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The World Bank

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Report No: 22229

IMPLEMENTATION COMPLETION REPORT  
(TF-28960)

ON A

GRANT

IN THE AMOUNT OF US\$6.9 MILLION

TO THE REPUBLIC OF

BELARUS

FOR AN

OZONE DEPLETING SUBSTANCES PHASEOUT PROJECT

03/30/2001

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## CURRENCY EQUIVALENTS

(Exchange Rate Effective April 12, 2001)

Currency Unit = Special Drawing Rights (SDR)

1 SDR = US\$ 1.269

US\$ 1 = SDR 0.788

## FISCAL YEAR

January 1 - December 31

## ABBREVIATIONS AND ACRONYMS

Vice President:	Johannes F. Linn
Country Director:	Luca Barbone
Sector Director:	Kevin M. Cleaver
Task Team Leader:	Karin J. Shepardson

**BELARUS  
OZONE DEPLETING SUBSTANCES PHASEOUT PROJECT**

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<i>Project ID:</i> P044729	<i>Project Name:</i> ODS PHASEOUT (GEF)
<i>Team Leader:</i> Karin Shepardson	<i>TL Unit:</i> ECSSD
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> June 22, 2001

## 1. Project Data

*Name:* ODS PHASEOUT (GEF)

*L/C/TF Number:* TF-28960

*Country/Department:* BELARUS

*Region:* Europe and Central  
Asia Region

*Sector/subsector:* VP - Pollution Control / Waste Management

### KEY DATES

	<i>Original</i>	<i>Revised/Actual</i>
<i>PCD:</i> 01/31/96	<i>Effective:</i> 08/11/97	
<i>Appraisal:</i> 12/02/96	<i>MTR:</i>	
<i>Approval:</i> 05/01/97	<i>Closing:</i> 08/29/2000	12/29/2000

*Borrower/Implementing Agency:* Government of Belarus/Ministry of Natural Resources and Environmental Protection

*Other Partners:* Beneficiary Enterprises

STAFF	Current	At Appraisal
<i>Vice President:</i>	Johannes F. Linn	Johannes Linn
<i>Country Manager:</i>	Luca Barbone	Basil G. Kavalsky
<i>Sector Manager:</i>	Jane E. Holt	Geoffrey Fox
<i>Team Leader at ICR:</i>	Karin Shepardson	Karin Shepardson
<i>ICR Primary Author:</i>	Karin Shepardson; Paola Meta; Elena Klochan	

## 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:* SU

*Bank Performance:* S

*Borrower Performance:* HS

QAG (if available)

ICR

*Quality at Entry:*

S

*Project at Risk at Any Time:* No

*This project did not have a QAG assessment.*

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

#### *3.1 Original Objective:*

The project's main objective was to assist Belarus with the rapid phaseout of ODS consumption in a manner consistent with international efforts and within internationally agreed timeframes. The project was designed to help provide assistance to high consumption enterprises in Belarus to enable them to make the transition to non-ODS materials before supplies diminish. The project would also provide needed technical assistance and institutional strengthening to an Ozone Office established on July 1, 1996 in the Ministry of Natural Resources and Environmental Protection (MNREP).

The project objectives were quite simple and "technical" in nature as compared to other Bank projects- but very similar to other GEF ODS Phaseout Projects within the ECA region. Policy reforms in the ODS Phaseout Project were limited to adoption of environment laws and treaties concerning ODS production consumption, custom controls, and adoption of rules to alter enterprise and consumer behavior. The project was an outcome of Bank ESW recommendations and therefore it matched our country dialogue in the environment sector. The project was approved at a time in the country dialogue when a complex project would not have been acceptable - and it became the only Bank project to be approved in Belarus for the following five year period due to concerns with Belarus' macroeconomic framework, most importantly the multiple exchange rate policy. A Forestry Loan under implementation at the time of the ODS Phaseout Project approval experienced problems particularly related to a lack of government commitment to policy reforms, and the government had recently cancelled preparation of several other Bank loans midstream. Overall, there was not a very high level of confidence or trust between the Bank and the government, and there was a lack of experience to demonstrate the government's capacity to implement and follow-through on a Bank project. Thus the good implementation performance of this project provides an important milestone for future cooperation between the Bank and the government.

#### *3.2 Revised Objective:*

N/A - The objective was not revised during the course of the the project.

#### *3.3 Original Components:*

The project was comprised of an investment component in technology conversion and a technical assistance and training component in support of Belarus' ODS Phaseout Country Program. The technology conversion components consisted of one sub-project in the household refrigeration manufacturing sector; one sub-project in the industrial/commercial refrigeration servicing sector; and four sub-projects in the solvent sector. The technical assistance and training subcomponent consisted of a national training workshop to assess alternatives for phasing out halon systems; and an institutional strengthening component aimed at enhancing government's capacity to meet Montreal Protocol obligations.

Refrigeration Manufacturing (\$4.3 million) - This sub-project was designed to complete a large refrigerator manufacturer (Atlant's), conversion to non-ODS materials. It specifically helped finance conversion CFC-11 to a cyclopentane substitute in its refrigeration foaming line. Additionally, it financed equipment and training for the enterprise's refrigeration servicing business which dominates the local market. An estimated 282 tons/year of ODS used in manufacturing and

62 tons/years from servicing requirements were targeted for phaseout.

Commercial Refrigeration Servicing (\$1.5 million) - This sub-project was designed to support training and investment in equipment to establish a national capacity for recovering, recycling, and reclaiming refrigerants in the industrial, commercial, and transportation refrigeration servicing sector. It also provided funds to retrofit refrigeration units to operate with non-ODS materials. A national servicing network lead by the enterprise Beltopprogress was the key executing organization. An estimated 256 tons/year consumed in servicing of ODS was targeted for phase-out.

Solvent Sector (\$0.7 million) - Four enterprise based sub-projects in the electronics and consumer products manufacturing businesses (Belva, Minsk Computer, Kamerton, and Tsvetotron) were targeted for conversion to non-ODS technologies. Three sub-projects subsequently substituted CFC-113 solvent with high purity water and acid-alkaline techniques for cleaning electronic components. Two sub-projects converted the used of trichloroethane (TCA) in circuit board manufacturing to a non-ODS alkaline process. An estimated 15 tons/year of CFC-113 and 75 tons/year of TCA was targeted for phaseout.

#### Technical Assistance and Training sub-components

Two technical assistance sub-components provided technical knowledge and training regarding ODS conversion in the fire protection sector (US \$30,000) and institutional strengthening to Government authorities concerned with ODS issues (US \$154,000). Funds supported a national workshop on fire protection and alternatives for conversion to non-ODS materials, focusing specifically on halons. The institutional strengthening component provided support to the government's Ozone Office and their role in carrying out the objectives of the Belarus ODS Phaseout Country Program.

The design of the project components matched the key recommendations of the ODS Phaseout Country Program for Belarus and targeted the largest ODS consumers. Lessons learned from earlier ODS Phaseout Projects were taken into consideration in this project's design, particularly with regard to the need to include refrigeration servicing and halon sectors. Flexibility in the TA and training sub-components allowed for cross-fertilization among other ODS phaseout projects across the ECA region by supporting periodic inter-regional exchanges (initially hosted by Hungary) on outreach and public awareness efforts in areas with relatively less worldwide experience like refrigeration servicing and halons substitution schemes. The project incorporated additional financial risk prevention measures (routine financial viability monitoring of enterprises and a design that anticipated some enterprise failures) primarily because of bankruptcy experiences in ODS projects of other countries where the macroeconomic risks were assessed to be lower than Belarus.

#### *3.4 Revised Components:*

No project components were revised; however some of the project savings were used to expand the impact of the refrigeration servicing sub-project and to expand the technical assistance component to publish training and public awareness materials related to the sub-projects.

Savings under the servicing equipment sub-project at Beltorg progress allowed Belarus to increase the amount of spare parts and refrigeration technician toolkits available to technicians trained under the project as well as to purchase additional servicing equipment for milk coolers in the agricultural sector. The latter investment proved to be particularly valuable to sustain operation of coolers in dairy farms. The specific requirements of the milk coolers were not captured in the original ODS Country Program, and were therefore not included in the phaseout proposals presented for GEF support. During subsequent project supervision, however the dependence of these milk coolers ODS supplies and need for special conversion and retrofit were identified. Since the Government could not afford to replace these coolers with new equipment, they have been converted to "transitional substances" allowed under the Montreal Protocol for a limited timeframe, but ineligible for GEF financing. To assist the Government to meet long term ODS phaseout of refrigerants in these milk coolers, and to ensure the continued operation of equipment critical to the country's milk production, the project allocated US\$ 48,000 of savings to purchase GEF eligible equipment for the servicing organizations covering the agricultural dairy sector.

Additional activities funded under the technical assistance component included: (1) development of consumer education brochures to encourage people to service refrigerators using properly trained technicians bearing a "Green Card" (the Green Card certifies technicians who have been trained in ODS recovery and reclaim from refrigerators); (2) development of an educational pamphlet for technicians on servicing issues; (3) development of a manual for servicing technicians; and (4) development of a refrigeration energy efficiency program to be carried out through the servicing centers.

