karaj Center 1, Karaj Center 2
Isfahan	4	Isfahan Center 1, and Isfahan Center 2, Kashan, and Shahre-kord.
Markazi	2	Arak, and Qom
Khozestan	3	Ahwaz, Dezful, Khoramabad
Fars	5	Shiraz, Bushehr, Lar, and Dogonbedan
East Azerbayejan	3	Tabriz Center 1, and Tabriz Center 2, and Maragheh
West Azerbayjan	2	Orumieh, and Mahabad
Ghazwin	3	Ghazwin, Zanjan and Hamadan
Kermanshah	4	Kermanshah, Sanandaj, Ilam, and Sare-Pol-Zahab
Yazd	1	Yazd
Gilan	3	Rasht Center 1, Rasht Center2, and Ardabil
Mazandaran	4	Sari, No-shahr, Gorgan, and Semnan
Kerman	4	Kerman, Minab, Jiroft, and Bandar Abbas
Khorasan	5	Mashad, Sabzewar, Bojnourd, Birjand, and Ferdows
Sistan and Baluchestan	3	Zahedan, Zabul, and Iranshahr
Total	52	

TRAINING OF CUSTOMS OFFICERS PROJECT

PROJECT COVER SHEET

COUNTRY	:	I.R. IRAN
Name of Project	:	Training of Customs Officers
Sector Covered	:	All sectors
ODS Consumption	:	750 tons of CFC-12
Duration of Project	:	18 months
Total Project Cost	:	US$ 239,200
Monitoring of training program on effectiveness of implementation of import/export policies and the impact on reduction in consumption		US$ 10,000
Amount to be Contributed by Government of I.R. Iran	:	NOT FINANCIALLY EVALUATED
Amount Requested from Multilateral Fund	:	US$ 249,200
National Coordinating Body	:	National Ozone Unit,Department of Environment
Implementing Agency	:	UNIDO

1. Background

The institutional structure within I.R. Iran needs more organized and efficient systems to monitor and control the imports of CFC or CFC containing equipment in the country. Customs statistics may not be as accurate as need to be due to customs officers being untrained in recognizing and identifying CFC, and the lack of specific customs codes for CFC and lack of regulations for their control - I.R. Iran has approximately 88 import / customs stations. The Government is thus seeking to train its customs officers to implement more detailed import classification and in recognizing ODS and ODS containing equipment to control and ensure that acceptable products are entering the country The customs department and authorities responsible for compilation of statistics will be involved in this training activity to enhance the co-operation between these administrative units. The technical aspects of the training will be

concentrated in the customs laboratory in I.R. Iran. It is imposing discriminatory measures on importation of ODS. Imposing direct measures on ODS imports like punitive taxes, direct bans, permits, licenses or quotas may result in unexpected trading patterns, parallel activities and punish the low income earners through higher prices and non- availability of service. On the other hand, the importation and local production of non-ODS equipment needs incentives, which talks for the restrictions in imports.
To sort out the feasibility of restrictive measures on the imports of ODS and ODS containing equipment, it is proposed that an expert group will be established. This group should analyze the practical possibilities to impose any restrictive measures and their envisioned repercussions on die actual ODS and ODS containing equipment trade.

2. Objectives

This project aims at Training customs officers (inspectors, controllers and customs policemen) to enable them to identify:

- Controlled substances under the Montreal Protocol
- Imported refrigerators, freezers and other refrigeration equipment using CFCs
- Providing CFC-detection equipment for customs entry points in the country.

In addition this project will allow the customs department to create a database on imported ODS. Developing and imposing clear rules (bans, quotas, licenses) to actually restrict ODS and ODS containing equipment imports. The implementation of these activity will be made in a manner and publicity, that supports the training and recovery-recycling projects.

3. Expected results and criteria for success

The implementation of this training project will result in:

- Development of reliable and valid statistics on national ODS consumption
- Identification of ODS, ODS-using and ODS-containing equipment and discouraging parallel activities
- Accurate implementation of restrictive import and resulting in decreasing importation volumes
- Enhancement of the local non-ODS equipment production
- Feed-back e.g. to the Ozone Office; needs to modify rules and regulations

The expected result is a more efficient control of ODS and ODS using equipment upon entrance to the country and enhancement of the entry of non-ODS in the market. The successfulness of this activity can be observed indirectly only. The main issue is to create awareness in the trade and business and direct them to seek for new opportunities with non-ODS instead of continued ODS trade. The imported ODS volumes should continue to decrease steadily.

4. Target audience

The technical training will be directed to a core team of some 176 customs officers and foremen. They should come from the customs department and different customs entry points in the country and will be in charge of instructing the officers at customs stations.

5. Approach

The technical training will be arranged in one week's period, during which the core team will be familiarized with the following issues:

- Background to ozone protection and the Montreal Protocol
- The management and practices of the revised harmonized system
- The use of identification kits for the detection and identification of CFC and CFC mixtures
- The recognition of ODS containing equipment

Recognizing of generally known, irregular, trading patterns will also be discussed. The UNEP developed "Regulations to control ODS - A Guidebook" and "Monitoring Imports of ODS-A Guidebook" will de used as training aids.

The project may be also define and identify import channels, which need a special attention One international trainer - expert will be identified to support the core team in using the technical aids but also to elaborate the trade patterns, envisioned irregularities and corrective measures. The customs department needs to elaborate the repercussions of imports restrictions. When imposed, restrictive measures should be clear and one should envision the actual effects, among which the increasing of parallel activities should be taken into consideration. Unwise, economically and financially impossible conditions will lead to confusions only. It should be noted that import duties levied currently mainly have a fiscal purpose.

The customs department will establish a team to sort out criteria. This team should be allowed to hire some outside expertise familiar with the ODS trade in the region. Also the department should actively take part in organizing training programme. A local consulting company which is familiar with MP regulations and ODS phase out projects in Iran such as Refrigeration, Foam, Solvent, Methyl Bromide and Halons and licensing system and customs rules and regulations will be used to conduct training programme for customs officers.

6. Time frame

The technical training should take place in 3rd quarter of 2002. The development of criteria for imports is expected to last approximately 18 months. The customs department should be technically ready to impose restrictions at the end of the year 2003.

7. Co-operating partners and their role

The I.R. Bureau of customs will be involved in the development of the content from the start of the project in order to get its input for specific issues in the training agenda. The participation of Government's finance authorities are expected. When developing criteria to restrict imports, the customs department and the team should monitor the advancement of the training and recovery and recycling projects.

8. Supporting and follow-up actions

The national team for the Implementation of the Montreal Protocol will monitor this activity. Since the imposition of the restrictions most likely has some policy and fiscal aspects, the NOU should take a stand on this activity.

