

Document of  
The World Bank

Report No: UA-32788

IMPLEMENTATION COMPLETION REPORT  
(TF-20426)

ON A

LOAN/CREDIT/GRANT

IN THE AMOUNT OF US\$ MILLION

TO THE

UKRAINE

FOR A

Ozone Depleting Substances

June 29, 2005

CURRENCY EQUIVALENTS

(Exchange Rate Effective )

Currency Unit =

FISCAL YEAR

ABBREVIATIONS AND ACRONYMS

Vice President: Country Director Sector Manager Task Team Leader/Task Manager:
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**UKRAINE**  
**Ozone Depleting Substances**

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<i>Project ID:</i> P044728	<i>Project Name:</i> Ozone Depleting Substances
<i>Team Leader:</i> Alexei Slenzak	<i>TL Unit:</i> ECSSD
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> June 29, 2005

## 1. Project Data

*Name:* Ozone Depleting Substances *L/C/TF Number:* TF-20426  
*Country/Department:* UKRAINE *Region:* Europe and Central Asia  
Region

*Sector/subsector:* Other industry (96%); Central government administration (4%)  
*Theme:* Environmental policies and institutions (P); Pollution management and environmental health (P)

KEY DATES	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 05/22/1996	<i>Effective:</i> 03/31/1999	
<i>Appraisal:</i> 09/28/1997	<i>MTR:</i> 11/05/2001	
<i>Approval:</i> 06/23/1998	<i>Closing:</i> 12/31/2000	12/31/2004

*Borrower/Implementing Agency:* GOVERNMENT OF UKRAINE/MIN. OF ENVIRON. PROTECT. & NUCLEAR SAFETY  
*Other Partners:* Danish Environmental Protection Agency

STAFF	Current	At Appraisal
<i>Vice President:</i>	Shigeo Katsu	Johannes F. Linn
<i>Country Director:</i>	Paul G. Bermingham	Paul Siegelbaum
<i>Sector Manager:</i>	Benoit Blarel	Michele de Nevers
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Richard Cooke, Alexei Slenzak, Yuriy Chornenkiy

## 2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

*Outcome:* S  
*Sustainability:* L  
*Institutional Development Impact:* M  
*Bank Performance:* S  
*Borrower Performance:* S

*QAG (if available)* *ICR*  
*Quality at Entry:* S  
*Project at Risk at Any Time:* Yes

### **3. Assessment of Development Objective and Design, and of Quality at Entry**

#### *3.1 Original Objective:*

The overall original objective of the Ukraine Ozone Depleting Substance Phase Out Project (the Project) was to assist Ukraine in the rapid phase out of ODS consumption, in a manner consistent with international efforts and within internationally agreed timeframes.

The Project's more specific objectives were to:

- (i) assist high consumption enterprises in Ukraine to make the transition to non-ODS substitutes before ODS supplies diminish;
- (ii) provide technical assistance for phase out in the halon sector;
- (iii) provide technology transfer associated with low Global Warming Potential (GWP) refrigerants for domestic refrigeration; and
- (iv) provide institutional strengthening to the Ozone Office within MEPNS and MEP.

#### *Assessment of the Objectives*

The origin of the Project was the international community's recognition of the difficulty that the Countries with Economies in Transition (CEITs) in Eastern Europe and the Former Soviet Union (FSU) would have in meeting their obligations under the 1990 London Amendment to the Montreal Protocol (MP), namely the elimination of Annex A and B Ozone Depleting Substances (ODS) consumption and production by December 31, 1996 Phase Out date for all Annex A and B ODS except carbontetracloride (CTC) under the 1992 Copenhagen Adjustment. To address this, the the Global Environmental Facility (GEF) formally opened an Ozone Focal Area in 1995 for CEITs who had Country Programs endorsed by the Parties to the MP, and had ratified the London Amendment. As a GEF Implementing Agency (IA), the Bank has undertaken a number of successful GEF ODS Focal Area operations in eligible countries in the region.

Ukraine was the last of these countries, having adopted a Country Program Developed with Danish Bilateral assistance in October 1996, and ratified the London Amendment in February 1997. Among the CEITs in the region, the Ukraine was considered among the largest consumers of ODS. In 1991, annual consumption of Annex A and B ODS in Ukraine was estimated to be 7,061 MT but by 1994 actual consumption had fallen to 3,310 MT and was reported to be 1,470 MT ODP in 1996 and 1,780 MT ODP in 1997 Consumption occurred in the refrigeration, aerosol, solvent sectors and fire protection sectors.

At a general level, the Project's overall objective adequately defines what the Project was intended to accomplish within the context of international and national priorities prevailing at the time. It was intended to be a comprehensive country consumption phase out of Annex A and B ODS such that Ukraine achieved compliance with the London Amendment phase out requirements by January 1, 2000, a date that was initially accepted by the Parties to the Montreal Protocol for non-compliant CEITs. The specific objectives also appropriately amplify the overall objective and proactively reflect the GEF priority related to promotion of low GWP ODS substitutes that was emerging at the time.

However, this assessment should be qualified in relation to some of the original assumptions that underpinned the objective, mainly in terms of how realistic it was to meet the targeted date for London Amendment compliance.

#### *3.2 Revised Objective:*

The Project's objectives were never formally revised and essentially remained as originally stated throughout its implementation. However, the phase out compliance date effectively changed when Ukraine was granted a further extension to December 31, 2002 for correction of its non-compliance status ( "UNEP/OzL.Pro/ImpCom/21/3, Decision X/27(h). - Compliance with the Montreal Protocol by

Ukraine" Minutes of the Implementation Committee under Non-Compliance for the Montreal Protocol, Twenty-first meeting Cairo, 16 November 1998). Revisions to the scope and GEF Work Program were initiated during implementation to place greater emphasis on investment initiatives in the refrigeration servicing and fire protection sectors were made to better address economic and social impacts associated with phase out, particularly in light of the rapid closure of traditional ODS suppliers in Russia in 2000.

The two additional one-year extensions in 2002 and 2003, granted by the Bank were essentially related to the expanded work program and project scope as well as accommodating slow implementation of problematic sub-projects. More specifically, the requested extensions were to allow (a) orderly completion of the original work program, in particular with respect to two large and technically complex sub-projects in aerosol sub-sector, and (b) implementation of additional reserve sub-projects, requested by the government as a matter of priority in refrigeration servicing and fire safety sub-sectors. It should be noted that while original project development objectives were effectively achieved by the end of the first extension period, the further extensions allowed significantly expand project's positive social impact through provision of better quality services to poor segments of population and establishment of the operational system of reclaim and recovery of halons in the area of public fire safety.

### *3.3 Original Components:*

The project design involved three components: investment sub-projects, technical assistance, and support for the project implementation unit (PIU) within the local Implementing Agency. The overall Project received GEF Council approval in May 1998 (*Global Environment Facility, Ukraine Ozone Depleting Substances Phase-out Project, Project Document*, The World Bank, Report No. 17211-UA, May 1998) and Board approval in June 1998. The following provides a brief description of the three components as originally approved:

*a) Investment Component:* This component involved a portfolio of eight (8) appraised enterprise specific investment sub-projects plus a framework sub-project covering the refrigeration servicing sector. The initial portfolio consisted of two sub-projects in the consumer aerosol sector, one enterprise in the domestic refrigeration sector, four enterprises in the commercial/industrial refrigeration sector, and one enterprise in the solvent sector, plus two pilot sub-projects for the recovery and recycling of ODS refrigerant

*b) Technical Assistance:* The technical assistance (TA) component was intended to strengthen country institutional capacity for management of ODS phase out and eventual elimination within MEP's Ozone Office, undertake a specific initiative related to the transfer of hydrocarbon refrigerant technology to JSC "NORD" for domestic refrigerator manufacture, development of a halon management plan and associated implementation capacity within the national fire protection service, and support the implementation Project's investment component with respect to safety audits and external procurement management capacity.

*c) PIU (Ozone Office) Support Component:* In accordance with GEF practice, this component supported the operation of the PIU inclusive of staffing required for project supervision, procurement administration, and financial management at a level of 3 % of the grant

### *3.4 Revised Components:*

Throughout the Project the components remained the same. However, the investment component was expanded and adjustment in the scope of the technical assistance and PIU (Ozone Office) support components as originally defined was made. This is described as follows:

*a) Investment Component:* The original investment portfolio was maintained with the

exception of one cancelled sub-project within the commercial refrigeration sector (Odessaholodmash). Resources available from procurement savings, transfers from underutilized technical assistance resources and the sub-project cancellation allowed an additional five refrigeration servicing sub-projects and a halon reclaim and recycling sub-project to be included. These additions provided the capability for a more comprehensive national phase out of residual ODS use and better addressed economic and social impact associated with the elimination of ODS in these sectors.

*b) Technical Assistance:* Over the course of Project implementation it became apparent that various local institutional barriers related to procurement and taxation would preclude effective use of the available technical assistance resources, particularly for institutional strengthening. These resources were transferred either to the Investment Component or to the Ozone Office support component.