### *3.5 Quality at Entry:*

N/A. This project did not undergo a quality at entry review, however it was considered to be well prepared and it met all of the Bank's project processing service standards. The government easily and efficiently met the project's policy conditionality which was the ratification of the London Amendment of the Montreal Protocol. The most difficult preparation hurdle were efforts to establish a procurement and financial management specialist in the Ozone Office. Although preparation funds were allocated to fund these two positions, they went unspent in the PDF-B (GEF preparation grant) because of legal contracting difficulties (government Ministry could not legally hire contract staff; were required to assess social taxes; and required to currency hand-over requirements due to the multiple exchange rates). The Bank did not agree to grant funds being allocated for social taxes; and did not agree to higher than normal salaries to compensate for currency losses from mandatory government exchange rates (equivalent to a direct transfer of grant funds to the central government). These difficulties persisted into the first year of the project until they were ultimately resolved at a high level and on an exceptional basis for World Bank projects. Early project implementation did suffer from these positions being vacant for such a long period- and the issue was extensively discussed between the Bank and the government on a regular basis to try to find an acceptable solution for both sides.

## **4. Achievement of Objective and Outputs**

### *4.1 Outcome/achievement of objective:*

#### **Achievement of Project Objective.**

The project was completed successfully with an overall highly satisfactory rating for implementation performance. The investment activities were completed by the end of July, one month in advance of the August 29, 2000 closing date. A short extension of the project to December 29, 2000 was granted to complete the final audit of project accounts, which was



delivered to the Bank at the end of November 2000. Project objectives were fully achieved, and 100% of the amount targeted for phaseout under this project was achieved.

This was the only ODS Phaseout project in the ECA region to be implemented within its appraised three year project implementation period. This success was achieved mainly due to the high implementation capacity of the Ministry Ozone Office and beneficiary enterprises. Another significant factor in ensuring smooth and timely implementation was the continuity of the task team on the Bank side, which provided the MNREP and the enterprises with a source of consistent and uninterrupted support. Resident mission staff training on project procurement and disbursement functions during project implementation (one of only 2 projects in the country) also provided timely and useful support to the client, particularly in the later part of the project implementation.

The largest implementation challenge for the project concerned financial difficulties at several solvent consuming enterprises, which thus risked cancellation of their sub-projects and contributed to project implementation delays for these sub-projects. Ultimately, all sub-projects were implemented once enterprises improved their financial situation and demonstrated an ability to provide necessary counterpart funds.

### **Consistency of the Project with the ODS Phaseout Country Program**

The Belarus ODS Phaseout Country Program (CP) was completed in 1994, and was the Government's planning document underlying the design of this project. Formal Government approval of the Country Program was a pre-requisite for GEF funding. The CP discussed the potential for ODS phaseout in Belarus from two aspects: 1) government strategy; and 2) actions by individual enterprises in the foam, refrigeration and solvent sectors.

The Belarussian Government broadly followed the proposals outlined in the CP. An Ozone Office (OO) was set up to oversee project implementation, assist in drafting legislation and administer ODS import licenses. Legislation was adopted to require attainment of a license issued by the OO by any organisation wishing to import any ozone depleting substances. Public Awareness Raising Campaigns (PARCs) were successfully implemented and the OO drafted and facilitated the adoption of the key legal instruments for ODS control that are currently in force (Order #120; 02/06/1997 of the Ministry of Natural Resources and Environment and the Decree of the Council of Ministers #1038; 08/08/1997). Order #120 defined the procedure of moving ODS through the customs border of the Republic of Belarus and made it possible to establish control over their import and export while Decree #1038 introduced duties on ODS import and mandated licensing of activities related to ODS production, storage, industrial consumption, recycling and disposal. A comprehensive law on the protection of the ozone layer is currently awaiting approval by Parliament; and when passed, will complete the establishment of legal and institutional conditions enabling Belarus to meet its international commitments for the protection of the ozone layer. An inter-ministerial agency on ODS phaseout was established to oversee the process of developing the Country Program, and continues to play an important role in promoting cooperation between different government agencies (e.g. Ministries of Environment and Economy, the State Customs Committee).

Some proposals outlined in the CP were not carried out, or were modified. In particular, the proposal to license refrigeration technicians was modified. Instead legislation was adopted to require users to be registered and to make annual reports on their ODS use. This was later strengthened by an additional decree to require all refrigeration service companies to show capacity for, and evidence of, refrigerant recycling as a precondition for renewal of their annual trading licence. The high percentage of servicing technicians who received project-financed training coupled with a requirement for companies to demonstrate recycling, make it highly unlikely that anyone will deliberately vent refrigerant to atmosphere (the prevention of which would be the objective of a technician licensing scheme). Legislation designed to stop the activities of a small number of untrained technicians is likely to be expensive and difficult to police. Thus the refrigeration technician licensing scheme envisioned in the CP is not being pursued. The market price of ODS substances also doubled in a year and will continue to rise as the available supplies diminish- establishing strong economic incentives for compliance.

In summary, all sub-projects recommended for GEF investment in the Country Program for ODS phaseout have been implemented. The one area that received little attention in the CP, but which remains the sole ODS use sector in Belarus is the fire protection sector. The CP assumed that halon substitutes exist or would exist by the time of implementation and that curtailing their use could be achieved by disseminating information about substitutes through a workshop. Unfortunately, convenient substitutes have not been developed during this time and thus the fire fighting services in Belarus are currently and remain dependent on halons. All developed countries face this problem and have solved it by setting up halon banks which enable halon collection from installations where it is not required to be re-used in locations where there is no effective alternative (aircraft, hospitals, fine art museums etc.). The low consumption needs and shrinking base of essential halon users makes this a long term strategy. With hindsight, the Belarussian government probably should and would have sought assistance for a halon bank had this option been considered the only solution. The most urgent problem is that halon is vented from installations being subjected to the mandatory five year re-filling requirement. Provision of a halon recycling equipment could have prevented this significant discharge.

#### *4.2 Outputs by components:*

It should be noted that each participating enterprise prepared its own sub-project completion reports which are included in the project files.

### **1. Domestic Refrigeration Manufacturing Conversion and Domestic Refrigeration Recovery and Recycling Scheme - Atlant Enterprise - HS**

The GEF financed part of this project consisted of two parts: 1) the partial financing of a door foaming line using cyclopentane to replace CFC-11; and 2) the provision of refrigerant recycling and recovery machines and toolkits to Atlant's service network to establish a recovery, recycling, and reuse (3R) scheme for the domestic refrigeration sector. All ODS substances used at this enterprise were phased out by the project. This project component was rated highly satisfactory.

Atlant is a very sound company whose business position has been marginally improved by the new line. The refrigerator doors now produced with ozone free chemicals have allowed the company

to market their products with an ozone-friendly "green" label (particularly important in western european markets). Exposure to the state-of-the-art foaming technology has improved the knowledge and professionalism of technicians at all levels. The improved product quality has increased the company's competitiveness and enabled it to increase exports to western european markets at a time when traditional CIS markets were weakening.

Refrigerant recovery from refrigerator repair established under the project has proceeded well. In 2000, 3,105 kgs of CFC-12 were recovered and re-used by Atlant's service network. Atlant's refrigeration servicing networks did not purchase any new CFC-12 in 2000, and thus the recovery scheme objectives had been fully met. About 30% of the demand for refrigerant to charge repaired refrigerators had been met by recycled product. The rest was met by a Russian S-10 substitute for CFC-12.

Secondary benefits from the sub-project have been considerable. Health and safety of workers at the Atlant plant has improved by reducing CFC-11 vapours in the door foaming workshop; and by introducing a new door design which eliminated a riveted construction that had been responsible for health problems reported in around 100 female workers over the last 15 years. The pneumatic riveter machines used previously had caused female operators (with weaker bone structures) to experience repetitive stress fractures of the wrist. Atlant had earlier (1995) financed conversion of its body foaming line to cyclopentane and experienced none of the benefits described above. If the Project not been implemented, Atlant reportedly would have likely continued using HCFC-141b, a transitional low- ODS fluid allowed under Montreal Protocol rules.

Some minor (resolvable) technical problems were encountered after commissioning of the new equipment, however they were eventually addressed by the suppliers. The time taken to implement the sub-project (1997 to 1999) was considered excessive by the enterprise who felt that the World Bank's procedures were cumbersome and slow. Atlant was accustomed to competitive bidding for its own procurement and felt it did not gain anything using the Bank's methods. The implementation time for Bank procurement of this type of equipment package was however not considered excessive by World Bank standards and was very close to the two-year schedule estimated for the LIB packaged goods at appraisal.

## **2. Beltorprogress - Refrigeration Recovery, Recycling, and Reclamation Scheme (3R) and Technician Training Program - HS**

The Beltorprogress sub-project consisted of the establishment of a scheme for Refrigerant Recovery Recycling and Reclamation (3R). This involved provision of technician training, servicing equipment, recycling and reclaim and equipment, and equipment for testing refrigerant purity. This project sub-component was rated highly satisfactory.

