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The World Bank

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Report No: 74659-JO

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT FROM THE MULTILATERAL FUND FOR THE IMPLEMENTATION
OF THE MONTREAL PROTOCOL

IN THE AMOUNT OF US\$2,783,149

TO THE

HASHEMITE KINGDOM OF JORDAN

FOR A

HYDROCHLOROFLUOROCARBON (HCFC) PHASE-OUT PROJECT (ODS III)

April 26, 2013

Sustainable Development Department
Middle East and North Africa Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective April 26, 2013)

Currency Unit = Jordanian Dinar (JD)
JD0.71 = US\$1

FISCAL YEAR

January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AC	Air-conditioning
CDM	Clean Development Mechanism
CFC	Chlorofluorocarbon
EA	Environmental assessment
EE	Energy Efficiency
EER	Energy Efficiency Ratio
EU	European Union
GEF	Global Environment Facility
GDP	Gross Domestic Product
GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft fuer Internationale Zusammenarbeit
GWP	Global warming potential
HC	Hydrocarbon
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
HPMP	HCFC Phase-out Management Plan
IA	Implementing Agency
IDA	International Development Association
IOC	Incremental operating cost
JISM	Jordan Institution for Standards and Meteorology
JREEF	Jordan Renewable Energy and Energy Efficiency Fund
MEMR	Ministry of Energy and Mineral Resources
MoEnvnv	Ministry of Environment
MoIT	Ministry of Industry and Trade
MOPIC	Ministry of Planning and International Cooperation
MLF	Multilateral Fund for the Implementation of the Montreal Protocol
MP	Montreal Protocol
MT	Metric tons
NERC	National Energy Research Centre
NOPP	National ODS Phase-out Plan
NOC	National Ozone Committee
NOU	National Ozone Unit
NPV	Net present value
ODP	Ozone Depleting Potential
ODS	Ozone Depleting Substance
PIM	Project Implementation Manual

PMU	Project Management Unit
R-22	HCFC-22
R-410A	HFC-410A
RSS	Royal Scientific Society
TA	Technical Assistance
USAID	United States Agency for International Development
UNIDO	United Nations Industrial Development Organization
VTC	Vocational Training Center

Regional Vice President:	Inger Andersen
Country Director:	Ferid Belhaj
Sector Director:	Junaid Kamal Ahmad
Sector Manager:	Charles Cormier
Task Team Leader:	Tracy Hart

JORDAN
HCFC PHASE-OUT PROJECT (ODS III)

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PAD DATA SHEET

Jordan

Jordan Ozone Depleting Substances

Hydrochlorofluorocarbon (HCFC) Phase-Out Project (ODS3) (P127702)

PROJECT APPRAISAL DOCUMENT

MIDDLE EAST AND NORTH AFRICA

MNSEN

Report No.: PAD360

Basic Information			
Project ID	Lending Instrument	EA Category	Team Leader
P127702	Specific Investment Loan	B - Partial Assessment	Tracy Hart
Project Implementation Start Date		Project Implementation End Date	
26-Apr-2013		31-Dec-2018	
Expected Effectiveness Date		Expected Closing Date	
08-May-2013		30-Jun-2019	
Joint IFC			
No			
Sector Manager	Sector Director	Country Director	Regional Vice President
Charles Joseph Cormier	Junaid Kamal Ahmad	Ferid Belhaj	Inger Andersen
Borrower: Ministry of Planning and International Cooperation			
Responsible Agency: Ministry of Environment			
Contact:	Eng. Ghazi Al-Odat	Title:	Ministry Advisor and Head of Ozone Unit
Telephone:	962-6-552-1931	Email:	odat@moenv.gov.jo
Project Financing Data(in USD Million)			
<input type="checkbox"/> Loan	<input type="checkbox"/> Grant	<input checked="" type="checkbox"/> Other	
<input type="checkbox"/> Credit	<input type="checkbox"/> Guarantee		
Total Project Cost:	2.78	Total Bank Financing:	0.00
Total Cofinancing:		Financing Gap:	0.00
Financing Source			Amount
Borrower			0.00
Montreal Protocol Investment Fund			2.78
Total			2.78

Expected Disbursements (in USD Million)									
Fiscal Year	2013	2014	2015	2016	2017	2018	2019	0000	0000
Annual	0.41	1.03	0.80	0.27	0.20	0.07	0.00	0.00	0.00
Cumulative	0.41	1.44	2.24	2.51	2.71	2.78	2.78	0.00	0.00
Institutional Data									
Sector Board									
Energy and Mining									
Sectors / Climate Change									
Sector (Maximum 5 and total % must equal 100)									
Major Sector	Sector			%	Adaptation Co-benefits %	Mitigation Co-benefits %			
Industry and trade	Petrochemicals and fertilizers			90		100			
Public Administration, Law, and Justice	Central government administration			10					
Total				100					
<input type="checkbox"/> I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.									
Themes									
Theme (Maximum 5 and total % must equal 100)									
Major theme	Theme			%					
Environment and natural resources management	Environmental policies and institutions			50					
Environment and natural resources management	Pollution management and environmental health			50					
Total				100					
Project Development Objective(s)									
Proposed Development Objective(s)									
The project development objective is to support Jordan in its overall efforts to meet its first Montreal Protocol HCFC phase-out obligations between 2013 and 2017, and to strengthen the capacity of responsible government entities to continue to effectively implement the Montreal Protocol.									
Components									
Component Name						Cost (USD Millions)			
Technical Assistance, Policy and AC Sector Plan Management						0.41			

Investment in HCFC Consumption Reductions	1.92		
Institutional Strengthening	0.44		
Compliance			
Policy			
Does the project depart from the CAS in content or in other significant respects?	Yes []	No [X]	
Does the project require any waivers of Bank policies?	Yes []	No [X]	
Have these been approved by Bank management?	Yes []	No [X]	
Is approval for any policy waiver sought from the Board?	Yes []	No [X]	
Explanation:			
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No []	
Safeguard Policies Triggered by the Project			
	Yes	No	
Environmental Assessment OP/BP 4.01	X		
Natural Habitats OP/BP 4.04		X	
Forests OP/BP 4.36		X	
Pest Management OP 4.09		X	
Physical Cultural Resources OP/BP 4.11		X	
Indigenous Peoples OP/BP 4.10		X	
Involuntary Resettlement OP/BP 4.12		X	
Safety of Dams OP/BP 4.37		X	
Projects on International Waterways OP/BP 7.50		X	
Projects in Disputed Areas OP/BP 7.60		X	
Legal Covenants			
Name	Recurrent	Due Date	Frequency
Description of Covenant			
Conditions			
Name Article V 5.01			Type
			Effectiveness
Description of Condition			
The execution and delivery of the Grant Agreement on behalf of the Recipient has been duly			

authorized or ratified by all necessary governmental action.

Team Composition					
Bank Staff					
Name	Title	Specialization	Unit		
Tracy Hart	Senior Environmental Specialist	Team Lead	MNSEN		
Mary-Ellen Foley	Senior Environmental Specialist	Senior Environmental Specialist	CPFIA		
Faisal Abdulrahaem Al-Hothali	Senior Environmental Specialist	Senior Environmental Specialist	GSDSR		
Lina Fares	Senior Procurement Specialist	Senior Procurement Specialist	MNAPC		
Jad Raji Mazahreh	Sr Financial Management Specialist	Sr Financial Management Specialist	MNAFM		
Hassine Hedda	Finance Officer	Finance Officer	CTRLA		
Yuan Tao	Counsel	Counsel	LEGEN		
Maya Abi Karam	Counsel	Counsel	LEGAM		
Mark M. Njore	Program Assistant	Program Assistant	MNSSD		
Sanne Agnete Tikjoeb	Consultant	Consultant	MNSEN		
Amal Hijazi	Consultant	Consultant	MNSEN		
Tamer Anton Al-Assad	Consultant	Consultant	MNSEN		
Peter Whitford	Consultant	Consultant	MNSEN		
Locations					
Country	First Administrative Division	Location	Planned	Actual	Comments
Jordan	Amman	Muhafazat `Amman	X		

I. STRATEGIC CONTEXT

A. Country Context

1. Until 2011, Jordan enjoyed a relatively high average growth rate with annual real GDP growth averaging around 7% and per capita GDP more than doubling since 2000. Sectors which led in growth include manufacturing, construction and real estate. HCFC-consuming sectors of foam and refrigeration, particularly residential air-conditioning which are integral for manufacturing, construction and housing, have consequently been part of this rapid expansion.

2. A high level of growth in these sectors, particularly for air-conditioning, reflects the improvement of living standards taking place coupled with growing economic stability in some of the neighboring countries that trade with Jordan.¹ Although growth slowed in 2009 to 2.3% as a result of the global financial crisis, some upward trends continued, notably the growth in domestic energy consumption at 9.6%.² An indicator that this energy demand continued was that 2010 sales in air-conditioning – which consumes up to 40% of electricity in developing country households – soared due to a severe summer heat wave across Jordan. Consequently, HCFC consumption in Jordan has also rapidly increased as seen through the progression of consumption in 2006-2010 data reported under Article 7 of the Montreal Protocol.

Table 1. 2005-2010 HCFC Consumption in ODP and metric tons per Art. 7 Reporting

Consumption	Baseline	2006	2007	2008	2009	2010
HCFC – ODP tons	83	46.6	55.7	59	70.9	95
HCFC – metric tons	--	721	833	874	1,080	1,405

3. Jordan will have to reduce its consumption of HCFCs dramatically if growth continues at the same pace after 2010 in order to meet its Montreal Protocol obligations.³ Starting from the calculated baseline level in 2013, Jordan will need to phase out 8.3 ODP tons to comply with 10% reductions required by 2015. Assuming on a conservative basis that there is no growth from 2010 to 2013, Jordan would still face difficulties meeting the 83 ODP ton freeze – it would have to reduce consumption (defined as imports minus exports) by nearly 12 ODP tons by 2013 in addition to 8.3 ODP tons by 2015 for a total reduction of 20 ODP tons (over 360 metric tons).

4. Hydrochlorofluorocarbons (HCFCs) are substances used in several manufacturing sectors but primarily as refrigerants in refrigeration and air-conditioning equipment and as blowing agents for producing foam. HCFCs were introduced as transitional substances to chlorofluorocarbons (CFCs) given that they have a much lower ozone depleting potential (ODP).⁴ Nonetheless, as ozone depleting substances (ODS), HCFCs are now also subject to the control measures of the Montreal Protocol on Substances that Deplete the Ozone Layer (an international environmental treaty with universal ratification) following the total elimination of CFCs in 2010.

¹ This refers mainly to Iraq; fallout from the Syrian conflict in 2012 may have impacted import/exports of AC parts.

² In early 2012 GDP grew at 3%, a slightly higher rate than 2.6% in 2011 primarily in the manufacturing sector,

³ HCFC growth trends continued into 2011, with Jordan recording 101.3 ODP tons of consumption for the year.

⁴ CFC-11 and CFC-12 each have an ODP of 1 as opposed to HCFC, whereby for example, HCFC-141b and HCFC-22 have ODP values of 0.11 and 0.055 respectively.

5. HCFCs are not only ODS, but also high global warming gases with global warming potential (GWP) ranging from several hundred to several thousand times that of carbon dioxide. The conversion of HCFC-based manufacturers to alternative, advanced technologies in fact usually leads to improved energy efficiency, particularly in the refrigeration and air-conditioning sectors. Thus, phasing out HCFCs provides two types of potential benefit to the climate. Synergies with the climate agenda were duly recognized by the Parties to the Montreal Protocol when they decided to accelerate HCFC phase-out in 2007 through Decision XIX/6 for both developed and developing countries also known as “Article 5” countries.

6. As a Party to the Montreal Protocol operating under Article 5, the Hashemite Kingdom of Jordan must also phase out HCFCs by 2030 in accordance with the accelerated HCFC phase-out schedule. This entails meeting stepped reduction targets on consumption, including the first – a 2013 freeze on its 2009-2010 average consumption of 83 ODP tons. This presents a number of challenges for effective HCFC phase-out, including resistance from enterprises that only recently converted from CFC to HCFCs, an extremely high growth rate in HCFC-using sectors, and constraints in alternative technologies for some manufacturing sectors.

B. Sectoral and Institutional Context

7. In November 2011, the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) approved Jordan’s HCFC Phase-out Management Plan (HPMP), which constructs a detailed picture of HCFC consumption and uses by substance and product, presents patterns of growth and identifies priority sectors for receiving MLF funding and achieving its first reductions. HCFC consumption in Jordan is made up of primarily HCFC-141b and HCFC-22 for manufacturing in the foam and refrigeration and air-conditioning (RAC) sectors, respectively, as well as HCFC-22 for servicing installed refrigeration and air-conditioning equipment.

Table 2. HCFC Consumption by Major HCFC Sector in ODP tons: 2006-2010

HPMP Data by Sector	2006	2007	2008	2009	2010
HCFC-22 Manufacturing	13.1	15.6	18	24.37	33.3
HCFC-22 Servicing	19.8	20.5	19.1	23.76	26.24
Total HCFC-22	32.9	36.1	37.1	48.1	59.5
Total HCFC-142	0.7	0	0	0.2	0.2
Total HCFC-141b	13	19.6	21.9	22.8	35.3
Total HCFC	46.6	55.5	59.0	70.1	95

8. The HPMP assumed an average HCFC growth rate of 15%. Using historical consumption figures for each major sector (foam and RAC manufacturing, and servicing) however, variations were seen with the growth rate for HCFC-22-based manufacturing of AC units coming out in front at an estimated 28%. Of the total HCFC-22 consumed in 2010, 25 tons, or 43%, went to AC manufacturing alone. Industrial trends in Jordan and neighboring countries confirm growing demand for air-conditioning with two new enterprises starting operations in 2008 and 2009, enlarging the sector to six HCFC-based manufacturers.

9. HCFC-22 consumption for air-conditioning has the potential to grow significantly seeing that one of the largest manufacturers in Jordan was only at 28% capacity in 2010. Imports are also increasing with the majority being low-cost, energy inefficient, HCFC-22 models. In addition, the growing fleet of installed AC units in Jordan compounds the challenge of reigning in HCFC-22 consumption given that they will require servicing throughout their 8-10 year product lives with leakage rates estimated to be 30% annually, particularly in Aqaba where temperatures often exceed 40°C. HCFC demand in servicing has been modest to date but will eventually accelerate as installed air-conditioning units become more prevalent in Jordan.

10. Given that Jordan is nearly fully dependent on imported energy (98%), continued economic development rests on its ability to secure affordable energy. Energy demand is expected to double by 2020 which has given impetus to Jordan's energy strategy, embodied in the 2010 Law on Renewable Energy and Energy Efficiency. In parallel to developing energy efficiency (EE) by-laws, Jordan has been considering various sectors and targets for implementing EE measures that can absorb the rising domestic energy demand and meet the national target of saving energy by 20%. Three types of electrical appliances, including air-conditioning, are already subject to EE labeling as of 2011 in recognition of the large potential for energy savings. In fact, this labeling system is partly a result of the rapidly developing Jordan EE program for appliances that comprises investments from bilateral and multilateral donors of several tens of US\$ millions.

11. Rationale for Bank Involvement. The Bank has played a major role in assisting developing countries develop and implement policies, investment and technical assistance activities to meet their obligations under various multilateral environmental agreements. The World Bank serves as an implementing agency under the MLF and the Global Environment Facility (GEF). The World Bank was invited to be one of the first three Implementing Agencies of the MLF in 1991 and to specifically assist Article 5 countries in investment operations. Since that time, UNIDO and UNDP have expanded their mandate to also cover investment activities however the Bank continues to have in-house technical expertise on Montreal Protocol (MP) implementation and to receive requests for support by a group of core countries, including Jordan. These countries recognize the important policy and technical contributions made by the Bank to the MLF over the years. In addition, since the MP Parties decided in 2007 that phase-out of HCFCs must minimize other impacts on the climate, taking into account GWP, energy use and other factors, the context for ODS phase-out has been widened and more clearly involves the sectors and themes in which the Bank has a comparative advantage, including green growth, trade, energy, transportation, and carbon finance.

12. Under the MLF, the World Bank has assisted client countries phase out over 302,000 ODP metric tons of ODS consumption and production— nearly 70% of the total ODP phased out under the MLF. The Bank has helped countries achieve this impressive result through innovative implementation and financing approaches. It first introduced to the MLF the performance-based, sector ODS phase-out approach. The advantages of this approach are flexibility given to the country to utilize and reprogram funding in the most effective manner as needs evolve; the inclusion of accompanying policies and technical assistance to create an enabling environment; long-term funding commitment by donors that allows the Government to secure buy-in for phase-out from an otherwise reluctant private sector; and, the guarantee provided to the MLF of continued phase-out through independent verification of ODS imports.

13. The Bank has been engaged with Jordan on MP implementation since the early 1990s. The first Jordan ODS Phase-out Project (P005238) saw the creation of the institutional and regulatory framework for implementing the Protocol as well as the implementation of the first investment

activities targeted at reducing CFC consumption. The ODS Phase-out II Project (P049706) continued in the same vein through support for enhancing the institutional capacity of the ozone focal point in the Ministry of Environment (MoEnv) while providing grants to enterprises for reduction and total elimination of CFCs and halon (controlled as “Annex A” substances) by the 2010 MP phase-out target. The cumulative phase-out of 834 CFC tons of consumption under ODS II in Jordan has also resulted in climate benefits amounting to roughly 5.8 million tCO₂ eq. per year of avoided emissions (given the GWP of CFCs of up to 10,900).

C. Higher Level Objectives to which the Project Contributes

14. The higher level objectives of the HCFC Phase-out Project (ODS III) are to permit the Government of Jordan to meet its international environmental treaty obligations, while improving the global and regional competitiveness of its industry through the transfer of the most current, zero ODP alternative technology. This is in line with Jordan’s Executive Development Program (EDP) for 2011-13 which elevates the importance of exports to Jordan’s economy and of enhancing the competitiveness of the economy.

15. The World Bank Group’s Country Partnership Strategy (CPS) for FY12-FY15 (Report #58114-JO) for Jordan was discussed and approved by the Board of Executive Directors on January 24, 2012. The CPS forms the basis of its development assistance to the country. This project supports the second pillar of the CPS, to strengthen the foundation for sustainable growth with a focus on competitiveness.