*c) PIU (Ozone Office) Support Component:* In successive work program and annual budget approvals, resources to for Ozone Office were increased, mainly to support local individual consultants and consulting firms employed within the MER structure. This replaced much of the originally planned technical assistance in that it provided project implementation support as well as undertaking supplementary investment sub-project preparation, and institutional strengthening.

A summary of the evolution of the project by component and work program approval stage through to completion, inclusive of GEF grant allocation, and sectors addressed is provided in Table 1 below.

**Table 1. GEF Grant Allocation from Initial Approval to Completion (US\$)**

<b>Component/ Sub-Project/ Sub-Component</b>	<b>Sector</b>	<b>GEF/Board Approval May/June 1998</b>	<b>First Work Program Amendment Feb. 2002</b>	<b>Second Work Program Amendment Mar. 2004</b>	<b>Project Completion Dec. 2004</b>
<b>Investment Component</b>	<b>20,999,476</b>	<b>21,115,106</b>	<b>21,462,342</b>	<b>21,457,256</b>	
Donetsk Chemical Plant	Aerosol	2,871,220	2,873,220	3,099,155	3,099,155
Simpferopol Household Chemical Plant	Aerosol	3,894,000	3,894,000	4,199,550	4,205,832
JSC "Nord"	Domestic Refrig.	9,790,599	9,774,535	9,774,535	9,774,535
Dnipro-MTO	Commercial Refrig.	63,954	57,995	53,564	53,254
Kharkivholodmash	Commercial Refrig.	1,135,974	1,136,684	1,135,684	1,135,684
REFMA	Industrial Refrig.	897,390	855,250	869,141	869,141
Odessaholodmash	Industrial Refrig.	950,692	554,222	Cancelled	Cancelled
DNK Servis	Refrig. Servicing	559,223	426,769	426,770	426,770
Kyiv Servis	Refrig. Servicing	559,224	404,727	404,727	404,727
Cherkassy Torgtechnika	Refrig. Servicing	n/a	198,325	137,560	137,561
Chernigov RMC	Refrig. Servicing	n/a	164,449	151,445	151,445

Dnipro-MTO Service	Refrig. Servicing	n/a	42,535	40,547	40,547
Electroservice (Kyiv)	Refrig. Servicing	n/a	n/a	278,035	265,961
Dianna (Lyiv)	Refrig. Servicing	n/a	n/a	198,752	202,752
Refrigeration Training	Refrig. Servicing	93,500	93,062	93,062	93,062
Service Sector Study	Refrig. Servicing	49,500	44,773	44,830	44,830
Electronmash	Solvent	134,200	136,660	133,743	133,743
Lugansk Specavtomatika	Halon	n/a	493,900	421,242	418,286
<b>Technical Assistance Component</b>		<b>1,551,000</b>	<b>840,206</b>	<b>785,216</b>	<b>785,216</b>
HC Conversion (NORD)	Domestic Refrig.	550,00	550,000	494,930	494,930
Halon Sector	Halon	203,500	261,996	262,076	262,076
Institutional Strengthening	Institutional Strengthening	797,500	28,210	28,210	28,210
<b>PIU (Ozone Office) Support</b>		<b>676,514</b>	<b>749,986</b>	<b>777,200</b>	<b>938,927</b>
<b>Unallocated</b>		<b>0</b>	<b>0</b>	<b>275,250</b>	<b>0</b>
<b>Project Totals</b>		<b>23,226,990</b>	<b>22,705,298</b>	<b>23,200,000</b>	<b>23,181,399</b>
<b>Grant Funds Un-disbursed at Closing</b>		<b>18,601</b>			

### 3.5 Quality at Entry:

The Project's overall quality of entry is rated as satisfactory, although it did not recognize the implementation issues associated with the TA component and optimistic expectation of meeting the original phase out compliance date. This assessment is based on the Project being able to complete the required comprehensive phase out, the basis for which was underpinned by the effective use of bilateral assistance which provided the basic Country Program framework and a GEF PDF-B grant of US\$340,000 (the PDF-B grant in the amount of US\$340,000 with co-financing of US\$38,000 (\$30,000 from enterprises and US\$8,000 from the Government of Ukraine) was approved by the GEF CEO on May 14, 1996, and by the Bank on July 15, 1996, and was completed on September 1, 1997). This allowed comprehensive identification of a candidate investment portfolio and detailed sub-project preparation and financial viability assessment prior to appraisal. No formalized link was made with a CAS at the time of entry. However, the Project was consistent with the Bank and Government's stated priority of addressing key global environmental issues, and facilitating the Government's participation in and compliance with global environment conventions. This has become and remains a basic part of the CAS. In terms of safeguard policies, the Bank's Operational Policy 4.01 "Environmental Assessment" is the main one applicable and the Project's overall objective is consistent with it. Recognizing that individual sub-project implementation could have environmental impacts, all were subject to environmental assessment consistent with the Category B rating assigned to the overall project and were subject to the environmental assessment/expertise review process required under Ukrainian legislation during implementation. The main environmental issue identified at entry was the use of flammable and explosive hydrocarbon ODS substitutes in the aerosol and refrigeration sectors. This was to be addressed by applying design review and formal safety audits by international experts of all affected investment sub-projects as a condition of eligibility.

## 4. Achievement of Objective and Outputs

### 4.1 Outcome/achievement of objective:

*Assist Ukraine in the Rapid Phase Out of ODS Consumption, in a Manner Consistent with International Efforts and within Internationally Agreed Timeframes:* The Project's outcome respecting the overall objective of effective phase out of Annex A and B ODS consumption consistent with international expectations is evaluated as satisfactory. Ukraine was in substantial compliance with its obligations under the London Amendment by December 31, 2001 which was the revised target set by the Parties to the Montreal Protocol for rectifying its previous non-compliance status. The ODS phased out achieved was 4,580 MT based on appraised consumption, 1,238 MT based on the year of project implementation and 533 MT based on the last year of ODS use. This covered virtually all the primary Annex A and B ODS consumption identified in Ukraine at the time of project implementation as well as a substantial portion of the residual ODS consumption in the refrigeration servicing sector. In making this assessment it is noted that this was two years later than originally targeted (December 31, 1999) when the Project was approved, consequently the objective of rapid the phase out was not fully met. However, the impact of this delay on the level of ODS consumption was limited and the main consumer at the time of Project initiation (JSC "NORD") did in fact very rapidly implement its sub-project.

*Assist High Consumption Enterprises in Ukraine to make the Transition to Non-ODS Substitutes before ODS Supplies Diminish:* The Project satisfactorily achieved this objective, specifically through providing the means for conversion to internationally accepted ODS substitute technologies in the high consumption refrigeration and aerosol sectors as well as the only known viable ODS solvent consumer. In all cases the technology supplied allows the respective enterprises to remain in business recognizing that the traditional sources of supply from Russia were terminated at the end of 2000 when these production facilities closed and Russia implemented an export ban. NORD, Dnipro-MTO, and Electronmash took full advantage of GEF funding to implement alternative technology in a timely manner to effectively avoid either termination or substantial reduction in production from 2001 onwards. However, the other enterprises including the nominally high consumption aerosol enterprises were less decisive in capitalizing on the opportunity to do so and to avoid production interruption. As a consequence, some uncertainty exists as to the long term sustainability of these enterprises, particularly the two aerosol manufacturers involved in the project.

*Provide Technical Assistance for Phase Out in the Halon Sector:* The GEF funded TA for development of the Halon Management Plan and capacity strengthening within the fire protection service satisfactorily met this objective in that the country has the institutional and technical capacity to ensure responsible management of halon stocks in the near term while maintaining the integrity of critical fire protection systems. Furthermore, this work was expanded into the development of a modern halon recovery and recycling capability through an additional investment sub-project. While the operational effectiveness of this capability has yet to be fully realized, the country should be as well equipped as any country in the region to ultimately complete phase out in this sector without additional assistance.

*Provide Technology Transfer Associated with Low GWP Refrigerants for Domestic Refrigeration:* The GEF funding of technology transfer for the conversion of NORD to low GWP hydrocarbon refrigerant has had a highly satisfactory result. The enterprise rapidly implemented the results of this assistance to the point where its full product range is offered to both domestic and export markets using this technology, something that allows full access to the European market. This is largely the result of highly committed, market oriented enterprise which recognized the trends in their business and were prepared to co-finance the GEF contributions in a timely manner.

*Provide Institutional Strengthening to the Ozone Office within MEPNS and MEP:* Overall, outcomes against this objective are marginally satisfactory. The project was successful in stimulating the creation of a dedicated capability within MEP for the regulatory management of ODS through direct financial support of the Ozone Office. This has resulted in the development of the necessary regulatory framework for ODS control, including licensing of ODS use and control of import and export, although questions remain respecting the level of enforcement that exists to support these measures. In addition, Ukraine has generally improved its compliance with international reporting obligations although recent experience in developing a follow on project covering methyl bromide shows that this requires further strengthening. The country has also extended its Montreal Protocol obligations through ratification of the Copenhagen Amendment in 2000 although has not yet proceeded with ratification of latter amendments.