The total numbers of refrigeration technicians trained under this sub-project exceeded the expected number by more than 10%. The initial performance of the 3R scheme itself was highly successful, even in its first three months of operation (at the time of the ICR mission). In the first three months of operation - 2,200 kgs of CFC-12 was recycled from Beltorprogress' five Oblast level servicing depots. This amount equals about 7 tons per year, or more than 10% of

Beltorprogress' 1999 purchase of CFC-12 for servicing. This result is excellent as compared to projections for this early stage, and the startup performance was better than similar schemes in other ECA's GEF ODS Phaseout projects. The original project document estimated financial viability of the recycling and recovery scheme at about 20% of the service use recycled. At the time of the ICR mission, a further 400 kgs were expected from the railroad refrigeration servicing depot and about 2,400 kgs from Belcoopsoyuz, the agricultural equipment service organisation. Once these amounts are received and processed, the 20% recovery rate targeted by the project design would be exceeded.

Prospects for sustainability of this sub-component are excellent. The cessation of CFC-12 supplies to the Republic of Belarus effective since January 1, 2000 immediately raised the local price of CFC-12 from \$US 2 to \$US 4. The price was expected to continue to rise to at least the price of a Russian made CFC-12 substitute (\$US 7/kg) possibly even higher as supplies of virgin CFC-12 dry up (Russian production ceased in December 2000). Recycled refrigerants are clearly the cheapest alternative for servicing existing CFC-12 refrigeration systems. Thus, field service technicians have benefited financially from recovering refrigerant. They are paid \$US 0.5 per kg recovered, and on average they have boosted their \$US 60/week average wages by approximately \$US 10-15 per week (to \$70-75/week).

Both management and technicians who received training were pleased with the results of the training course. The training reviewed basic service skills while teaching the use of new equipment, refrigerant recovery and system retrofit. The training equipment has been transferred to the Agricultural Training Institute at Sennista (Minsk region) who will use it as part of its refrigeration courses.

As the first company from the former Soviet trade equipment service network to have a GEF funded 3R project, the demonstration value has and will be very great. Similar projects in Ukraine have already used Beltorprogress' help in procurement, and the experience of preparing this project has helped consultants preparing 15 3R projects in the Russian Federation. The objective of setting up a viable 3R scheme has been met. Over the next three years, the bulk of Belarus' 256 ton servicing demand is likely to disappear through the retrofit activities that this project has encouraged. The 3R scheme will reduce the direct economic cost of this transition to the country. The training scheme will reduce indirect costs by ensuring that service technicians are trained in refrigerant retrofit techniques. Preventable system failures resulting from retrofitting to non-ODS fluids will also be minimized.

## **Solvent Sector Enterprise Conversion Components**

### **3. Minsk Instrument Building Company (formally Belvar) - S**

This sub-project involved the provision of a wave soldering line, washing machine, water de-ionizer and a wastewater treatment unit to a company whose principle product is television tuners. This project component was rated satisfactory.

The phaseout objective was fully achieved. Prospects for sustainability are good. The old

washing equipment was physically destroyed. Certificates attesting to the destruction were provided by the chief engineer, and the Ozone Office confirmed that destruction had taken place. Belvar's production levels as a company are a fraction of what they once were but the enterprise showed significant improvement in 1999. Higher operating costs of the new technology, was largely offset by the higher quality products achieved. The company reported significant commercial benefits as a result of the higher quality achieved by the new equipment. Previously Belarus' two TV producers had sourced their tuners abroad, buying from Belvar only when they lacked foreign currency. Now they are sourcing all tuners from Belvar.

A secondary benefit was the improvement of health and safety conditions in the workplace. With the old technology, Belvar staff were exposed to CFC-113 vapours whereas the new process uses no volatiles. Having witnessed the improvement in conditions in the soldering workshop, other workshop staff pressed management to consider ways of improving conditions throughout the plant. Implementing the project had a very positive effect on staff morale. The delivery of modern equipment provided a psychological boost that improved staff morale at a time when production was dropping and the future looked uncertain.

#### **4. Minsk Computer (MPOVT) - S**

This sub-project involved the partial funding of a fluxless wave soldering machines to replace a process that required washing of PCBs with CFC-113. It also financed an aqueous cleaning process to replace trichloroethane (TCA) used in a photoresist process; a water de-ionizer; and a wastewater treatment unit. This project component was rated satisfactory.

Thus MPVOT's use of ODS has been eliminated and the sub-projects objectives fully met. A main secondary benefit was a significant increase in product quality which improved competitiveness of the company's main product, telephone exchanges. At the same time, an increase in energy and water treatment related operating costs partially off-set these gains. Health and safety improved with the elimination of CFC-113 and TCA vapours in the workplace. A fire hazard associated with TCA use was also eliminated. A new joint venture agreement and a 70% production increase reported for 1999 indicate improvement in MPVOT's business position which should ensure sustainability in the medium term. The old washing equipment was physically destroyed. Certificates were provided by the chief engineer, and the Ozone Office confirmed that destruction had taken place. The enterprise felt it would have phased out ODS consumption themselves if the project had not been implemented, but it would have taken longer. Phaseout of the the TCA was the most costly and the most likely expenditure to have been deferred.

The main problems in sub-project implementation were related to a lack of funds. MPVOT's financial position was marginal and the project was delayed for a long period because of concerns related to the company's financial viability and ability to provide counterpart funds. Despite MPVOT's poor financial state - the Bank decided to proceed, based on strong indications that this state-owned enterprise would continue to operate and would continue to use CFCs for the foreseeable future. Installation supervision was left out of their wave soldering machine contract at the enterprise's request to help make the overall package more affordable. As a result, the enterprise's engineers had to disassemble and re-assemble machinery and program the control

software themselves. This led to some initial difficulties, but all the equipment is working well today.

## **5. Tsvetotron Enterprise - S**

This subproject assisted Tsvetron, a manufacturer of printed circuit boards, to phase out 3.2 MT of methylchloroform (TCA) used in the photoresist development processing of the circuit boards. The conversion consisted of new photoresist development equipment using an alkaline solution base; the acquisition of photoresist stripping equipment; and the modernization of the surface preparation machine. Additionally, the enterprise had to upgrade its ventilation and power supply systems, and upgrade its wastewater treatment facilities. Tsvetotron workers also received training in the use and maintenance of the new equipment. This project component was rated satisfactory.

Tsvetotron was late in completing its sub-project and experienced several years of delay. The enterprise installed the new equipment in March, 2000 and decommissioned and destructed the old equipment in June, 2000. Delays in converting to ODS-free technology resulted in a longer than expected ODS consumption. Nonetheless, on the date of last consumption of TCA, the enterprise was in full compliance with the country program. As with all other ODS consumers, Tsvetotron was issued an import license from the MNREP, which was revoked in 2000 once the sub-project was completed. Despite problems and setbacks, the company is happy with the final outcome of the project.

The investment improved the competitiveness of Tsvetotron's product, and the procurement process exposed staff to a wide range of technologies in the PCB manufacturing industry. Increased worker morale and safety were secondary benefits of the technology conversion. Workers are no longer exposed to the hazardous fumes released by the TCA. Management and workers have increased their level of environmental awareness as a result of these improvements, and have begun a program to implement energy efficiency measures at the plant. Staff have benefited from training in operating the new production equipment and have seen the company's prospects improve dramatically as a result of the investments.

Most of the problems and project delays in this sub-project's implementation stemmed from the poor financial performance of the enterprise. Tsvetotron was subjected to close scrutiny by a Bank until it secured contracts and improved its financial position to a point where the Bank team was comfortable with the future sustainability of the GEF investment. Additionally, the enterprise proposed changes to the agreed procurement plan, that were not initially substantiated by technical analysis and required further research by the firm and a technical review by the Bank. Eventually, the proposed changes in equipment procurement were accepted by the Bank in light of product shifts necessary to convert from defense-oriented production to more consumer oriented products.

The conversion encountered some technical problems because the upgrade was carried out in two phases. First, an alkaline stripping processing was introduced, while the ODS based photoresist developing process was retained. Once the firm acquired the new soda-based photoresist

developing machine, the full conversion was completed. This two-step upgrade yielded a higher than normal rate of defective products, which impacted the company's sales during that period. Additionally, after some time, adjustments were required in the wastewater system requiring the installation of a new filters to bring effluent water quality up to national standards. The enterprise experienced an increase in energy related operating costs, which were offset by the higher quality and increased quantities of production.

This sub-project had a lower than expected enterprise contribution because of the devaluation of local expenditures (currency devaluation and exchange rate changes) and because of the ability of Tsvetotron to locate and purchase suitable second-hand equipment to complete its part of the sub-project. Some of the existing equipment, such as the surface preparation machines, were upgraded instead of buying new ones.

## **6. Kamerton - S**

This sub-project financed the phase out 2.4 MT of CFC-113 used in cleaning and polishing processes at a plant manufacturing silicon wafer components for the electronic and semiconductor industry. The technology replacement uses a multi-stage acid-alkaline water based washing process. The sub-project led to the phaseout of all ODS consumption and was rated satisfactory.

This was the first solvent investment to be completed under the project, and the learning curve was very steep for both the beneficiary enterprise and the Ozone Office. The project was eventually completed 15 months behind schedule in March 1999, but still within the deadline set for ODS phaseout at the plant. The implementation delay resulted in ODS use longer than expected, but this was offset by the enterprise's introduction of ODS-free pre-cleaning techniques, which helped meet the firm's phaseout targets.