16. The project will also indirectly provide net benefits to the global climate given the replacement of high GWP HCFC-22 (1810) with a smaller amount of replacement refrigerant, but more significantly, the introduction of more energy efficient appliances that result in 5- 16% lower net CO₂ emissions annually and contributes to demand-side drawdown in Jordan’s energy sector. This particular outcome contributes to the CPS Outcome 2, “increased contribution of Jordan to the climate change mitigation agenda,” within CPS Results Area 2.1.2, i.e., support to selected priority infrastructure. In addition, the strategy aims to foster growth in the private sector by removing obstacles to innovation at the firm level, among others.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

17. The project development objective is to support Jordan in its overall efforts to meet its first Montreal Protocol HCFC phase-out obligations between 2013 and 2017, and to strengthen the capacity of responsible government entities to continue to effectively implement the Montreal Protocol.

B. Project Beneficiaries

18. In the nearly twenty years of managing the Jordan’s national ODS phase-out program, MoEnv, through the National Ozone Unit (NOU) has established a strong network of public and private sector actors. This includes the ministries and agencies represented in the National Ozone Committee, an advisory body to the NOU and MoEnv that was created in the early 1990s with advisory functions on strategic, regulatory and policy aspects related to the country’s implementation of Montreal Protocol requirements. Stakeholders are generally known from previous ODS work however, the pool has been widened given that there are new private sector players manufacturing AC appliances and that the AC sector is a prime target for the energy sector community that is exploring energy efficiency programs. Three manufacturers will be direct beneficiaries of project investment activities, while a remaining three will be included in

the technical assistance and policy support provided to the overall sector. Other relevant government and related agencies that will be involved in the project can also be considered beneficiaries (of technical assistance (TA) and training) – this includes Customs, Ministry of Energy and Mineral Resources (MEMR), Jordan Institution for Standards and Meteorology (JISM), the National Energy Research Center (NERC) and Ministry of Industry and Trade (MoIT).

C. PDO Level Results Indicators

19. The 2013 through 2017 HCFC consumption reduction targets as required by the Montreal Protocol and the Multilateral Fund (per the HPMP agreement between Jordan and the MLF Executive Committee) will be the key PDO level indicators. Jordan’s annual fulfillment of overall implementation and reporting obligations to the Protocol and MLF as another PDO indicator will gauge the level of capacity built in the Government. In addition, there will be climate benefits associated from complete conversion at the three enterprises under the project due to the base increase in energy efficiency when moving to the proposed alternative technology (based on HFC-410A, or “R-410A”). Although R-410A has a GWP of 2100, the energy gains from the new AC system, expected lower leakage rates and reduced charge of refrigerant will more than offset the new refrigerant’s impact. Thus, overall reduction of annual GHG emissions at the three enterprises is the third PDO level indicator.

III. PROJECT DESCRIPTION

20. Jordan received funding in April 2010 from the MLF Executive Committee (under UNIDO) to phase out HCFC use at one AC manufacturer by the end of 2011 (Petra Engineering). Although the project presented the opportunity to demonstrate improved energy efficiency in appliances when converting operations from HCFC, the national impact of this project in terms of energy efficiency and HCFC phase-out will be negligible and not enforceable given that the remaining AC manufacturing base continues to grow at a rapid pace based on the production of cheaper, energy inefficient HCFC-based units to maximize profits from high demand for air-conditioning.

21. It is in this context that the Government of Jordan decided to prioritize HCFC phase-out in the entire AC manufacturing sector for meeting its MP obligations, allowing it to eventually ban both manufacturing and import of HCFC-22 based AC units, while pursuing, in close coordination with the MEMR and other related agencies, an intervention that aims to transform the AC sector to the production of more energy efficient appliances in line with its energy strategy.

A. Project Components

22. The proposed project, consisting of a performance-based, sector plan for HCFC phase-out in air-conditioning manufacturing will contribute to an estimated 20% reduction from Jordan’s MP baseline as required in its HPMP agreement, while minimizing the longer-term impact on the climate and ozone layer (i.e. reducing the amount of future equipment requiring HCFC-22 servicing and reducing energy consumption in installed units). In addition, the project will reintroduce a standing line of MLF assistance that is dedicated specifically to institutional strengthening for the focal point for the Montreal Protocol in Jordan: the national ozone unit in the Ministry of Environment (MoEnv).

23. Given the similar objectives and scope of the proposed project with Jordan’s ODS I (P005238) and ODS II (P049706) Projects, it is proposed that new project arrangements build

upon the existing infrastructure and capacity established in MoEnv to deliver the required assistance to beneficiaries and stakeholders. In that sense, the proposed project can be considered as a continuation of the previous ones and will consequently include a combination of investment, technical assistance, and policy and regulatory interventions which will be carried out in tandem to assure sustainable HCFC phase-out while enabling Jordan to manage its overall MP program.

Component 1: Investment in HCFC Consumption Reductions

24. Investments will be made in residential AC manufacturing enterprises in Jordan and complement the already approved Petra project. This component therefore includes coordination of conversions of at least six enterprises: one addressed through the UNIDO-implemented MLF grant, three under this project, and two enterprises, which are not eligible for MLF financing that will convert on their own in compliance with future Government regulatory actions to ban HCFC-based manufacturing. The conversion entails a change from HCFC-22-based technology to R-410A since this is considered by global industry leaders, as well as the Jordanian industry as currently the only commercially viable alternative technology on the market.

25. The three beneficiary enterprises will receive funding for new manufacturing equipment (refrigerant charging stations and vacuum pumps) and technology (including prototype development) and for incremental operating costs due to higher costs of alternative parts and the refrigerant.

Component 2: Technical Assistance, Policy and AC Sector Plan Management

26. To support implementation of investment interventions under the project, assistance will be provided for technical experts who will support beneficiaries to inter alia, prepare project proposals and equipment specifications, develop prototypes and complete the conversions (technical support), and complete project completion reports. Assistance will also be made available to the overall air-conditioning manufacturing sector and relevant stakeholders, through training workshops and technical guidance to facilitate efficient and effectual HCFC phase-out in the sector. The project will also include support to increase technical capacity of local authorities in order to allow them to monitor and enforce HCFC-related policies for new and existing industrial installations, including customs officers in order to ensure effective control of HCFC imports and products containing HCFCs.

27. A demonstration activity that targets partly the servicing sector to tighten HCFC consumption will also be introduced. This TA activity will support, inter alia, the development and use of good practice guidance for the servicing sector so that service technicians can employ good practice in servicing HCFC-22 air-conditioning units to avoid excess leakage over time, to retrofit AC units to alternative, lower GWP refrigerants as they become available and, to be prepared for handling alternative refrigerants ranging from HFCs to natural refrigerants, in anticipation of evolving technologies worldwide.

28. The project will put a special focus on strengthening Jordan's capacity to implement energy conservation and energy efficiency measures in the residential air-conditioning sector to encourage demand for HCFC-free air-conditioners through coordination and cooperation with responsible ministries and related agencies to ensure that there is complementarity and synchronization of initiatives between EE supply and demand aspects. In addition, through the sector plan, additional TA will be sought to help the sector, including non-eligible enterprises,

improve and optimize energy performance of components and the entire system to achieve EERs that meet the country's new performance requirements.

29. An import quota system to curb the supply of HCFCs was established on January 1, 2013 through support to Jordan's overall HPMP which is managed by UNIDO. Under the proposed project, Jordan will receive support to establish a policy structure that ensures HCFC phase-out in its priority sector, residential air-conditioning, is permanent and sustainable, and to promote the transfer and dissemination of suitable substitute technologies. This includes the introduction of a ban on the use of HCFC-22 in manufacturing AC as well as a ban on imports of HCFC-22-based AC units by the end of 2016. The project focal point in MoEnv will also work with relevant agencies to pursue regulations regarding minimum energy efficiency standards to complement Jordan's new AC appliance labeling system and the work being undertaken with USAID and other donors. Similarly, the NOU will work with government agencies to promote the uptake of more efficient AC and stimulate local manufacturers to compete on EE.

30. Given that the new, R-410A air-conditioning equipment will be more costly than HCFC-22 ("R-22") based units (by about \$100-\$150), it will be crucial for product uptake and project sustainability that the public is made aware of the large energy savings it will incur as a result of purchasing these new units, as well as its part in protecting the ozone layer. Hence public awareness will be a critical element of the project.

31. The project will provide support to the focal point, the NOU within MoEnv so that it may establish a small dedicated project team that provides administrative and technical support for AC sector plan implementation. It will be designated as the AC Sector Plan project management unit (PMU). The NOU, with the support of the PMU, will oversee implementation of investments and TA activities and ensure that MLF and World Bank policies on financial management, use of funds and procurement are followed when implementing subprojects. The AC sector plan PMU will, through the NOU, coordinate the AC sector plan activities with Jordan's overall HPMP as governed by the agreement between the Government of Jordan and the MLF Executive Committee.

Component 3: Institutional Strengthening

32. The project will help transfer dedicated MLF funding to the Recipient through the NOU in MoEnv to enhance the capacity of Government agencies to manage and address all ozone protection issues in the country and to interact with the international ozone protection community. This will include assistance for coordinating Jordan's portfolio of MP projects (with the Bank, UNIDO, GIZ and others); policy formulation and enforcement; awareness raising in industrial sectors and the general public; monitoring and reporting of annual ODS consumption; regular participation in international and regional MP meetings; and facilitating inter-agency coordination and decision-making on ozone-related issues.

B. Project Financing

Lending Instrument

33. The project will be supported through a US\$2,783,149 specific investment grant from the Multilateral Fund for the Implementation of the Montreal Protocol.

Project Cost and Financing

34. US\$1,070,100 of the grant for Components 1 and 2 was released by the Executive Committee in November 2011 under Jordan's approved Stage I HPMP. The balance of the

project funding will be released in tranches by the Committee between 2012 and 2016 according to an agreed schedule for each the HPMP (Components 1 and 2) and for Institutional Strengthening (Component 3).

Table 3. Project Cost and Financing

Project Components		Project Cost	Grant Funding	% Grant Funding
1	Investment in HCFC-22 Consumption Reduction	1,923,850	1,923,850	100
2	Technical Assistance, Policies and AC Sector Plan Management	417,300	417,300	100
3	Institutional Strengthening	441,999	441,999	100
Total (US\$ million)		2,783,149	2,783,149	

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

35. The National Ozone Unit in MoEnv will serve as the project implementing agency through a dedicated project implementation unit. It will be in charge of project implementation, coordination with other ministries and agencies, facilitating the delivery of technical assistance to stakeholders such as expertise to companies for choosing alternative technologies and for phase-out per agreed industry targets. Working arrangements will be similar to that under the ODS II Project, except that supplemental support for project management will be required, including financial management (FM) and procurement capacity and technical experts, in order to more effectively manage the project in a relatively short project timeframe. This will reinforce previous arrangements under ODS II and ensure that FM and procurement aspects are well-covered and contribute to longer-term capacity in MoEnv.

36. The NOU has a long record of engagement in various ODS-consuming sectors as the country's focal point for MP implementation. MoEnv's role has been not only to control imports of ODS through licensed importers but also consisted of hands-on involvement in project implementation and monitoring ODS-consuming and converted enterprises. Partly through funding from Component 3 and MLF funding through UNIDO (the "lead agency" for HPMP implementation), the Ozone Unit will set the policy agenda for tackling HCFC phase-out in line with overall HPMP objectives and the proposed project. It will collaborate and coordinate with key Government agencies including Jordan Customs and MoIT) to institute and implement the import/control system for HCFCs; review annual HCFC import license applications to ensure that HCFCs are supplied only by registered importers; and establish the annual import quota for HCFCs for the period 2013 through 2018.

37. A separate Designated Account (DA) will be opened at the Central Bank of Jordan and the project's accounts will be annually audited by an acceptable audit firm according to acceptable terms of reference. MLF funding will flow to the DA through the Bank according to the schedule set forth in the HPMP agreement between the Executive Committee and Jordan and based on Jordan meeting independently verified, HCFC phase-out targets (see Annex 7). Upon receipt of grant funds, the NOU will disburse funds to the three AC manufacturers under Component 1 for

incremental capital and operating costs, in accordance with the terms and conditions stipulated in separate sub-grant agreements with MoEnv.

38. The NOU will be directly responsible for carrying out activities under Components 2 and 3 of the project. As Component 2 requires specialized technical inputs, the NOU will engage consultants and consulting firms, and will be involved in some limited procurement of servicing sector tools and equipment, as well as office equipment.

B. Results Monitoring and Evaluation

39. Results monitoring and evaluation will be done at several levels. At the project level, the NOU-MoEnv will be responsible for monitoring overall progress of the project as well as the implementation of the Montreal Protocol. Component 3 funding will support the NOU in using its existing monitoring system of all sectors, enterprises, importers and suppliers that import and/or use ODS or ODS-based equipment. This entails random site visits, surveys, and stakeholder workshops; and maintenance of a database of all ODS users and importers.

40. Results will be captured in various reports due to the Bank including quarterly unaudited Interim Financial Reports (IFRs) on use of funds, annual financial audits of the project account and consolidated, annual work programs and semi-annual progress reports on the project. It will also provide reports required by the MLF, including “tranche implementation reports and plans,” separate annual progress reports on the AC Sector Plan (Components 1 and 2), the Institutional Strengthening component (Component 3), and biennial Institutional Strengthening terminal reports and renewal requests and a final project completion report on the AC Sector Plan in 2018. In addition, the degree of meeting MP and MLF Executive Committee-agreement obligations will be captured in annual “Article 7” and country program reporting to the Ozone and MLF Secretariats respectively.

41. On the subproject level, the NOU will conduct periodic on-site inspections through the PMU. The PMU will collect regular progress reports from the project enterprises, as well as subproject completion reports upon completion of their subprojects. The World Bank will coordinate with UNIDO that is responsible for ensuring annual independent verification of maximum allowable HCFC consumption, by providing data on the import and consumption of HCFC-22 in the AC manufacturing sector. The verification audit is key to the release of future tranche funding under the agreement between Jordan and the Executive Committee and will provide confirmation whether intermediate targets and eventually, the PDO have been attained.

C. Sustainability

42. In 2000, the Government, with MoEnv’s leadership, revamped ozone policies by disseminating a series of instructions for controlling and monitoring ODS which included among others: assigning MoEnv as the focal point for granting import licenses to ODS importers; mandatory labeling of products containing ODS and ozone friendly materials; and prohibiting ODS use at converted enterprises. Currently, importers must be licensed in order to import HCFCs. These policies are being supplemented by a by-law which will impose further restrictions on ODS, most critically HCFCs with an import quota system and bans on new installations and expansion of HCFC-based manufacturing.

43. As a Party to the Montreal Protocol, the Government of Jordan is obligated to meet HCFC phase-down obligations starting in 2013. The flow of funding to the Bank and subsequently to the Project is governed by the ability of the country to meet its maximum 2013 through 2018 consumption values. The HCFC quota system will be the main tool for restricting

supply. The degree to which the country meets MP obligations will be verified annually through an independent audit. In addition, sustainability will be ensured through features in the project design, namely a) a sector-based approach which will deliver financial and/or technical support to the sector, provide TA to involved government agencies and stakeholders and introduce sector-level policies (i.e. a ban in HCFC-22 based manufacturing by 2017) and b) linking the transformation of the AC sector to the energy efficiency agenda of the country.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

Risk Category	Rating
Stakeholder Risk	Moderate
Implementing Agency Risk	
- Capacity	Moderate
- Governance	Low
Project Risk	
- Design	Moderate
- Social and Environmental	Low
- Program and Donor	Low
- Delivery Monitoring and Sustainability	Low
Overall Implementation Risk	Moderate

B. Overall Risk Rating Explanation

44. As indicated in the table above and in the Operational Risk Assessment Framework (ORAF) in Annex 4, the Overall Implementation Risk of the project is rated as “Moderate.” The table indicates that individual risk categories fall between the ratings of “Low” to “Moderate.”

45. Due to the similar design and successful implementation of the first (P005238) and second (P049706) Jordan Ozone-depleting Substances (ODS) reduction consumption projects, the Project can be considered as a “repeater” project whereby the implementing agency, the NOU, is familiar with the Montreal Protocol and has an understanding of Bank fiduciary requirements. Nonetheless, this project will require more rapid implementation and presents some new policy challenges in regards to the air-conditioning sector which is made of beneficiaries of ranging capacity and set in an environment of high demand and competition. Moreover, capacity strengthening is required in procurement and financial management. Risk in the capacity of the implementing agency is therefore seen as “Moderate.” Initial risk management measures have been put into place prior to appraisal, including a detailed project implementation manual (PIM) that includes a procurement section.

46. Stakeholder risk is rated as “Moderate” because there is limited time remaining before the first Montreal Protocol obligations enter into force and because AC manufacturers are new to

World Bank project requirements. Smaller beneficiaries may have more challenges in technology adoption as well as in procurement. Technical expertise will be made available to assist these companies. The import license and quota system employed by MoEnv in the past to monitor and limit the quantity of CFCs imported to Jordan during the past fifteen years has proven to be robust. The Government's plan to extend this existing system to control HCFC imports by October 2012 gives confidence that it will be able to meet MP targets in a short time.

47. Another dimension to stakeholder risk is that a sector transition to more energy efficient, alternative AC appliances will result in overall higher prices as compared to others in the region that may continue to produce HCFC-22 based units. Without action to carve a new market segment, this may adversely impact the beneficiaries' export market. Dialogue will need to be initiated with the sector to provide it sufficient warning of the Government's intentions and to determine what type of incentives can be instituted at a sector and national level to help industry create new business in the higher end market of the region, as well as Europe. Finally, under the project, a refrigerant technology with climate impact is being introduced that has a potential risk in the longer term for exports to countries with restrictions on HFCs (controlled by the Kyoto Protocol) in products and in terms of any future Jordan climate policy. The project will provide for a continued evaluation of new and emerging technologies in the AC sector for stakeholders that may later opt for use of greener technology, where it becomes available as well as good practice guidelines to handle new, alternative refrigerant technologies in the servicing sector.

48. Project design is rated as having a "moderate" risk because it depends to a certain extent on programs and actions beyond the financing boundaries of the project. The AC sector in Jordan comprises six manufacturers, but only three will receive grant funding under the project. Yet the whole sector will need to convert through a) technical assistance on optimization of appliances and energy efficiency which is partly outside the grant financing scope of the project and b) regulation. In addition, the project will depend on the overall progress made by Jordan and various programs to establish functional standards and labeling program for AC units to create market demand for new products of the converted enterprises (hence sustainable phase-out of HCFC-based appliances) given the fact that the new appliances will be more costly.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

49. An economic analysis that fully captures the Project's impact on the Jordan economy would have to include, aside the air-conditioning sector, related productive sectors, consumers, the Government, and other aspects of risks and benefits to Jordan's society, particularly on health. With the data available, an economic model was developed to obtain a better understanding of the potential impact of proposed project activities for HCFC-22 phase-out in Jordan in the AC sector. The model evaluated the economic impact at the household, sectoral, and national levels.