*Address Economic and Social Impacts Associated with Phase Out:* The Project's outcome against this objective is judged as satisfactory, having substantively mitigated the economic and social impacts of ODS phase out and in fact provided benefits in this area. It is likely that few if any of the major ODS consumers financed under the Project would have been sustainable in the absence of the Project. Having no access to legal ODS supplies and the high cost of any other sources would have effectively rendered their old technology uncompetitive. This would have resulted in substantial employment reductions and associated local economic impacts as well as increasing import reliance for the country as a whole. The Project was expanded to provide an effective national capability for the recovery and recycling of refrigerant, something that significantly mitigates social and economic impacts potentially felt in the food distribution system. Similarly, a significant contribution to maintenance of public and property protection should result from the halon sector initiatives allowing a gradual transition of fire protection systems.

#### *4.2 Outputs by components:*

*Investment Component:* The outputs from the investment component are assessed as satisfactory in terms of meeting their basic objective eliminating ODS consumption and implementing modern substitute technologies. Only one of the original nine investment sub-projects that were identified and appraised was not completed and was cancelled prior to the commitment of financial resources on viability grounds. However, five additional investment sub-projects were added to the component during implementation and three of which have been successfully completed and the remaining two, while incomplete, have reasonable near term prospects of being completed, assuming appropriate action by the Government. The overall phase out achieved effectively eliminated all primary ODS consumption in the country, leaving only a modest and declining residual demand primarily in the refrigeration servicing sector which should be significantly reduced by the recovery and recycling capacity provided under the Project. At an individual sub-project level, the outputs did vary. Highly satisfactory results for the largest sub-project undertaken at JSC "Nord" and for the DNKServis refrigeration servicing sub-project were achieved, while several sub-projects were considered unsatisfactory. However, the majority of the sub-projects were considered satisfactory despite implementation delays.

*Technical Assistance Component:* In general the outputs from this component are considered marginally satisfactory. The following provides an assessment of TA outputs is done for each of the general categories of activities supported by the Project:

- i) *NORD Isobutane Technology Transfer:* The technical assistance supporting the transfer of hydrocarbon refrigerant technology to NORD for domestic refrigerators resulted in the development and now effective conversion of the enterprise's product line to state of the art low GWP refrigerant. This represents a highly satisfactory result and represents a model of for such technology transfer initiatives.

- ii) *Halon Management Plan and Demonstration Capacity:* The TA resources directed to and administered by the Ukrainian Fire Safety Research Institute resulted in a needed upgrading of capacity to regulate and manage halon stocks at a national level and most significantly the development of a comprehensive National Halon Management Plan that was adopted.
- iii) *Institutional Strengthening:* The outputs from this TA sub-component were generally unsatisfactory, noting that the contemplated institutional TA not undertaken in this component is partially compensated for by the use of unused TA resources within the PIU support component. The outputs from the international safety audits undertaken at three sub-projects were less than satisfactory and ultimately had to be repeated by the Bank project team in two cases to ensure eligibility conditionality of the GEF were met.

*PIU (Ozone Office) Support Component:* The Ozone Office and the PIU operation within it that supported the Project is judged as having developed a satisfactory capability in implementing such projects. The investment sub-project component was successfully completed albeit with significant delays where enterprises required more timely external support in developing technical specifications and procurement documents. Ultimately, in many cases, this support had to be provided by the Bank team in cooperation with the PIU. The financial management capacity was judged as being excellent in terms of collection and reporting of commitment and disbursement information. In assessing the PIU's outputs, it should also be noted that overall performance declined in the last two years of the project largely due the reduction in contracted staff, despite the granting of extensions and increased PIU budgets. The institutional outputs of the Ozone Office itself were generally satisfactory in that over the period of the Project the basic regulatory framework necessary to manage ODS was created, a modest public information program was mounted, the Country Program was updated, the Ukraine ratified the latter Copenhagen Amendment to the Montreal Protocol and it initiated technical preparation of a follow up GEF project on MBr phase out.

#### *4.3 Net Present Value/Economic rate of return:*

An economic analysis was not performed on the Project as this has not been the practice for projects of this type given the difficulty in quantifying the positive economic impact from global reduction in ozone depletion and resulting health and climate change impacts. However, it is apparent that the project would also have had significant local and national positive economic impacts through modernization of a significant number of manufacturing and service enterprises such that they are sustainable when they would otherwise likely have disappeared.

A further measure of economic performance is provided by the grant cost effectiveness (CE) as measured in US\$/Kg ODP. The overall GEF grant CE of the Project's ODS consumption related investment was US\$18.75/Kg ODP based on ODS consumption in the year in which the sub-projects were implemented which compares to US\$5.07/Kg ODP based on appraised consumption or US\$43.56 based on the final year of ODS use prior conversion. Table 2 summarizes the appraised and actual CE's for each investment sub-project. In general the actual CE based on the original phase out impact was similar to that on which the sub-project was approved but worse based on the last year of ODS use. This generally reflects the continued production decline of the enterprises after appraisal and in a number of cases, notably JSC "NORD", implementation of transitional measures to reduce ODS consumption in advance of the sub-project's implementation. Late completing sub-projects, notably the aerosol sub-projects effectively when out of business after ODS supplies ceased to be legally available. Table 3 below compares this against other Bank GEF ODS projects in the region. Ukraine would rank as being among the least cost effective in the region, something that is largely attributable to implementation delays and the economic decline of beneficiaries immediately prior to and during implementation.

**Table 2. Approved and Actual Grant Cost Effectiveness for Investment Sub-Projects**

Enterprise/ Sub-Project	Cost Effectiveness US\$/Kg ODP			
	Approved	Actual	Based on Last Year of ODS Use	MPMF Threshold
		Based on Appraised Phase Out		
<b>Aerosol Sector</b>				
Donetsk Chemical Plant	1.65	1.72	52.52	4.4
Simpheropol Household Chemical Plant	2.65	2.85	62.68	4.4
<b>Commercial/Industrial Refrigeration Sector</b>				
Dnipro-MTO	12.00	9.99	9.99	15.21
Kharkivholodmash	15.07	15.24	54.73	15.21
REFMA	15.21	15.24	289.71	15.21
Odessaholodmash	12.81	n/a	n/a	n/a
<b>Domestic Refrigeration Sector</b>				
JSC "Nord"	13.64	13.56	58.16	13.76
<b>Solvent Sector</b>				
Electronmash	19.93	20.14	208.92	19.73
<b>Refrigeration Servicing Sector</b>				
DNK Servis	14.13	11.08	21.34	N/A
Kyiv Servis	14.73	10.51	163.86	N/A
Cherkassy Torgtehnika	7.65	5.31	10.92	N/A
Chernigov RMC	21.06	19,3	58.23	N/A
Dnipro-MTO Service	8.94	8.46	20.27	N/A
Electroservice (Kyiv)	15.78	15.01	29,55	N/A
Diana (Lviv)	11.72	1193	18.42	N/A
<b>Halon (Fire Protection) Sector</b>				
Lugansk Specavtomatika	1.01	0.85	2.09	N/A

Enterprise/Sub-Project	Cost Effectiveness US\$/Kg ODP			
	Approved	Actual		MPMF Threshold
		Based on Appraised Phase Out	Based on Last Year of ODS Use	
<b>Aerosol Sector</b>				
Donetsk Chemical Plant	1.65	1.72	52.52	4.40
Simpheropol Household Chemical Plant	2.65	2.85	62.68	4.40
<b>Commercial/Industrial Refrigeration Sector</b>				
Dnipro-MTO	12.00	9.99	9.99	15.21
Kharkivholodmash	15.07	15.24	54.73	15.21
REFMA	15.21	15.24	289.71	15.21
Odessaholodmash	12.81	n/a	n/a	n/a
<b>Domestic Refrigeration Sector</b>				
JSC "Nord"	13.64	13.56	58.16	13.76
<b>Solvent Sector</b>				
Electronmash	19.93	20.14	208.92	19.73
<b>Refrigeration Servicing Sector</b>				
DNK Servis	14.13	11.08	21.34	N/A
Kyiv Servis	14.73	10.51	163.86	N/A
Cherkassy Torgtehnika	7.65	5.31	10.92	N/A
Chernigov RMC	21.06	19,3	58.23	N/A
Dnipro-MTO Service	8.94	8.46	20.27	N/A
Electroservice (Kyiv)	15.78	15.01	29,55	N/A
Diana (Lviv)	11.72	1193	18.42	N/A
<b>Halon (Fire Protection) Sector</b>				
Lugansk Specavtomatika	1.01	0.85	2.09	N/A

**Table 3. GEF Grant Cost Effectiveness (CE) Comparison with other Bank ODS Phase out Projects in the Region**

Country	Actual GEF Grant Million US\$	Actual GEF Grant CE US\$/Kg ODP
Belarus	6.79	9.84
Bulgaria	9.69	26.64
Czech Republic	2.42	Not Calculated
Hungary	6.49	6.24
Poland	5.88	7.17
Russian Federation**	52.37/44.6*	2.98/4.94*
Slovenia	5.40	15.88
Ukraine	23.23	18.75

\* Estimated without Production Closure

\*\* Estimated based on ODS consumption in the last year before Phase Out completion

#### 4.4 Financial rate of return:

Consistent with practice for projects of this type, no FRR was performed on the Project. However, a

financial viability assessment was performed on each enterprises proposing investment sub-projects through the screening, preparation and appraisal process. The financial position of beneficiary enterprises was monitored during implementation, specifically during the annual audit process. In general, it was concluded that this process was effective in ensuring that both comprehensive phase out was achieved while directing available funds to viable enterprises. As an example one sub-project for which a sub-grant agreement was signed was cancelled prior to disbursing funds on the grounds of financial viability. A significant number of potential beneficiaries that would not have survived transition to the market economy were eliminated before GEF financing was committed. At closing, of the fifteen investment sub-projects implemented, two are considered at some risk due to the enterprises potentially not being sustainable. The remaining enterprises all appear to have viable and sustainable businesses.