Detailed budget for Customs Training

Item	No Units	Cost	Budget US$
International expert (travel, DSA, fee) for technical training and local Consultants	1	40,000	40,000
Local organization (220 persons for 3 days)	220	50	11,000
176 ODS identification kits @ US$ 1000	136	1000	136,000
Freight cost (5% of Equipment cost)			6,800
Training material & aids	300	10	3,000
Travel & per diem for outstation participants (220 persons for 3 days @ US$ 30per day)	660	30	19,800
Monitoring of training program on effectiveness of implementation of import/export policies and the impact on reduction in consumption	1	10,000	**10,000**
Sub-total			**226,600**
Contingencies (10%)			22,600
Total			**249,200**

Annex I

Useful Information and statistics for RMP

1- Current Country Status

1-1 Land and Climate

Iran covers a land area of 1,629,918 sq. km and is located in Western Asia between 44 and 63 degrees longitude and 25 and 39 degrees latitude . It is bordered by Iraq and Turkey to the West, Turkmenistan, Caspian Sea, Azerbaijan and Armenia to the North, Afghanistan and Pakistan to the East, and Persian Gulf and the Sea of Oman to the South. Iran through its coastlines also borders Russian Federation and Kazakhstan in the north, Kuwait, Saudi Arabia, Bahrain, United Arab Emirates and Oman in the south.
Length of the Iranian coastlines is 2,700 km while its borderline is 6,031 km long.
The country is divided into 28 provinces, 282 districts, 742 counties and 724 cities/towns.
The country generally features three climatic zones :
1) Arid/semi-arid regions of the interior and far south which are characterized by long, warm and dry periods, sometimes lasting over 7 months. The annual precipitation in such regions varies between 30 to 250 mm;
2) Mountainous areas which are divided into cold and moderate mountainous regions. Cold mountainous regions cover about 40,000 sq. km of total land with annual precipitation of over 500 mm. Moderate mountainous regions occupy about 300,000 sq. km of the country with annual precipitation of 250 to 600 mm;
3) Caspian region trapped between the Caspian Sea and the Alborz mountains with annual precipitation of 600 to 2,000 mm.
The temperature variation between the hottest and the coolest places is about 35 to 40 degrees centigrade.

1-2 Population

Typical of most developing countries, Iran is very young in terms of population such that over 50% of the population is under 20 years of age. This has been the result of high population growth in the last four decades, especially since 1980s. Population of the country has trebled since 1956 and has doubled over the period 1976- 1999. As a result the total population has increased from 19 million in 1956/57 to 60 million in 1996/97 (Table-1). The table also shows that while the growth of population was checked in 1970s, in 1980s its rate of growth again began to increase. This can directly be attributed to government's policy to encourage growth of population and also provide cheap food, health services, free education, highly subsidized housing and keeping the level of prices down by means of cheap imports financed from the sale of petroleum. This was at the time that the country was at war for eight years. After the war, however, and as the pressure for jobs increased and the cost of maintaining the health service and providing basic education mounted, the government began to revisit its population policy and population control policy was officially and strictly adopted. As a result of this and as the cost of maintaining larger families increased and it became more and more difficult for those at marriage age to get married , a downward population growth rate was put in motion. This brought the rate of growth of population to around 2% per year. AS is indicated in Table-1, under – five population has decreased from its peak of 9.0 million in 1986/87 to just over 6.0 million in 1996/97, showing downward trend of population increase. Population at school age, on the other hand, is still increasing which is indicative of

high growth rates in 1980s.Working age population is also increasing which again is a reflection of high population growth in 1980s.The total population in 1999/2000 is estimated to be 62.8 million. Of this total over 30 million are under 20 years of age and are in need of schooling, health care and many other social provisions

Population according to age group and its distribution, various years, million persons (per cent)

Age Group (years)	Year					
	1956 /57	1966/67	1976/77	1986/87	1991/2	1996/97
0-4	3.4	4.6	5.4	9.0	8.1	6.2
	(17.9)	(17.8)	(16.0)	(18.2)	(14.5)	(10.3)
5-19	6.0	9.5	13.2	18.6	22.5	24.7
	(31.6)	(36.8)	(39.1)	(37.6)	(40.3)	(41.2)
20-64	8.9	10.8	13.9	20.4	23.3	26.6
	(46.8)	(41.9)	(41.3)	(41.2)	(41.8)	(44.3)
65 and over	0.7	0.9	1.2	1.5	1.9	2.5
	(3.7)	(3.5)	(3.6)	(3.0)	(3.4)	(4.2)
Total	19.0	25.8	33.7	49.5	55.8	60.0
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Average Annual Growth	-	3.1	2.7	3.9	2.4	1.5

Source : Iran Statistical Centre, Iran Statistical Yearbook, 1998/99

1-3 National economy

National economic developments in Iran have directly been a function of developments in crude oil prices and exports for the last three decades. At times of high oil income the economy has relatively prospered with higher growth rates and increased activities more dependent on oil revenue. During the period of lower petroleum prices and earnings, however, other activities have gained relative importance. Table-2 shows the contribution of various categories of activities in the domestic production of the country. As is evident, agriculture sector plays a dominant role in the Iranian economy both in terms of income and employment and accounts for more than a quarter of domestic production. It is mainly labour intensive and located in rural areas. It is partly mechanized and highly dependent on dry farming for the production of crops. Attempts to become self-supporting in basic food stuff have largely failed and the country is dependent on imports for staple items. Staple food prices are largely subsidized and hence there is a lack of incentive for farmers to produce more. Rural population as a result tend to migrate to towns in search of higher standard of living and better facilities. For the production of meat and protein, on the other hand, the country is self-sufficient and per capita consumption, especially of sea food, is increasing.

Manufacturing sector is the next important section of the economy both in terms of employment creation and income generation but is highly dependent on imports for machinery, raw and intermediate materials. It is especially vulnerable during the periods of foreign exchange shortage. It is highly protected against imports and often produces low quality industrial products. Despite heavy investments in the last two decades, the share of manufacturing in the national economy has been decreasing in favour of

services sector. Manufacture of food and beverages products, textiles, chemicals, non-metal minerals, machinery and equipment, and motor vehicles form the core of manufacturing activities in the country and are mainly concentrated in the capital city (Tehran), Esfahan , Tabriz, Arak and Ahvaz, with the capital city and the adjacent areas housing about 40% of all industrial activities in the country. These industries were mainly established by the public sector in 1960s and 1970s and are often in need of renovation. Their products are almost all domestically consumed and lack the competitive edge to enter the world markets as the main concern of the government's industrial policy is to preserve/create jobs with disregard to efficiency and competitiveness nations. In the last few years the government has been trying to divest the state industries and introduce competition as a means of enabling the firms to increase product quality. The government has also attempted to attract foreign investment, although with limited success, to both generate employment and enable the firms to link up with developments in international market place.

As against the manufacturing sector and with the abundance of non-metal minerals, growing population and the need for developing infrastructure in the country, the construction sector is almost self- contained and directly relates to over 50% of economic activities in the country. It employs over 10% of the labour force but produces less than 5% of the GDP and as such is a prime target of government intervention for job creation at times of slow down in economic activities. The sector has true indigenous potential and has developed as a self- sustained industry in the country.

Next in the country is the petroleum sector which has been developed in line with the exploitation of abundant crude oil and natural gas resources in the country. It is highly capital intensive and employs less than 1% of the country's labour force although it accounts for around 20% of the GDP, over 50% of government's budget revenue and over 80% of the foreign exchange earning of the country. It is, however, very vulnerable to fluctuation in international oil prices and as a result has high impact on domestic economic activities. Indeed, economic growth in the country has been at the mercy of the petroleum sector. The government for long has been trying to reduce its reliance on oil income but so far with no avail.

Importance of petroleum sector to provide foreign exchange has given rise to a large services sector that accounts for over 40% of GDP and employment in the country. A sizeable number of people are employed in wholesale and retail trade whose activities are mostly linked to the procurement and distribution of imports. Moreover, with the government receiving all the proceeds of the petroleum income, a large administrative apparatus has also been developed which provides health, education and other public services throughout the country. Indeed and due to this the government is a large employer in the country and accounts for about 30% of the total employment in Iran.