50. Results of the assessment show that the AC consumer and government sectors have a positive net present value (NPV) after conversion to non-HCFC based AC manufacturing and import. AC consumers enjoy a greater net benefit mainly because of large savings in electricity costs which substantially overcomes the additional cost of buying a more EE, non-HCFC AC unit. The Government also would have a large net benefit due to the reduction in fuel costs.

51. The AC industry would lose little with a negative NPV of about \$1.25 million that mainly occurs during the years of upgrading production lines between 2013 and 2015. It is noted that

with the project, this cost is largely offset by the incremental capital cost funding provided by the MLF. It was found that electric utilities would be the largest losers from lower electricity demand with a net loss of about \$400 million. Nonetheless, the net benefit to Jordan can be considered more important than the benefit to any particular company. In addition, demand for electricity (both energy and capacity) will continue to grow, so electric companies would eventually appreciate relief from lower demand through EE air-conditioning and the avoidance of investment in new power generation.

52. Major environmental benefits would accrue from the use of less power, thereby burning less fuel (with avoided CO₂ emissions) and use of less water for cooling; and, from the use of refrigerants not harmful to the ozone layer (the GWP of the replacement refrigerant is largely offset by energy gains in AC system). Quantifying benefits and monetizing their value is challenging however, and requires information that is not available. Nevertheless, reduction of pollution through lower SO₂, NO_x, CO₂ and ODS emissions is expected to improve ambient health conditions and guard against environmental deterioration.

B. Technical

53. Jordan targeted the residential AC manufacturing sector to meet its first HCFC phase-out obligations because i) the sector had the highest rate of growth and a possibility for the greatest long-term impact by avoiding future HCFC demand in the servicing sector; ii) the most prominent manufacturer of cooling/AC equipment in Jordan, Petra, received early MLF financial support to convert operations from R-22 to R-410A refrigerant, setting the stage for a sector-based, phase-out approach; and, iii) the only way to prevent HCFC growth in the MLF-ineligible AC manufacturers that have the potential to offset the gains achieved through other industry conversions, was by regulating the entire sector. However, current constraints in available refrigerant technology in the AC sector limit Jordan's choices for R-22 phase-out.

54. The current state of alternative technologies in the global market indicates that HFC blends, as mature and proven technology, are the most likely refrigerants to be used in air-cooled systems during the next 10-15 years. The 2010 assessment report of the UNEP Refrigeration Technical Options Committee confirms that the majority of non-HCFC alternative technologies for unitary air-conditioning systems employ HFC blends as refrigerant, such as R-410A and R-407C, with a small number of commercial AC using hydrocarbon (HC). This is demonstrated by the fact that the US, EU and Japan currently all rely on R-410A-based technology for the residential AC sector since the MP-imposed phase-out of HCFCs in 2010.

55. Careful vetting of alternative technology was nonetheless done with the Jordan industry in terms of costs, commercial and technical viability, country and industry-specific operating and market conditions, and environmental and safety impact. Several alternatives (HC and HFC-32) were not chosen for safety concerns due to flammability and related regulatory constraints in export markets and because there is little commercial experience (HC-based AC is currently undergoing market testing in China, and HFC-32 AC will be developed in Thailand and Indonesia with assistance from a leading Japanese AC manufacturer). R-407C, with a GWP of 1610, was ruled out because of its tendency to separate upon leakage, making it less suitable for smaller, leak-prone systems such as residential AC in Jordan which require frequent topping up.

56. Ambient temperature was another consideration in technology choice, particularly for Jordan. Unlike HC refrigerant, R-410A performance is affected by high temperatures but this can be completely addressed through optimization of AC components. What remains an issue with R-410A is its high GWP. As all Jordanian manufacturers preferred R-410A technology as an

alternative to R-22 for reasons outlined above and for maintaining competitiveness in the national and regional markets, the project design ensures that the added GWP is offset to the point that there is a net climate benefit over baseline conditions. Emissions from refrigerant in residential AC make up a small percentage of CO₂ eq. emissions from a running unit. With R-410A, the charge-size will be 80% of that of R-22. Emissions of 35,195 tCO₂ eq. a year are expected to be avoided when converting the sector to R-410A because of the smaller charge size and more technology-advanced components. Leakage rates are expected to decrease from 10-30% to 5-10% for additional emission reductions from installed units.

57. Given that 90-99% of the climate impact of AC stems from energy consumption, a key design element of the TA component is to support the Jordan EE framework to encourage enterprises to go beyond the base increase in EE in new units. If manufacturers only improve the energy efficiency ratio (EER) to the average of 2.8 under Jordan's new labeling scheme, an additional 24,900 tCO₂ a year will be avoided. However, with the new EE enabling environment to be established in 2-3 years, it is expected that manufacturers will be able to manufacturer units with an average energy consumption of 3.2 EER (an "A" grade under the labeling scheme). This would result in 89,985 tCO₂ a year avoided (instead of 24,900 tCO₂). The project's emission reductions from energy savings, and reduced charge and leakage far outweigh additional GHG emissions introduced from the use of R-410A. However, in recognition of the dynamic nature of refrigerant technologies, a key design element of the TA component is to create an enabling environment for eventual use of lower GWP alternatives such as R-32 or natural refrigerants, once commercial uncertainties have been overcome.

C. Financial Management

58. The World Bank undertook an assessment of the financial management systems within MoEnv, and updated those within MOPIC. The assessment has built on lessons learned during the implementation of the on-going Project "ODS Phase-out II". Financial management risks were evaluated and recommendations made on mitigation measures. Considering the risk mitigation measures proposed, the overall financial management risk for the project is assessed as "Moderate." Annex 3 provides additional information on financial management.

59. The main financial management functions will be managed by the NOU, housed in MoEnv, while MOPIC will manage the DA. The proposed Project will draw on the same financial management arrangements of ODS-II, including appointing, externally, a part time Financial Consultant as part of the NOU. One addition to these arrangements is having an accountant being seconded from the MoEnv Finance Department to work on a fulltime basis as part of the NOU. An Accountant will be selected from the MOPIC Finance Department who will closely coordinate with the NOU accountant on financial related aspects of the project.

60. The grant will mainly finance investment activities in HCFC consumption reduction in three residential air-conditioning enterprises, with estimated value of US\$ 1.92 Million (approximately 70% of the total grant). Sub-grant agreements will be signed between MOU and the air-conditioning enterprises. The Bank undertook an assessment of the financial management systems within the AC enterprises to have reasonable assurance that recipients i) possess adequate financial arrangements to manage the funds received under the sub-grants, and ii) maintain the financial solvency to meet the long term objectives of the investment made in reducing HCFC consumption reduction. The assessment concluded that the enterprises, maintain adequate financial systems and the needed solvency, except that the MEC enterprise, which faces high losses, shortage in liquidity, and high debt. The MEC management has in place a plan to

address these financial issues and to rectify its business and financial performance. Full implementation of the rectifying measures as per the business plan is a prior condition for signing the sub-grant agreement. Details are found in Annex 3.

61. The NOU will be responsible for preparing quarterly IFRs and annual project financial statements. The IFRs will be submitted by the NOU to the World Bank within 45 days after the end of the concerned period. An external auditor, acceptable to the World Bank, will be appointed based on terms of reference acceptable to the World Bank to audit project-produced financial statements.

D. Procurement

62. The assessment of NOU concluded that the procurement system defines clearly the accountability of procurement decisions, the procurement process, and the complaints mechanism. In parallel, the assessment of the three enterprises concluded that the commercial practices were found reasonably respecting procurement principle of economy and efficiency. The procurement risk rating with mitigation measures is Moderate.

63. The NOU will be supported by a procurement officer externally appointed or allocated from within the ministry. To expedite implementation, the Special Tender Committee (STC) mandate is to be extended for implementation of the project. The current STC is composed of the MoEnv, Ministry of Planning and International Cooperation, and the private sector.

64. World Bank “Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers” dated January 2011 and “Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers”, also dated January 2011., shall apply to the project. The legal agreement with the Government and the sub-grant agreements to be signed with the three private sector enterprises shall be in particular referring to (i) paragraph 3.13; the eligibility of using Well-established Private Sector Procurement Methods or “Commercial practices” for implementing component 1, and (ii) the “Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants” dated October 15, 2006 and revised in January 2011.

E. Social (including Safeguards)

65. The project will have positive social benefits as it will reduce the negative health impacts associated with HCFC impacts on the ozone layer. Given the nature of this HCFC phase-out plan, there are no anticipated adverse social impacts related to land acquisition, involuntary resettlement, and job changes or losses. Assessment has concluded that none of the three enterprises will need to expand, reduce or relocate operations.

F. Environment (including Safeguards)

66. The Project includes three subprojects, which will contribute to overall reductions of HCFC consumption and production by 10% of the baseline level by 2015 as per the Montreal Protocol and 30% by 2017 as per the Jordan-MLF Executive Committee agreement, by investments in residential AC manufacturers to change from R-22 to R-410A technology. Generally, these types of activities have minor to moderate adverse environmental impacts specific to each site. Moreover, the project is expected to not only have ozone benefits, but net climate benefits.

67. As the locations of subprojects are known at the time of appraisal, an environmental and social impact assessment (ESIA) and environmental and social management framework

(ESMP) has been prepared by the NOU to address these site-specific impacts. The ESIA/ESMP has been used to provide guidance to both beneficiary enterprises and NOU on the environmental and social management process to be followed in evaluating the baseline capacity and environmental performances of individual subprojects. The ESMP defines the content, procedures and institutional responsibilities for environmental management of the subprojects, to ensure compliance with both Jordanian environmental assessment (EA) laws and regulations and World Bank EA policies and procedures as specified in OP/BP 4.01 (Environmental Assessment). For Components 2 and 3, which deal with policy, AC sector plan management, and institutional strengthening to support reduction of ODS, the ESMP is not applicable.

68. Public Consultations and Information Disclosure. Public consultations have been conducted in accordance with the framework with beneficiary enterprise managers and employees, municipal actors, and relevant neighbors to the enterprise sites. The ESIA/ESMP was first disclosed in-country, through announcements published in the local newspaper and on the internet websites of NOU, as well as on the Bank's website on October 9, 2012. Revised safeguards documents were re-disclosed in-country as well as on the Bank's website on January 15, 2013.

Annex 1: Results Framework and Monitoring

Country: Jordan

Project Name: Jordan Ozone Depleting Substances HCFC Phase-Out Project (ODS3) (P127702)

Results Framework

Global Environmental Objectives

PDO Statement

The project development objective is to support Jordan in its overall efforts to meet its first Montreal Protocol HCFC phase-out obligations between 2013 and 2017, and to strengthen the capacity of responsible government entities to continue to effectively implement the Montreal Protocol.

Global Environmental Objective Indicators

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				YR1	YR2	YR3	YR4	End Target			
Reduction of HCFC	<input type="checkbox"/>	ODP tons	83.00	83.00	83.00	74.70	70.50	74.40	annually	HCFC-22 consumption reduction from the baseline level	Annually by the NOU; the Bank will ensure from 2013 through 2017, annual consumption verification at the enterprises and level of imports.
Avoided emission of tons of CO2 equivalent from transition to new technology at the three beneficiary enterprises	<input type="checkbox"/>	Text	0	0.00	0.00	0.00	28,147	28,147	annually	CO2e of HCFC-22 consumed by enterprises at project baseline minus CO2e of R-410A to	NOU with assistance of MEMR and JISM

										be consumed	
Montreal Protocol and MLF obligations and provisions are implemented and fulfilled	<input type="checkbox"/>	Percentage	0.00	100.00	100.00	100.00	100.00	100.00	annually	Article 7 and Country Program reporting	National Ozone Unit

Intermediate Results Indicators

Indicator Name	Core	Unit of Measure	Baseline	Cumulative Target Values					Frequency	Data Source/ Methodology	Responsibility for Data Collection
				YR1	YR2	YR3	YR4	End Target			
Number of subproject agreement contracts signed with AC manufacturers	<input type="checkbox"/>	Text	0	1	3	3	3	3	semi-annually	MIS is NOU and semi-annual progress reports	NOU
Cumulative HCFC-22 consumption phased out in the AC sector	<input type="checkbox"/>	ODP tons	0	0	0	1.1	7.8	7.8		3 AC enterprises	NOU
Implementation of key policies and regulations for HCFC-22 phase-out	<input type="checkbox"/>	Text	no HCFC-22 policy	--	--	--	--	Ban on use of HCFC-22 policy in manufacturing AC and ban on		MIS in NOU and semi-annual progress reports	NOU

								imports of HCFC- 22 based AC units			
Completion of technical assistance activities and satisfactory sector plan management	<input type="checkbox"/>	Percentage	0.00	100.00	100.00	100.00	100.00	100.00	Annually		PMU/NOU
Compliance with project reporting requirements	<input type="checkbox"/>	Percentage	0.00	100.00	10.00	100.00	100.00	100.00	Semi-annually and ongoing	Overall project, including all components	NOU
Institutional and policy measures for ozone protection introduced and/or strengthened	<input type="checkbox"/>	Text	No or underdeveloped measures to control new ODS phase-out requirements	HCFC import quota system	HCFC import quota system	HCFC quota and methyl bromide phase-out measures	HCFC import quota system	HCFC import quota	ongoing	MIS in NOU and semi-annual progress report	NOU, TA contractors and related interministerial/agency partners

Annex 2: Detailed Project Description

1. The development objective of the Stage I HCFC Phase-out Project is to support Jordan in its overall efforts to meet its first Montreal Protocol HCFC phase-out obligations in 2013 to 2017, and to strengthen the capacity of responsible government entities to continue to effectively implement the Montreal Protocol.
2. The project, consisting of a “sector plan” for HCFC phase-out in AC manufacturing is to contribute to the estimated 20% in reductions of ODP tons from Jordan’s MP baseline that is needed by 2017 through 17.44 ODP tons of HCFC-22 phase-out while minimizing the longer-term impact on the climate and ozone layer (i.e. reducing the amount of future equipment requiring HCFC-22 servicing and reducing energy consumption in installed units). In addition, the project will reintroduce a standing line of MLF assistance that is dedicated specifically to strengthening the focal point for the Montreal Protocol in Jordan: the national ozone unit (NOU) in the Ministry of Environment (MoEnv).
3. Given the similar objectives and scope of the proposed project with those under the Jordan now-closed ODS I (P005238) and ongoing ODS II (P049706) Projects, it is proposed that new project arrangements build upon the existing infrastructure and capacity established in MoEnv to deliver the required assistance to beneficiaries and stakeholders.
4. The MLF Executive Committee’s performance-based and programmatic approach for providing assistance to countries to phase-out HCFCs will be applied to Components 1 and 2 of the project. This approach gives flexibility to Jordan to utilize the grant funding for HCFC phase-out in the AC sector in the most effective manner and reprogram funds as needs evolve (and subject to Executive Committee no objection); includes a regulatory and policy framework and technical assistance to create the enabling environment; ensures long-term funding commitment by donors that allows the government to secure buy-in for phase-out from stakeholders; and, gives the MLF a guarantee of continued phase-out through independent annual verification audits of HCFC import data. As per the Executive Committee-Jordan agreement (Annex 7), funding will be released to the World Bank in three tranches upon Jordan’s achievement of agreed consumption targets (in addition to the first tranche approval in November 2011).

Component 1: Investment in HCFC Consumption Reductions

5. Investment activities will comprise subprojects that eliminate the use of HCFC-22 in residential air-conditioning manufacturing at each of three, Jordanian-owned companies. These companies were identified for approval by the MLF Executive Committee as Middle East Complex for Engineering, Electronics and Heavy Industries PLC (MEC), Abu Haltam Group for Investments and National Refrigeration Company (NRC). The conversion entails a change in HCFC-22-based technology to, what is considered by the global industry as currently the most commercially-viable alternative technology on the market, R-410A-based technology. The three subproject enterprises have received MLF approval of US\$1,923,850 for new manufacturing equipment and technology, prototypes and testing, and, operating costs. In exchange, they have agreed to phase out the use of 7.8 ODP tons (141 metric tons (MT)) of HCFC-22 by the end of their subprojects.

Table A-2.1 List of beneficiary air-conditioner producing companies

Company Name	Year AC mfg Started	Trade Name	Refrigerant	Units Produced		HCFC-22 in MT		Grant Funding Allocation
				2009	2010	2009	2010	
Middle East Complex for Engineering, Electronics and Heavy Industries PLC (MEC)	1994	Multiple names	HCFC-22	70,420	74,870	105	115	1,335,850
Abu Haltam Group for Investments	2001	General De Luxe	HCFC-22	11,000	22,000	18	20	344,310
National Refrigeration Company	1976	NRC	HCFC-22	2,963	3,005	5.5	6	243,690
Total				84,383	99,875	129	141	1,923,850

6. The actions required for the conversion consist of three parts, redesign and testing of the redesigned models to ensure performance and reliability, retrofit of the production lines for the air conditioners, including online testing equipment, and modification of the service equipment so that new air-conditioners with R-410A can be serviced when they are sold in the market.

7. As R-410A (an HFC) has a higher GWP as R-22 on a kg basis, it is essential to minimize the refrigerant charge and achieve maximum efficiency of new air-conditioners with alternatives in order to reduce indirect emission of CO₂ from electricity consumption. Leakage of the refrigerant must also be minimized to reduce the climate impact. A comparison over the assumed lifetime (10 years) of the equipment shows that indirect emission of CO₂ due to electricity consumption is the dominant contributor to CO₂ emissions and is the area to address for significant reductions.

(a) **Redesign:** The theoretical dynamic efficiency of R-410A is the same or a little lower than HCFC-22. However, the lower pressure drop and better thermal conductivity characteristic results in higher coefficient of performance of R-410A equipment than that based on HCFC-22. In order to take advantage of this characteristic, the use of an improved compressor design for R-410A as well as optimal design of the refrigeration cycle accompanied with optimized cycle conditions is needed to lead to improved efficiency. Hence, redesign of the air-conditioners for alternative refrigerants with higher pressure, lower charge, different lubricant and several other thermodynamic and physical characteristics are needed with the change away from HCFC-22.

(b) **Changes to the production line:**

- i. **Refrigerant charging equipment:** Current refrigerant is charged in vapor at the suction side. HFC blends must be charged in liquid to keep the right composition of the refrigerant blend. New charging units for liquid charging of zeotropic HFC refrigerant blends are required. The unit cost includes a precise electronic balance, diffuser and controls, in order to prevent any liquid backing into the compressor.
- ii. **Vacuum pumps:** New pumps must be procured to replace existing pumps due to the higher pressure of the refrigerant blend.