#### *4.5 Institutional development impact:*

The Project has supported the development of the basic regulatory and institutional tools to allow Ukraine to move forward with future ODS management, consistent with international expectations and standards. A permanent structure to do this is nominally operational within the State Ecological Inspectorate of the Ministry of Environmental Protection. In the current post presidential election period, this is anticipated to be sustained and hopefully enhanced as a more European oriented national environmental policy evolves. Similarly, an overall institutional mechanism, namely the Interagency Commission for Montreal Protocol Fulfillment (IAC) exists. While this appeared to have had a minimal role during Project implementation it has recently been reactivated and its operation would improve internal communication and coordination on ODS issues with the Government. In general, the impacts of the Project are assessed as modest in this area, largely on the basis of the limited resources available to sustain the Government's continued commitment to ODS issues and the limited enforcement capacity currently supporting the available regulatory framework. The Project's long term impact on institutional development is dependant on the policies of the new government and the priority it attaches to global issues generally and ODS in particular.

## **5. Major Factors Affecting Implementation and Outcome**

### *5.1 Factors outside the control of government or implementing agency:*

The one external factor affecting project implementation and outcomes that was to some degree outside the government or local implementing agency's control was the overall evolution of the country's industrial sector generally during the period of implementation. Market driven restructuring over the Project's life cycle had mixed impacts on the viability and stability of ODS consumers and Project beneficiaries in particular. In general it may have been a factor in slowing implementation as ownership and enterprise priorities evolved in some cases such as REFMA and Kharkivholodmash, but except for the one cancelled appraised sub-project (Odessaholodmash) it did not result in the sub-project's not ultimately being successfully implemented. In fact, the ownership consolidation of the two aerosol sub-projects early in implementation likely saved these sub-projects from failing, notwithstanding the subsequent modest implementation performance. Similarly, the full privatization of a number of refrigeration servicing enterprises and Dnipro-MTO were likely factors in their successful implementation.

### *5.2 Factors generally subject to government control:*

A number of factors that did impact Project implementation and outcomes were clearly within the Government's control. The first was the Government's late initiation of the Project and subsequently the extended period between the negotiation of the grant agreement and its effectiveness. This was the principle factor in Ukraine being the last major ODS consuming country in the region to meet its London Amendment obligations. Once the Project was under implementation on-going administrative delays were encountered with such things as customs clearances and local tax administration despite the Grant Agreement making explicit provision for VAT and import duty exemptions. Finally, the limited resources available to the local implementing agency, particularly for implementation and enforcement of the regulatory framework governing ODS from the government have been a significant factor in the modest outcomes and concern about sustainability associated with the Project's institutional strengthening objectives. All of the above factors are generally characteristic of

the weak institutional capacity found in Ukraine during this period as experienced by many Bank projects. Comparatively, the fact that the project did achieve its objectives and was ultimately successfully implemented within this environment should be seen as positive and in the context of Ukraine a significant achievement.

### 5.3 Factors generally subject to implementing agency control:

The principal factor impacting project performance within the control of the local implementing agency was the general administrative inefficiencies within the Ministry which in turn were a direct cause of implementation delays. This is in part attributable to the high turn over of senior Ministry people, including Ministers themselves which resulted in the absence of any high level continuity in championing the Project. This, combined with the placement of the PIU and permanent institutional responsibility for ODS at a relatively low level in the Ministry structure, also contributed to the limited communication and co-ordination on ODS issues beyond the Ministry within the Government.

### 5.4 Costs and financing:

The capital cost estimate for the originally appraised overall framework project was US\$32,740,921 made up of US\$23,226,990 in GEF grant financing and US\$9,513,931 in enterprise and government financing. US\$29,963,407 was for consumption phase out investment sub-projects made up of US\$20,999,476 in GEF grant financing and US\$8,963,931 in enterprise financing. Based on appraised sub-projects including those added during implementation, the estimated cost of investment sub-projects was US\$31,486,733 million inclusive of US\$22,375,472 in GEF financing and US\$8,994,046 in enterprise contribution. The actual overall cost of the project was US\$27,704,590. Total GEF financing was US\$23,181,399 of which US\$21,457,256 was devoted to consumption phase out investment sub-projects. Enterprise financing for investment sub-projects and technical assistance was US\$4,524,189. No direct government financing was recorded against the project. The following Table 4 provides a summary of appraised investment sub-project costs and financing. The approved and actual technical assistance and PIU costs are reported previously in the Table 1, Section 3.4, and the overall project costs are summarized in Annex 2.

The variation between appraised and actual costs noted above resulted from a number of factors. Significant savings were accumulated through generally positive competitive bidding impacts. Early completing sub-projects also generally benefited from favorable changes in US\$/SDR exchange rates. Later finishing sub-projects were negatively impacted by the reversal in US\$/SDR exchange rates particularly where procurement contracts were denominated in Euros. The overall costs were lower than appraised, largely due to lower levels in enterprise financing. US\$18,572 in grant funding was left unused.

**Table 4. Cost and Financing Summary of Investment Sub-projects**

Enterprise/Sub-Project	Estimate at Appraisal (US\$)			Actual (US\$)		
	Cost	Financing		Cost	Financing	
		Enterprise	GEF		Enterprise	GEF
<b>Aerosol Sector</b>						
Donetsk Chemical Plant	3,526,480	655,260	2,871,220	3,395,354	296,198	3,099,156
Simferopol Household Chemical Plant	4,965,000	1,071,000	3,894,000	4,484,172	278,340	4,205,832
<b>Commercial/Industrial Refrigeration Sector</b>						
Dnipro-MTO	99,154	35,200	63,954	78,443	25,189	53,253
Kharkivholodmash	1,454,171	318,197	1,135,974	1,453,880	318,197	1,135,684
REFMA	2,982,250	1,977,360	897,390	1,114,306	869,141	869,141
Odessaholodmash	1,328,358	377,666	950,692	n/a	n/a	n/a

<b>Domestic Refrigeration Sector</b>						
Nord	14,147,037	4,356,438	9,790,599	12,231,499	2,456,964	9,774,535
<b>Solvent Sector</b>						
Electronmash	307,010	172,810	134,200	300,797	167,081	133,717
<b>Refrigeration Servicing Sector</b>						
DNK Servis	559,223	-	559,223	533,020	106,250	426,770
Kyiv Servis	559,224	-	559,224	422,122	17,395	404,727
Cherkassy Torgtehnika*	201,675	3,350	198,325	143,745	6,184	137,581
Chernigov RMC*	167,589	3,140	164,449	157,108	5,663	151,443
Dnipro-MTO Service*	43,995	1,480	42,535	43,367	2,820	40,546
Electroservice (Kyiv)*	287,780	9,745	278,035	278,731	12,770	265,961
Diana (Lyiv)*	203,887	5,135	198,752	213,152	10,400	202,732
Refrigeration Training	93,500	-	93,500	93,062	-	93,062
Service Sector Study	49,500	-	49,500	44,830	-	44,830
<b>Halon (Fire Protection) Sector</b>						
Lugansk Specavtomatika*	510,900	17,000	493,900	442,859	25,573	418,286
<b>PROJECT TOTAL</b>	<b>29,963,407</b>	<b>8,963,931</b>	<b>20,999,476</b>	<b>25,430,447</b>	<b>3,974,189</b>	<b>21,247,256</b>

## 6. Sustainability

### 6.1 Rationale for sustainability rating:

The Project's satisfactory sustainability rating is primarily based on the irreversible nature of the successful ODS consumption phase out outcome which was its overall objective. It can be concluded with some certainty that Ukraine will not be a consumer of Annex A and B ODS in the future. Similarly, the prospects appear good for the long term viability of the majority of investment sub-projects undertaken. Therefore, the positive social and economic benefits of the Project associated with industrial modernization should be sustained in a market economy. While not altering the overall conclusion on sustainability of the Project's ODS phase out outcome, the sustainability of the Project's institutional and regulatory outcomes has some uncertainty attached to it. The utilization and further development of the institutional mechanisms and regulatory tools stimulated by the Project will depend on policy and resourcing commitments of the Government.

### 6.2 Transition arrangement to regular operations:

Within MER, transition arrangements to regular operations related to maintaining the institutional and regulatory framework developed under the Project are in place, although to be effectively sustained they will have to receive adequate resources. The country continues to maintain its participation in international forums on ODS and recent initiatives respecting adoption of an updated country program and proceeding with ratification of alter amendments to the Montreal Protocol are encouraging. In addition, the general direction of the newly elected government would suggest more proactive policies respecting global environmental issues and particularly those prioritized by the European Union.