To sum up, Iranian economy for the last three decades has experienced chronic stagflation and its rate of growth has been very moderate if not slow and negative. The real GDP at factor cost has increased from 11254.3 billion Rials in 1976/77 to 17455.1 billion Rials in 1999/2000, showing an average annual increase of only 1.9%. The population at the same time has increased by an average annual rate of 2.7%. As such, per capita income has actually decreased and the average Iranian is now poorer than three decades ago. Lack of sufficient capital formation and inefficient use of resources and low use of capacity utilization are the main causes of this decline in per capita GDP. While in 1970s the share of gross fixed capital formation as percentage of GDP was around 30, in 1980s and 1990s this rate has fallen to less than 20. Moreover, most of the capital formation has been realized in the construction of buildings and hence less investment has been done in acquiring equipment and machinery, which usually lead to increased production. Furthermore, the industry in most years in the last two decades on average has produced at less than 50% of the capacity and in many instances firms produce at as low as 30% of the capacity. Table-3 summarizes the state of Iranian economy which is characterized by high rate of inflation and unemployment, high dependence on petroleum export for generating hard currency income, relatively high

rate of national saving but much lower rate of fixed capital formation and fast depreciating national currency. The gap between national saving and capital formation is reflective of non-conducive economic environment which makes it impossible to engage in productive activities in the real sector of the economy and hence intermediation and rent seeking is highly prevalent in the country.

Gross Domestic Product at factor cost by sector and sectoral distribution (%), 1982-83 prices), billion Rials

GDP by Sector	1991/92	1994/95	1995/96	1996/97	1997/98	1998/99
Agriculture	3120.2 (26.4)	3605.5 (27.2)	3688.4 (26.5)	3822.9 (26.0)	3957.6 (26.1)	4277.8 (27.7)
Mining	68.4 (0.6)	80.0 (0.6)	84.2 (0.6)	88.2 (0.6)	91.0 (0.6)	94.6 (0.6)
Manufacturing	1940.3 (16.4)	2061.1 (15.5)	2180.6 (15.6)	2320.1 (15.8)	2510.3 (16.5)	2633.3 (17.1)
Petroleum	2516 .7 (21.3)	2496.1 (18.8)	2517.8 (18.1)	2566.0 (17.5)	2430.0 (16.0)	2410.4 (15.6)
Water, electricity and gas	285.0 (2.4)	377.4 (2.8)	397.3 (2.8)	424.9 (2.9)	443.9 (2.9)	466.8 (3.0)
Construction	508.3 (4.3)	596.4 (4.5)	623.8 (4.5)	707.8 (4.8)	686.0 (4.5)	613.4 (4.0)
Services	4945.9 (41.8)	5885.9 (44.3)	6024.6 (43.4)	6339.1 (43.1)	6608.9 (43.5)	6539.7 (42.3)
Less: Imputed bank service charges	120.7 (1.0)	117.1 (0.9)	58.3 (0.1)	76.7 (0.5)	29.5 (0.2)	18.5 (0.1)
Terms of trade Adjustment	-1439.3 (-12.2)	-1704.2 (-12.8)	-1574.4 (-11.3)	–1498.3 (-10.2)	- 1503.8 (-9.9)	-1572.8 (-10.2)
GDP at factor cost	11824.8 (100.0)	13280.4 (100.0)	13884.0 (100.0)	14694.0 (100.0)	15194.4 (100.0)	15444.7 (100.0)
Per Capita GDP* In Iran Rials)	211,773	227,452	234,276	247,943	249,022	249,138

Source: Statistical Centre of Iran, Iran Statistical Yearbook, March 1998- March 19999.
*As the population data based on national census was available only for 1991-92 and 1996-97, average population growth rate of 1.5% was used to arrive at the population figure. For the subsequent years and according to official estimate, a growth rate of 1.6% is applied.

Table -3: Some macro- economic indicators of Iran

Indicator	Year					
	1991/92	1995/96	1996/97	1997/98	1998/99	1999/2000
Inflation rate	20.7	49.4	23.2	17.3	20.0	20.1

Unemployment Rate	11.1	N.A.	9.1	12.1	13.9	15.1
Budget deficit as % of GDP	N.A.	3.5	1.7	3.0	6.8	1.1
Foreign debt as % of export of goods	N.A.	119	75	66	107	53
Gross fixed Capital formation as % of GDP	16.0	16.6	16.8	16.2	14.9	14.3
National savings as % of GDP	30.4	24.9	25.8	23.2	21.4	22.6
Rate of exchange (US$ to Rials)			4446	4782	6468	8658
Trade balance (million US$)	6529	5586	7402	4258	-1116	6215
Export of oil/gas As % of total Goods export	85.8	82.3	86.1	84.2	75.7	82.4

Source : Central Bank of Iran, Economic Report and Balance Sheet (various years) and Quarterly Economic Trends (no. 16 and 21) , Statistical Centre of Iran: Iran Statistical Yearbook (1998/99)

2- **Customs**

according to Department of Customs there are more than 300 customs points in Iran, which 150 of these points could be found eligible for considering in RMP project.

a) **Economic importance and trends**.

Manufacturing is an important sector in the economy of Iran in terms of its contribution to income generation and job creation. It accounts for over 20% of national income and about 18% of total employment in the country. This share in national income has been increasing steadily over the past years, from about 10% in 1986 to over 21% in 1998. In the field of employment generation, the same pattern can be observed, although with slower pace.

b) **Degree of electrification of country and trends.**

Electrification of the country is obviously a function of total electricity production. Provision of electricity has been one of the prime targets of the government. Electricity production in Iran in the past 10 years has almost doubled and all of the urban areas and most of the rural areas are now supplies with electricity. In fact, 99% of the urban households and 88% of households in rural areas have access to electricity. The industry has also increasingly been provided with electricity and total number of industries having access to electricity

increased by 60% during 1994-98. This trend is continuing and almost all industrial companies are now supplied with electricity, especially as they are located in urban areas which have access to electricity or located in industrial estates which also are supplied with electricity .

c) **Extent of foreign investment.**

As mentioned in various parts of this report, foreign investment in Iran is a new phenomenon and only in recent years the government has attempted to attract foreign capital to the country by in-acting appropriate laws, putting in place proper regulations and giving necessary incentive to foreign investors. Despite this, the foreign investors are slow to come forward and most of the existing investments are in the form of buy-back agreements. Moreover, most of these have been attracted in the oil and gas industry. Other industries have not been successful in this and the total foreign investment in non-oil/gas industries hardly amounts to few hundred million US$.

Quantities and types of imported ODS refrigerants and equipment containing them
Numbers and types of imported systems containing or capable of containing ODS
Name of importers (ODS and units)
Import licenses, quotas, import taxes, if any (ODS, units containing them and equipment)
Quality of inspection and monitoring of imports
Amount of exports of ODS or units containing them, if any
Origin of imports and destination of exports (ODR and equipment)

Quantities and types of imported ODS refrigerants and equipment containing them.

Different ODS refrigerants are mainly imported in three modes.

1. Importing through special economic zones and/or industrial/commercial free zones and border markets,
2. Importing through different customs sites,
3. Smuggling through different sea shore and land borders. Unfortunately there are more than 18 border point through out more than 8700 km of see and land border that different type of goods are being smuggled. Any kind of material is imported without government control.

According to our findings, assessment and review of documents and data received from different sources, almost 60 percent of ODS imports are released from different Customs sites either Sea ports or land/air customs.

Related information such as weight and value of the material are recorded, but more detailed information are recorded by Ministry of Commerce during issuance of relevant licensees for official importing and bank formalities for opening L/Cs.

The figures of imported OSD, recorded by customs data center are 80% accurate and they should be compared with other data received from other sources, such as Ministry of Commerce Affairs data bank and etc.

The figures should be adjusted in accordance with the facts and figures obtained from different ODS consumers such as Home Appliance Manufacturers, Commercial Refrigerator Manufacturers, Data available in the Ministry of Industries Data bank, and etc.