- iii. **Leak detection equipment:** New leak testing equipment for HFCs must be used. As reduced leakage is a requirement in terms of avoiding emissions of high GWP gases, the leak detection equipment must be more sensitive than the traditional hand held leak detectors.
- (c) **After-sale service facilities:** The service tools required for the new refrigerant blend include the following: vacuum pump with a back flow prevention device, gauge manifold, charging weight module, leak detector, recovery unit, recovery cylinder, and an additional cooling device for R-410A at high temperature recovery. This is based on US, the European Union (EU) and Japanese standards for servicing. The equipment required and the cost is based on costs of one set of new tools for each service team at each company. As HCFC-22 air-conditioners will remain on the market and require ongoing servicing and recharging, this change is not related to the ongoing servicing of HCFC-22 air-conditioners by servicing shops throughout Jordan.
 - (d) **Incremental operating cost (IOC)** is calculated based on prices for HCFC-22 and costs of substitutes, including R410A. The NOU has conducted an investigation in 2010, obtaining quotations from chemical suppliers in Jordan. Cost of HCFC-22 was US\$4.50/kg. Cost of R-407 was US\$11/kg and R410A was US\$11.6/kg. The IOC calculation takes into account the price difference of the chemicals and the incremental cost of heat exchangers and compressors. Operating pressure is higher compared to that of R22, meaning that all system components must be designed especially for R410A. As the market for R410A is emerging in developing countries, the prices of compressors are high. Experience from CFC phase-out showed that cost of compressors went down over a number of years. A similar situation can be expected for R410A compressors.
8. The investment component will complement the MLF-approved grant delivered through UNIDO to convert the largest AC manufacturer in Jordan, Petra Engineering, to non-HCFC technology. Although the UNIDO project has demonstrable value, the national impact in terms of energy efficiency and HCFC phase-out would be negligible and not enforceable if the remaining AC manufacturing base continued to grow at the current rate. HCFC growth in Jordan averaged at 15% over 2005-2010, however in the AC sector it grew about 28%.
9. Jordan would have had extreme difficulty in meeting its 2013 freeze in consumption and comply with 2015 reductions with only the phase-out of 8.1 ODP tons from the Petra project. Taking into account growth trends, it required at least another 12 ODP tons of phase-out to achieve targets, taking into account growth. Modeling several scenarios of growth showed that the greatest reductions for meeting Jordan's freeze and 2015 obligations would come from the AC sector as opposed to foam or commercial refrigeration.
10. The Government of Jordan therefore decided to prioritize HCFC phase-out in the entire AC manufacturing sector for meeting its first two Montreal Protocol obligations. This will allow it to not only ban manufacturing, but also the importation of HCFC-based AC units. This will also significantly curb future HCFC servicing demand from installed units. It is only by addressing the entire sector that the Government can regulate the two enterprises which are not eligible for MLF financing and which are the most problematic for the ozone layer and the climate as they market the most energy inefficient appliances and are growing extremely fast.
11. The project will contribute to Jordan's overall Stage I HPMP strategy – to eliminate HCFC-22 use in the manufacturing of residential AC in Jordan over a period of four years, starting first

with MLF eligible enterprises. The two enterprises which are not eligible for MLF financing (which consumed a total of 7.7 ODP tons of R-22 in 2010) will convert on their own in compliance with future Government regulatory actions to ban all HCFC-based manufacturing in the AC sector. Consequently, Component 1 will be implemented in coordination with the conversions of all enterprises in the sector: one through UNIDO, three under this project, and the two, that will convert on their own (NIIC and Al Sadan).

12. Under the flexibility mechanism afforded by the MLF for multi-year agreements such as that between the Executive Committee and Jordan (Annex 7), a certain level of grant funding intended for investment activities may be reprogrammed if in future years it is determined that needs have changed and will be subject to the Executive Committee’s policies and guidelines, and its non-objection. The three enterprises identified as eligible for Executive Committee funding are subject to a technical and financial appraisal prior to signing sub-grant agreements.

Component 2: Technical Assistance, Policy and AC Sector Plan Management

13. To support implementation of investment interventions under the project in the AC sector and to ensure sustainable outcomes – i.e. that the enterprises remain competitive with the new technology and do not revert to HCFCs, a series of technical assistance activities will be conducted under Component 2. In addition, support will be provided to the Government of Jordan to create an environment conducive to HCFC phase-out in the sector through crucial regulations, import quotas and other policy measures while managing the implementation of the three enterprise subprojects and the overall AC Sector Plan. Component 2 is expected to be worth US\$417,300 as suggested below.

Table A-2.2 MLF funding requested for the air-conditioning and domestic refrigerator sectors

Component	Cost (US\$)
Technical Assistance	317,300
Policy and Regulation	40,000
Project Management	60,000
Total	417,300

Technical Assistance

14. Technical assistance (TA) is required under the proposed sector plan for the enterprises and the country to ensure efficient and effectual phase-out in the sector. This will be made up of four main types of TA: Training workshops for AC companies and the sector; technical consultant services; a demonstration activity for the existing servicing sector and, energy performance optimization in AC enterprise manufacturing and a focus on complying with energy labeling and standards. The TA will also include support to increase technical capacity of local authorities in order to allow them to monitor and enforce HCFC-related policies for new and existing industrial installations, including customs officers in order to ensure effective control of HCFC imports and products containing HCFCs.

15. Training workshops: A training workshop for the AC industrial base will be organized upon approval of the sector plan by the MLF Executive Committee. The first workshop will provide a full overview of the phase-out activities in the air-conditioning sector, planned policies and the implication of changing to a new refrigerant from HCFC-22. As Jordan is in the midst of developing its energy strategy, the upgrade to more energy efficient air-conditioners and the implications to customers will be discussed.

16. The workshop will be followed by more technical workshops for the companies directly responsible for the conversion to non-HCFC-22 air-conditioners. This workshop will be conducted for technical staff involved in the redesign of air-conditioners and staff involved in infrastructure changes. This training will also include information on implementation aspects, e.g. Executive Committee guidelines for use of funds, and, World Bank and Jordanian guidelines for procurement and reporting.

17. Another workshop will be conducted when the new air-conditioners are about to be introduced into the market. The workshop will address the service technicians. Public awareness will also be conducted to facilitate the acceptance of new, non-HCFC based air-conditioning.

18. Technical assistance to manufacturers: Technical assistance will be provided through technical experts who will support beneficiaries to prepare project proposals and equipment specifications, redesign and testing and project completion reports. As there will be a number of companies that import air-conditioners or manufacturers that refurbish them in small-scale industries, it will be important for the NOU to draw on Jordanian experts with the necessary knowledge and experience in the sector to assist these companies to seek new markets of non-HCFC based AC at cost.

19. Demonstration of servicing techniques to minimize environmental impact: In order to meet the 2013 freeze, Jordan will need to make drastic cuts in HCFC consumption above and beyond the limits that will be put in place in the air-conditioning sector starting as soon as the possible and no later than 2013. The Stage I strategy of the HPMP therefore envisions the tightening of HCFC-22 in the servicing sector with expected reductions of 107 MT, of which 36 MT would benefit from direct MLF support (2 ODP MT) for training to a targeted servicing sector group dealing with AC systems. This activity would also lead to an avoidance of HCFC emissions equivalent to 217,440 CO₂ tons per year from 2013 through 2015.

20. Due to the wide availability, easy access and low cost of HCFCs, no incentives currently exist to improve service practice, particularly to make systems leak proof and minimize service needs. The knowledge level of most customers of the technologies available is low and expectations on product life and repair intervals are based on the principle of a “quick fix” at a low cost. Furthermore, most service technicians receive on-the-job training and have a limited understanding of methods that are not commonly used in their daily work and/or alternative methods that would improve the life expectancy and reduce energy consumption of refrigeration and air-conditioning systems.

21. A TA component is therefore proposed that will provide for the development and use of good practice guidance for training to the existing servicing network of the AC enterprises and service shops that are actively servicing air-conditioners either through contracts with building owners or directly for consumers. The aim of the training program will be three-fold with an emphasis on the two latter objectives:

- (a) To enable good practice in servicing HCFC-22 air-conditioning units to avoid excess leakage;
- (b) To be prepared for handling alternative refrigerants ranging from HFCs to natural refrigerants, in anticipation of changing technologies worldwide; and,
- (c) To safely and effectively retrofit AC units to alternative refrigerants, including to R-290

22. It is proposed that training curricula be developed by Jordan's Vocational Training Corporation (VTC) building on the work already completed under the servicing sector component of Jordan's previous National ODS Phase-out Plan. For the first component of the activity, the servicing network of AC manufacturers may be included insofar it is expected that they will already be equipped with the required equipment and tools and can put what is learnt to practice immediately. A set of basic equipment and tools will be provided to training centers under the VTC in the major cities of Jordan.

23. For the second and third parts of the activity, it is anticipated that international expertise will be required to assist VTC prepare training guidance, source the training materials, including gas and parts, and deliver the training on a pilot scale. The VTC will work with the PMU/NOU to select a group of service shops and technicians to partake in this pilot TA activity. Basic equipment and tools that permit safe use of R-290 will also be needed.

24. The expected outputs of the training will be service technicians with the capacity to recover and recycle HCFC-22, tighten AC systems and fix leaks in the growing fleet of AC units as well as to handle other alternative refrigerants that may enter the market (including flammable refrigerants). A specialized group of technicians that work for the major air-conditioning companies in Jordan will become versed in retrofitting AC for different refrigerants such as R-290. At the end of the demonstration activity, an evaluation will be conducted along with a survey to determine the demand in the sector for retrofits to hydrocarbon refrigerant.

25. Energy performance optimization: The project will aim to put a special focus on strengthening Jordan's capacity to implement energy conservation and energy efficiency in the residential air-conditioning sector by reaching out to the MEMR, National Energy Research Center and related agencies to ensure there is complementarity and synchronization of initiatives on EE for the sector.

26. Through the sector plan non-eligible enterprises in the sector may benefit in terms of technical workshops, training and meetings organized in conjunction with cooperation with the energy sector. Additional but separate TA will be sought to help the sector improve and optimize energy performance of components and the entire system towards achieving EERs that meet the country's new performance requirements for "A" grade products. Jordan introduced a mandatory technical regulation on energy labeling for household air-conditioners (1772-2) in July 2011. Because the World Bank must ensure national regulations are respected when implementing projects, the enterprises will be required to meet the minimum EER captured in the labeling scheme. In the case of this project, the EER of 2.8 will be used as the benchmark because the regulation establishes 2.8 as the minimum amount of efficiency for an average piece of equipment (a Grade "C"). This is a jump for some of the manufacturers, particularly the two non-eligible companies that have an average EER of 2.37.

27. The Jordan Renewable Energy and Energy Efficiency Fund (JREEF) was just established early in 2012, embedded within the Ministry of Energy. One of its mandates is to fund energy efficiency activities. To entice customers to switch to non HCFC-based AC units, TA to determine how best to stimulate market demand and/or a program to subsidize AC owners to purchase non-HCFC units can be established, making a direct link between the Project and JREEF and the development objectives.

Policy

28. An import quota system to curb the supply of HCFCs will be established by January 1, 2013 through support to Jordan's overall HPMP which is managed by UNIDO. Under the proposed project, Jordan will receive support to establish a policy structure that ensures HCFC phase-out in its priority sector, residential air-conditioning, is permanent and sustainable, and to promote the transfer and dissemination of suitable substitute technologies.

29. Given the MLF policy to limit funding in Stage I HPMPs to the percentage of phase-out from the MP baseline, the Government of Jordan had to devise a strategy that can be applied selectively to the sectors or applications where complete phase-out can be attained, therefore facilitating issuance and enforcement of sector policies, such as specific bans on manufacturing with HCFC. The Government will consequently establish a policy structure to complement MLF funding to ensure HCFC phase-out in the priority sector, AC manufacturing, is permanent and sustainable. Only by establishing and enforcing policies and regulations, can it influence the activities of enterprises and consumers to participate actively and quickly in the conversion.

30. While the key policy instrument for HCFC-22 phase-out in the refrigeration equipment and air-conditioning manufacturing sector will focus on the supply side by controlling and monitoring the import of HCFC to ensure that consumption targets are reached, it is also necessary to meet the high demand for air-conditioners in the market and to permit further economic development of this sector, by ensuring access to alternative technology and a supply of the substitute refrigerant and components. The main policies to be introduced as part of the AC Sector Plan will be a ban on the use of HCFC-22 in manufacturing air-conditioners as well as a ban on imports of HCFC-22 based air-conditioners, both by the end of 2016. As all of the AC companies presently import their HCFC-22 directly from international suppliers, the control will be done by NOU-MoEnv through the import licensing system. The commitment to stop importing HCFC-22 will be a condition of the contract with each of the three eligible manufacturers under the ODS III Project. The NOU will negotiate the phase-out with the two non-eligible manufacturers and Petra, and agree to no HCFC-22 imports after an agreed date to ensure the ban can be implemented by end 2016.

31. In order to avoid the importation of HCFC-22 based air-conditioners at the same time that the domestic manufacturers have stopped their production, an import ban on HCFC-22-based air-conditioners will be devised by the NOU and issued by the relevant ministry. The NOU has ample experience in outreach to the public and Customs (CFC phase out) to be supplemented by UNIDO, in issuing and enforcing this and other particular bans.

32. The NOU and MoEnv will also work with the MEMR and relevant agencies (Jordan Institution for Standards and Metrology (JISM), National Energy Research Centre (NERC) to pursue policies on minimum energy efficiency standards, to promote the uptake of more efficient air-conditioning and to stimulate local manufacturers to compete on EE. These proposed energy efficiency requirements would be a logical outgrowth of the new air-conditioner appliance labeling system and the work being undertaken with UNDP, USAID and other bilateral and multilateral donors. In addition, the NOU will work with the MEMR and the Ministry of Industry and Trade to include energy efficient AC appliances in the list of energy efficient equipment that is subject to import tax waivers to promote the uptake of more energy efficient air-conditioning and to stimulate local manufacturers to compete on this front (energy efficiency). The NOU and MoEnv will have to work with the MEMR to develop the necessary

framework for the sector. In addition to MEMR and NERC, it will be most useful to also engage the electric companies -- namely the transmission company NEPCO, the distribution companies JEPSCO, EDCO and IDECO -- in the scaling up of non-HCFC units. These companies have resources to help implement activities on a larger scale.

33. The proposed level of MLF funding to support the component on reviewing and developing the policy and regulatory framework for the air-conditioning sector is US\$40,000.

AC Sector Plan Management

34. The project will provide technical and administrative support to the focal point, the National Ozone Unit (NOU) within MoEnv for implementation of the AC sector plan.

35. This technical and administrative support will form a small project management unit (PMU) to manage activities related to the implementation of investments and TA activities. The PMU will also be responsible for coordinating sector plan management through the NOU in the context of the overall HPMP Agreement between Jordan and the Executive Committee, with UNIDO as the Lead Agency and the World Bank as the Cooperating Agency (see Annex 7). The set-up will be coordinated with UNIDO which has received PMU funding to ensure the NOU maintains oversight of the all HCFC-related activities, including those that go beyond the AC sector plan (such as reporting to the MLF on overall implementation or the quota system).

36. The World Bank will monitor the implementation of all activities under the sector and will report to the Multilateral Fund (through UNIDO as required) in accordance with policies established for the implementation of HCFC phase-out and the agreement between the Executive Committee and Jordan. As in the past, the Bank will work closely with the NOU and its PMU, supervise implementation and provide management and technical support.

37. The PMU will be responsible for carrying out following tasks:

- a) Coordination with stakeholders in the public and private sectors that are relevant to the air-conditioning sector;
- b) Preparation or review of TORs for consultancy services to support implementation, and supervision of HCFC phase-out activities;
- c) Preparation, implementation, and review of the work programs for the AC Sector Plan;
- d) Preparation of relevant reports as required by the Implementing Agencies and the Executive Committee;
- e) Undertaking procurement of goods and services necessary for implementation of the Sector Plan, monitoring and supervising works of the consultants;
- f) Financial management to ensure effective use of the MLF resources;
- g) Development and maintenance of project management information system;
- h) Organizing meetings and workshops for Ministry of Environment's staff and staff of other relevant agencies to ensure full cooperation of all stakeholders in the HCFC phase-out efforts;
- i) Inform the industry of the availability of funds from the MLF;
- j) Organize training and TA for the beneficiaries; and,

- k) Supervision and evaluation of conversion projects with assistance from technical experts to be engaged as part of the technical assistance component.

38. The PMU will also support the NOU substantively in its endeavor to put into place sector specific regulations and policies as outlined in previous sections. This assistance will include but is not limited to the:

- a) Collaboration with the Ministry of Industry and Trade, and the Customs Bureau, to establish and implement the HCFC-22 import quota system and the eventual ban on imports of HCFC-based appliances;
- b) Assistance to the Government of Jordan to issue measures to eliminate HCFC use in the manufacturing of new products according to the AC sector timeframe; and,
- c) General coordination with ministries and agencies in order to promulgate and implement cross-cutting policies which facilitate the sustainable conversion from HCFC-based AC manufacturing and use to alternatives (for example control of types of business licenses for new manufacturers of appliances, import waivers for energy efficient appliances, etc.); and,
- d) Disseminate information related to the Government's policy to phase-out HCFC-22 in the manufacturing sector.

39. Finally, the PMU will be responsible, through its budget to conduct public awareness campaigns. Given that the new, R-410A air-conditioning equipment will be more costly than R-22 based units (by about \$100-\$150), it will be crucial for product uptake and project sustainability that the public is made aware of the large energy savings it will incur as a result of purchasing these new units, as well as its part in protecting the ozone layer.

40. It is estimated that US\$15,000/year for the four years of Stage I will be required for technical and management capacity to implement the AC Sector Plan (a total of US\$60,000).

Component 3: Institutional Strengthening

41. Support will be provided to the Recipient through the NOU in the Ministry of Environment to enhance the capacity of Government agencies to manage and address all ozone protection issues in the country and to interact with the international ozone protection community. "Institutional Strengthening" funds are provided by the MLF Executive Committee to Article 5 countries to strengthen their capacity for expeditious implementation of projects, and in turn, effective phase-out of MP controlled substances.