## 7. Bank and Borrower Performance

### Bank

#### 7.1 Lending:

The Bank's performance in undertaking its obligations as a GEF Implementing Agency for the Project is considered satisfactory. The Project represented a timely intervention on a major global environmental issue in a country important in addressing the ODS phase out issue in the region. It integrated its preparation work with bilateral assistance and implementation was coordinated within the Bank with similar projects in the region that had significant impact on this Project's outcomes. The Project is inherently investment oriented but was designed to provide institutional and regulatory support consistent with the needs jointly identified with the Government. The flexible administration of

the Grant Agreement, while maintaining appropriate due diligence respecting the use of donor funds, allowed the Project to overcome various barriers and ultimately facilitated the development of a follow up project.

#### *7.2 Supervision:*

The Project's supervision is rated as satisfactory although in the early stages of implementation was a factor in the long implementation period. The Project had a number of different task managers during this period that along with relatively weak PIU capacity caused initial implementation delays. However, the core Project team including the current Task Manager was constant throughout which allowed technical continuity and maintenance of critical relationships and networks which ultimately led to successful implementation. The Project itself was highly supervision intensive given the large number of beneficiaries, the technical complexity of many of the investment component sub-projects, the institutional instability encountered, and due diligence requirements associated with a large GEF grant. The Grant Agreement was administered rigorously but with enough flexibility to allow the timely adjustments which provided counterparts with the opportunity to maximize benefits from it. The procurement and disbursement management requirements applicable to the investment and technical assistance components of the Project involved a total of 61 separate contracts of which 6 were ICB, 40 were IS, 11 were NS and 4 were Consultant Firms. Addition contracts for individual consultants and consulting firms were covered under the PIU budget. It should also be noted that the Bank was required to provide a greater degree of technical support in the procurement process than in other similar projects, specifically in development of technical specifications, identification of suppliers and generally preparing procurement documentation. Similarly, the Bank team had to undertake a significant amount of instruction and assistance in completing sub-project documentation in the form of safety audits and sub-project ICRs.

#### *7.3 Overall Bank performance:*

On the basis of the above, the overall Bank performance is considered satisfactory. Throughout, the Bank as a whole has maintained a strategic perspective of the ODS issue as reflected in cross communication with other regions, including the other major ODS phase out programs administered by the Bank under the MPMF. Similarly the lesson's learned are being applied in the planning of new ODS initiatives in the region as additional priorities developed under the MP. At the same time, the Bank responded to the detailed supervision needs of this kind of operation. It also reflects the Bank providing the necessary patience and timely guidance respecting the needs of the client/beneficiary, particularly recognizing the institutional instability that existed through much of the Project implementation period.

#### **Borrower**

#### *7.4 Preparation:*

Recipient was not initially well prepared to undertake the Project based on the country generally being behind other counties in the region in pursuing ODS phase out. However, initial capacity, particularly at the enterprise level, was enhanced, during preparation through the bilateral assistance provided by the Danish government and subsequently through a Bank administered PDF-B grant. By the time, the Project was appraised, a basic capacity was developing in the Ministry and ultimately with the creation and staffing of the Ozone Office, allowed the grant agreement to be negotiated and become effective, albeit after significant delays.

#### *7.5 Government implementation performance:*

The Government's implementation performance is considered moderately satisfactory. While the Project met its objectives in terms of ODS Phase out and meeting international obligations, this was accomplished without strong government policy commitment as reflected in the delays encountered in making the project effective despite the urgent need for action to meet international obligations and subsequently the relative passive policy commitment to ODS Phase out during project implementation

#### *7.6 Implementing Agency:*

The overall performance of the local implementing agency parallels that of the Government as a whole. Development of institutional capacity for management of ODS phase out and a modest project implementation capacity were supported by MENR in terms of policy but this may not be resourced sufficiently to ensure sustainability of the project's institutional outcomes. Similarly, the less than optimum implementation performance reflects limitations in the capacity of MEPNR to administer such projects. This was particularly evident over the final two years and by the incomplete tasks and actions remaining at project closing.

#### *7.7 Overall Borrower performance:*

Overall the Recipient's implementation performance is considered satisfactory largely on the strength of having substantively completed the Project and its meeting the principle objectives. This is largely a consequence of the efforts of the majority beneficiary enterprises.

### **8. Lessons Learned**

***Placement of PIU Capacity within the Institutional Structure:*** This Project applied the model of having the PIU capacity within the local implementing agency's structure. Nominally, it demonstrated the benefit of this arrangement in developing and putting into force the necessary legislative and regulatory measures needed to support ODS phase out within the organization that must champion and implement them. Theoretically it also provides a linkage to their direct application to investment sub-project beneficiaries. However, The PIU's placement at a relatively low level within the overall implementing agency limited its effectiveness in coordinating actual sub-project implementation and in sponsoring the necessary enforcement capacity. This structure also led to delays and inefficiencies in actually administering procurement and disbursement arrangements. The main lesson learned from this is that while PIU placement within the operational structure of a responsible local implementing agency is beneficial, it must be placed high enough to have access to decision-making in order to have the authority and influence to effectively champion the project's objectives and be able to operate somewhat independently of the restrictive administrative structure.

***Prospects of future global environmental initiatives:*** This Project offers useful direction on undertaking future global environmental initiatives of this type in Ukraine. The country is proposing to expand its international commitments with respect to ODS phase out and may qualify for international assistance in support of their implementation. This will relate primarily to methyl bromide where a project has already been prepared by the Bank and potentially to transitional ODS. In this regard, the positive experience with refrigeration servicing benefits in the current project provide useful experience in minimizing refrigerant use generally with the added benefit of reducing potential emission of high GWP refrigerants and increasing energy efficiency. It also extends to the broader management of chemicals on a global basis such as persistent organic pollutants and heavy metals where the country has major legacies and potentially significant global impacts. The results of this Project send a positive message to the international community on the country's interest in such future initiatives, with its successful completion. As a consequence, the Government and the Bank should pursue these opportunities expeditiously in order to capitalize on the credibility and experience derived from this Project. However, in doing so, new initiatives should be better integrated into the overall strategy jointly adopted with the Government for new environmental initiatives and should also link to broader CAS objectives. While this Project was undertaken essentially in isolation of other Bank operations, future initiatives should be integrated where possible to other sectoral initiatives. The linkage between

methyl bromide phase out and the grain sector is an example of such an opportunity.

***Importance of counterpart commitment and financial contribution:*** An overall lesson that should be drawn from this Project and one that is noted in other projects in the region is the correlation between implementation performance and counterpart financial commitments. At the local implementing agency level the general support provided by the Project for developing and sustaining capacity within it through the PIU budget was not matched by any real financial commitment from the Government, nor is it apparent that what now exists will be sustained. The lesson learned is that future projects should ensure that creditable commitments for matching government funding are built into the project design and as part of Grant conditionality. Otherwise an over dependence on grant funding develops and timely replacement of this support to sustain the results is less likely to be provided for.

***Importance of enterprise commitment and financial contribution:*** The most successful sub-projects in terms of meeting objectives and offering sustaining economic and social benefits to the country were those where enterprise contributions after implementation were both significant and timely. Conversely, where enterprise contributions were smaller or delayed, poorer results were obtained. JSC "Nord" represents a model for this kind of operation where the enterprise aggressively implemented the project and the rate of implementation was only limited by processing and procurement timing constraints imposed under the Project's framework. In particular, it demonstrated the effectiveness and value of enterprise commitment both in terms of making timely and significant enterprise contributions and the dedication of its own staff to leaning Bank procedures and effectively managing it themselves. A similar characteristic was exhibited by DNK Service who developed a model recovery and reclaim operation for refrigerants as well as a national and regional training capability, largely on its own initiative. Other examples of strong enterprise commitment with effective and timely implementation were the sub-projects at Electronmash and Dnipro-MTO. The majority of the other sub-projects, while successfully completed, suffered substantial delays in implementation for a variety of reasons. These mainly relate to a higher dependence on PIU support in areas such as procurement management and extended periods were involved with preparation of procurement documents, evaluation of bidders and particularly the negotiation and activation of contracts. The major impact of these delays was extended periods between the enterprises having access to ODS and being able to re-start production with non-ODS technology. The two sub-projects considered the least satisfactory were the two aerosol sub-projects where extended implementation delays occurred largely as a result of enterprise reluctance to make timely counterpart investment and continual attempts to renegotiate the amount of the sub-grant. As a consequence these enterprises face uncertainties respecting economic viability and sustainability, something for which ongoing monitoring is recommended.