Numbers and types of imported systems containing or capable of containing ODS

Almost 98% of Domestic Refrigerator used as home appliances and office uses are produced locally. Iranian Product Sizes are limited to Max 400 lt. internal volume. Electrosteel Company is the only producer of 500 litre no-frost refrigerator. Its annual production capacity is about 10,000 units. Therefore we assume only 2% domestic refrigerators using R12 refrigerant are imported. We take into our consideration that since these Refrigerators are mainly imported from Japan, South Korea, USA, and European countries and in these countries use of ODS are prohibited, therefore refrigerant contained in them are either R134a or R600a ozone friendly refrigerants. We should not consider their use of ODS in our ODS consumption . The sizes of these products are varied from 500 to 800 litres and mainly American Style side by side refrigerators could be found at show rooms for sale.

Almost 80% of Window type air conditioners and split unit air conditioners are imported. There are only two main window type air conditioner producers in Iran which account for 90% of total production and the small producers assemble air conditioners on SKD basis. Window type air conditioners and split unit air conditioners use R22 as refrigerant.
We could not find any end product containing ODS which are imported other than Domestic refrigerator and Air conditioner.

Name of importers (ODS and units)

15 refrigerator manufacturers import their requirements directly from their suppliers.

Table 1.1 Imported CFC and HCFC
1996 – 2000
Metric Tons

Year	CFC – 11 All Applications	CFC – 12 Refrigerant	Total	HCFC – 22 Refrigerant	CFC – 502 Refrigerant	Total
1996	2065	1151	3216	665	31	696
1997	2561	1802	4363	405	1	406
1998	2718	1088	3806	580	3	583
1999	2461	1791	4251	680	9	689
2000	2313	1682	3995	851	28	879

Sources: Ministry of Commerce and I.R. Iran Customs, Department of Central Statistics and Information.

Table 1.2 Imported Compressors and Heat Pumps Using CFC and HCFC Units
1996 - 2000

Compressor **Capacity in HP.**	Years					Total
	1996	1997	1998	1999	2000	
1/10	4920	5000	10194	1120	29435	50669

1/8 and 1/7	22640	64480	24925	29248	46490	187783
1/6	319946	355105	625885	528774	496462	2326172
1/5	153362	123361	380049	193841	215623	1066236
¼	222945	389356	634344	343803	250944	1841392
1/3	846088	120764	132490	139301	124335	1002978
½	31439	15113	61006	23766	15492	146816
¾	25317	13189	22671	19282	11124	91583
1	4647	180	1894	36	23276	30033
1.5	5941	42091	74	58628	15	106749
2	304	15	153	1	1	472
3	209	5	108	1	36	358
5	298	15	1	10	47	307
7.5	253	10	21	32	10021	10337
10	3073	363	225	11144	553	15358
Others	3182	79851	150041	29215	7076	269365
Grand Total*	1644564	1208898	2044081	1378202	1230930	7146608

*** Total R12, compressors manufactured by local manufacturers and R134a compressors imported have not been calculated herein above.**

Table 1.3 Imported Compressors and Heat Pumps for Air Conditioners Window Type and Split Units Type Units 1996 - 2000					
Years					
1996	1997	1998	1999	2000	Total
4920	5000	10194	1120	29435	69960

Table 1.4 Imported Compressors and Heat Pumps for Cold Stores and Chillers Using Ammoniac as Refrigerant Units 1995 - 1999					
Years					
1996	1997	1998	1999	2000	Total
44	2	7978	21065	131	29220

Table 1.5 Imported CFC and HCFC, Different Countries Metric Tons					
Country of Origin	1996	1997	1998	1999	2000

Germany	63	78.6	756.1	5.5	0
Italy	912.4	0	431	290.7	0
UK	8.8	512.5	38	0	0
Belgium	21.9	0	141.8	0	0
Netherlands	19.7	0	0	526.5	0
Greece	76.7	390.2	45.3	64.1	0
France	4.7	0	0	196.8	0
China	1	0	74.8	105.3	176.9
India	98.6	1785	445	1004.8	878.7
United Arab Emirates	224.7	148.5	37.5	96.2	80.9
Others	2480.5	1854.2	2419.5	2650.1	3755.5
Total	3912	4769	4389	4940	4892

Sources: I.R. Iran Customs Department of Central Statistics and Information and Ministry of Commerce Central Statistics and Information. Data for Imported system containing ODS is not available at I.R. Iran Customs and Ministry of Commerce central Information and Statistics department, because according to different notes domestic, commercial and industrial appliances could not be imported during period of 1995 - 1999, unless by individual travelers who come to Iran are authorize to bring such an appliance not more than 160 USD value. It means numbers of imported systems containing ODS with regard to the production rate of local made appliances are not significant and could be considered negligible.
Name of Importers

3- Industries

d) **Economic importance and trends.**

Manufacturing is an important sector in the economy of Iran in terms of its contribution to income generation and job creation. It accounts for over 20% of national income and about 18% of total employment in the country. This share in national income has been increasing steadily over the past years, from about 10% in 1986 to over 21% in 1998. In the field of employment generation, the same pattern can be observed, although with slower pace.

e) Degree of electrification of country and trends.

Electrification of the country is obviously a function of total electricity production. Provision of electricity has been one of the prime targets of the government. Electricity production in Iran in the past 10 years has almost doubled and all of the urban areas and most of the rural areas are now supplies with electricity. In fact, 99% of the urban households and 88% of households in rural areas have access to electricity. The industry has also increasingly been provided with electricity and total number of industries having access to electricity increased by 60% during 1994-98. This trend is continuing and almost all

industrial companies are now supplied with electricity, especially as they are located in urban areas which have access to electricity or located in industrial estates which also are supplied with electricity .

f) **Extent of foreign investment.**

As mentioned in various parts of this report, foreign investment in Iran is a new phenomenon and only in recent years the government has attempted to attract foreign capital to the country by in acting appropriate laws, putting in place proper regulations and giving necessary incentive to foreign investors. Despite this, the foreign investors are slow to come forward and most of the existing investments are in the form of buy-back agreements. Moreover, most of these have been attracted in the oil and gas industry. Other industries have not been successful in this and the total foreign investment in non-oil/gas industries hardly amounts to few hundred million US$.
Industrial firms using refrigeration and/or air conditioning

According to the assessments and review of available information conducted by our team, we believe it is impractical to assume ODS consumption in different industries as a Part of RMP, because percentage of ODS consumed in production process at different industries is not remarkable comparing with ODS consumed by well known sectors such as Domestic/Industrial and Commercial sectors. For instance we received following information regarding use of ODS refrigerant in 8 major Iranian Petroleum Refineries which are not significant in comparison with other known sectors.

It is believed that ODS consumed in refinery and petrochemical sector which use cooling cycle in their production process is a good indication for our prediction. We could classify different industrial sectors, which use refrigeration system in their production process.

State Owned Industries

State Owned Industries are classified as:

i) Heavy Industries,
b) Oil Industries
c) Mine and Metal Industries
d) Petrochemical Industries
e) Military Industries

We conducted a thorough and comprehensive study on different governmental industries for collection of ODS consumption by sampling methods. Our findings revealed that collection of ODS data from few industries does not give us a good guidance for assumption of ODS consumption, thus, the data received could not be reliable, especially in military industries and metal industries which they consider these type of information as confidentional and do not record their ODS consumption either in Customs nor in Ministry of Commerce data bank.

Private Sectors

More or less the same problem rose during our assessment for private sector as described above for State Industries. There are numerous different industries which a comprehensive study should be conducted to determine whether ODS refrigerant are used in their production process or not.