42. The funding, which is renewed on a rolling basis every two years, is also intended to facilitate liaison between the country and the Executive Committee, the Fund Secretariat, and the four MLF Implementing Agencies. This will include assistance for coordinating the portfolio of MP projects (with the Bank, UNIDO and GIZ); for awareness raising in industrial sectors and the general public; monitoring and reporting of annual ODS consumption; regular participation in international and regional MP meetings (in cases where UNEP does not cover the costs); and facilitating inter-agency coordination and policy and decision-making on ozone-related issues.

43. The focal point for Montreal Protocol implementation and consequently the recipient of the Institutional Strengthening (IS) funding is the NOU. The responsibilities of the NOU include, but are not limited to the following:

- Ensure sustainability of projects implemented in relation to the Montreal Protocol;
- Control imports and re-exports of ODS substances;
- Control illegal trade and equipment which contain ODS;
- Collect CFC, HCFC and MBr consumption data and review the data regularly ;
- Develop/refine the quota system, licensing system and regulation for ODS;
- Co-operate and co-ordinate with ministries, the private sector, enterprises and NGOs in order to implement Montreal Protocol;
- Undertake regular visits to the companies and factories which use ODS;
- Organize workshops and seminars to raise public awareness;
- Develop curriculum in agricultural and industrial education;
- Build capacity in the Customs Department, Ministry of Education, Jordan Institute of Standards and Metrology, judges and enterprises;
- Report ODS data to the Ozone and MLF Secretariats;
- Follow-up on the Methyl Bromide phase out project, the labeling system for new ozone friendly products and Halon Bank activities;
- Update rules and regulations and develop regulation for HCFCs;
- Continue implementation of the quota and licensing systems;
- Follow-up on the preparation of new ODS phase-out projects;
- Follow-up on MeBr consumption for dates and quarantine & pre-shipment;
- Raise awareness on HCFCs and alternatives through posters, TV spots and brochures;
- Celebrate National Ozone Day;
- Participate, on a regular basis, in international and regional Montreal Protocol-related meetings on behalf of the Government of Jordan;
- Facilitate project supervision or evaluation as required by various MLF bilateral and multilateral agencies and the Monitoring and Evaluation Officer of the Executive Committee; and
- Facilitate performance and financial audits as required by the project.

44. Component 3 will span three renewals of the ISP by the MLF Executive Committee: ISP X (2013-2014), ISP XI (2015-2016), and ISP XII (2017-2018). Although the funding level of the two-year renewals is currently fixed for Jordan at US\$147,333, the Executive Committee has the discretion to adjust the funding schedule and level for Art. 5 countries. It is highly unlikely that it will change its approach during the Stage I HPMPs. Thus, the total value of Component 3 is US\$441,999.

Annex 3: Implementation Arrangements

1. The Stage I HCFC Phase-out Project is financed by grant funding from the Multilateral Fund for the Implementation of the Montreal Protocol (MLF). Terms and conditions of the use of the funds for Components 1 and 2, along with the specific performance targets are specified in an HCFC phase-out agreement between the MLF Executive Committee and Jordan (see Annex 7). In addition, the use of all grant proceeds is subject to the “Policies, Procedures, Guidelines and Criteria of the Multilateral Fund”, updated December 2012.

Project Institutional and Implementation Arrangements

2. As a Party to the Montreal Protocol since 1989, the Government of Jordan has continuously put measures into place to implement Protocol provisions and has ratified all amendments, including the Copenhagen Amendment in June 1995. The National Ozone Unit (NOU) was appointed in 1993 as the focal point for overall coordination of the ODS phase-out program in Jordan and to ensure that Jordan’s obligations to the Montreal Protocol are respected. It is responsible for coordinating and informing all relevant Government agencies and for regulating the private sector.

3. The National Ozone Committee (NOC) is an advisory body that is convened annually by MoEnv for weighing in on final import quotas of importers of ozone depleting substances (now limited to HCFCs and methyl bromide). Reflecting the new important linkages of the MP to other sectors of development, it now consists of representatives from Ministry of Trade and Industry, Ministry of Planning and International Cooperation, the Customs Department in Ministry of Finance, the Chamber of Industry, Chamber of Commerce, Ministry of Energy and Mineral Resources, Ministry of Agriculture and the Jordan Institute of Standard and Metrology. The inter-ministerial committee provides guidance to the NOU for preparing national ODS phase-out regulations and policies.

4. The NOC headed by MoEnv was set up at the beginning of the ODS phase-out program in Jordan. A cooperative relationship between these ministries and agencies with the NOU has ensued and is a major factor in Jordan’s track record of Montreal Protocol compliance.

5. Working groups are established as needed to evaluate proposed policies and make recommendations. The Secretary General of MoEnv who heads the NOC, may convene meetings more frequently in a given year, if need arises. On an advisory basis, the NOC or any of its working groups may be called to review progress reports and HCFC phase-out strategy documents pertaining to the Project and Jordan’s overall HPMP. In doing so, the NOC will ensure that schedules for new policies to come on line are consistent with ODS phase-out activities.

6. The Jordan Ministry of Environment, through its NOU, has a long record of engagement in various ODS-consuming sectors as the country’s focal point for Montreal Protocol implementation. MoEnv’s role has been not only to control imports of ODS through licensed importers but consisted of hands-on involvement in project implementation and monitoring ODS-consuming and converted enterprises. In fact, it has accumulated project implementation experience through the two previous ODS phase-out projects (ODS I and ODS II).

7. In 2000, Jordan revamped its policies by disseminating a series of instructions for controlling and monitoring ODS which included: prohibition of licensing of new installations based on CFCs; assigning MoEnv as the focal point for granting import license to ODS importers;

mandatory labeling of products containing ODS and ozone friendly materials; prohibiting ODS use at converted enterprises; and the possibility to increase taxes on use of ODS. Currently, importers must be licensed in order to import HCFCs. These policies will continue to be important for controlling HCFC growth and facilitating the phase-out.

8. The NOU will set the policy agenda for tackling HCFC consumption in HCFC-using sectors, in line with overall HPMP objectives. The NOU has the key role in delineating feasible technologies and approaches for all sectors in the early stages of implementation, including providing advice to companies for controlling ODS growth and for phase-out per agreed industry targets. The same approach will be taken for HCFC, however, given the long timeframe for HCFC phase-out and that all HCFCs falls under one ODS group, additional measures will have to be instituted at the sector level.

Project administration mechanisms

9. The implementation modality for the HCFC Phase-out Project will be similar to the one used for the implementation of the CFC, CTC and halon phase-out activities in Jordan, i.e. the Ministry of Planning and International Cooperation (MOPIC) will sign a Grant Agreement with the World Bank for an HCFC umbrella project and will designate the Ministry of Environment to implement the agreement in its capacity as focal point for Montreal Protocol implementation.

10. The NOU within the Ministry of Environment and headed by the Special Advisor to the Minister, will be in charge of day-to-day MP operations and oversight of the implementation of all ODS phase-out activities in Jordan. To complete these tasks, the NOU will be staffed with 3 full-time engineers, part time procurement and financial specialists (see the following sections), and 2 part time support staff (in addition to the Head of the Ozone Unit).

11. The NOU will be in charge of carrying out the HCFC Phase-out Project in accordance with annual work programs to be agreed upon with the World Bank, and therefore responsible for closely managing the work of the PMU. It will be responsible for maintaining the Project accounts and the preparation and furnishing progress and financial reports to the Bank on the Project implementation.

12. The NOU will be responsible for monitoring the preparation and implementation of Action Plans by the PMU for implementing the AC sector plan (Components 1 and 2). It will also be responsible for reporting to the World Bank. The monitoring will include among others, spot checks of the records of on-going projects and random enterprise visits.

13. The PMU will fall under the direct authority of the NOU and will implement the AC sector plan as per the overall HPMP Agreement between Jordan and the Executive Committee, with UNIDO as the Lead Agency and the World Bank as the Cooperating Agency. In cooperation with the NOU, the PMU will manage activities related to the implementation of investments and TA activities; ensuring that MLF and World Bank policies on financial management, use of funds and procurement are followed when implementing the subprojects. The PMU will have the technical responsibility to appraise the three subprojects and conclude sub-grant agreements for signing between MoEnv and the beneficiaries.

14. The PMU will be staffed by technical consultants and part-time (as needed) experts. The PMU will assist the NOU in further developing project implementation manual as needed, which will describe detailed procedures for project implementation, management structure,

accountability of various officers and departments within the Ministry of Environment as well as cooperating ministries on matters related the AC Sector Plan and HPMP (Components 1 and 2).

Financial Management, Disbursements and Procurement

Financial Management

15. The NOU, housed within the MoEnv, will be responsible for the project overall implementation, management, coordination and the main financial management functions. MOPIC, on the other side, will manage a US Dollar Designated Account (DA) that will be opened at the Central Bank of Jordan (CBJ) to make payments to beneficiaries. The NOU has wide implementation experience gained during the implementing of the ODS-II. Owing to the fact that the financial management functions were fully outsourced during the implementation of ODS-II, MoEnv did not build the necessary capacity to manage this Project. Therefore, a part time Financial Consultant will be externally appointed to assist the NOU Accountant who will be seconded from the MoEnv Finance Department. On the other side, an Accountant will be selected from MOPIC Finance Department who will closely work with the NOU Accountant on the financial related aspects of the Project.

16. **HCFC Consumption Reduction Sub-Grants.** The Grant is to finance investment, in the form of sub-grants, in HCFC reduction at residential air-conditioning enterprises including: i) Middle East Complex for Engineering, electronics and Heavy industries (PLC- MEC), ii) M. Abu Haltan Group for investments (L.L.C.- General Deluxe), and iii) National Refrigeration Company (NRC). The financial management assessment of those enterprises concluded that they maintain the adequate financial systems and the financial solvency to meet the long term objectives of investment in reducing HCFC consumption reduction except for MEC enterprise that faces high losses, shortage in liquidity, and high debt. In order to rectify these financial challenges, MEC management developed a business plan to put the enterprise's business and financial performance back on track. Full implementation of the rectifying measures as per the business plan is a prior condition for signing the sub-grant with MEC, which are:

- Agree with banks and lending parties to reschedule the debt of the group;
- Identify a strategic partner to increase the group's capital and support its financial position and decrease the leverage ratio and achieve positive working capital;
- Activate solid overall marketing plan in order to increase the group's sales and support the cash flow;
- Decrease massively the investment in stocks in order to achieve positive cash flow;
- Agree with all companies and related parties to settle their due amounts during 2013; and,
- Reduce administrative expenses and indirect manufacturing expenses in order to minimize the gross profit margin

17. The sub-grant will not be signed with MEC unless the above measures are implemented and improvement is witnessed in the group's liquidity and sales and reduction in losses and debt. The NOU will assess the latter using the annual audited financial statements to be provided by MEC.

18. **Project FM Risk.** The overall FM risk is assessed as "*Moderate,*" mainly due to:

- Funds are not utilized, by recipients, in accordance with the terms and conditions stipulated in the sub-grant agreements;
- Limited coordination between MOPIC and the NOU that may cause delays in financial reporting and payments to beneficiaries;
- Limited FM capacity at MOENV and prior experience with the World Bank's FM and disbursement guidelines; and,
- Lack of appropriate accounting system at MOENV.

19. The following measures are to be taken to mitigate FM-related risks:

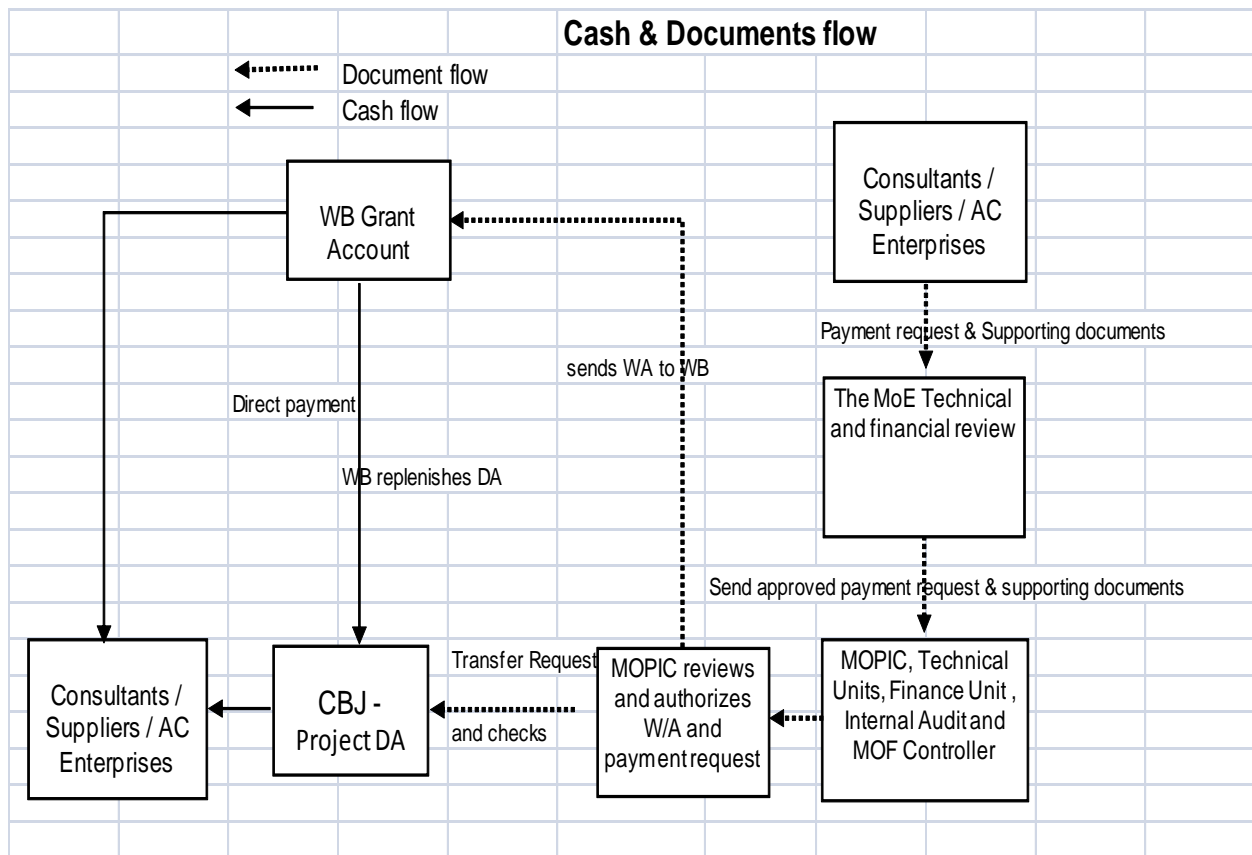
- Each enterprise will receive only a one time advance payment, at signing the Sub-Grant Agreement, with a maximum of 20 percent of the Sub-Grant and against a bank guarantee. Subsequent payments will be based on actual work completed;
- A qualified Financial Consultant will be hired, on part time basis, to work with NOU Accountant;
- Adequate training will be provided by the World Bank to the PMU on World Bank FM and disbursement guidelines; and
- The NOU FM team will be in close contact with the MOPIC designated Accountant.

20. The following measures are to be taken to mitigate FM-related risks:

- Payments to enterprises will follow the terms of payments as per the signed sub-grant agreements (SGAs), reflecting that:
 - i. Each enterprise will receive only a one time advance payment, at signing of the sub-grant agreement (SGA), with a maximum of 20 percent of the sub-grant and against a bank guarantee;
 - ii. 60 percent of equipment value will be paid only after being received at the enterprise warehouse and verified by a Committee consisting of MOENV, MOPIC, and the Audit Bureau (being the Government of Jordan's external auditor); and,
 - iii. The remaining value of equipment will only be paid after equipment has been installed and operational, the baseline equipment destroyed, and operations commissioned by the same above committee.
- A qualified financial consultant will be hired, on part-time basis, to support the NOU Accountant;
- A joint procurement and financial management training was delivered to around fifteen (15) participants from the Ministry of Environment, Ministry of Finance, Audit Bureau and representatives from the three beneficiary enterprises. Adequate training will continue being provided by the World Bank to the NOU on World Bank FM and disbursement guidelines as needed;
- The type of supporting documentation for replenishment has been agreed on and will be stipulated in the FM Manual;

- An independent external auditor, acceptable to the World Bank, will be hired to audit the project’s annual financial statements in accordance with terms of reference acceptable to the World Bank. The auditor will also assess the effectiveness of internal controls within the project; and,
- The project will use the same basic accounting software used for ODS-II, governed by a chart of account specifically developed for the Project. Expenditures according to the Project’s chart of account will be broken down by category and components.

21. **Budgeting and Funds Flow.** A project budget and periodical disbursement plan, based on the procurement plan and implementation schedule, will be developed by the NOU. To ensure that funds are readily available for project implementation, a US Dollar DA will be opened at the CBJ to be managed by MOPIC. The bulk of the Project’s expenditures relate to finance investment in HCFC consumption reductions in three residential air-conditioning manufactures, with estimated value of US\$ 1.94 Million (approximately 70 percent of total Grant value of US\$ 2.78 million). The DA will have sufficient funds to cover these costs up to 4 months in advance.



22. **Accounting and Reporting.** The Project will follow the cash basis of accounting where resources and uses of funds are recorded when cash is received or when payments are made. The system used in the MOENV is mainly a manual system which uses registers and only relies on a basic system to report on monthly expenditures with respect to budget. To be able to report on the Project’s activities and record expenditures made, the project will use the same basic accounting software used for ODS-II. This system will be governed by a chart of account

specifically developed for the Project. Expenditures according to the Project's chart of account will be broken down by categories and components.

23. The NOU will be responsible for preparing quarterly IFRs and annual project financial statements in accordance with International Public Sector Accounting Standards (IPSAS). The reports will consist of "Statement of Cash Receipts and Payments by category" and accounting policies and explanatory notes, including a footnote disclosure on schedules: (i) "the list of all signed Contracts per category" showing contract amounts committed, paid, and unpaid under each contract, (ii) Reconciliation Statement for the balance of the DA, and (iii) a list of assets (goods and equipment). The IFRs will reflect as well the financial status of the sub-grants provided to air-conditioning enterprises, under component one. The IFRs will be submitted by NOU to the World Bank within 45 days after the end of the concerned period. In parallel, MOPIC will keep records of all financial transactions and regularly reconcile them with NOU records.