A critical factor in encouraging enterprises to quickly phaseout ODS consumption was the passage and enforcement of new regulations on import licensing, export bans, and ODS consumption taxes. Kamerton received a license to import ODS which was revoked by the Ministry of Natural Resources and Environmental Protection (MNREP) upon completion of the project. After installation and trial runs of the new equipment in January 1999, the enterprise decommissioned and destroyed the old equipment in March 1999.

Kamerton reported many secondary benefits from the ODS project. Worker morale is higher from more exposure to current technologies and other international business partners encountered during the procurement process, and from training on the new equipment. Awareness of environmental issues at the plant has increased, and some work-related health hazards reduced (elimination of CFC-113 hazardous fumes). Lastly, Kamerton, already an ISO 90001 certified firm, initiated procedures for an independent ISO 14001 certification due to the improved environmental management practices introduced in the plant by the ODS conversion investment.

As with all solvent sub-projects, the project resulted in incremental operating expenses rather than savings, because the aqueous-based cleaning system requires multiple steps and produces wastewater which must be treated before discharge. Initially, the firm was not sure that the new

cleaning system would yield the desired level of cleanliness for the wafers; however these doubts were dispelled after installation of the new equipment. The quality of the finished product is fully satisfactory and has allowed the enterprise to compete on western markets. Kamerton is now part of a joint-venture with a German firm which purchases the silicon wafers as components for its electronic products. The increased water consumption has been counter-balanced by several cost reduction measures, such as reorganization of its production lines to better match market demands, and introduction of a plant-wide energy saving program. The firm also adequately managed to address additional environmental issues stemming from the technology change (release of ammonia, alkali, and peroxide in the water), minimizing any potentially negative impact of the technology conversion.

## **7. Fire Protection - S**

This small technical assistance sub-component financed a national workshop of stakeholders in the fire protection sector to discuss technology options for conversion of halon-based fire protection systems. The sub-project was rated satisfactory. The workshop was useful and well-attended however occurred later than originally planned. One of the main conclusions of the workshop was that Belarus needs to develop a system to collect, recycle, and recover halon equipment. The cost of this was outside of the current project's scope and a halon recycling system has not yet been established with national funds. Although this component met expectations, in hindsight, more consideration should have been given to an investment proposal for the halon sub-sector. Since the GEF requires that investments be articulated in the ODS Phaseout Country Programme, this would have been the appropriate stage to initially evaluate the feasibility of this type of investment in Belarus. Unfortunately the timing of project preparation coincided with a period of greater optimism at the international level (GEF Scientific and Technical Advisory Panel for example) that drop-in halon substitutes were very near to development. Projects developed later acknowledged the critical role that halon recycling schemes could play in preventing halon releases in the interim period.

## **8. Institutional - HS**

The institutional Strengthening sub-component provided resources to the Ozone Office to administer the project and other aspects of the ODS Phaseout country program implementation. It financed office equipment and supplies; ozone monitoring equipment for customs staff and Ozone Office staff inspections; consultants in procurement and accounting; staff training; regulatory program development support; and outreach and public awareness materials. The sub-component was rated as highly satisfactory largely because of success at implementing public awareness and outreach activities; for the diligent and pro-active role of the Ministry and Ozone Office staff; and the high capacity that the Ozone Office reached in the second half of the project period.

Specific outreach and public awareness activities included a booklet- *Protecting the Ozone Layer: Belarus' Viewpoint*, 1997; a video on ozone layer protection, 1997; a workshop at Atlant enterprise -*Measures Taken By Belarus To Protect The Ozone Layer*, 1998; a workshop at the Academy of Sciences on Ozone Layer Protection Problems, 1998; support needed for regular



reports for the mass media (TV, radio and newspapers); an informational bulletin titled, *Some Problems of Ozone Layer Protection*, V. Minchenya and N.Kryzhanovsky, 1999; an educational manual for service technicians focused on the protection of the ozone layer *Refrigerants and Oils for Refrigeration Equipment*, V. Minchenya, 2001; a consumer educational brochure *What you Should Know About Refrigerants*, V. Minchenya, N. Kryzhanovsky and G. Chernyak, 2001; and a workshop on problems of control over ODS trade and possible solutions, 2000.

Staff training included courses targeted at project implementation, such as a 1-month Bank endorsed international procurement course; participation in periodic gatherings of a regional network of ODS phaseout project implementation units; and on support for some staff to attend Montreal Protocol technical meetings.

Project implementation was also supported by two project financed local consultants - one for procurement and one for accounting. All other staff in the Ozone Office were supported by standard government salaries.

The Bank's supervision reviews of the Ozone Office's project records, financial records and procurement documentation found them to be in good order - and all audits were unqualified and accepted by the Bank. The Bank supervision team performed about four post-reviews of procurement documents in the second half of the project period and found them to be in compliance with Bank procedures. Overall, the Belarus Ozone Office implementation capacity grew strong and staff became a resource for support to other Ozone Offices in the region, most notably, Ukraine. The Ozone Office has also performed well in terms of Montreal Protocol reporting and compliance activities. The country introduced licensing of activities related to ODS production, storage, industrial consumption, recycling and disposal (Decree of the Council of Ministers #1038, August 8, 1997) and a ban on import and export of especially hazardous ODS in accordance with the London Amendment to the Montreal Protocol (Decree of the Council of Ministers #1741, November 13, 1998). A comprehensive Ozone Layer Protection Law is pending parliamentary approval.

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

A net present value calculation was not performed for this project, as it would have been difficult to include in the NPV for the global environmental benefits, which represent the majority of the returns generated by this project.

Each investment sub-project was measured for cost-effectiveness and could only be funded up to the cost-effectiveness thresholds of the Montreal Protocol. Since all targeted phaseout was achieved- the cost-effectiveness values recalculated for the project's final costs are:

	<u>Original Estimate</u>	<u>Final Estimate</u>
Atlant Household Refrigeration	\$9.60/ kg ODP	\$10.11/kg ODP
Beltorgprogress	\$6.25/kg ODP	\$5.27/kg ODP
Belvar	\$53.25/kg ODP	\$51.35/kg ODP
Minsk Computer	\$20.8/kg ODP	\$20.08/kg ODP

	\$37.17/kg ODP	\$35.88/kg ODP
Tsvetotron	\$38.5/kg ODP	\$14.70/kg ODP
Kamerton	\$27.85/kg ODP	\$27.36/kg ODP

#### 4.4 Financial rate of return:

A financial rate of return was not calculated for this project as a whole. However extensive financial analyses were performed for each beneficiary enterprise at appraisal and a quarterly reporting and monitoring system was established for supervision. Records of these reviews and the initial financial assessments has been included in the project files. The system established for monitoring the financial performance of enterprises (involved conversion of soviet style accounts to western style accounts) provided the team with a useful tool during supervision. It also increased enterprise awareness of the importance of transparent financial accounts for investors. Due to a particular concern with multiple exchange rates in Belarus - an additional sensitivity analysis was performed for varying inflation and exchange rates at the time of project appraisal.

#### 4.5 Institutional development impact:

##### **Institutional Strengthening of the Ministry Natural Resources and Environmental Protection Performance Assessment**

Overall, Ozone Office implementation capacity in Minsk grew to a high level. In the first year of project life, the Ozone Office struggled to learn Bank procedures and and policy needed to implement the project. Subsequently, under a strategy of targeted supervision support by the Bank team, training courses in Bank procurement, and participation in regional ozone layer protection seminars - the Ozone Office developed a full set of skills and professional qualifications that made it one of the most efficient ODS implementation units in the region. In addition to the project specific functions, the project staff also took on an important role within the MNREP providing policy advice and details concerning on Montreal Protocol compliance monitoring. The staff were called on to support other offices in the region, especially Kiev, as they were several years behind Belarus' schedule.

As a result of intense policy and regulatory activity by the MNREP to support and strengthen the GEF funded ODS phaseout, the Ozone Office was instrumental in drafting several pieces of regulation. Among these, the Ozone Layer Protection Law now pending parliamentary approval, a system of licensing the activities related to ODS production, storage, industrial consumption, recycling and disposal (Decree of the Council of Ministers #1038, August 8, 1997), and a ban on import and export of especially hazardous ODs in accordance with the London Amendment to the Montreal Protocol (Decree of the Council of Ministers #1741, November 13, 1998). These last two pieces of legislation have contributed in large part to the cessation of import of the most hazardous ODS and to the timely transition to their alternative substitutes. Lastly, the Ozone Office promoted a series of public awareness activities on ODS phaseout, which increased the overall institutional impact of the project in several groups of Belarussian society.

##### **Enterprise Institutional Development**

Another important result of the project was the development of procurement skills and environmental safety concerns at the enterprise level. Beneficiary enterprises were exposed to Bank procurement practices, and in spite of the delays and sometimes seemingly cumbersome requirements, they overall favored the adoption of Bank procurement for the project. They believe Bank procurement procedures assisted them in locating

the most attractive suppliers in terms of quality and price, and further reinforced their preference for commercially based procurement practices versus central government specified procurement.

Additionally, the attention to environmental issues at the enterprise level encouraged many companies to seek and achieve ISO 9001 rating (quality control standards) and to request independent audits for ISO 14001 certification (environmental management standards). The strengthening of management and operational capacity at enterprise participants under the project was one of the secondary benefits of the ODS Phaseout Project.