Our team is proposing that, I.R. Iran Department of Environment should establish a policy for determination of OSD consumption in different industries, because we believe it is not feasible to consider industries using ODS refrigerant as a part of RMP program. Therefore, a new policy and governmental effort should be established to determine ODS consumption, and thus a national effort to phase out ODS especially in Military Industries Sector, which is absolutely impossible to find out their actual ODS consumption, as refrigerant.
With respect to the above justification and as a conclusion we believe that at this stage of collection data, data gathered from different industrial sector using ODS as refrigerant in their production process could not be reliable.

Food Industries

Food industries are categorized in 9 main Sectors in Iran such as;

1- Canned Food Industries.
2- Cookies, Chocolate Industries.
3- Milk Product Industries.
4- Meat Product Industries.
5- Non-Alcoholic Beverages Industries.
6- Pasta and Macaroni Industries.
7- Fruit Juice Industries.
8- Corn, Sunflower Oil Industries.
9- Food Product and Packing Machineries Manufactures.

According to our findings and research following sectors are using cooling system in their production process. We have considered one chilling and cooling system for any individual factories, using R22, refrigerant in their production process cooling system.

Table(1) Food Industries Sectors Using ODS in their Production Process As Refrigerants

Description	Number of Factories	Refrigerant
Canned Food Industries.	88	R11, R12, R-22
Cookies, Chocolate Industries.	68	HCFC-22
Milk Products Industries.	40	HCFC-22
Meat Products Industries.	22	R-11 R-12, R22
Non-Alcoholic Beverages Industries.	22	R12, R22
Pasta and Macaroni Industries.	56	R22
Fruit Juice Industries.	18	R12, R22
Total	244	

4- Agriculture and Fishing Sectors

Geographical characteristics

Iran comprises a land area of over 1.6 million square Km. It lies down the northern temperate zone, between latitudes 25° 00' north and 39° 47' north and between longitudes 44° 02' east and 63° 20' east. The lands average height is over 1200 meters, the lowest place, located in Chaleh Loot is only 56 meters high, while the highest point, Demavand Peak, in Alborz mountains, rises as high as 5671 meters. At some points of the southern coastal strip of Caspian Sea, land height is 28 meters lower than open seas.

Climate

The country generally features three climate zones;
Arid/semiarid regions of the interior and far south which are characterized by long, warm and dry periods, lasting sometimes over 7 months. The annual precipitation in such regions varies between30to 250 mm.
Mountainous extensions, are in, turn divided into cold and moderate mountainous regions.
Cold mountainous regions: About 40,000 sq.km of the total land consist of major high lands; including Alborz and Zagross mountain ranges, as well as Sahand and Sabalan high peaks. The annual precipitation in these regions exceeds 500 mm.
Moderate mountainous regions; some 300,000 sq.km of the country enjoys moderate mountainous climate, where the annual precipitation varies from 250 to 600 mm.
Caspian region, which is a narrow strip with a limited extension, trapped between the Caspian Sea and Alborz Mountains; with as much as 600 to 2000 mm. precipitations are per annum.

Table (1) shows the climatic conditions of the country.

Zone Name	Yearly sunny hours	Days of frost (yearly)	Rain fall (yearly)
Sefidrood,Talesh, Caspian area water shed	1680-2705	11-125	94-400
Aras river and Uromieh lake water shed area	2400-2800	12-73	92-110
Fars & Hormozgan water shed area	3100-3370		
Kerman & Sistan Baloochestan	3100-5400	34-85	23-48
Esfahan &Yazd	3100-3300	56-80	
Central parts	2600-3060	49-80	

Source: Ministry of Agricultures and Iran Statistical Year Book 1998

As a matter of fact, Iran boundaries in the ancient time (The Achaemenian dynasty) was lied between Mediterranean Sea up to China and Nil to Jeihan, so it provided an ideal condition for nourishment interchange in between this vast area specially as far as fruit trees are concerned so that due to climatic condition and above mentioned fact various kinds of fruit trees such as apple, citrus trees, date, mango, banana and... (Cold region, arid/semi arid regions, semi tropical and tropical sorts) are grown in the country. Specially northern parts of Iran (Caspian Sea area) has got Mediterranean climate condition which is adequate for growth of any olive and citrus trees. Table 2 shows cultivated area and yearly production of fruit trees.

Table (2): cultivated area and yearly production of garden fruit trees. (1999)

Crop Name	Cultivated area (ha)			Production (tons)
	Sapling	Productive trees	Total	
Cold region trees	241,333	966,775	1,208,088	6,194,288

Semitropical trees	90,218	526,894	617,112	5,646,071
Tropical trees	2,023	2,797	4,820	41,929
Others	21,482	150,621	172,103	182,702
Total	355,056	1,647,067	2,002,123	12,064,990

Source: Ministry of Agriculture

As shown in table 2 coverage area and production of fruit trees in the country are as fallow:

-Cold region	1,208,088	ha
- Semi tropical	617,112	ha
- Tropical	4,820	ha
- Other fruit trees	172,103	ha
Total area	2,002,123	ha

Production:

-Cold region	6,194,288	tons
-Semi tropical	5,646,071	tons
-Tropical	41,929	tons
-Others	182,702	tons
Total production	12,064,990	tons

Land use

About 14 million ha (8.5%) of the lands is under the annual and perennial crops. From above amount 12.7 million ha is under annual crops, and 2.3 million ha is under perennial crops. (Fruit trees, tea and etc.)
Most of the cultivated areas of the country are located in Khorasan (13.39%), Fars (7.57%), Eastern Azarbaijan (6.69%) and Khoozestan (6.55%). Where most of the fruit trees gardens are located in Kerman (17.74%), Fars (11.93%), and Khorasan (11.24%) provinces.

Fishing:

a) **Economic importance and trends**.

Fishery is quite a sizeable industry in terms of income and employment generation in Iran. Over 200,000 people are directly employed in fishery activities in the country. The sector accounts for nearly 1% of the Gross Domestic Product in Iran. Due to increasing demand for fish products and shortage of supply from natural sources, fish farming has been growing quite rapidly in recent years. Share of fish products from fish farming has in recent years increased to nearly 20% of the total output in the country and the trend indicates that it will be further increasing in coming years. The government is also keen to increasing fish output from farms to meet the increasing demand for fish products. Presently over 400,000 tons of various fishes are caught/produced in the country. Fish industry is a source of foreign exchange earning for the country, too. The world famous Iranian caviar and shrimps are the most important hard currency earners in the sector. The fishing industry is important for food security of the country, too. For this the government allocates a lot of funds to the sector to increase fish output and generally encourages investment in the sector. In the past the fishing industry was in the monopoly of the government as fish resources as part of national resources were nationalized. To increase the efficiency in the sector,

however, the government has embarked on a policy of privatization and as a result more investment is being directed to the sector which would result in higher output in future years.

b) Estimated extend of foreign investment.

There is no foreign investment in Iranian fishery industry and the sector is dependent on domestic resources of finance for its investment undertaking.

About 2700 km of total the country boundaries (873 km) is the coastal lines in north and south parts of the country. So, the fishery activities are one of the most important sectors in the country.

Due to climatic condition and long distances between production and consumption point of fisheries products such as fish, shrimp, caviar and so on, keeping of such products in cold stores for a long time will become of high importance for the producers. Especially when market control is applied to the market demand and supply system.

Table (3) boundary lines round the country (km)

Coastal line In south	Iran-Pakistan borderline	Iran-Afghanistan border line	Coast line in north	Iran –Armenia borderline
2043	978	945	657	40

Iran – Azerbaijan Borderline	Iran- Turkemanistan borderline	Iran- Turkey borderline	Iran- Iraq borderline	Total
767	1206	486	1609	8731

Table (4)

Year	Caviar	Others	Total
1991	6608	203085	209693
1994	6295	269123	275418
1995	6125	259967	266092
1996	12456	296131	308587
1997	21557	358997	383554
1998	24557	358997	383 554

Source: Iran Fisheries Company (Shilat)

Table(5) Shows production of the Caviar and meat from Sturgeon fishes through 7 years period.