24. **Internal Controls.** The Project will follow the controls specified in the National Financial System of the Hashemite Kingdom of Jordan, which includes: (i) technical approval of the department involved; (ii) finance staff checking and approval; (iii) resident Internal Auditors; and (iv) Ministry of Finance's Financial Controller who validates the accuracy of the payment and its compliance with the applicable laws in Jordan and with the World Bank procurement and FM procedures as well as the Grant terms and conditions. Complementing that, the Project will have in place supplementary controls for monitoring project activities, including the verification and approval of the NOU staff (financial and technical). Project's financial controls are documented in the PIM, which includes a FM chapter, describes the roles and responsibilities of MOPIC and NOU in relation to FM and disbursement, flow of funds, accounting and reporting, internal controls, auditing, flow of information and documentation, and management of sub-grants.

25. **External Audit.** An external independent auditor acceptable to the World Bank, financed by the Grant, will be hired to audit project financial statements in accordance with international standards of auditing. The audit report and management letter will be submitted by NOU to the World Bank within six months after the end of the audit period. NOU will be responsible for preparing the Terms of Reference for the auditor and submitting them to the World Bank for clearance. The auditor will be requested also to provide an opinion on the project's effectiveness of internal control system. The final payment for the auditor after the Closing Date will be transferred from the Grant account to an escrow account. According to the World Bank Policy on Access to Information issued on July 1, 2010, the audit report with audited financial statements of the project will be made available to the public.

26. **Training and Implementation Support.** During appraisal, a joint procurement and financial management training was delivered to around fifteen (15) participants from the Ministry of Environment, Ministry of Finance, Audit Bureau and representatives from the three beneficiary enterprises. The FM training covered the World Bank FM and disbursement guidance with focus on the FM related aspects of the sub-grants that will be signed with air-conditioning enterprises. The World Bank will continue providing training to NOU staff on World Bank FM and disbursement guidelines and procedures, and will provide FM implementation support during project supervision.

27. **Retroactive Financing.** Retroactive financing will be applied in this project. Eligible expenditures of up to \$28,000 under Category 3 incurred on or after December 21, 2012 to GA effectiveness (expected 8 April 2013) will be allowed for retroactive financing. Activities for retroactive financing are included in the procurement plan and are subject to the Bank's prior review. Retroactive financing will allow the NOU to function in the months between the date of effectiveness of the Project and the previous ODS II Project that closed on December 31, 2012. The audit of this retroactive financing will be covered in the audit for the year ending December 31, 2013.

Disbursements

28. The proceeds of the Grant will be disbursed as outlined in the Disbursement Letter and in accordance with the World Bank Disbursement Guidelines for Projects dated May 1, 2006. Transaction-based disbursement will be used under this project. Accordingly, requests for payments from the Grant will be initiated through the use of Withdrawal Applications (WAs) either for direct payments, reimbursements, and advances to the DA. All WAs will include appropriate supporting documentation, including detailed Statement of Expenditures (SOEs) for reimbursements and reporting on advances to the DA. The category of Eligible Expenditures that may be financed out of the proceeds of the Grant and the percentage of expenditures to be financed for Eligible Expenditures will be spelled out in the Grant Agreement.

Designated Account

29. The NOU will open a segregated Designated Account at the Central Bank of Jordan (CBJ) in US Dollars to cover Grant' shares of eligible project expenditures. The Ceiling of the Designated Accounts would be 10% of the Grant's amount. NOU will be responsible for submitting monthly replenishment applications with appropriate supporting documentation.

30. **Statements of Expenditures (SOEs).** Necessary supporting documents will be sent to the Bank in connection with contract that are above the prior review threshold contracts as per the procurement plan, except for expenditures under Contracts with an estimated value of: (a) US\$100,000 or less for Sub-Grants to AC Enterprises and Consulting Firms; and (b) US\$50,000 or less for Individual Consultants, which will be claimed on the basis of SOEs. The documentation supporting expenditures will be retained at the NOU and will be readily accessible for review by the external auditors and World Bank supervision missions. All disbursements will be subject to the conditions of the Grant Agreement and disbursement procedures as is defined in the Disbursement Letter. The documentation supporting expenditures will be retained at the NOU and will be readily accessible for review by the external auditors and World Bank supervision missions. All disbursements will be subject to the conditions of the Grant Agreement and disbursement procedures as will be defined in the Disbursement Letter.

31. Table 1 below specifies the categories of Eligible Expenditures that may be financed out of the proceeds of the Grant and the percentage of expenditures to be financed for Eligible Expenditures:

Table 1: Categories of Eligible Expenditures and the Percentage of Expenditures to be Financed by the MLF Grant

Category	Amount of the Grant Allocated (expressed in US\$)	Percentage of Expenditures to be Financed (inclusive of taxes)
Sub-grants to Beneficiary Enterprises	1,923,850	100%
Consultant's Services, Training, Goods and Incremental Operating Costs under Component 2 of the Project	417,300	100%
Consultant's Services, Training, Goods, Incremental Operating Costs and Recurrent Cost under Component 3 of the Project	441,999	100%
TOTAL AMOUNT	2,783,149	

32. "Training" means training courses, workshops, conferences, seminars and outreach activities carried out under the Project, including costs of purchase and publication of training materials, rental of facilities and equipment, travel expenditures and subsistence of trainees.

33. "Incremental Operating Costs" means Project related incremental costs on account of communication, translation and interpretation, printing, procurement-related advertising, service contracts, office supplies, banking charges, Project-related local travel including per diem accommodation and transportation, international travel for Montreal Protocol-related meetings, vehicle rental and fuel, public awareness, and other miscellaneous costs directly associated with Project implementation subject to prior approval by the World Bank.

34. "Recurrent Cost" means any remuneration paid to a civil servant through institutional strengthening grant funds provided by the Multilateral Fund for the additional work done in carrying out specific functions in the country's national ozone unit for Montreal Protocol implementation, including managing, coordinating, facilitating and monitoring activities to phase out ODS.

Procurement

35. An Overall Procurement Capacity Risk Assessment of the NOU concluded that the procurement system defines clearly the accountability of procurement decisions, the procurement process, and the complaints mechanism. In parallel, the assessment of the three enterprises ("Middle East Complex for Engineering, Electronics & Heavy industries PLC- MEC"; M. Abu Haltam Group for investments L.L.C.- General Deluxe"; and "National Refrigeration Company-NRC") concluded that the commercial practices were found to reasonably respect the procurement principle of economy and efficiency. All three enterprises follow the same procurement process: they rely on a roster of suppliers that is updated periodically. Comparison of quotations leads to awarding the least cost that has been evaluated to be offering the best value for money. Procurement is conducted efficiently (processing average timeliness if of 4-5 months). A solid inventory is in place and consistent yearly external audit is conducted. Financial administrative clearance (certifying that the enterprise has no overdue taxes) is observed diligently. However, no standard bidding documents are developed, and no procurement section is detailed in operation manuals.

36. The procurement risk rating with mitigation measures is **Moderate**. The identified Risks are (i) Record keeping/Inventory: Delays in deploying GEFMIS, (ii) Staffing: Improper

implementation of procurement activities under the project, (iii) Planning: Delayed implementation and ad hoc procurements resulting in overstocking or insufficient quantities for project needs, (iv) Bidding documents: Implementation delays because no standardized bidding documents (BDs) for national competitive bidding (NCB) known to local bidders, (v) Contract management: Delays in payments, (vi) Procurement oversight: Insufficient oversight of procurement, lack of compliance with Bank fiduciary obligation, mis-procurement, and (vii) Failure of the enterprises to execute the sub-grants satisfactorily.

37. Mitigating the risks to moderate, will entail implementing the following measures (i) Implement record security and backup program as early as possible in the project, (ii) The NOU will be supported by a procurement officer externally appointed or allocated from within the ministry; (iii) The STC mandate is to be extended for implementation of ODSIII; (iv) Agree on a training plan; (v) Arrange for appropriate support (staff, training, tools) to prepare the project procurement plan such that there is a clear relation between project objectives and the procurement plan; (vi) Prepare acceptable bidding documents for NCB; (vii) Rectifications of bidding document to avoid bidders administrative noncompliance; (viii) Independent external audit; (ix) Sub-Grants: Consultants shall be assisting enterprises to develop technical specifications, conduct market research, develop action plans, procurement planning, contract management (e.g. testing equipment at delivery at port).

38. World Bank “Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers” dated January 2011 and “Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers”, also dated January 2011 shall be used for the project procurement. The legal agreement with the Government and the sub-grant agreements to be signed with the three private sector enterprises shall be in particular referring to (i) paragraph 3.13; the eligibility of using Well-established Private Sector Procurement Methods or “Commercial practices” for implementing component 1, and (ii) the “Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants” dated October 15, 2006 and revised in January 2011.

39. The NOU will be supported by a procurement officer externally appointed or allocated from within the ministry. To expedite implementation, the Special Tender Committee (STC) mandate is to be extended for implementation of the project. The current STC is composed of the Ministry Of Environment, Ministry of Planning and International Cooperation, and Private Sector.

40. The Procurement Specialist of the NOU shall prepare the procurement section of the Project Operations Manual. For NOU activities, the section will include all standard bidding documents to be used under the project in National Competitive Bidding, Shopping, and selection of consultants. The pertaining forms (invitations, guarantees, notifications, etc.) shall be enclosed. The Bank will review the package. In addition the PIM will provide tools for efficiently monitoring and management of the contracts with the private sector. The manual is to reiterate that the enterprises shall be implementing sub-grants using their commercial practices.

41. Eligibility of paying civil servants under ODSIII project: Under Jordanian labor law (Chapter 10, Art. 68Z), civil servants are eligible for extra payments if (i) a prime minister waiver is obtained, and (ii) additional work is provided after regular hours. “Policies, Procedures, Guidelines and Criteria of the Multilateral Fund”, updated December 2012, do not prevent a limited staff of civil servants from receiving additional support to carry out the required

functions of the national ozone unit if required through institutional strengthening funds (Document UNEP/OzL.Pro/Executive Committee/7/20). Under World Bank procurement guidelines "Selection and Employment of Consultants- January 2011" section Eligibility article 1.13, these expenses may not be considered eligible unless under very particular circumstances as described in the article. Under this project, a supplemental payment will be made through the incremental operating costs disbursement category for one civil servant, the head of the ozone unit. Any changes to this arrangement must be submitted to the Bank for its review and no objection.

42. During appraisal a preliminary procurement plan was developed and thresholds and categories defined for the whole project. The NOU will consolidate its update bi-yearly or as seen necessary.

Environmental and Social (including safeguards)

43. The project will have indirect positive social benefits as it will reduce the negative global health impacts associated with ODS impact on the ozone layer. Given the nature of this HCFC phase-out plan, there are no anticipated adverse social impacts related to land acquisition, involuntary resettlement, and job changes or losses. The assessment has concluded that none of the three enterprises will need to expand, reduce or relocate operations.

44. The Project subproject targets the phase-out of HCFC use in manufacturing, for contributing to overall reductions of HCFC consumption by 10% of the baseline level by 2015 as per the Montreal Protocol, through investments at residential AC manufacturers to change from HCFC-22 to HFC-410A-based technology. Generally, these types of activities have minor to moderate adverse local environmental impacts specific to each site.

45. As the locations of subprojects are known at the time of appraisal, an environmental and social impact assessment (ESIA) and environmental and social management plan (ESMP) have been prepared by the NOU to address these site-specific impacts. The ESIA/ESMP will be used to provide guidance to both the NOU and beneficiary enterprises on the environmental and social management process to be followed in evaluating the baseline capacity and environmental performances of individual subprojects. The ESMP defines the content, procedures and institutional responsibilities for environmental management of the subprojects to ensure compliance with both Jordanian environmental assessment (EA) laws and regulations and World Bank EA policies and procedures as specified in OP/BP 4.01 (Environmental Assessment). For Components 2 and 3, which deals with policy reform, AC sector plan management, and institutional strengthening to support reduction of current production levels of HCFC producers, the ESMP is not applicable.

46. The project will have a net positive impact on the global environment by reducing the use of HCFCs, which are ozone-depleting substances and greenhouse gases with a global warming potential (GWP) ranging from several hundred to several thousand times that of CO₂. While HCFCs have an impact on the global environment, they have limited local impact as these chemicals are stable and not considered toxic or otherwise dangerous for the environment. The main environment and safety monitoring requirement for each HCFC phase-out subproject is to ensure that any negative impacts of the conversion on occupational health and the local environment can be minimized or prevented.

Preparation Phase

47. *Subproject Screening.* The enterprises have undergone initial project screening, and have each prepared a draft subproject ESMP. This subproject will be further refined and finalized to be attached as an annex in the subproject document package.

48. *Grievance Mechanism.* In order to ensure that consultation, disclosure, and community engagement continues throughout project implementation, the enterprises will establish a grievance mechanism. This should allow the enterprises to receive and facilitate resolution of concerns and grievance about the subprojects environmental performance raised by the affected communities or individuals.

49. *Review and Approval of Subprojects.* NOU will review the document package submitted by enterprise to ensure it is consistent in terms of environmental and social issues, mitigating measures, monitoring requirements and institutional responsibilities for mitigation and monitoring. The environmental and social documents will also be post-reviewed by World Bank. The review will include prior review during the early stages of project pre-conversion with respect to ESMP implementation, and post review after the enterprises and NOU have shown compliance with the ESMP.

50. *Related Conditions and Responsibilities.* NOU will ensure that an appropriate clause is included in the enterprise's contract obligating the enterprises to implement the mitigation, monitoring, and reporting measures specified in the ESMP and to strictly follow the procedures according to related Jordanian laws and regulations. It is the responsibility of the enterprises to ensure that relevant tender documents and contracts include requirements put forward in the ESMP. During subproject implementation, NOU has the right to check the documents and contracts to verify that this condition has been satisfied.

Implementation Phase

51. **Institutional Arrangements.** To mitigate environmental and social risks, implementation of the Environmental and Social Management Plan (ESMP) will be closely supervised by the NOU during project implementation. This work will be funded through counterpart funds. In addition, qualified environmental consultants will be contracted to support the PMU to perform the tasks required under this Plan in the identification and management of environmental risk in project evaluation and implementation. The contracted qualified consultants will provide environmental safeguard training to subproject owners and other stakeholders. The ESMP will be prepared and implemented by subproject owner with assistance from qualified consultants. Further, the Bank Team will periodically carry out field supervision and provide safeguard training and guidance to the PMU. Such supervision and safeguards training will be funded through the Bank's supervision budget.

52. **Public Consultations and Information Disclosure.** Public consultations have been conducted in accordance with the framework with beneficiary enterprise managers and employees, municipal actors, relevant neighbors to the enterprise sites. The ESIA/ESMP was disclosed in-country, through announcements published in the local newspaper and on the internet websites of NOU, as well as on the Bank's website, both on October 9, 2012. Revised safeguards documents were disclosed in-country as well as on the Bank's website, on January 15, 2013.

53. **Capacity Building.** Training shall include (1) relevant requirements of environmental laws and regulations; (2) environmental assessment procedures; (3) environmental issues which may be

caused by subproject preparation and implementation. The NOU, through its technical consultant, will also provide training on the safe handling and management of R-410A and related aspects of the conversion process. The training will be conducted by the Jordan MoENV/NOU in cooperation with chemical and equipment suppliers and regional experts. The training courses will be conducted regularly, particularly one is at the beginning of the Project in early 2013 (to help equipment procurement), one before the production start-up and several ones during the conversion. It is estimated that the funding for these training activities will be US\$10,000.

54. *Monitoring and Reporting.* NOU will work with local environmental authorities to ensure that subproject implementation meets the requirements of all specified safeguards instruments (ESMP and due diligence review report). NOU will require each enterprise to report on the implementation of its safeguards instruments. NOU will send a progress report on the safeguards instruments regularly to the Bank.

55. *Enterprises.* The enterprises will carefully document monitoring results in accordance with the Monitoring Plan included in the safeguards instrument and identify any necessary corrective or preventive actions taken during the monitoring period, as well as the results/outcome of similar actions that may have been taken in the previous reporting period.

Monitoring and Evaluation

56. Monitoring and reporting requirements for the project are at three levels: (a) overall program reporting for the MLF and Montreal Protocol; (b) project reporting level; and (c) subproject reporting level. The NOU-MoEnv will be responsible for monitoring overall progress of the project as well as the implementation of the Montreal Protocol. Component 3 funding will support the NOU in using its existing monitoring system of all sectors, enterprises, importers and suppliers that import and/or use ODS or ODS-based equipment. This entails random site visits, surveys, and stakeholder workshops; and maintenance of a database of all ODS users and importers. Results will be captured in various reports due to the Bank, the Multilateral Fund Secretariat and Executive Committee, and the Ozone Secretariat.

A. Overall Monitoring and Reporting for the MLF and MP

57. Separate approvals by the Executive Committee for funding tranches under Components 1 and 2, and for renewals of institutional strengthening funding under Component 3 require separate reporting on an annual basis and according to an agreed timetable for release of the grants periodically.

58. **Tranche Implementation Reports and Plans.** These are required for reporting on the progress of the AC Sector Plan (Components 1 and 2) in the context of Jordan's overall Stage I HPMP. Each report will provide a complete overview of all activities of all project components that were carried out in the previous tranche period and which will be carried out in the subsequent year(s). An estimated budget for each component of the AC Sector Plan (per that approved by the Executive Committee) and expected disbursement for the related calendar year are to be included. The report will also provide an update of achievements and lessons learned from the previous year/period including the amount of ODP reduction captured by the subprojects, actual ODP reduction from completed subprojects, and expenditures made in the previous year work programs. These Tranche Implementation Reports and Plans will be prepared in accordance with the format agreed upon by the Executive Committee.

59. Institutional Strengthening Terminal Reports and Renewal Requests. In order to renew the institutional strengthening (IS) grant according to the approved Executive Committee schedule (every two years, starting with January 2013), a biennial terminal report and renewal request is to be prepared utilizing the template approved by the Executive Committee.

60. Annual Progress Reporting. Project implementation updates, including level of disbursement, milestones achieved, implementation delays and other status notes shall be provided to the Executive Committee through the Bank each for Components 1 and 2 (AC Sector Plan) and Component 3 (ISP).

61. Project Completion Report. The NOU will prepare a project completion report for the air-conditioning sector plan upon completion of the subprojects and receipt of beneficiary reports. The PCR shall be prepared in accordance with the data requested in the MLF Secretariat's template for multi-year agreements. The PCR should be submitted to the Bank within three months after completion of the last activity in the AC Sector Plan. This report will include lessons learned and a detailed account of expenditures and outputs.

62. Other reports that may be required by the Executive Committee and the Montreal Protocol. The Executive Committee and the Parties to the MP may request ad hoc reports as need arises.