***Flexibility and transparency in the use of technical assistance resources:*** The Project took a pragmatic approach to the use of resources originally earmarked for institutional strengthening technical assistance by transferring these to the PIU support component. The basic rationale for this was to get around significant institutional and legal barriers that existed in hiring consulting firms, both local and foreign, as well as individual consultants under Bank procurement rules. While the results were generally satisfactory, this process was less transparent and actual outputs from GEF funding were not as readily apparent. A lesson to be gained is that future Projects carefully evaluate the practicality of supporting TA under Bank procedures, get agreement that this can be done before committing resources to such activities, and clearly define what will be done within PIU budgets and within a TA component. In this regard, the recommended requirement of creditable Government contribution in this area should allow a better distinction to be made between grant funded TA, administered transparently under the Grant Agreement and the use of internal resources under contract within the PIU.

**Supervision intensity of large investment portfolios:** This Project provides an example of the supervision intensive nature of operations involving multiple, technically diverse and complex investment sub-projects as well as supporting technical assistance. This is particularly true where grant based financing is governed by strict eligibility requirements and Bank due diligence obligations related to safety and appropriate use of donor funds. While supervision resources were mostly adequate in this case, development of future projects of this nature should ensure that this requirement is recognized and matched to PIU capacity.

## 9. Partner Comments

### *(a) Borrower/implementing agency:*

The main objective of the project - the conversion to ozone-friendly technologies of the leading industrial enterprises in Ukraine has been achieved. The positive outcomes of the successful implementation of the project at NORD, for example, were the increase in refrigerators production and competitiveness of the enterprise as well as substantial saving of the energy resources.

Project implementation along with addressing mainly environmental issues resulted in substantial strengthening of the economic potential of the country – Ukrainian enterprises were supplied with new modern equipment, which had not been not produced and used earlier. In addition to the above-mentioned enterprise (domestic refrigeration), two chemical enterprises SHCP and DCP were fully supplied with new can and valve manufacturing equipment respectively. These enterprises were the biggest ODS consumers in Ukraine. Also the conversion of such enterprises as REFMA (Melitopol) and Kharkiholodmash (Kharkiv) has been successfully completed.

At the initial stage of the project implementation for the purpose of its better efficiency the Ministry initiated and later the World Bank supported the idea of making revision and introducing some changes into the general concept, the procurement plan and the work program. The above mentioned activity, low biddings for equipment supply and re-denomination by the Bank made possible to relocate resources for initiation of six additional investment sub-projects (five in refrigeration servicing and one in halon recovery) - total amount was about \$ 1 ml. Taking into consideration the prohibition of ODS export to Ukraine - halon recovery sub project (halons are widely used in fire fighting and explosion prevention) is very important strategically.

Costs-savings made it possible to initiate and complete preparation of Methyl Bromide Phase-out Project in Ukraine. This issue is considered as one of the paramount importance under the Montreal Protocol and is critical for Ukraine.

During the time of the project implementation the team of professionals was formed. Attending seminars and trainings which were organized by the World Bank the members of the team got necessary experience in project management, financial monitoring, complicated procurement procedures in biddings not in use in Ukraine before. The project supported institutional strengthening which helped to substantially expedite the fulfillment of all planned activities at the final stage. This factor plays an important role in successful implementation of other projects with participation of the World Bank.

It is hard to overestimate the impact of the project in creating conditions not only for introduction of ozone-friendly technologies, but also for improvement of legislation in Ukraine to fulfill its international obligations under the Montreal Protocol.

In fact, success in the project implementation created necessary conditions for the Copenhagen Amendment ratification and Government's decision on ODS export/import prohibition of Annexes A and B of the MP according to the terms, stated by Decision 10/27 of the MP regarding Ukraine. Currently Ukraine is in a preparatory process of the ratification of the Montreal and Beijing

Amendments to the MP. The ratification of these Amendments will substantially bring national environmental laws on the Ozone Layer protection of Ukraine closer to EU standards.

***Lessons learned.***

Project implementation has resulted in deep understanding of the necessity of early (preparatory stage) adjustments of national legislative system in reimbursement, taxation and bidding procedures to the World Bank regulations and requirements.

The second lesson learnt is the necessary to simplify complicated bureaucratic system of approvals and adoption of decisions (regarding formal, financial, and other issues). It would help to achieve better effectiveness.

The team for project implementation should be carefully selected based on real conditions of the project implementation, its objectives and tasks. The members of the team should possess good professional knowledge and permanently improve it.

It is very important for successful implementation of any long term (more than 1 or 2 years) project to be implemented by the same team of professionals and the same supervisors from the World Bank as well as from the Ministry.

To enforce project successful implementation every beneficiary enterprise should create a permanent group of professionals to maintain contacts with the main team for project implementation regarding biddings, technical specifications, and other issues.

We find necessary to acknowledge the activity of the World Bank – acting as an implementation agency for the Global Environmental Facility. At the initial stage and during its implementation the project faced some difficulties, which caused some impediments (long ratification process, development and adoption of legislative documents regarding equipment supply taxation, etc). Under such conditions the Bank has demonstrated flexibility in its approach, willingness to understand problems and has given support to address them rapidly.

Cooperation with the experts of the World Bank was an important element of our activity. Their professionalism made possible to reach project objectives at a high scientific and technical level.

*(b) Cofinanciers:*

*(c) Other partners (NGOs/private sector):*

## **10. Additional Information**

## Annex 1. Key Performance Indicators/Log Frame Matrix

### Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR <sup>1</sup>	Actual/Latest Estimate
1. Phaseout of primary ODS consumption through technology conversion investments by the Montreal Protocol Deadline of January 1, 2002 (a two year non-compliance extension of the originally targeted ODS Phase out deadline was granted by the MP Implementation Committee in Nov. 1998))	All primary ODS consumption phased out plus initial reduction of residual consumption in halon and refrigeration servicing.	The Project's overall objective of fully phasing out Annex A and Annex B ODS consumption was achieved with the GEF interventions being responsible for 4,580 MT ODP of appraised phase out and 533 MT ODP of actual phase out based on the last year of enterprise consumptions. All non-exempt consumption was reported to have stopped by the revised compliance target date of December 31, 2002.
2. Development of a product line of domestic refrigerators which uses low GWP hydrocarbons	NORD initiated product design changes for low GWP conversion.	NORD has fully implemented a full product range of domestic refrigerators based on hydrocarbon refrigerant and blowing agents, completely displacing both ODS and partially displacing HFC based refrigerants.
3. Creation of an Ozone Office in the Ministry of Environment, which will act as project implementation unit. Within the Ozone Office, availability of advisory services	The Ministry has in place a mature system of regulatory control on ODS at the national and regional levels and maintains its reporting and participation obligations under the Montreal Protocol and current amendments. 3 laws and 10 GOU resolutions have been passed	The Ozone Office (Renamed the Ozone Division) continues to operate as a permanent division with MEP's State Ecological Inspectorate. Its most recent achievement is the development and adoption of an Updated Country program. The main qualifications on satisfactory performance against this indicator is the recent significant reduction in resources available to sustain this effort, something that is reflected in deficiencies in international data reporting and in enforcement of what should be an effective framework for ODS elimination. However, its capacity to provide advisory services is limited.

### Output Indicators:

Indicator/Matrix	Projected in last PSR <sup>1</sup>	Actual/Latest Estimate
1. Completion of ODS-free investments in two aerosols companies, one domestic refrigeration company, four commercial refrigeration companies, two refrigeration services and one solvent company	Nine of the ten initially planned investments have been implemented and an additional seven investment subprojects have been undertaken. One of the initially planned sub-projects in the commercial refrigeration sector was cancelled. Four of the additional sub-projects are completing.	All but one of the originally planned investment subprojects have been completed, along with an additional seven sub-projects added to expand the project's coverage of residual ODS consumption
2. Support for development of a national Halon Management Plan	Halon Management Plan completed and under implementation. In addition to planned activities the investment sub-project on halon reclaim and recovery partially implemented	Halon management plan has been adopted and is being implemented by the National Fire Protection service in the Ministry of Emergency Situations, including controls on fire protection servicing and development/approval of alternative technologies. Full effectiveness of the recovery and reclaim system financed under the project remains to be proven
3. Support for development of national refrigeration servicing sector strategy and refrigeration sector training in recycling of ODS refrigerants	Training and Technical assistance completed as planned. The Training Center (Dniprotechpobutservice) currently provides training to technicians from Ukraine and FSU	The planned technical assistance and training has been delivered and effective national capacity within the private sector exists to sustain this and the operation of an

<p>4. The planned technical assistance and training has been delivered and effective national capacity within the private sector exists to sustain this and the operation of an effective recover and reclaim system for refrigerants. At a policy level this and the future phase out of transitional ODS refrigerants is incorporated into the updated Country Program.</p>	<p>countries.</p> <p>Most enterprises supported under the project appear to be viable, and are sustaining or are expanding employment that would have otherwise like have been lost without Project support.</p> <p>Residual ODS phase out in the refrigeration servicing sector is progressing.</p> <p>Effectiveness of halon recovery and re-use yet to be demonstrated</p>	<p>effective recover and reclaim system for refrigerants. At a policy level this and the future phase out of transitional ODS refrigerants is incorporated into the updated Country Program.</p> <p>Refrigeration servicing investment providing geographical coverage to approximately 75% of the country. Residual ODS demand is declining rapidly than anticipated due to equipment replacement and use of drop in substitutes.</p> <p>Effectiveness of halon recovery and re-use yet to be demonstrated. The viability and sustainability of all enterprises except the two aerosol enterprises is assessed positively in terms of employment maintenance and potential growth. Sustainability of the aerosol enterprises requires post closure monitoring</p>
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<sup>1</sup> End of project