Year	Caviar	Meat
1986	303	1687
1991	283	1789
1994	218	1284
1995	182	1163
1996	195	1295
1997	151	1000
1998	157	1200

Cold Stores Technology (in Agriculture & Fishery sectors)

Nowadays the storage and preserving of fisheries and agricultural products in cold stores is common practice but despite of planning and executing of several

programs in case of harvesting, processing and preserving of above-mentioned products; they have not been fully scattered in all over the country.

In ancient times, and before using modern cooling system, people were practicing so many ancient methods and solution for keeping food products cool, such as keeping the product in cold places, cold water, the water wells and etc., for cooling the water they were keeping it inside the clay pots that were cooling due to evaporating of the water through the clay pot's walls. In the cold regions fruits were kept in cold stores, which have been constructed for these reason and they were able to keep them for many times in the lower temperature.

Preserving of the meet and agricultural crops with such method, were very difficult and need very large areas for cooling equipment's.

As preserving of the food is very importing and due to market controlling and prevention from spoiling products, foods should be kept for some times in proper and suitable places. So nowadays, it is of one the most important interest of the society.

Despite of the using modern cooling system for these reasons, the local method such as drying, smoking, salting, etc is also common among Iranian community.

The history of the modern Cold Stores in the country:

In Iran application of cold stores for preserving of the fruit crop has been started since 1957. At first, they were only practicing to keep the apples and citrus fruits only. But in recent years due to above mentioned reasons the preserving of many food materials, such as meat, fishes, fruits and other spoilable materials especially from view point of economy and marketing, keeping of those mentioned products in cold stores is a common practice.

Anyhow, unfortunately the cooling industries have not been fully developed in agricultural sector in the country yet. Otherwise every year a great amount of fruit and other products are spoiled for this reason, and therefore the developing of cold stores in the country is one of the most important developing programs of the government in near future.

5- Tourism

a) **Economic importance and trends.**

Tourism was insignificant in the Iranian economy in the past but recently has gained a lot of importance and is a rapidly growing industry in Iran nowadays. It is now very significant in terms of generating foreign exchange and creating employment. The sector has been growing at about 10% per year in real terms in the last ten years. Number of people engaged in tourism industry has also been growing. There are now about 200,000 people involved in providing accommodation , serving food and extending other related services in the sector. The foreign exchange income of the country in the last few years has increased by five folds to about 850 million US$ and still increasing. This figure alone accounts for nearly 5% of country's foreign exchange income. The share of tourism in generating foreign exchange income is forecast to increase further in the next few years. Soon it will be able to account for at least 10% of country's total foreign earning. In addition to external tourism, there are millions of internal tourist. These together have put a lot of pressure on available tourist facilities of the country such that it is very difficult for tourists to find accommodation in a timely manner. The situation usually becomes critical during the Summer and hot seasons which last at least six months in the year. Expansion of tourism industry and provision of appropriate facilities is one of the top priorities of the government. The government is paying a lot of subsidies and giving incentive for the purpose.

b) Extent of foreign investment.

Tourism as other sectors of the Iranian economy has not been benefiting from foreign investment resources. There are rare cases of foreign investment in the country in tourism and what exists is in the form of hotel building and accommodation provision as joint venture undertakings with the Iranian investors. The government realizing the importance of foreign investment in the development of tourism, however, has recently been promoting attraction of foreign capital and the indications are that it is on the increase. Given the more conducive investment environment of the free trade zones in the country, it is expected that considerable amount of foreign investment would be attracted to these zones.

c) **Economic importance and trends.**

Tourism was insignificant in the Iranian economy in the past but recently has gained a lot of importance and is a rapidly growing industry in Iran nowadays. It is now very significant in terms of generating foreign exchange and creating employment. The sector has been growing at about 10% per year in real terms in the last ten years. Number of people engaged in tourism industry has also been growing. There are now about 200,000 people involved in providing accommodation , serving food and extending other related services in the sector. The foreign exchange income of the country in the last few years has increased by five folds to about 850 million US$ and still increasing. This figure alone accounts for nearly 5% of country's foreign exchange income. The share of tourism in generating foreign exchange income is forecast to increase further in the next few years. Soon it will be able to account for at least 10% of country's total foreign earning. In addition to external tourism, there are millions of internal tourist. These together have put a lot of pressure on available tourist facilities of the country such that it is very difficult for tourists to find accommodation in a timely manner. The situation usually becomes critical during the Summer and hot seasons which last at least six months in the year. Expansion of tourism industry and provision of appropriate facilities is one of the top priorities of the government. The government is paying a lot of subsidies and giving incentive for the purpose.

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In table below we could find number of Hotels which are categorized by stars, and number of rooms, according to our survey all two, three, four and five stars hotels rooms have mini bar refrigerators 20% of available hotel rooms and suits are using absorption type mini bar refrigerator which have been deducted from total number of rooms.

Survey on Hotels by star rankings.

Two stars hotel do not have restaurant and air conditioning system, Water Evaporative coolers, so called desert coolers are the most common devices for cooling rooms there is no restaurant and cold store in these hotels

Three star hotels have at least one restaurant, and most of them are using Desert Coolers, but in Southern Region of Iran which the ambient temperature and relative humidity are high, the most cooling device are Window Type Air Conditioner using R22 as refrigerant. Commercial refrigerator/freezers type (usually Upright Refrigerator/Freezer) are the most common appliances for storing foods and drinks.

Four Stars hotels have restaurants, and two above and below zero cold stores are used for storing food materials and drinks. Depending on number of rooms chillers are used for air conditioning using R22 as refrigerants and window type air conditioners are also used.

There are only 9 five starts hotel in Iran, Which are mainly located in major cities such as Tehran, Shiraz, Meshed, Isfahan, and Mazandaran. Depending on number of rooms and facilities there are two or three restaurants each hotel has two cold stores for keeping fresh and frozen food materials. Air condition system are usually Ammoniac and absorption system using Lithium Bromide as refrigerants.

No foreign investment has been done on tourism since 1979. and during last 23 years only one five stars hotel and few four stars were built. No economical trend could be provided, because no significant development in this sector were observed during last 20 years.

Table (1)

Number of Hotels 1994 -1998					
	1994	1995	1996	1997	1998
5 Stars	8	8	9	9	11
4 Stars	15	18	16	19	27
3 Stars	41	48	55	56	60
2 Stars	159	162	183	185	203
1 Stars	193	192	188	192	212
Not Ranked	29	43	70	82	100
Total	445	471	521	543	613

Table (2) Number of Hotels, Hotel Apartments, etc. 2000

Hotel / Motels	Number	Rooms	Restaurants	Refrigerator	Cold Store	Air Condition
Hotels	494	22321	91	22321	44	35
No Ranked Hotels	1782	33433	N/A	33433	N/A	N/A
Hotel Apartments	95	344	N/A	344	N/A	N/A
Motels	1691	3382	N/A	3382	N/A	N/A
Total	4062	59480	91	59480	44	35

6- Commerce

a) Economic importance of commerce using ODS (supermarkets, other shops) and trends.