63. In addition to the reporting above, Jordan is obligated to report annual ODS consumption to the Ozone and MLF secretariats under Article 7 of the Montreal Protocol and the country programme updated under the IS project respectively. The latter report includes sector by sector consumption whereas the former reports on the various substances controlled by the MP only. The Bank will be responsible for transmitting reports to the MLF as defined in the HPMP agreement between Jordan and the MLF Executive Committee and as required by the Executive Committee on various Executive Committee-approved activities. In coordination with the NOU and the lead agency for the HPMP (UNIDO) the Bank will submit the "tranche implementation reports and plans" and HCFC consumption verification reports on the AC sector to the Executive Committee on behalf of Jordan in order to confirm the achievement of the previous year's work program.

B. Project Monitoring and Reporting

64. The NOU will be responsible to provide the following reports to the World Bank:

- Annual work program: An annual work program will provide a complete overview of the activities of all project components to be carried out within the calendar year). It should include an estimated budget for the related calendar year.
- Quarterly interim financial reports. Quarterly interim financial reports will be prepared by NOU and submitted to the Bank not later than 45 days after the end of each calendar quarter. The financial management reports will be prepared in accordance with the format agreed by with the Bank.
- Annual financial auditing report of the project account. Annual audited reports of the project account should be prepared by independent qualified financial auditors on a calendar year basis. The annual audited reports should be made available to the Bank by 1 July of each calendar year.
- Semi-annual progress reports. Semi-annual progress reports ("project reports") should be prepared by NOU based on the format agreed with the Bank. The NOU should make

semi-annual progress reports available to the Bank not later than 45 days after the end of the six-month period covered (periods January 1 through June 30 and July 1 through December 31).

C. Subproject Monitoring and Reporting

65. The NOU through the PMU will be responsible for providing the following reports to the World Bank:

- Subprojects and appraisal reports. The NOU will ensure that each beneficiary prepares a subproject proposal. Immediately prior to signing any subproject agreements, the NOU should prepare a subproject appraisal report to confirm funding eligibility of each enterprise. The appraisal reports should provide any updates on the assessments of the financial health of the enterprises done at Project appraisal, including availability of counterpart funding, if counterpart funding is needed. The main focus of the appraisal however shall be technical – to ensure all baseline equipment is in use and to verify the consumption levels of HCFC.
- Subproject completion reports. Subproject completion reports should be prepared by the beneficiaries with support from NOU. The format of the subproject completion report is included in the PIM. Subproject completion reports should be submitted to the Bank within three months after completion of the related subproject contracts.
- Safeguards Monitoring and Subproject Progress Reports: Regular monitoring will be led by the NOU during the full conversion period (planned from 2013 through 2016). Subproject implementation progress reports are to be prepared by the enterprises biannually with details of conversion activities such as time of conversion, testing, trials and progress and results of mitigation and monitoring measures. Information on the implementation of the Environmental and Social Monitoring Plan should be included which in turn will be included in the project's semi-annual progress reports.

Annex 4: Operational Risk Assessment Framework (ORAF)

Jordan: Jordan Ozone Depleting Substances HCFC Phase-Out Project (ODS3) (P127702)

1 Project Stakeholder Risks							
Stakeholder Risk	Rating	Moderate					
<p>Description:</p> <p>There is limited time remaining before the control measures enter into force and the AC enterprise beneficiaries may not be able to convert their production lines on time to impact HCFC import levels.</p> <p>Smaller beneficiary enterprises may have challenges to adopt the alternative technology and in procurement of equipment.</p> <p>The project aims to assist Jordan to reduce its HCFC consumption to 90% of the baseline level by 2015 and to 80% by 2017. Beneficiary enterprises converting to non-HCFC technology earlier than end 2016 when the HCFC-22 ban in AC manufacturing can be put into place will be at a disadvantage as new products will be initially more expensive.</p> <p>Stakeholders are adopting a refrigerant technology that has climate impact (GWP of 2100) which can be a potential risk in the longer term for exports to countries that have restrictions on HFCs in products and in terms of any future Jordan climate policy.</p>	Risk Management:						
	HCFC importers and manufacturers will be encouraged to stockpile HCFCs in 2012, before the control measures enter into force, to supplement the quantities that they can import in 2013 and 2014. This stockpile will enable manufacturers to maintain their normal industrial operations until conversion is completed.						
	Resp: Client	Status: Completed	Stage: Preparation	Recurrent: <input type="checkbox"/>	Due Date: 31-Dec-2012	Frequency:	
	Risk Management:						
	Part of the TA component will deliver targeted technical expertise to these enterprises.						
	Resp: Client	Status: Not Yet Due	Stage: Implementation	Recurrent: <input type="checkbox"/>	Due Date: 31-Dec-2014	Frequency:	
	Risk Management:						
	To ensure a level-playing field, the manufacturers that may convert earlier will be allowed to continue using HCFC-22 from stocks until the ban becomes effective. In addition, the project will seek to leverage additional assistance from ongoing bilateral EE activities to create market demand for more energy efficient, HCFC-free AC units.						
Resp: Client	Status: Not Yet Due	Stage: Implementation	Recurrent: <input type="checkbox"/>	Due Date: 31-Dec-2014	Frequency:		
Risk Management:							
The TA component will provide for a continued evaluation of new and emerging technologies as they come on the market for manufacturers, importers and service technicians in the AC sector that may later opt for use of greener technology, where it becomes available. Good practice guidelines/training material will be developed to help the service sector handle new, alternative refrigerant technologies.							
Resp: Client	Status: Not Yet Due	Stage: Implementation	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency:		

Implementing Agency (IA) Risks (including Fiduciary Risks)

Capacity	Rating	Moderate					
<p>Description:</p> <p>The project will contribute to the Government's efforts to meet the phase-out obligations under the Montreal Protocol in 2013 through 2017 however the World Bank is not the lead agency working on Jordan's overall HCFC Phase-out Management Plan which sets the policy framework for compliance.</p> <p>Limited FM capacity of implementing agency.</p> <p>Limited procurement capacity.</p>	Risk Management:						
	<p>The main policy instrument for controlling HCFC imports – the import quota system - will be established by MoE by January 2013. The Bank will work with the Government through the ongoing Institutional Strengthening component of ODS II in 2012 to ensure it is on its way to putting the system into place.</p> <p>A part time Financial Consultant will be appointed to assist the NOU Financial Officer who will be seconded from the MOE Finance Department.</p> <p>A procurement consultant will be appointed to handle procurement activities. She/he will be seconded by a MOE procurement officer. Training on procurement guidelines will be provided.</p>						
	Resp: Client	Status: Completed	Stage: Preparation	Recurrent: <input type="checkbox"/>	Due Date: 31-Dec-2012	Frequency:	
Governance	Rating	Low					
<p>Description:</p> <p>The NOU has nearly 20 years of experience in overseeing MLF projects and approximately 10 years' experience in managing implementation and there have been no governance issues to date. This is despite a frequent turnover in the MoEnv which houses the NOU.</p> <p>Funds are not utilized, by recipients, in accordance with the terms and conditions stipulated in the sub-grant agreements.</p>	Risk Management:						
	<p>The Bank project team will work with the Recipient to ensure that there are structures and institutions in place within the NOU to maintain its excellent track record in future years.</p>						
	Resp: Both	Status: In Progress	Stage: Implementation	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency:	
	Risk Management:						
<p>Continuous implementation monitoring by the NOU, only one time advance payment to recipients against bank guarantees, and IFRs will reflect the financial status of sub-grants.</p>							
	Resp: Client	Status: Not Yet Due	Stage: Implementation	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency:	
Project Risks							
Design	Rating	Moderate					
<p>Description:</p> <p>Project design partly depends on programs and actions beyond the financing boundaries of the</p>	Risk Management:						
	<p>Consultations will be initiated immediately between industry, MoE and agencies responsible for product labeling as well as bilateral and multilateral agencies that are undertaking related activities (standards and labeling, product testing, etc.) in order to synchronize work on the supply and demand sides.</p>						

<p>project, i.e. in terms of creating demand for new products of converted enterprises (and hence sustainable phase-out).</p> <p>Possible inconsistency between WB FM guidelines and guidelines and decisions of the Multilateral Fund of the Montreal Protocol</p>	Resp: Both	Status: In Progress	Stage: Both	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency:
	<p>Risk Management:</p> <p>Any inconsistency between WB FM guidelines and guidelines and decisions through the Ozone Trust Fund under the MLF will be identified and addressed and all FM procedures will be agreed on.</p>					
	Resp: Both	Status: Completed	Stage: Both	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency:
Social and Environmental	Rating	Low				
<p>Description:</p> <p>HCFCs are ozone depleting substances and greenhouse gases with a significant global warming potential. HFC-410A, the identified alternative to HCFC-22 in the project, is also a potent greenhouse gas.</p> <p>While HCFCs and HFCs have an impact on the global environment, they have limited adverse local impacts, as these chemicals are stable and not considered toxic or dangerous for human health or the environment. However, they require careful handling in transport, and storage. Moreover, environmental, health and safety management at present in the three recipient plants is not adequate at present.</p> <p>The involuntary resettlement policy is not triggered, as the project is not expected to entail land acquisition. Some limited physical works might occur. They will be mitigated at the site level along with health and safety measures.</p>	<p>Risk Management:</p> <p>Jordan has a strong environmental protection framework with regulation that controls HCFCs. The general standards of environmental management and worker health and safety at the plants to be supported by the project were reviewed and the Environmental and Social Management Plan (ESMP) was prepared by the Recipient. In addition, capacity building and training of workers for the safe handling of chemicals and equipment is an integral part of the project.</p>					
	Resp: Client	Status: In Progress	Stage: Both	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency:
Program and Donor	Rating	Low				
Description:	Risk Management:					

<p>The Project funding is a grant stemming from the Montreal Protocol's Multilateral Fund (MLF) that will be provided to the country in several tranches depending on Jordan's ability to meet annual HCFC consumption targets. In its 20+ year history, the MLF has always been replenished in a manner allowing commitments to countries to be met. However, because of the recent global financial crisis and particularly difficulties experienced in Europe, future contributions may suffer.</p>	<p>The Bank will ensure that the MLF Executive Committee is kept fully up to date with Jordan's rate of disbursement and its financing needs throughout the next four years and communicate experience on the ground in terms of actual equipment and services costs to allow the Committee to make informed decisions on the level of future grants in similar sectors.</p>						
	Resp: Bank	Status: Not Yet Due	Stage: Implementation	Recurrent: <input checked="" type="checkbox"/>	Due Date:	Frequency:	
Delivery Monitoring and Sustainability	Rating	Low					
<p>Description: Reverse retrofit to HCFC after conversion completed as HCFCs are still available in Jordan and could undermine the PDO of the Project.</p>	<p>Risk Management: MoEnv plans on imposing a ban on the use of HCFCs in the AC manufacturing sector. The NOU will need to monitor the use of HCFCs in all remaining sectors to ensure there is no diversion to the AC sector. The project will promote compliance with the highest grade in the new labeling requirement for residential air-conditioners. MoEnv will work with MEMR and other agencies to put into place incentive mechanisms to stimulate demand for EE products</p>						
	Resp: Client	Status: Not Yet Due	Stage: Implementation	Recurrent: <input type="checkbox"/>	Due Date: 31-Dec-2016	Frequency:	
Overall Risk							
Implementation Risk Rating: Moderate							
<p>Description: The project is not complicated on a technical level. However, in terms of ensuring uptake of the converted production and non-HCFC based air-conditioning, the coordination, partnerships and policy/regulatory measures required must be well-planned and executed. This in turn impacts the sustainability of project outcomes.</p>							

Annex 5: Implementation Support Plan

1. The implementation support plan (ISP) has been designed taking into account the project's technical and complex nature, its risk profile and the lack of experience with Bank projects of the participating beneficiary enterprises. Through the ISP, the task team will provide support/guidance to the client in addressing the key risks identified in the ORAF (Annex 4). The principal risks are (a) design risks related to the project's technical complexity and the acceptability of HFC-410A to HCFC alternatives; (b) capacity risk due to the lack of experience of the beneficiary enterprises; and (c) implementation risks due to the profitability of HCFC-22 and reluctance of beneficiary enterprises to undergo conversion.

Implementation Support Strategy

2. The ISP will focus on:

- **Technical Support.** The project will provide technical assistance to the beneficiary enterprises through workshops on HC technology and the hiring of international experts. In addition the project has a specific component to provide TA and policy support to strengthen overall institutional framework for HCFC phase-out in AC production, establish an M & E system; provide training and facilitate information exchange and dissemination. The project team will hire a consultant to independently verify that the HCFC production and consumption phase-out targets are being met and will provide advice/guidance on issues which prevent the realization of said targets.
- **Support to Beneficiary Enterprises.** Most of the beneficiary enterprises that will participate in the project lack experience with Bank projects. Under the project, training will be provided to enterprises on the Bank's guidelines and procedures for FM/disbursement, environment and social safeguards and procurement. The task team will provide assistance in developing the sub-grant agreements between the NOU and ongoing support to MoEnv/NOU in implementing the SGAs.

3. The Bank team will closely monitor compliance with Bank FM/disbursement/safeguards and procurement requirements.

Implementation Support Plan

4. Most of the Bank team members are in HQ. However, the procurement, FM/disbursement and safeguards specialists are based in the MENA Region and will be able to provide more timely support to the client in terms of day to day operations. The Bank team will conduct semi-annual field visits to review implementation status and address potential issues and monitor progress on pending matters.

Table A5.1 Skills Mix Required

Skills Needed	Number of Staff weeks per year	No. of Trips
Technical experts in HCFC production phase-out	18	4
MLF guidelines and decisions	12	6
Institutional Strengthening facilitation and monitoring	18	6
Safeguard Specialist	2	5
FM Specialist	5	5
Procurement Specialist	5	5
Logistics management in HQ and Amman	12	1

Annex 6: Economic Analysis

1. An economic model was developed based on available data and on the methods of assessment explained in more detail in a background paper (Macroeconomic Analysis of Employing Energy-Efficient Air Conditioning in Jordan, T. Al-Assad, August 2012). The analysis aimed to assess the impact of the proposed project activities for HCFC-22 phase-out in Jordan in the AC sector. The model evaluated the economic impact at the household, sectoral, and the national levels. The model allows for manipulation of the cost and input parameters so as to develop different scenarios for the analysis.

Socioeconomic Impact at the Household Level

2. Phasing out HCFC based AC models and phasing in more efficient, non-HCFC AC models will increase the price of the AC units. The expected price increase of AC units per cooling capacity at business as usual over the coming 20 years would be around 160%. This additional cost on AC users would reduce the affordability of AC units to consumers particularly for households and might jeopardize the expected gains from moving to more EE AC models. However, this scenario is unlikely to happen for different reasons that include the following:

- Expected savings in electricity bills in the first year of installing alternative, EE AC units exceeds the additional cost of purchasing these units. Even if the increase in the AC unit price is more than double of what is estimated (\$100-150 more than baseline), this cost will be recovered within two years. A comparison between the incremental cost of the new AC unit and the forecasted electricity cost savings provides a clear indication that this additional cost will be recovered quickly by the AC consumers.
- This additional cost is paid only once when the consumer purchases the AC unit while the saving in electricity cost continues over the lifetime of the AC unit of about 10 years.
- This price increase in the AC unit is expected to be around 10-20% of the current price of HCFC-based AC units, which will not be a significant obstacle to consumers considering expected income growth of Jordanian households.
- By year 2017, AC users will have only the option of buying non-HCFC, more EE AC models because of the Government's plans to ban the manufacturing and import of HCFC-based residential air-conditioning.
- The electricity tariff is most likely to increase in Jordan which will make the option of using EE AC more appealing.

Costs and Benefits at the Household Level

3. **Costs to Individual Air Conditioner Users:** *Incremental cost of buying energy efficient models of AC (Continuous):* AC consumers will most likely pay higher costs for energy efficient, HFC-based AC units as a result of the incremental operating costs incurred by the local manufacturers or the additional cost of importing non-HCFC based, energy efficient AC units.

4. **Benefits to Individual Air Conditioner Users:** *Lower electricity bills (Continuous):* A major benefit to AC consumers is a reduction in their electricity bills as a result of energy savings. The savings will depend on the grade level (energy performance) of the AC units that users will install. *Maintenance cost reduction (continuous):* As a result of using R-410A

refrigerant and more advanced components and equipment, the leakage rate of the refrigerant will decrease from the current estimated rate at 10-30% in Jordan to a 5-10% leakage rate. The savings will come from the difference between the cost of the HCFC refrigerant lost and the R-410A refrigerant lost annually. Additionally, the frequency of the maintenance service required might be decreased. This also has a resulting benefit to the climate with less gases with GWP emitted to the atmosphere.

Costs and Benefits at the Government of Jordan Level

5. **Costs to Jordanian Government: *Government contribution to AC manufacturers (Fixed)***: The main contribution comes from the tax exception on imported equipment if any is applied and the governmental contribution (in this case external funding from the MLF given Jordan's status as an Article 5 country under the Montreal Protocol) in the capital investment required to upgrade the existing production lines.

6. **Benefits to Jordanian Government: *Reduction in subsidy budget (Continuous)***: This will occur only if the government continues to subsidize the electricity rates as a practice started since early 2011 after the economic crises and the political tensions in the region. However, with the recent commitment of the Government of Jordan to remove the temporary subsidy on electricity as part of the economic reform plan for the coming five years, it is not expected that this policy will continue. ***Incremental increase in sales tax and customs (Continuous)***: The increase will come mainly from the additional sales tax accrued of buying more EE models of AC. The current sales tax is 16% applied over the final sales value. Additionally, if no tax exception is applied on the imported items to upgrade the local factories, then more customs will be collected from the AC industry. ***Reduction in fuel cost***: The fuel used to generate power in Jordan is purchased by NEPCO that is owned by the GoJ and then sold to the generation utilities. Therefore, any reduction in the fuel consumption for power generation will reduce the fuel bill of the Government and thereby reduce the import cost.

Global Environment and Health Benefits

7. Major environmental benefits would accrue from the use of less power, thereby burning less fuel (with avoided CO₂ emissions) and use of less water for cooling; and, from the use of refrigerants not harmful to the ozone layer (the GWP of the replacement refrigerant is largely offset by energy gains in AC system). Quantifying benefits and monetizing their value is challenging however, and requires information that is not available at this stage. Becker et al., (2008) examined the value of the avoided negative environmental effects of using EE appliances based on the pollution cost of four major pollutants SO₂, NO_x, CO₂, and PM as published by the Public Utility Authority-Electricity of Israel. There are various other approaches for monetizing environmental externalities that include (1) damage costing approaches that seek to value the damage resulted from a specific pollutants, and (2) control cost approaches that seek to estimate the marginal cost of controlling a certain pollutant (Hornby et al., 2008). Nevertheless, reduction of pollution through lower SO₂, NO_x, CO₂ and ODS emissions is expected to improve ambient health conditions and guard against environmental deterioration.