## Annex 2. Project Costs and Financing

### Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	ICB	Procurement Method <sup>1</sup>		N.B.F.	Total Cost
		NCB	Other <sup>2</sup>		
<b>1. Works</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	2.60 (0.00)	2.60 (0.00)
<b>2. Goods</b>	13.30 (13.30)	0.00 (0.00)	7.30 (7.30)	1.40 (0.00)	22.00 (20.60)
<b>3. Services</b>	0.00	0.00	1.90	4.60	6.50
<b>3.1. Technical Assistance</b>	(0.00)	(0.00)	(1.90)	(0.00)	(1.90)
<b>3.2. Training</b>	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.10 (0.00)	0.11 (0.01)
<b>4. Miscellaneous</b>	0.00	0.00	0.70	0.00	0.70
<b>4.1. Project Implementation (PIU Cost)</b>	(0.00)	(0.00)	(0.70)	(0.00)	(0.70)
<b>4.2. VAT/Import Duties</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.80 (0.00)	0.80 (0.00)
<b>Total</b>	13.30 (13.30)	0.00 (0.00)	9.91 (9.91)	9.50 (0.00)	32.71 (23.21)

Figures in parenthesis are respective amounts financed by GEF

Notes:

- Includes US\$5.9 million in IS and US\$1.4 million in NS
- Includes US\$1.3 million in QCBS
- According to IBRD Guidelines for Consultant Selection
- To be financed by enterprise using local commercial practice

### Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US\$ million equivalent)

Expenditure Category	ICB	Procurement Method <sup>1</sup>		N.B.F.	Total Cost
		NCB	Other <sup>2</sup>		
<b>1. Works</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.90 (0.00)	1.90 (0.00)
<b>2. Goods</b>	14.00 (14.00)	0.00 (0.00)	7.10 (7.10)	0.40 (0.00)	21.50 (21.10)
<b>3. Services</b>	0.00	0.00	1.00	0.50	1.50
<b>3.1. Technical Assistance</b>	(0.00)	(0.00)	(1.00)	(0.00)	(1.00)
<b>3.2. Training</b>	0.00 (0.00)	0.00 (0.00)	0.10 (0.10)	0.10 (0.00)	0.20 (0.10)
<b>4. Miscellaneous</b>	0.00	0.00	1.00	1.50	2.50
<b>4.1. Project Implementation (PIU Cost)</b>	(0.00)	(0.00)	(1.00)	(0.00)	(1.00)
<b>4.2. VAT/Import Duties</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.10 (0.00)	0.10 (0.00)

<b>Total</b>	14.00 (14.00)	0.00 (0.00)	9.20 (9.20)	4.50 (0.00)	27.70 (23.20)
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<sup>1/</sup> Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

<sup>2/</sup> Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

### Project Financing by Component (in US\$ million equivalent)

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Govt.	CoF.	Bank	Govt.	CoF.	Bank	Govt.	CoF.
<b>1. Investment Component</b>	21.01		8.99	21.46		3.97	102.1		44.2
<b>1.1 Aerosol Sector</b>	6.77		1.65	7.30		0.57	107.8		34.5
<b>1.2 Refrigeration Sector</b>	14.11		7.17	13.60		3.21	96.4		44.8
<b>1.3 Solvent Sector</b>	0.13		0.17	0.13		0.17	100.0		100.0
<b>1.4 Halon Sector</b>				0.42		0.03			
	1.53		0.55	0.79		0.55	51.6		100.0
<b>2. Technical Assistance</b>									
<b>3. PIU Costs</b>	0.67		0.00	0.94		0.00	140.3		0.0
<b>Total Costs</b>	23.71		9.54	23.19		4.52	97.8		47.4

\* Co-financing excludes US\$4.92 million in enterprise pre-appraisal investment

### **Annex 3. Economic Costs and Benefits**

No economic analysis of the project estimated at appraisal

## Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating		
	Month/Year	Count	Specialty	Implementation Progress	Development Objective
<b>Identification/Preparation</b>					
September 1995	3	TASK MANAGER, TECHNICAL CONSULTANTS (2)			
May 1997	6	TASK MANAGER, OPERATIONS OFFICER (ESSD), TECHNICAL CONSULTANTS (4)			
<b>Appraisal/Negotiation</b>					
September-October 1997	6	TASK MANAGER, TECHNICAL CONSULTANTS (4), FINANCIAL SPECIALIST (1)			
<b>Supervision</b>					
10/1998	4	TASK MANAGER, DEPUTY TASK MANAGER, OPERATIONS OFFICER (ESSD), FINANCIAL SPECIALIST	S		
05/14/1999	3	PTL (1); TASK TEAM LEADER (1); PROJECTS OFFICER (1)	S		
03/10/2000	7	GEF REG. COORD. (1); PROJECT SPECIALIST (1); TECH. SPECIALIST (2); FINANCIAL SPECIALIST (2); OPS. OFFICER (1)	U		
10/21/2000	6	ENV. SPECIALIST, HQ (1); OPS. OFFICER, RM (1); TECHNICAL SPECIALIST (1); REFRIGERATION ENG. (1); PROCUREMENT OFF. (1); FINANCIAL ANALYST (1)	S		
05/18/2001	2	TASK TEAM LEADER (1); OPERATIONS OFFICER (1)	S		
07/02/2001	7	TTL (1); DEPUTY TTL (1); TECHNICAL CONSULTANT (1); REFRIGERATION CONSULTA (1); FINANCIAL CONSULTANT (1); CONSULTANT (LOCAL) (1); ADVISOR TO THE PIU (1)	S		
06/28/2002	6	TTL (1); DEPUTY TTL (1); PROCUREMENT SPECIALIST	S		

	06/09/2003	5	(1); FIN.MANAG.SPECIALIST (1); TECHNICAL CONSULTANT (2) TTL (1); DEPUTY TTL (1); FIN.MANGMNT.SPECILAIST (1); TECHNICAL CONSULTANT (2)	S
	12/10/2003	2	TASK TEAM LEADER (1); TECHNICAL CONSULTANT (1)	S
	06/10/2004	3	TASK TEAM LEADER (1); TECHNICAL CONSULTANT (1); CONSULTANT (1)	S
	11/30/2004	3	TASK TEAM LEADER (1); TECHNICAL CONSULTANT (2)	S
<b>ICR</b>	March 2005	3	TASK TEAM LEADER, TECHNICAL CONSULTANTS (2)	S

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation		
Appraisal/Negotiation		
Supervision		
ICR		
Total		

## Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<u>Rating</u>				
<input type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Physical</i>	<input checked="" type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<i>Social</i>					
<input type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA

## Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

### 6.1 Bank performance

#### Rating

- |                                      |                          |                                    |                         |                          |
|--------------------------------------|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Lending     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Supervision | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

### 6.2 Borrower performance

#### Rating

- |  |                          |                                    |                         |                          |
|--|--------------------------|------------------------------------|-------------------------|--------------------------|
| <input type="checkbox"/> Preparation                           | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Government implementation performance | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Implementation agency performance     | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |
| <input type="checkbox"/> Overall                               | <input type="radio"/> HS | <input checked="" type="radio"/> S | <input type="radio"/> U | <input type="radio"/> HU |

## **Annex 7. List of Supporting Documents**

### **Preparation Documents:**

*Country Programme for the Phase-Out of Ozone Depleting Substances in Ukraine*, COWIconsult/Ministry for Environmental Protection and Nuclear Safety of Ukraine, Final Report, October 1995.

*OORG Review, Solvent Sector Sub-Projects*, Bryan Baxter, January 1996.

*OORG Review, Aerosol Sector Sub-Projects*, Harry B. McCain, January 1996

*OORG Review, Foam Sector*, G. M.F. Jeffs, January 1996

*OORG Review, Refrigeration Sector Sub-Projects*, Dr. Lambert Kuijpers, February 1996

*Proposal for PDF Block B Grant, Ozone Depleting Substance Phase Out Project*, , The World Bank, April 8, 1996

*Project Information Document, Ukraine: Ozone Depleting Substance Phase Out Project*, The World Bank, May 15, 1996

*Environmental Data Sheet, Ukraine: Ozone Depleting Substance Phase Out Project*, , The World Bank, May 15, 1996

*Final Project Documents (Sub-Projects), Phase-out of Ozone Depleting Substances in Ukraine*, COWIconsult/Ministry for Environmental Protection and Nuclear Safety of Ukraine, June 1996

*GEF Proposal for Review, Ukraine: Ozone Depleting Substance Phase Out Project*, The World Bank, August 1, 1996

*Supplementary Preparation Studies, Ukraine ODS Phase-Out Project*, Arthur D. Little Inc., February 1997

*Identification and Preparation of Halon and Refrigeration Servicing*

*Sub-Projects, Screening Review*, COWI A/S, November 2001

*Sub-Project Documents and Technical Specifications: Halon and Refrigeration Servicing Sub-Projects*, COWI A/S, November 2001

*OORG Review: Refrigeration ODS Consumption Phaseout Project for 2 Oblasts, Cherkassy and Cherniviv*, Lambert Kuijpers, March 2002.