There are thousands of public accommodations and establishments serving food and beverages in the country, both in urban and rural areas. The latest available data which is for 1994 puts the total at over 60,000, About 90% of these places serve food and beverages. About three quarters of accommodations and establishments serving food and beverages are located in cities and towns. They mostly employ one to five persons for their operation. Public accommodation places in rural areas are not many, but establishments serving food and beverages are quite considerable and account for about 30% of country total. In 1994 they employed over 120,000 people most of whom worked in establishments serving food and beverages and accounting for about 80% of the total employment in the sector. Due to high degree of electrification of the country, these establishments are equipped with refrigeration facilities. The capital city and the cities bordering the sea shores house most of these establishment and they of great importance for job creation and income generation. The sector accounts for about 18% of GDP and during the 1986-98 period this share in GDP has been more or less constant. This share, however, is expected to increase in coming years as the economy grows and social habits change.

b) Estimated extent of foreign investment.

Foreign investment in this sector is a new phenomenon and efforts are being made to improve infrastructure through building of accommodations by employing foreign investment.

Table 1 Number of Restaurant, Supermarket, Grocery, etc.
Year 2000

	Number	Display Case Ref.	Upright Ref. Freezer	Total Commercial Appliances Refrigerator/Freezer
Restaurant	15772	2	2	63588
Pizza, Sandwich, and fast food restaurants	13635	2	1	40905
Coffee Shop Etc.	18890	1	1	37780
Iran Traditional Restaurant	3130		1	3130
Cold Fruit Juice, Beverages, shops etc.	3027	1	1	6054
Other Restaurants	1329	1	1	2658
Supermarkets	5533	2	1	16599

Butcheries	3050	1	2	9150
Milk Products	3750	1	1	3700
Groceries	16899	1	1	33798
Total	85015			217362

7- Transportation

There are more than four million cars, buses, trucks in Iran. Four major car manufacturers named as Iran Khodro, Pars Khodro, Saipa, and Kerman Khodro produced in 1999, about 240,000 different type and models of vehicles such as automobiles, buses, mini buses, lorry, van, trucks. Table 9.1 below shows number vehicles produce in 1995 – 1999

Sources: Department of Information and Statistics, information center.

Table (1)

Vehicles Produced, Units					
Year	1995	1996	1997	1998	1999
Automobile	75678	94404	133851	157017	187717
4 Wheels Drive	5272	8231	8896	7085	4893
Buses	1075	1084	937	2402	3860
Mini Buses	343	223	1314	505	928
Vans	7816	16506	24168	33830	38358
Lorry & Trucks	2543	4117	4893	7264	3985
Total	92727	124565	174059	208103	239741

Table (2)

Air Conditioner Compressor for vehicle Imported, Units				
Year	1996	1997	1998	1999
Automobile	----		48135	11550
Trucks and Lorry	----		160	3170
Buses	50	4	------	50

All air conditioned cars, buses, mini buses, lorries, and trucks produced in Iran since 1995 are equipped with R134a refrigerant system.

Table (3)

Air Conditioned Vehicles Produced, Units					
Year					
Automobile	35699	44500	65784	72610	85674
4 Wheels Drive	5272	8231	8896	7085	4893
Buses	560	670	560	1580	2369
Mini Buses	120	136	789	345	674
Vans	100	7000	12000	17890	19760
Lorry & Trucks	1456	2459	3564	4521	1563
Total	43207	62996	91593	104031	114933

Table (4)

Refrigerated Vehicles Produced, Units					
Year					
Vans	157	237	342	567	580
Lorry	270	376	287	469	488
Trucks	159	356	298	895	947
Total	586	969	927	1931	2015

Table (5)

ODS Consumption in Authorized Agencies of Major Car Manufacturers									
	No.	1997		1998		1999		2000	
		Car Units	CFC Kg.	Car Units	CFC Kg.	Car Units	CFC Kg.	Car Units	CFC Kg.
Iran Khodro	262	7860	8646	10480	11528	11790	12969	13100	12410
SAIPA	98	11760	7056	12740	7644	13230	7338	13720	05232
Pars Khodro	64	6400	5760	7040	5632	7500	6750	8320	05488
Pars Wagon	-	-	-	-	-	-	-	200	7000
Total			21462		24804		27057		30130

It is Estimated that more than 2000 Trucks and Lorries are equipped with Freezers and refrigerators for carrying food and industrial materials, which are using CFC-12 refrigerants. Average 10 Kg R12 Charge is considered for this purpose it means 20 Metric Tons are in use in this sector.

Different Types of Refrigerants, R11, R12, R13, R22 and etc.
Imported by Different Importers in Year 2001

Name	Address	Tel.	Refrigerant	Country	Weight
Sardrizan Co. Ltd.	Banihashem St. Saghdoosh	873116	CFC12	U.A.E.	11272.5 kg
			CFC13	France	13.6 ton
			CFC22	China	9248 kg
				U.A.E.	5872.5 kg 3660 Cylinders.
			Others	U.A.E.	1350 kg
Vagharkavir Co. Ltd.	Esfahan Chahar Bagh St.	210581	Others	S.Africa	60 kg
Bazargani Sanat Co.	Argantin Sq. Beyhaghi St. No.21	8755381-4	CFC12	India	10472 kg
			CFC22	India	5440 kg
Aslani Nosratolah	Hedayat St. No. 188	7537064	CFC12	India	47328 kg
Najafi Tavani Azim	Tonekabon Alameh St.	2051269	CFC11	India	20250 kg
				U.A.E.	93.5 ton
			CFC12	India	32640 kg
Sarmagostar Dorna Co.	Baharestan St. No. 309	7531424	CFC11	France	19.72 ton 29440 kg
			CFC12	France	13.6 ton 34544 kg
			CFC13	France	13600 ton
Avaj Sarma Co.	Baharestan St. Moayeri Alley	7523791-3	CFC11	India	26976 kg
			CFC12	India	17160 kg
			CFC22	India	680 kg
Jarfaye Ofogh Co. Ltd.	Fatemi St. Etemadzadeh St. No.461	3129589	CFC11	U.A.E.	10800 kg
			CFC12	U.A.E.	197882.5 kg 4800 Cylinders
			CFC13b	U.A.E.	6900 Cylinders
			CFC22	U.A.E.	31280 kg 2300 Cylinders
			CFC23	U.A.E.	4600 Cylinders
Foad Afarin Co. Ltd.	Iran St. Smaeili Alley No. 28	3123729	CFC12	Belgium	680 kg
Sarmaye Gozari Co.	Satarkhan St. Khosro st.	8810605	CFC12	Netherlands	20300 kg
Mirzaei Nikkhah Ali	Enghelab St. Noor St. No. 6	7526916	CFC11	U.A.E.	6063 kg
			CFC12	U.A.E.	48960 kg 10000 Cylinders
			CFC13	U.A.E.	1200 Cylinders
			CFC22	U.A.E.	46920 kg
Tafreshi Amir Mehdi	Jeyhoon St. Afkhami Alley	6041392	CFC13	U.A.E.	1200 Cylinders
Safari Teymour	South Majidieh St. No.308	8411508	CFC11	India	44800 kg
Moghimi Mohsen	Mash'had Khayam St. Zanbagh	788216	CFC22	Swiss	5805 kg
Kimianeshan Co.	Motahari St. Mansour Alley	8713367	CFC11	India	67200 kg