8. Generating less power will result in the consumption of less water for cooling power generation plants and thereby frees water for use in other economic activities. The monetary environmental benefits can be estimated based on the economic value of using water for power generation or for other economic activities. AFD (2011) estimated the economic value of water used for power generation to be 173.7 USD per cubic meter.

Macroeconomic Results:

9. As expected, the results of the assessment show that the AC users and the government sectors have a positive NPV, while the electric utilities and AC industry have a negative NPV. The AC users enjoy a greater net benefit mainly because of large savings in electricity costs which substantially overcomes the additional cost of buying a more EE AC units. The Government also would have a large net benefit as a result of the reduction in fuel cost. The AC industry would lose little with a negative NPV of about \$1.25 million that mainly occurs during the years of upgrading production lines between 2013 and 2015. It is noted that with the project, this cost is largely offset by the incremental capital cost funding provided by the MLF. It was found that electric utilities would be the largest losers from lower electricity demand with a net loss of about \$400 million. Nonetheless, the net benefit to Jordan can be considered more important than the benefit to any particular company. In addition, demand for electricity (both energy and capacity) will continue to grow, so electric companies would eventually appreciate relief from lower demand through EE air-conditioning.

Annex 7: Agreement between the Government of Jordan and the Executive Committee of the Multilateral Fund for the Reduction in Consumption of HCFCs

1. This Agreement represents the understanding of the Government of the Hashemite Kingdom of Jordan (the “Country”) and the Executive Committee with respect to the reduction of controlled use of the ozone-depleting substances (ODS) set out in Appendix 1-A (“The Substances”) to a sustained level of 66.4 ODP tons by 1 January 2017 in compliance with Montreal Protocol schedules, with the understanding that this figure is to be revised one single time, once the baseline consumption for compliance has been established based on Article 7 data.
2. The Country agrees to meet the annual consumption limits of the Substances as set out in row 1.2 (“Maximum allowable total consumption of Annex C, Group I substances”) of Appendix 2-A (“The Targets, and Funding”) in this Agreement as well as in the Montreal Protocol reduction schedule for all Substances mentioned in Appendix 1-A. The Country accepts that, by its acceptance of this Agreement and performance by the Executive Committee of its funding obligations described in paragraph 3, it is precluded from applying for or receiving further funding from the Multilateral Fund in respect to any consumption of the Substances that exceeds the level defined in row 1.2 of Appendix 2-A (“Maximum allowable total consumption of Annex C, Group I Substances”) as the final reduction step under this Agreement for all of the Substances specified in Appendix 1-A, and in respect to any consumption of each of the Substances that exceeds the level defined in rows 4.1.3 and 4.2.3 (remaining eligible consumption).
3. Subject to compliance by the Country with its obligations set out in this Agreement, the Executive Committee agrees in principle to provide the funding set out in row 3.1 of Appendix 2-A (“The Targets, and Funding”) to the Country. The Executive Committee will, in principle, provide this funding at the Executive Committee meetings specified in Appendix 3-A (“Funding Approval Schedule”).
4. The Country agrees to implement this Agreement in accordance with the HCFC phase-out plans submitted. In accordance with sub paragraph 5(b) of this Agreement, the Country will accept independent verification of the achievement of the annual consumption limits for each of the Substances as set out in row 1.2 of Appendix 2-A (“The Targets, and Funding”) of this Agreement. The aforementioned verification will be commissioned by the relevant bilateral or implementing agency.
5. The Executive Committee will not provide the Funding in accordance with the Funding Approval Schedule unless the Country satisfies the following conditions at least eight weeks in advance of the applicable Executive Committee meeting set out in the Funding Approval Schedule:
 - (a) That the Country has met the Targets for all relevant years. Relevant years are all years since the year in which the hydrochlorofluorocarbons phase-out management plan (HPMP) was approved. Years for which no obligation for reporting of country programme data exists at the date of the Executive Committee meeting at which the funding request is being presented are exempted;
 - (b) That the meeting of these Targets has been independently verified, unless the Executive Committee decided that such verification would not be required;

(c) That the Country had submitted annual implementation reports in the form of Appendix 4-A (“Format of Implementation Reports and Plans”) covering each previous calendar year, that it had achieved a significant level of implementation of activities initiated with previously approved tranches, and that the rate of disbursement of funding available from the previously approved tranche was more than 20 per cent;

(d) That the Country has submitted and received approval from the Executive Committee for an annual implementation plan in the form of Appendix 4-A (“Format of Implementation Reports and Plans”) covering each calendar year until and including the year for which the funding schedule foresees the submission of the next tranche or, in case of the final tranche, until completion of all activities foreseen; and

(e) That, for all submissions from the 68th meeting onwards, confirmation has been received from the Government that an enforceable national system of licensing and quotas for HCFC imports and, where applicable, production and exports is in place and that the system is capable of ensuring the Country's compliance with the Montreal Protocol HCFC phase-out schedule for the duration of this Agreement.

6. The Country will ensure that it conducts accurate monitoring of its activities under this Agreement. The institutions set out in Appendix 5-A (“Monitoring Institutions and Roles”) will monitor and report on implementation of the activities in the previous annual implementation plans in accordance with their roles and responsibilities set out in Appendix 5-A. This monitoring will also be subject to independent verification as described in paragraph 4 above.

7. The Executive Committee agrees that the Country may have the flexibility to reallocate the approved funds, or part of the funds, according to the evolving circumstances to achieve the smoothest reduction of consumption and phase-out of the Substances specified in Appendix 1-A.

(a) Reallocations categorized as major changes must be documented in advance in an annual implementation plan and approved by the Executive Committee as described in sub-paragraph 5(d) above. The documentation can also be provided as part of a revision to an existing annual implementation plan, to be submitted eight weeks prior to any meeting of the Executive Committee. Major changes would relate to:

- (i) Issues potentially concerning the rules and policies of the Multilateral Fund;
- (ii) Modifications to any clause in this Agreement;
- (iii) Changes in the annual levels of funding allocated to individual bilateral or implementing agencies for the different tranches;

(b) Provision of funding for programmes or activities not included in the current endorsed annual implementation plan, with a cost greater than 30 per cent of the total cost of the last approved tranche;

(c) Removal of activities in the annual implementation plan with a cost greater than 30 per cent of the total cost of the last approved tranche;

(d) Reallocations not categorized as major changes may be incorporated in the approved annual implementation plan, under implementation at the time, and reported to the Executive Committee in the subsequent annual implementation report; and

(e) Any remaining funds will be returned to the Multilateral Fund upon completion of the last tranche foreseen under this Agreement.

8. Specific attention will be paid to the execution of the activities in the refrigeration servicing sub-sector, in particular:

(a) The Country would use the flexibility available under this Agreement to address specific needs that might arise during project implementation; and

(b) The Country and the bilateral and implementing agencies involved will take full account of the requirements of decisions 41/100 and 49/6 during the implementation of the plan.

9. The Country agrees to assume overall responsibility for the management and implementation of this Agreement and of all activities undertaken by it or on its behalf to fulfil the obligations under this Agreement. UNIDO has agreed to be the lead implementing agency (the “Lead IA”) and the World Bank has agreed to be the cooperating implementing agency (the “Cooperating IA”) under the lead of the Lead IA in respect of the Country’s activities under this Agreement. The Country agrees to evaluations, which might be carried out under the monitoring and evaluation work programmes of the Multilateral Fund or under the evaluation programme of any of the agencies taking part in this Agreement.

10. The Lead IA will be responsible for carrying out the activities of the overall plan with the changes approved as part of the subsequent submissions, including but not limited to independent verification as per sub-paragraph 5(b). This responsibility includes the necessity to co-ordinate with the Cooperating IA to ensure appropriate timing and sequence of activities in the implementation. The Cooperating IA will support the Lead IA by implementing the activities listed in Appendix 6-B under the overall co-ordination of the Lead IA. The Lead IA and Cooperating IA have reached consensus on the arrangements regarding inter-agency planning, reporting and responsibilities under this Agreement to facilitate a coordinated implementation of the Plan, including regular coordination meetings. The Executive Committee agrees, in principle, to provide the Lead IA and the Cooperating IA with the fees set out in rows 2.2 and 2.4 of Appendix 2-A.

11. Should the Country, for any reason, not meet the Targets for the elimination of the Substances set out in row 1.2 of Appendix 2-A or otherwise does not comply with this Agreement, then the Country agrees that it will not be entitled to the Funding in accordance with the Funding Approval Schedule. At the discretion of the Executive Committee, funding will be reinstated according to a revised Funding Approval Schedule determined by the Executive Committee after the Country has demonstrated that it has satisfied all of its obligations that were due to be met prior to receipt of the next tranche of funding under the Funding Approval Schedule. The Country acknowledges that the Executive Committee may reduce the amount of the Funding by the amount set out in Appendix 7-A in respect of each ODP kg of reductions in

consumption not achieved in any one year. The Executive Committee will discuss each specific case in which the Country did not comply with this Agreement, and take related decisions. Once these decisions are taken, this specific case will not be an impediment for future tranches as per paragraph 5 above.

12. The Funding of this Agreement will not be modified on the basis of any future Executive Committee decision that may affect the funding of any other consumption sector projects or any other related activities in the Country.

13. The Country will comply with any reasonable request of the Executive Committee, the Lead IA and the Cooperating IA to facilitate implementation of this Agreement. In particular, it will provide the Lead IA and the Cooperating IA with access to the information necessary to verify compliance with this Agreement.

14. The completion of stage I of the HPMP and the associated Agreement will take place at the end of the year following the last year for which a maximum allowable total consumption level has been specified in Appendix 2-A. Should there at that time still be activities that are outstanding, and which were foreseen in the Plan and its subsequent revisions as per subparagraph 5(d) and paragraph 7, the completion will be delayed until the end of the year following the implementation of the remaining activities. The reporting requirements as per subparagraphs 1(a), 1(b), 1(d), and 1(e) of Appendix 4-A will continue until the time of the completion unless otherwise specified by the Executive Committee.

15. All of the conditions set out in this Agreement are undertaken solely within the context of the Montreal Protocol and as specified in this Agreement. All terms used in this Agreement have the meaning ascribed to them in the Montreal Protocol unless otherwise defined herein.

APPENDICES:

Appendix 1-A: The Substances

Substance	Annex	Group	Starting Point for aggregate reductions in consumption (ODP tons)
HCFC-22	C	1	54.19
HCFC-141b	C	1	40.11
Total			94.30

Appendix 2-A: The Targets, and Funding

		2009	2011	2012	2013	2014	2015	2016	2017	Total
1.1	Montreal Protocol reduction schedule of Annex C, Group I substances (ODP tons)	n/a	n/a	n/a	83.0	83.0	74.7	74.7	74.7	n/a
1.2	Maximum allowable total consumption of Annex C, Group I substances (ODP tons)	n/a	n/a	n/a	83.0	83.0	74.7	70.5	66.4	n/a
2.1	Lead IA (UNIDO) agreed funding (US \$)	2,167,033	70,000	0	22,184	0	0	0	0	2,259,217
2.2	Support costs for Lead IA (US \$)	162,527	6,300	0	1,997	0	0	0	0	170,824
2.3	Cooperating IA (World Bank) agreed funding (US \$)	0	1,070,100	0	842,750	311,240	0	117,060	0	2,341,150
2.4	Support costs for Cooperating IA (US \$)	0	80,258	0	63,206	23,343	0	8,780	0	175,586
3.1	Total agreed funding (US \$)	2,167,033	1,140,100	0	864,934	311,240	0	117,060	0	4,600,367
3.2	Total support costs (US \$)	162,527	86,559	0	65,203	23,343	0	8,780	0	346,410
3.3	Total agreed costs (US \$)	2,329,560	1,226,658	0	930,137	334,583	0	125,840	0	4,946,777
4.1.1	Total phase-out of HCFC -22 agreed to be achieved under this Agreement (ODP tons)									17.44
4.1.2	Phase-out of HCFC-22 to be achieved in previously approved projects (ODP tons)									6.88*
4.1.3	Remaining eligible consumption for HCFC-22 (ODP tons)									29.87
4.2.1	Total phase-out of HCFC-141b agreed to be achieved under this Agreement (ODP tons)									0.00
4.2.2	Phase-out of HCFC-141b to be achieved in previously approved projects (ODP tons)									1.19*
4.2.3	Remaining eligible consumption for HCFC-141b (ODP tons)									27.60
4.3.1	Total phase-out of HCFC-141b contained in imported pre-blended polyols agreed to be achieved under this Agreement (ODP tons)									0.00
4.3.2	Phase-out of HCFC-141b contained in imported pre-blended polyols to be achieved in previously approved projects (ODP tons)									0.00
4.3.3	Remaining eligible consumption of HCFC-141b contained in imported pre-blended polyols (ODP tons)									11.31

*Approved at the 60th Meeting for Petra Engineering Co. and herewith submitted into this Agreement

Appendix 3-A: Funding Approval Schedule

Funding for the future tranches will be considered for approval at the third meeting of the year specified in Appendix 2-A.

Appendix 4-A: Format of Implementation Reports and Plans

The submission of the Implementation Report and Plan for each tranche request will consist of five parts:

- (a) A narrative report regarding the progress since the approval of the previous tranche, reflecting on the situation of the Country in regard to phase out of the Substances, how the different activities contribute to it and how they relate to each other. The report should include ODS phase-out as a direct result from the implementation of activities, by substance, and the alternative technology used and the related phase-in of alternatives, to allow the Secretariat to provide to the Executive Committee information about the resulting change in climate relevant emissions. The report should further highlight successes, experiences and challenges related to the different activities included in the Plan, reflecting any changes in the circumstances in the Country, and providing other relevant information. The report should also include information on and justification for any changes vis-à-vis the previously submitted Annual Implementation Plan(s), such as delays, uses of the flexibility for reallocation of funds during implementation of a tranche, as provided for in paragraph 7 of this Agreement, or other changes. The narrative report will cover all relevant years specified in sub-paragraph 5(a) of the Agreement and can in addition also include information on activities in the current year;
- (b) A verification report of the HPMP results and the consumption of the Substances mentioned in Appendix 1-A, as per sub-paragraph 5(b) of the Agreement. If not decided otherwise by the Executive Committee, such a verification has to be provided together with each tranche request and will have to provide verification of the consumption for all relevant years as specified in sub-paragraph 5(a) of the Agreement for which a verification report has not yet been acknowledged by the Committee;
- (c) A written description of the activities to be undertaken until and including the year of the planned submission of the next tranche request, highlighting the interdependence of the activities, and taking into account experiences made and progress achieved in the implementation of earlier tranches; the data in the plan will be provided by calendar year. The description should also include a reference to the overall plan and progress achieved, as well as any possible changes to the overall plan that are foreseen. The description should cover the years specified in sub-paragraph 5(d) of the Agreement. The description should also specify and explain in detail such changes to the overall plan. This description of future activities can be submitted as a part of the same document as the narrative report under sub-paragraph (b) above;
- (d) A set of quantitative information for all annual implementation reports and annual implementation plans, submitted through an online database. This quantitative information, to be submitted by calendar year with each tranche request, will be amending the narratives and description for the report (see sub-paragraph 1(a) above) and the plan (see sub-paragraph 1(c) above), the annual implementation plan and any changes to the overall plan, and will cover the same time periods and activities; and
- (e) An Executive Summary of about five paragraphs, summarizing the information of the above sub-paragraphs 1(a) to 1(d).

Appendix 5-A: Monitoring Institutions and Roles

The implementation and monitoring of this HPMP will be coordinated by the National Ozone Unit in cooperation with respective governmental bodies and also national experts recruited for particular tasks which would arise in the course of the project implementation. An independent chartered national auditing organization will be recruited by the Lead IA to verify consumption.

Appendix 6-A: Role of The Lead Implementing Agency

The Lead IA will be responsible for a range of activities, including at least the following:

- (a) Ensuring performance and financial verification in accordance with this Agreement and with its specific internal procedures and requirements as set out in the Country's HPMP;
- (b) Assisting the Country in preparation of the Implementation Plans and subsequent reports as per Appendix 4-A;
- (c) Providing independent verification to the Executive Committee that the Targets have been met and associated annual activities have been completed as indicated in the Implementation Plan consistent with Appendix 4-A;
- (d) Ensuring that the experiences and progress is reflected in updates of the overall plan and in future annual implementation plans consistent with sub-paragraphs 1(c) and 1(d) of Appendix 4-A;
- (e) Fulfilling the reporting requirements for the annual implementation reports, annual implementation plans and the overall plan as specified in Appendix 4-A for submission to the Executive Committee;
- (f) Ensuring that appropriate independent technical experts carry out the technical reviews undertaken by the Lead IA;
- (g) Carrying out required supervision missions;
- (h) Ensuring the presence of an operating mechanism to allow effective, transparent implementation of the Implementation Plan and accurate data reporting;
- (i) In case of reductions in funding for failure to comply in accordance with paragraph 11 of the Agreement, to determine, in consultation with the Country and the Cooperating IA, the allocation of the reductions to the different budget items and to the funding of each implementing or bilateral agency involved;
- (j) Ensuring that disbursements made to the Country are based on the use of the indicators; and
- (k) Providing assistance with policy, management and technical support when required.

After consultation with the Country and taking into account any views expressed, the Lead IA will select and mandate an independent entity to carry out the verification of the HPMP results and the consumption of the Substances mentioned in Appendix 1-A, as per sub-paragraph 5(b) of the Agreement and sub-paragraph 1(b) of Appendix 4-A.

Appendix 6-B: Role of the Cooperating Implementing Agency

The Cooperating IA will be responsible for a range of activities. These activities are specified in the overall plan further, but include at least the following:

- (a) Providing policy development assistance when required;
- (b) Assisting the Country in the implementation and assessment of the activities funded by the Cooperating IA, and refer to the Lead IA to ensure a co-ordinated sequence in the activities; and
- (c) Providing reports to the Lead IA on these activities, for inclusion in the consolidated reports as per Appendix 4-A.

Appendix 7-A: Reductions in Funding for Failure to Comply

In accordance with paragraph 11 of the Agreement, the amount of funding provided may be reduced by US \$279 per ODP kg of consumption beyond the level defined in row 1.2 of Appendix 2-A for each year in which the target specified in row 1.2 of Appendix 2-A has not been met.