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

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

Two key factors outside the control of the government that affected the project were the financial viability and commitment of the beneficiary enterprises; and the procedures of the World Bank. The financial viability of individual enterprises was assessed during project appraisal and monitored by the Bank team throughout supervision using a locally based accountant who helped convert data from Russian/former soviet accounts to western style statements on a routine basis. Project implementation delays occurred for two sub-projects where the financial viability issues were the most difficult. In the case of Belvar (later re-named Minsk Instrument Building Company), this enterprise was at a very difficult point at project appraisal, and was almost dropped from the project. A decision was made instead to continue monitoring Belvar's restructuring efforts (including its participation in an ongoing U.K. Know-How business restructuring support program), allow it more time to demonstrate its viability, and ensure that the project agreements could accommodate its drop-out if necessary. The enterprise shifted product lines; cut costs, and eventually turn a profit during the project period. The enterprise's relatively small ODS conversion investment was cleared for procurement only after the results of the restructuring efforts were demonstrated.

Minsk Computer's financial condition was marginal but accepted as viable for the medium-term at project appraisal, but deteriorated further over the course of project implementation. Concern over the enterprise's ability to meet counterpart funding requirements and its overall financial viability delayed the processing of its procurement documents for more than a year. During this period the enterprise sought clearances for a lower cost alternative ODS conversion design, based on retrofitting of existing equipment, and moved forward on its own. Additionally, the company sought from central government agencies (Ministry of Industry and Ministry of Environment) to help them meet their counterpart financing commitments. The Bank eventually agreed to finance this conversion sub-project based on grounds that the enterprise was likely to exist beyond 5 years and would continue to require this technology conversion for their core business.

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

The government adopted legislation supporting the project. Specialists within the Ozone Office worked routinely on the legislative and regulatory issue, and continue to do so today. The project funds did not directly support these efforts, with the exception of helping to produce public awareness materials used in the public outreach process. Excellent support from all levels of government (other Ministries, regional offices, Parliament, and the Presidents office) was demonstrated and the timing of this support complemented the project investments. An inter-agency working group was established and operated effectively to implement ODS Phaseout Country Program Objectives.

The government staffed the ozone office, with the exception of procurement and accounting local consultants who were hired almost a year after the project became effective. There were problems with the Ministry's legal structure that did not allow hiring two local consultants to manage core World Bank-specific functions (procurement and accounting/financial management) beginning during project preparation (the preparation grant was originally partially intended for this purpose and eventually this portion was cancelled). The problems stemmed from requirements for handling social taxes; multiple exchange rates in the country that devalued the grant financed salary (thus no one would accept the position); and processing of local based payments. All of the key issues related to hiring consultant staff were issues within the control of the government, and eventually resolved.

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

Since the implementing agency was within a government Ministry, there is not a large distinction between the implementing agency control and government control. The beneficiary enterprises were required to coordinate all project activities with the Ozone Office and therefore the efficiency of transactions at the implementing agency were critical to the project. The processing of procurement and disbursement transactions improved substantially once dedicated staff were retained to oversee these functions. Non-contract (government) staffing of the Ozone Office were maintained at the appropriate levels with high staff continuity throughout the project implementation period. The government staff were always effective in its communications with and support of Bank missions- and the Minister of Natural Resources and Environment personally participated in discussions with every World Bank mission.

### *5.4 Costs and financing:*

The total project cost variations were not substantial and remained largely within the estimated procurement contracts and anticipated 10% contingency (detailed tables in Annex 2). Greater variations occurred in enterprise counterpart funds because of local currency devaluation over the project implementation period. Foreign exchange was held in an SDR account and therefore not subject to the same local currency fluctuations. The SDR did devalue during the project period resulting in a net loss of grant funds, however this did not affect the project needs. Specific sub-project issues that affected cost variations like the re-design of the Tsvetotron sub-project investments are discussed in the technical sub-project description (section 2).

## **6. Sustainability**

### *6.1 Rationale for sustainability rating:*

The project sustainability rating was considered highly likely based on the fact that legislative controls were established during the course of the project to control and restrict the use of ozone depleting substances; and subsequently reinforcing market signals from supply limitations effectively took hold. The ODS restrictions are now well rooted in the legislative base of the country - and an awareness raising campaign was effective in changing the behavior of end users. The introduction of legislation in Belarus and financial penalties set by this legislation served to critically enforce accelerated enterprise conversion to non-ODS chemicals even before ODS supply prices started to increase (Belarus' environmental enforcement capacity is strong and is based on its centralized economic structure).

Economic pricing signals stemming from successful international efforts to phaseout-out and control ODS supplies, subsequently strengthened compliance with ODS legislation; and in the long-run will serve as a more sustainable compliance tool than legislative controls in Belarus. Project supervision missions monitored the market prices of legal ODS substances through interviews with enterprises and compared information from neighboring countries with similar projects (a common Bank team worked with Russia and Ukraine) thus documenting the changes in ODS prices. Despite Belarus's economy being largely

centralized, all enterprises under the project were responsive to market signals of ODS pricing.

The refrigeration servicing sub-projects (Beltopprogress - commercial; and Atlant- household) were key elements for long-term sustainability of the phaseout efforts. These sub-projects address "residual" or remaining ODS consumption demand (for example household or industrial refrigerators needing servicing in the future). The Montreal protocol acknowledged the economic impact and technical difficulty in converting all equipment over to non-ODS chemicals, and therefore retained provisions to allow for the collection, recycling, and re-use of "contaminated or used" ODS chemicals under controlled conditions that minimize ventilation to the atmosphere. Within the context of a declining world wide production of ODS, the capacity for a country to collect and clean ODS chemicals in an ecologically safe manner represents an economic and social safety against the high costs of replacement chemicals for older equipment still operating with a useful life. Most ODS chemicals being recycled originate from equipment discarded or under servicing that would have at the start of the project (in a context of unlimited supplies and cheap prices) been easiest to discard by venting to the atmosphere. These sub-projects purchased special equipment to equip technicians with tools to reclaim or capture refrigerant freons (ODS substances); built up capacity at regional servicing centers to clean the reclaimed refrigerant; supported self-sustaining financing schemes from the sales of recycled materials; and provided training to refrigerant servicing technicians on the techniques and rationale for these changes. The technician training program reached more than twice the number of technicians than originally planned. It remains in place and continues to train technicians through a vocational technical school in Minsk.

Sustainability of the project and its objectives were reinforced by the project implementation structure selected. Project implementation was set up within a newly established department within the Ministry Of Environment and Nature Protection called the Ozone Office rather than in a stand alone project implementation unit (PIU), management entity, or project intermediary. While this created some early challenges on how to execute Bank required procurement and disbursement procedures - in the end it resulted in a much higher level of Ministry/Government ownership of the program. The procurement and accounting functions were the only two functions contracted and paid for by the GEF grant funds- while all other staff were Ministry civil servants. The Ministry's legal structure and role in executing the project created some problems in contracting these two positions (related to taxation and applicability of the governments social benefits policies) which were eventually resolved. After these contracting issues were resolved- about one year into the project - overall project implementation accelerated and eventually compensated for the slow start of the the project.

Government support the Ozone Office was continuous and maintained at an adequate level including staff assigned to tasks not directly supported by the project. The Ozone Office staff had excellent access to higher level administrators to be able to smoothly and timely process needed legislation changes and resolve administrative issues. The Ozone Office remains in place today, is an integral part of the Ministry Structure, and continues to be active in inspection and enforcement of ozone depleting substances related legislation. Their staff continue to participate in international meetings of the Montreal Protocol. Following a Fall, 2000 ratification of the United Nations Framework Convention on Climate Change, their mandate was recently expanded to support Belarus' future role in climate change issues.

#### *6.2 Transition arrangement to regular operations:*

Refrigeration servicing training course was transferred to a vocational/ technical school in Minsk where the majority of refrigeration technicians in the country receive their education. This training program which addresses the proper use and handling of ODS refrigerants has been integrated in the curriculum and will serve to educate future generations of technicians that were not already trained under the project.

All of the beneficiary enterprises under the project are operating production lines today free of ozone depleting substances and in most cases are more environmentally friendly in other respects (energy savings or other water treatment improvements). The new technologies introduced have served to improve the product quality and thus have improved the market value of products. This coupled with the increased prices of ODS supplies makes it highly unlikely that an enterprise would want to revert back to an ODS dependent technology.

The Ozone Office today remains an integral part of the Ministry of Natural Resources and Environmental Protection as described above.

## **7. Bank and Borrower Performance**

### **Bank**

#### *7.1 Lending:*

The Bank performance during project preparation was satisfactory and a diverse Bank team (including a refrigeration teacher; mechanical and chemical engineers; financial analyst; accountant; economist, and environmental specialist) were able to effectively provide the government and beneficiary enterprises with project development support. The team had a good knowledge of other GEF and Montreal Protocol Projects in the ECA region and other parts of the world, and lessons learned, particularly the need for improved monitoring of enterprise financial viability in more risky transitional economies were incorporated into the project design. The project design anticipated the possibility of bankruptcy of a beneficiary enterprise and modeled an agreement that was flexible enough to accommodate this possibility without a major re-design effort (although this was never used).