				U.A.E.	44800 kg
			CFC12	U.A.E.	22400 kg
			Others	France	19760 kg
Shokouh Tejarat Co.	Sohrevardi St. kooshehs St.	7434539	CFC11	India	11200 kg
			CFC12	India	8160 kg
Abd Ghayoor Masoud	Hedayat St. No. 188	7523468	CFC12	China	3495 Cylinders
				India	47328 kg
				U.A.E.	45562.5 kg
			Others	China	565 Cylinders
Mehrab Taban Co. Ltd.	Baharestan St. Fakhrabad St.	5379770	CfC11	U.A.E.	54400 kg
			CFC12	U.A.E.	32640 kg
Bazargani Nahrag Co.	Qom Azar St. 32nd Alley No. 6	----------	CFC12	Germany	19608 kg
Pouya Tejarat Co.	Jay St. Shariat Alley	6698304	CFC12	India	15776 kg
Name	Address	Tel.	**Refrigerant**	**Country**	**Weight**
Bashir Asia Co. Ltd.	Afrigha St. East Nahid St. No.17	2051269	CFC11	U.A.E.	19.4 ton
			CFC12	India	48960 kg
			CFC23	India	31280 kg
Bazargani & Int. Co.	Kalantary Sq. Kerman St. Ahari St. No.4	7437674	CFC11	India	22.4 ton
			Others	France	19760 kg
Sardafarid Co. Ltd.	Seraj St. East Golestan St. No. 111	7370167	CFC11	France	19.72 ton
			CFC12	France	27.20 ton
			CFC22	China	1140 Cylinders
Sarmaye Gozari Co.	Satarkhan St. South Khosro St. 26th Alley No.36	8810605	CFC11	India	22.4 ton
			CFC12	Korea	17.5 ton
Javaherkalami Farshad	Sanaei St. 15th Alley No.42	835610	CFC22	U.A.E.	13972.5 kg
Mammut Co.	Motahari St. Fajr St. Lotfi St. No.65	8830966	CFC11	U.A.E.	122.28 ton
Daroosazi Lorestan Co.	Fatemi Sq. Bistoon St. No. 7	655300	Others	Germany	160 kg
Mooneh Gostar Co.	Motahari St. Amiratabak St. No.138	8828739	CFC22	U.A.E.	600 Cylinders
			Others	U.A.E.	85 Cylinders
Raham Gas	Jahane Koodak Blvd. No. 10	8776460	CFC12	U.A.E.	15912 kg
				Italy	30 ton
			CFC22	Italy	17 ton
			CFC23	U.A.E.	34 ton
Central Bank of I.R. Iran	South Pasdaran St. No.203	2844882	CFC11	U.A.E.	2800 kg
Mehr Asl Co.	Mofateh St. No. 154	8300801	CFC22	U.K.	27945 kg
Asari Ali	Hedayat St. No. 249	7534818	CFC11	U.A.E.	28.08 ton
Abd Ghayoor Bahman	Hedayat St. Shahnaz Alley No. 258	7536618	CFC12	U.A.E.	5625 kg
Bandar Gholamali	Hedayat No. 279	7528575	CFC11	U.A.E.	30375 kg
			CFC12	U.A.E.	4657.5 kg
			CFC13	U.A.E.	4657.50 kg
			CFC22	U.A.E.	25488 kg
Shirin Mohammadali	Ahvaz Fatemiyeh Hayati St. No. 238	0611-513713	CFC11	India	22400 kg
Mazidi Mohammadtaghi	Yazd Enghelab St. Mahmoodabad Alley	0351-53668	CFC12	U.A.E.	32640 kg
Alish Gaz	Mirdamad St. No. 183	2221102	CFC12	India	16.32 ton
Sardrizan Co.	Banihashem St. Saghdoosh Golgoon Alley No.1	8731611	CFC11	China	680 kg
				India	67.20 ton
				France	59.16 ton
			CFC12	India	15.77 ton

					31522 kg
Electro steel Co.	Mashhad daneshgah St. No.98	0511-6551165	CFC11	Italy	19.04 ton
Saravel Co.	Saadat Abad St. Kaj Sq. West Sarv St.	2060069	CFC22	Germany	12600 kg
F.M. Co.	Motahari St. Fajr St. Lotfi St. No.65	8822005	CFC11	India	22400 ton
Poly Urethane Iran Co.	Beheshti St. Saboonchi St. 5th Alley No.20	8743719	CFC11	France	19720 kg
Uretane System Co.	North Dibaji Noorian St. Golbarg Alley No. 35	2294447	CFC11	India	20.16 ton
			Others	China	9400 kg
					28800 kg
Movaled Co.	West Mirdamad St. No. 309	8787072	CFC11	India	22400 kg
				Italy	10080 kg
			CFC12	Italy	9792 kg
Tolid Automobile Co.	Km 15 Karaj Road	6026558	Others	Spain	65000 kg
Name	Address	Tel.	**Refrigerant**	**Country**	**Weight**
Booshehr Chem. Ind. Co.	Valiasr St. Park Saei No.1178	8886125	Others	U.A.E.	100800 kg
Fars Iran Co.	Vozara St. 25th Alley No. 9	8712819	Others	India	9000 kg
			CFC	India	10000 kg
Kapasitor Co.	AhmadGhasir St. 16th St.	8734371	Others	Germany	300 lit.
Sinadaroo Co.	Km 15 Karaj Road	6026630	CFC11	India	30240 kg
			CFC12	India	30000 kg
			CFC13	India	15000 kg
Lavazem Khanegi Co.	Taleghani St. No. 246	8823921	CFC13b	Germany	12600 kg
			Others	Italy	3400 kg
Rafiei Mohammadhosein	North Karegar St. No.249	657755	CFC12	U.K.	21060 kg
Shafigh Aliasghar	Shariati Ave. Dolat St. No.60	263468	CFC12	U.A.E.	30375 kg
Goordas Co.	Aluminum Bld. No.949	6709152	CFC12	India	16320 kg
			CFC22	India	31280 kg
Tak Lar Co.	Ghaemmagham St. No.130	8308566	Others	U.K.	507 kg
Golsarma Co.	Jomhoori St. Aluminum Bld. No. 947	6709152	CFC22	India	4760 kg
			CFC12	India	70720 kg
			CFC11	India	92160 kg

VIENNA CONVENTION FOR PROTECTION OF OZONE LAYER
VIENNA – 1987

ENVIROMENT PROTECTION ORGANIZATION

Act on joining of the Islamic Republic of Iran's government to Vienna Convention, on protection of ozone Layer, was ratified on the open session dated 28th Nov. 1989, by the Islamic Consultative Assembly {Majlis) and was approved by the Guardian Council and sent via the letter No. G-1261 dated 10th Dec.1989 by the Islamic Consultative Assembly, which is dispatched for performance.

Act on Membership of Islamic Republic of Iran Government in Vienna Convention on Protection of Ozone Layer

Unified Article – Vienna Convention on Protection of Ozone Layer, covers an Introduction, 21 Article, and 2 attachments, in addition to the text of Montreal Protocol, an Ozone Layer deterrents, ratified on 16th September 1987 (One of the appendices of Vienna Convention on protection of Ozone Layer) , which is ratified, as detailed in the attachment, and permission is given for submission of its attached documents.

Act on ratification of London & Copenhagen Sessions Related to Montreal Protocol on Ozone Layer Deterrents (19th Dec. 1996)

Act on ratification of London & Copenhagen Sessions, related to Montreal Protocol, on Ozone Layer deterrents, was ratified in the open session, on Wednesday 19th Dec. 1996, by the Islamic Consultative Assembly (Majlis), and was approved by the Guardian Council, on 2nd of Jan. 1996, with the sent Act, delivered Via Letter No. G – 594, dated 12th Jan. 1996, hereby, attached to this text, for execution.

Act on ratification of Amendments of London & Copenhagen |Meetings, on Montreal Protocol on Related to Ozone Layer Deterrents

Unified Article – Amendment of London Meeting, include 2 Articles and an Amendment of Copenhagen Meetings, include 3 Articles on Montreal Protocol, on Ozone Layer deterrents, which have been ratified, as detailed in the attachment, while permission for submission of documents are delegated upon the government.