*OORG Review: Servicing of Commercial Refrigeration, Dnipro-MTO*, Lambert Kuijpers, March 2002.

*OORG Review, National Halon Management and Banking Operation*, Michael H. Wilson, March 2002

*Financial Viability Evaluation of Enterprises in the Refrigeration Servicing Sector, Electroservice Ltd., Kyiv and PTC Diana, Stryi, Lviv Oblast*, Sergei G. Khapatko, October 2003

*Sub-Project Documents and Technical Specifications, Enterprises in the Refrigeration Servicing Sector, Electroservice Ltd., Kyiv and PTC Diana, Stryi, Lviv Oblast*, Sergei G. Khapatko, October 2003

*OORG Review, Electroservice Ltd., Kyiv*, Lambert Kuijpers, December 2003.

*OORG Review, PTC Diana, Stryi, Lviv Oblast*, Lambert Kuijpers, December 2003.

## **Appraisal Documents**

*Financial Analysis and Restatement, Ukraine ODS Phaseout Project, Barry Shaeffer, August, 1997*

*Final Project Documents (Sub-Projects), Ukraine ODS Phase-Out Project, Arthur D. Little Inc., September 1997*

*Global Environment Facility, Ukraine Ozone Depleting Substances Phase-out Project, Project Document, The World Bank, Report No. 17211-UA, May 1998*

*Final Sub-Project Documents and Technical Specifications, Halon and Refrigeration Servicing Sub-Projects, World Bank, February 2002*

*Final Sub-Project Documents and Technical Specifications, Enterprises in the Refrigeration Servicing Sector, Electroservice Ltd., Kyiv and PTC Diana, World Bank, October 2003*

## **Legal Agreements**

*Global Environmental Facility Trust Fund Agreement on Phaseout of Ozone Depleting Substances, Between Ukraine and IBRD, September 15, 1998*

*Amendment to the Grant Agreement No. TF 020426-UA UKRAINE - Phaseout of Ozone Depleting Substances Project - between the Recipient and the Bank regarding redenomination from SDR to USD, November 18, 2003*

*Amendment to the Grant Agreement No. TF 020426-UA UKRAINE - Phaseout of Ozone Depleting Substances Project - between the Recipient and the Bank regarding carrying out of audits by Beneficiaries, May 13, 2003*

## **Extensions of the Closing Date and Reallocations of the GEF Grant Proceeds**

*First Extension of the GEF Trust Fund Grant No. TF 020426 from 31st December 2000 to 31st December 2002 agreed on **August, 2000***

*Second Extension of the GEF Trust Fund Grant No. TF 020426 from 31st December 2002 to 31st December 2003 and Reallocation of GEF Trust Fund Grant Proceeds agreed on **July, 2002***

*Third Extension of the GEF Trust Fund Grant No. TF 020426 from 31st December 2003 to 31st December 2004 and Reallocation of GEF Grant Proceeds agreed on **October, 2003***

*Reallocation of GEF Grant Grant No. TF 020426 Proceeds agreed on **April, 2004***

## **Sub-Grant Agreements**

*Sub-project Agreement between Ministry of Environmental Protection and Nuclear Safety of Ukraine and SEC "Dnipro-MT.": Commercial refrigerating appliance, **May, 1999***

*Sub-project Agreement between Ministry of Environmental Protection of Ukraine and SEC "Dnipro-MT.": Refrigerant Recovery, Recycling and Retrofit Scheme, **August, 2002***

*Sub-project Agreement between Ministry of Environmental Protection and Natural Resources of Ukraine and SC "NORD" (Donetsk), **May 1999***

*Sub-project Agreement between Ministry of Environment and Natural Resources of Ukraine and PC "Dneprotechbytsevis" (Dnipropetrovsk), **September, 1999***

*Sub-project Agreement between Ministry of Environment and Natural Resources of Ukraine and OJSC "Kharkovholodmash" (Kharkiv), **September, 1999***

*Sub-project Agreement between Ministry of Environment and Natural Resources of Ukraine and OJSC "Remtorgoborudovanie" (Kyiv), **August, 1999***

*Sub-project Agreement between Ministry of Environment and Natural Resources of Ukraine and JSC "Bytova Khimiya" (Simferopol), **September, 1999***

*Sub-project Agreement between Ministry of Environment and Natural Resources of Ukraine and Closed Stock Company "Donetsk Chemical Plant "Impulse"" (Donetsk), **July, 1999***

*Sub-project Agreement between Ministry of Environmental Protection of Ukraine and JSC "REFMA"(Melitopol), **August, 1999***

*Sub-project Agreement between Ministry of Environmental Protection of Ukraine and CJSC "Tekhnoservis" (Cherkassy), **October, 2002***

*Sub-project Agreement between Ministry of Environmental Protection of Ukraine and CJSC "Chernigiv Repair and Montage Complex" (Chernigiv), **May, 2003***

*Sub-project Agreement between Ministry of Environmental Protection of Ukraine and TPC "Diana" (Stryi, Lviv Oblast), **May, 2004***

*Sub-project Agreement between Ministry of Environmental Protection of Ukraine and ELECTRONMASH (Kyiv), **July, 2004***

### **Completion Documents**

*Halon Management Plan, Report #1 on Stage 1, Enterprise "ADM", December 2001*

*Halon Management Plan, Report #1 on Stage 2, Enterprise "ADM", January 2002*

*Overview of Refrigeration Equipment Service, M. Fainshtein, Ukrainian Association of Refrigerant Users and Suppliers, 2002*

*Implementation of Pilot Sub-Projects in Refrigeration Servicing Sector, M. Fainshtein, Ukrainian Association of Refrigerant Users and Suppliers, 2003*

*Overview of Refrigeration Equipment Service, M. Fainshtein, Ukrainian Association of Refrigerant Users and Suppliers, 2002*

*Report on Refrigeration Servicing Training, 2004*

*Sub-project ICRs:*

*Sub-Project Implementation Completion Report, SEC "Dnipro-MTO" (Kyiv), Commercial Refrigerating Appliance Conversion, October 2003*

*Sub-Project Implementation Completion Report, PC "Dneprtechbytservis" (Dnipropetrovsk), Commercial Refrigeration Recovery, Recycling and Reclaim Servicing Pilot Initiative, September 2003*

*Sub-Project Implementation Completion Report, Affiliate of CSC "Donetsk Chemical Plant" "Impulse", October 2004*

*Sub-Project Implementation Completion Report, Public Research & Production Enterprise "Electronmash", Phase-out of CFC-113 Use in Production of Electronic Modules, December 2002*

*Sub-Project Implementation Completion Report, OJSC "Kharkovholodmash": Conversion of commercial refrigerating equipment from CFC-12, March 2004*

*Design for the Conversion of Condensing Unit Manufacture from CFC-12 to HFC\_134a and from CFC-502 to HFC-404a at OJSC "Kharkovholodmash, Ekotez SPOL S. R. O., April 2003.*

*Sub-Project Implementation Completion Report, OJSC "Remtorgoborudovanie" (Kyiv), Commercial Refrigeration Recovery, Recycling and Reclaim Servicing Pilot Initiative, September 2003*

*Sub-Project Implementation Completion Report, JSC "NORD" (Donetz), Phase Out of CFC-11, CFC-12, CFC-113 in Domestic Refrigerator Manufacture, July 2002*

*Report on NORD HC TA, 2003*

*Sub-Project Implementation Completion Report, JSC "Refma" (Melitopol) . Conversion from CFC-12 to HFC-134a and HFC-404a in Commercial/Industrial Refrigerating Appliances, July 2004*

*Sub-Project Implementation Completion Report, Open Joint Stock Company "Bytova Chimia" (Simferopol), Conversion of Aerosol Production to Hydrocarbon Aerosol Propellants, October 2004*

*Sub-Project Implementation Completion Report, SEC "Dnipro-MTO" (Kyiv), , Refrigerant Recovery, Recycling and Retrofit Scheme, April 2004*

*Sub-Project Implementation Completion Report, CJSC "Tekhnoservis" (Cherkassy), Refrigerant Recovery, Recycling and Retrofit Scheme, April 2004*

*Sub-Project Implementation Completion Report, CJSC "Chernigiv Repair and Montage Complex" (Chernigiv), Refrigerant Recovery, Recycling and Retrofit Scheme for Cherniviv Oblast, February 2005*

*Sub-Project Implementation Completion Report, TPC "Diana" (Stryi, Lviv Oblast)CJSC, Refrigerant Recovery, Recycling and Retrofit Scheme for Lviv Oblast, March 2005*

*Sub-Project Implementation Completion Report, Electroservis Ltd. (Kyiv), Refrigerant Recovery, Recycling and Retrofit Scheme for Lviv Oblast, December 2004*

*Sub-Project Implementation Completion Report, CJSC "Institute Spetsavtomatika", Halons Recovery, Recycling and Establishment of Bank System, March 2005 (Documentation Incomplete- No Final Dated Version of the Sub-Project ICR Submitted)*