The project concept was supported by the Bank's Country Assistance Strategy (CAS) to Belarus at the time and action to address ODS phaseout was recommended in 1993 World Bank Economic and Sector Work (report 11926-BY). Support from the Danish government and a GEF preparation grant helped the government prepare the project. Project processing was smooth and proceeded on a timeline within World Bank business standards. Resident Mission and Bank Country Department (Director, Resident Rep., local staff, and country economist) support and communication with the project team was strong. The project was closely monitored as many other lending operations at the time in Belarus were being frozen or dropped because of deteriorating macroeconomic conditions. The team successfully argued to continue processing the project and to keep it free from macroeconomic conditionality (unification of the exchange rate), a recommendation sought by some within the Bank. An energy efficiency project under active preparation about the same time made project appraisal conditional on full unification of the exchange rate; and subsequently all lending operations in the country were frozen for 4 years because of the government's failure to achieve this conditionality. The country dialogue was coordinated closely with the IMF and the project contributed to shared knowledge of the business conditions at enterprises.

#### *7.2 Supervision:*

The Bank's supervision performance was satisfactory and included regular semi-annual supervision missions to work with the government and beneficiary enterprises as appropriate to help resolve project implementation issues.

The World Bank processing of procurement packages experienced delays, especially in the first years, because of the need to contract specialists for the Bank's technical review of specifications; and initially because the enterprise and Ozone Office had little experience with procurement. Problems with the Ministry's ability to hire a procurement consultant delayed bringing on board this staff person who was critically needed at the earliest of stages. Procurement processing improved as the project progressed and eventually post-reviews were adopted and cleared with a very high acceptance rate from the Bank. The capacity of the resident mission staff team member on procurement also increased during the project leading to better local support for pre-screening documents. Enterprise feedback on procurement varied and included impressions that the Bank could have provided the PIU with more support; complaints of cumbersome procedures, and reports that Bank procurement was a useful to learn more about the market and access a better price.

Some delays also occurred on the World Bank loan department side, with particular delays in processing of letters of credits. The lines of communication between the client and the loan department were not always clear and the Bank task team was not always copied on these communications. Training of the resident mission based team member on disbursement issues and her direct follow-up with accounting seemed to help improve the system. Some beneficiary enterprises reported feeling vulnerable to supplier complaints about slowness in the processing of payments when payment processing was the Ozone Office and the World Bank's responsibility.

Supervision missions were well staffed to address any outstanding issues, and included a local accountant who assisted both the Ozone Office Accountant with review of her work, and helped on the financial monitoring of beneficiary enterprises. Regular (almost daily) E-mail correspondence was maintained between the Bank and the Ozone Office to help assist process and resolved issues. The working relationship between the Bank and the Ozone Office staff were quite good. The project monthly progress reporting was difficult in the earlier stages of the project- and became better when a standardized format was developed by the Bank for the Ozone Office. Less frequent reporting was adopted later in project implementation. The project always had favorable proactivity and realism ratings, and the project supervision forms regularly reported on the development impact- in this case, on the progress toward ODS phaseout through it's interventions. Although the country held a risky country rating for most of the project's life- the project itself was never considered to be at risk.

Most members of the Bank project supervision team also worked on similar projects in Russia and Ukraine which helped to transfer lessons learned and helped to exchange views with the client in a knowledgeable regional context. Two key technical consultants of the Bank were particularly active in the regional dialogue and helped bring in excellent knowledge exchanges. The wider Bank team also helped, for example by encouraging the development of an Eastern Europe - Former Soviet Union knowledge exchange with several workshops hosted by Ozone Offices in Central Europe. The Belarus Ozone Office staff participated in these and very much appreciated the opportunities for inter-regional exchanges and subsequent public awareness efforts were very much a reflection of these exchanges.

### *7.3 Overall Bank performance:*

The overall Bank performance was satisfactory. The World Bank team continuity was high and

almost unchanged throughout the project period. The team had the correct mix of skills which included a mixture of locally based staff and consultants (accounting); international consultants (engineer, refrigeration teacher, chemist, financial analyst); and Bank staff (environmental economist; operations specialist; procurement specialist). The resident mission team member took on an increasing level of responsibility as the project progressed and later worked on a similar Ukraine project because of her experience gained through on the job training and core operational skills gained under this project. Many supervision task management functions were delegated over time to a junior Bank team member after initial start-up issues had been addressed to save on supervision costs and to provide more direct day to day support to the routine project supervision issues. The team leader however always maintained oversight and review of key decisions and correspondence. Although some delays occurred on the procurement and disbursement processing side- these two areas both improved substantially as the project progressed due to specific efforts of the Bank team to help build better capacity. Bank team efforts to maintain strong regular supervision communications with the client in the later part of the project helped ensure that the project got back on track in terms of the original project completion schedule.

### **Borrower**

#### *7.4 Preparation:*

The government's performance on preparation was highly satisfactory. Government commitment was demonstrated at each stage by highly engaged counterparts, and efficient processing of baseline commitments required as eligibility requirements for international assistance through the GEF (established an inter-agency committee on ODS; adopted a Country Program; and ratified the London Amendment of the Montreal Protocol). Beneficiary enterprises also demonstrated strong interest and commitment and provided the necessary baseline financing for the project. The early preparation activities involved preparation of an ODS Phaseout Country Program which required government endorsement and the establishment of an Inter-agency working group for ODS issues. The government worked effectively with Danish government funded consultants to prepare and approve these documents. The Inter-Agency working group became effective during the preparation period and is still an active working body today. Consultations were held with various business groups who were the primary ODS consumption stakeholders. More detailed preparation activities, particularly initial the enterprise financial viability assessments, were supported by a GEF preparation grant. The government worked closely with the enterprises and the Bank on this. Preparation funds also supported the start-up of the Ozone Office and procurement of initial computer and office supply equipment. The most difficult issue to resolve during the preparation phase was the advance contracting of a procurement and accounting specialists for the Ozone Office. An international procurement adviser was hired to help prepare all initial procurement documents, however missed out on the opportunity to do this with the Ozone Office procurement staff who could not be hired. The beneficiary enterprises were also effective and cooperative during the preparation stage of the project where they were just becoming familiar with the World Bank and the GEF procedures. All requested information about industrial processed and financial information was provided in an efficient and cooperative manner. Counterpart funding commitments were agreed at the enterprise level and it was understood that they would be required to enter into sub-grant agreements to formalize these commitments.

#### *7.5 Government implementation performance:*

The government's implementation performance was also highly satisfactory. While government implementation of the project provided some barriers in terms of the difficulties of hiring local consultants (subjected to civil service rules), it predominantly was an advantage for the project in terms of generating



strong government ownership for the ODS Phaseout agenda. Overall, the associated policy and legal framework for ODS Phaseout would have been much more difficult to achieve if a separate legal entity outside of the Ministry had implemented the project. The Ministry of Natural Resources and Environmental Protection played a commendable role in supporting the Ozone Office's mandate and functions. Inter-governmental coordination was carried out in an effective manner with such government partners as Customs and Trade; the Ministry of Economy; Ministry of Finance; Parliament; and the Ministry of Industry. A mandated government exchange rate, and associated hard currency handover requirements created some problems and delays for local currency transactions from the special account in the first year of implementation. This issue was eventually resolved at a high level (both within the Bank and the government) for this project and one other Bank project under implementation in Belarus. The government quickly met all project processing requirements including ratification of the London Amendment of the Montreal Protocol (GEF requirement); authorization of a team for negotiations; and issuing a legal opinion after signing the grant agreement. As a result; the project was declared effective with no delays. The government provided all support necessary to help ensure that the project was implemented on schedule and the government team extended extra efforts to achieve this.

#### *7.6 Implementing Agency:*

The Ozone Office within the Ministry of Natural Resources and Environmental Protection was the key implementing agency of the project and acted as the defacto core project implementation unit. They were comprised of all civil servants with the exception of a procurement consultant and accounting consultant who were hired after the first year of project implementation. The core Ozone Office staff remained constant throughout the project preparation and implementation period and expanded in size by several staff over the course of the project as their associated monitoring, inspection, and policy and legislative functions were more fully established. The Ozone Office was able to effectively call in more senior Ministry Officials to help resolve any implementation issues that developed. Although a Deputy Minister held the primary responsibility for attending Montreal Protocol International meetings, the communication of information back to the Ozone Office was excellent in terms of staff awareness of the international process. The Ozone Office staff worked with World Bank staff during all missions and actively participated in discussions with beneficiary enterprises. Their working relations with beneficiary enterprises continued to be effective even when Bank missions were not present, despite the sometimes conflicting inspection role that they performed.

The Ministry of Environment and the Ozone Office were effective in launching a public relations campaign for the Ozone Depleting Substance phaseout which included regular press (television and radio) conferences/ interviews with Bank missions; publication of brochures; and production of an educational video. Public awareness materials were also specifically produced to help process the proposed changes to the policy and legal framework for ODS Phaseout (incorporating the international obligations into national laws).

The capacity of the Ozone Office was weakest on the procurement and financial management functions because these were not typical Ministry functions. Ozone Office staff did however get trained in these aspects and carried them out during the first year before the two local consultants were hired to perform these functions. The management and technical capacity of the Ozone Office was strong, and the assigned staff had the necessary skills to carry out their functions. The project implementation capacity of the Ozone Office staff eventually became so strong that they were used to help train the Ozone office in Ukraine which had a later start up date. The Belarus Ozone Office also developed an effective working relationship / information exchange channels with other Ozone Offices in Central Europe, Russia, and Ukraine.

The Ozone Office maintained effectively the flow of project information including the process of

establishing sub-grant agreements with each beneficiary enterprise. They performed regular project reporting which was weak at their start-up and became very effective later in the project period.

#### *7.7 Overall Borrower performance:*

The overall government performance rating is highly satisfactory, and the government team maintained a high level of continuity throughout the project period. Early in project implementation the government team struggled to stay on top of and learn the Bank's procedures- however later in the project they were able to demonstrate their proficiency not only in Belarus but also by training ODS colleagues in Ukraine. The Ministry of Natural Resources and Environment dedicated a substantial effort to the complementary legislative and enforcement side of the project, and provided the project with excellent support. The Ministry was also instrumental in one sub-project in helping to negotiate a financing package for counterpart funds that involved contributions from the government's Environment fund (managed by the Ministry). The Ozone Office in Belarus is still very active and operating today, and works with the customs department to monitor the import/export laws and other stakeholders to ensure that Belarus remains in compliance with its international commitments under the Montreal Protocol. Many government civil servants dedicated their time and talents to help this project achieve its phaseout objectives in an efficient manner, and worked hard to prove that Belarus could effectively implement a World Bank financed project.

## **8. Lessons Learned**

A number of lessons were learned through implementation of this project:

- Team continuity on the Bank, the government, and the enterprise project teams helped to maintain a good working relationship and to build a common understanding of the project objectives. It also helped to establish a dialogue about future cooperation on environment issues. Several project enterprises are currently participating in an IDF Grant program to help build capacity for environmental certification (ISO 14000).
- The financial viability of beneficiary enterprises is difficult to predict, even with criteria aimed to assess whether or not a company would be in business in a relatively short five year time horizon. However a good monitoring system such as the one established under the project helped maintain a dialogue about the importance of enterprise viability to an investor throughout the project. The details collected through the monitoring system provided the basis for regular, frank exchanges on the challenges that business were facing in the Belarus economy.
- The experience with combining the ODS phaseout investments with legislative controls to discourage the use of ODS (a consumption tax) proved to be effective and resulted in a cooperative relationship between the Ministry of Natural Resources and Environmental Protection and the participating enterprises.
- Implementation of the project from a unit within the Ministry and reliance on civil servant staff helped to ensure that the ODS Phaseout agenda would continue to be supported after the project ended (contributed to the project's sustainability). It also helped to ensure good complementarity/ collaboration between the investments and the legislative / environmental

enforcement side. The Ozone Office did not suffer from being seen as separate or any more privileged than other civil servant staff in the Ministry, and were paid their normal salaries to perform project related duties.

- Establishment of procurement and financial management capacity at the start of the project is critical for starting off implementation quickly. However, it proved difficult in this project because of restrictions placed on civil servant staff. This was the one key drawback of the project implementation arrangements and it was difficult to anticipate in advance the length of time it would take to resolve these issues.
- Good procurement support on the supervision missions helped the project recover from a slow start in this area. Full integration of the procurement specialist into the project supervision team (including enterprise site visits) helped the client build and develop their own capacity, and established a good working relationship between the Bank and the Ozone Office that helped resolve issues at later stages.
- The project had a clear and detailed procurement plan- unlike earlier projects in Belarus where implementation problems stemmed from a lack of clarity (or too much flexibility) in this area. The project made only small deviations from the original procurement plan.
- Knowledge of and predictability of the ODS market helped to build support for the refrigeration servicing initiatives, and helped the regulators decide on which enforcement methods would be most appropriate at any given point in time.
- The information transfer between this project and two other FSU projects (Ukraine and Russia) was excellent and helped provide a more cohesive regional program. The information transfer between the Belarus Project and the Central European ODS Phaseout projects was also excellent due to their participation in information exchange workshops. The Belarus project in a sense helped provide a bridge of information back to the other two FSU ODS Phaseout projects managed by the Bank, who could not for various reasons attend. Information exchanges were particularly useful on policy issues like the introduction of ODS import/export regulations.
- It was important for the Bank team to include staff working on similar projects in the region to help exchange knowledge and gain information about the local ODS market. It also helped to address very technical issues like refrigeration servicing specifications by creating a critical mass of knowledge.
- Both the domestic and commercial refrigeration servicing schemes benefited by utilizing well organized existing structures for the basis of the project design. Atlant was by far the dominant player for the home refrigeration servicing sector in Belarus and therefore could reach a large number of customers quickly and efficiently through their existing business operations. Similarly- Beltorgprogress was also a servicing organization with existing networks throughout the country which were "ready made" for introduction of a refrigeration recovery, recycling, and servicing program. Similar programs in other countries have

struggled and lacked an existing centralized organization that could help roll out the program to reach a large number of consumers.

- Task delegation to a more junior level staff person helped provide the project with more dedicated supervision time that was important near the end to ensure that the project was completed on time. This helped both to contain supervision costs, and to provide the project with more individualized attention.
- Time spent training of resident mission staff (deputy team leader) through targeted courses and through time spent with the project team in headquarters to learn the Washington based side of supervision, was very valuable not only in helping with the later half of project supervision, but also in building long term capacity in the resident mission.
- Despite an unfavorable macro-economic environment - a project of this nature is well worth pursuing, and helped to maintain the Bank's dialogue in the country during a period of no-lending. Because of this unique situation, the project had the full support and attention of the Bank management as necessary. Global environment issues are an area where international cooperation is needed irregardless of a country's economic framework. The project was well implemented, and helped to establish a good World Bank project implementation track record in a country where poor performance in this area had affected the country dialogue.
- Many other secondary benefits came from project investments in addition to the ODS phaseout benefits that were targeted including improvements in worker health and safety; local environmental improvements; and awareness raising of best practices for environmental control. Each enterprise was asked to prepare their own assessment of the project which details these secondary benefits in more depth. Most enterprises reported product quality improvements from the investments.

## **9. Partner Comments**

*(a) Borrower/implementing agency:*

The following letter was sent to the Bank in response to their review of the Draft ICR. All of the editorial comments recommended in this letter have been incorporated into the final text of the ICR as suggested.

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**MINISTRY OF NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION**  
**REPUBLIC OF BELARUS**

June 12, 2001

World Bank Resident Mission  
Belarus

Re: Comments On Implementation Completion Report On ODS Phaseout Project

Ministry of Natural Resources and Environmental Protection has thoroughly studied the ICR for the ODS Phaseout Project (TF-28960, US\$ 6.9 million) provided by the World Bank and is satisfied with its objectiveness and completeness.

The project resulted in phasing out about 700 tons of ODS at six large enterprises that used ODS in manufacturing and servicing of refrigeration equipment and as solvents for the cleaning of electronic components.

Financial assistance and the hard work of highly skilled World Bank experts allowed Belarus both to phase out a significant amount of ODS, procure high-tech equipment and benefit from valuable experience of using ODS-free substances and technologies and training personnel.

We are especially thankful to the management, experts and consultants of the World Bank and its local Resident Mission for valuable assistance in project implementation and preparation of the final report.

Unfortunately, there is a number of problems that we did not manage to solve.

At present, we are mostly concerned with two issues. One of them is **phasing out the residual amount of CFC-12** in commercial/trade and agricultural refrigeration equipment. Another problem relates to **phasing out the residual amount of halons** in halon-based fire protection systems.

On the whole, the service use of the residual amount of CFC-12 in about 60,000 pieces of equipment in commercial and agricultural sector is about 500 tons. The equipment has been in service for over 10 years and has been already worn out. Recovery, recycling and re-use of utilized refrigerants cannot provide for the service of equipment. It is necessary to set up production of new equipment that will use ozone friendly refrigerants.

Also at the present moment there are 241 tons of halons in halon-based fire-fighting equipment, of which 200.5 tons of halon 2402 (C<sub>2</sub>F<sub>4</sub>Br<sub>2</sub>) and 40.5 tons of halon 1301 (CF<sub>3</sub>Br). Their ozone depleting potential is considerably higher than that of CFC-12.

In accordance with existing regulations halon containers should be periodically (once every five years) inspected and re-charged. Since there are no funds in Belarus for halons recovery and recycling, utilized halons are usually discharged into the atmosphere when halon containers are

inspected and re-charged. The requirement of halons for automatic fire-fighting equipment and special-purpose systems is from 110 to 120 tons per year. It means that from 110 to 120 tons of halons are discharged into the air every year. To prevent emissions, halons should be recovered, recycled and re-used. But Belarus does not have the appropriate equipment for that.

We would like to hope for continued cooperation and assistance from the part of international financial organizations to solve existing problems as at present Belarus experiences certain economic difficulties which do not allow it to deal with the problems alone. Belarus needs assistance in financing production of new ozone friendly commercial/trade and agricultural refrigeration equipment as well as procurement and introduction of equipment for halons recovery and recycling and their re-use.

At the same time we would like to see the following clarifications incorporated in the report.

**Part 4. Achievement of Objectives and Outputs.** In section “Consistency Of The Project With The ODS Phaseout Country Program” (page 5), Paragraph 2 after “Public Awareness Raising Campaigns (PARCs) were successfully implemented ...” should read: “...and the OO drafted and facilitated the adoption of the key legal instruments for ODS control that are currently in force (Order #120; 02/06/1997 of the Ministry of Natural Resources and Environment and the Decree of the Council of Ministers #1038; 08/08/1997). Order #120 defined the procedure of moving ODS through the customs border of the Republic of Belarus and made it possible to establish control over their import and export while Decree #1038 introduced duties on ODS import and mandated licensing of activities related to ODS production, storage, industrial consumption, recycling and disposal. A comprehensive law on the protection of the ozone layer is currently awaiting approval by Parliament; and when passed, will complete the establishment of legal and institutional conditions enabling Belarus to meet its international commitments for the protection of the ozone layer.” The last sentence of this paragraph is unchanged.

**Part 4.2. In section 2 “Beltorgprogress – Refrigeration Recovery, Recycling and Reclamation Scheme (3R) and Technician Training Program** (page 7). In paragraph 3, replace “The cessation of CFC-12 export from Russia in July, 2000...” by “The cessation of CFC-12 supplies to the Republic of Belarus effective since January 1, 2000 ....”.

**8. Institutional** (page 12). In the second paragraph, it should be N. Kryzhanovsky instead of K. Kryzhanovsky and V. Minchenya instead of M. Minchenya. After *Some Problems of Ozone Layer Protection*, V. Minchenya and N. Kryzhanovsky, 1999; add “an educational manual for service technicians focused on the protection of the ozone layer *Refrigerants and Oils for Refrigeration Equipment*, V. Minchenya, 2001; a consumer educational brochure *What You Should Know About Refrigerants*, V. Minchenya, N. Kryzhanovsky and G. Chernyak, 2001;...”.

In **Paragraph 2 on page 13**, replace the last two sentences with “The country introduced licensing of activities related to ODS production, storage, industrial consumption, recycling and disposal (Decree of the Council of Ministers #1038, August 8, 1997) and a ban on import and export of especially hazardous ODs in accordance with the London Amendment to the Montreal

Protocol (Decree of the Council of Ministers #1741, November 13, 1998). A comprehensive Ozone Layer Protection Law is pending parliamentary approval.”

In **4.5 on page 14, paragraph 2**, revise the second sentence in the following way: “Among these, the Ozone Layer Protection Law now pending parliamentary approval, a system of licensing the activities related to ODS production, storage, industrial consumption, recycling and disposal (Decree of the Council of Ministers #1038, August 8, 1997), and a ban on import and export of especially hazardous ODS in accordance with the London Amendment to the Montreal Protocol (Decree of the Council of Ministers #1741, November 13, 1998). These last two pieces of legislation have contributed in large part to the cessation of import of the most hazardous ODS and to the timely transition to their alternative substitutes. ...”.

A. Apatsky  
Deputy Minister

*(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	Actual/Latest Estimate
- Reduction of refrigerant consumption by 600 tons.	Fully phased out	Target met
- Reduction of solvent consumption by 90 tons.	Fully phased out	Target met.
- Training of 100 refrigerator service technicians.	All expected technicians trained	More than 200 technicians were trained. Many technicians requested training at their own expense. The training center moved to a vocational school to ensure continuity of program at the end of the project.

### Output Indicators:

Indicator/Matrix	Projected in last PSR	Actual/Latest Estimate
Training/ policy support for implementation of the ODS Phaseout Country Program.	Fully achieved- the project supported training for Ozone Office staff; informational exchanges with other countries; and public awareness materials on new legislation introduced to implement the Country Program.	complete at time of last PSR
Retrofitting / Substitution of technologies that consume ODS	All technical sub-projects financing retrofits or substitutions were implemented	complete at time of last PSR
Training refrigerant servicing technicians in recycling and materials handling	More than double the number of technicians were trained and the training program continues to be offered through a local vocational technical school.	The refrigeration technician training program is ongoing at a vocational technical school and therefore there continues to be additional trained technicians at the cost of the government.
Training for fire protection sector in the use of non-ODS technologies	A national workshop to discuss alternatives to halon for fire protection was conducted with fire protection officials.	complete at time of last PSR

End of project



## Annex 2. Project Costs and Financing

Project Cost by Component (in US\$ million equivalent)

<b>Project Cost By Component</b>	<b>Appraisal Estimate</b> US\$ million	<b>Actual/Latest Estimate</b> US\$ million	<b>Percentage of Appraisal</b>
Atlant- Household Refrigeration Sub-Project	10.30	10.86	105.64
Beltoprogress Refrigeration Servicing Sub-Project	1.76	1.48	84.34
Belvar - Solvent Enterprise	0.31	0.30	96.44
Minsk Computer - Solvent enterprise	0.89	0.86	96.52
Tsvetotron - Solvent Enterprise	1.89	0.72	38.17
Kamerton - Solvent Enterprise	0.19	0.19	97.89
Technical Assistance- Halon Workshop	0.03	0.02	53.33
Technical Assistance - Ozone Office	0.35	0.32	90.99
<b>Total Baseline Cost</b>	15.72	14.75	
<b>Total Project Costs</b>	15.72	14.75	
<b>Total Financing Required</b>	15.72	14.75	

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)	0.00 (0.00)	0.00 (0.00)
<b>2. Goods</b>	0.40 (0.40)	0.00 (0.00)	7.00 (6.00)	7.30 (0.00)	14.70 (6.40)
<b>3. Services</b>	0.00 (0.00)	0.00 (0.00)	0.20 (0.20)	0.30 (0.00)	0.50 (0.20)
<b>Technical Assistance and Training</b>					
<b>4. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.30 (0.30)	0.20 (0.00)	0.50 (0.30)
<b>Operating Costs/Processing Fees</b>					
<b>5. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>6. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	0.40 (0.40)	0.00 (0.00)	7.50 (6.50)	7.80 (0.00)	15.70 (6.90)

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)	0.00 (0.00)	0.00 (0.00)
<b>2. Goods</b>	0.48 (0.48)	0.00 (0.00)	6.31 (5.99)	7.66 (0.00)	14.45 (6.47)
<b>3. Services</b>	0.00 (0.00)	0.00 (0.00)	0.15 (0.15)	0.00 (0.00)	0.15 (0.15)
<b>Technical Assistance and Training</b>					
<b>4. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.17 (0.17)	0.00 (0.00)	0.17 (0.17)
<b>Operating Costs/Processing Fees</b>					
<b>5. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>6. Miscellaneous</b>	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
<b>Total</b>	0.48 (0.48)	0.00 (0.00)	6.63 (6.31)	7.66 (0.00)	14.77 (6.79)

<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.
Atlant	4.32	0.00	5.98	4.32	0.00	6.57	100.0	0.0	109.9
Beltoprogress	1.48	0.00	0.28	1.45	0.00	0.03	98.0	0.0	10.7
Belvar	0.26	0.00	0.05	0.27	0.00	0.03	103.8	0.0	60.0
Minsk Computer	0.26	0.00	0.63	0.26	0.00	0.60	100.0	0.0	95.2
Tsvetotron	0.12	0.00	1.77	0.09	0.00	0.63	75.0	0.0	35.6
Kamerton	0.07	0.00	0.12	0.06	0.00	0.13	85.7	0.0	108.3
Halon Workshop	0.03	0.00	0.00	0.02	0.00	0.00	66.7	0.0	0.0
Ozone Office	0.15	0.00	0.00	0.17	0.00	0.00	113.3	0.0	0.0
Sub-grant processing fee	0.20	0.00	0.00	0.15	0.00	0.00	75.0	0.0	0.0

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

Economic costs and benefits of the project were evaluated on the basis of GEF's incremental cost analysis, and by applying the Montreal Protocol's cost-effectiveness thresholds to individual sub-projects. Baseline activities were defined as that portion of the project's activities that would have occurred in Belarus has not signed the Montreal Protocol or the London Amendment. Activities required to phase out ODS because of Belarus's participation in international phaseout efforts were designated as the globally incremental costs of the project.

The GEF was designated to help finance Ozone Depleting Substances Phaseout Projects countries-in-transition which needed international assistance to do so but which were not eligible for funds under the Montreal Protocol Financing Instrument. It was also agreed that GEF ODS Phaseout projects should follow the policies and procedures of the Montreal Protocol as they were established (many policies and procedures of the Montreal Protocol evolved over time including during the course of preparing this project). One key set of guidelines from the Montreal Protocol Instrument adopted was the use of cost-effectiveness thresholds for individual types of investments. These cost-effectiveness thresholds represents the maximum price per ton to phaseout a substance that the international community was willing to pay. These thresholds were developed to ensure that only cost-effective investments were undertaken. In some sub-projects they also established an appropriate cost-sharing between the GEF and beneficiary enterprises.

These Montreal Protocol cost-effectiveness thresholds existed only for investment sub-projects at the time the Belarus project was prepared. None existed for technical assistance components or the refrigeration servicing component. Therefore six (6) investment sub-projects used and reported their cost effectiveness calculations in the project documentation.

## 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> 1995 - 1996		2	Economist/ Engineer	S	S
		1	Procurement Specialist		
		1	Financial Analyst		
		1	Refrigeration Teacher		
		2	Management consultants		
		1	Administrative Assistant		
<b>Appraisal/Negotiation</b> December 1996 - February 1997		2	Economist/ Engineer	S	S
		1	Lawyer		
		1	Resident Representative		
		1	Administrative Assistant		
		1	Financial Analyst		
		1	Local Accountant		
		1	Project analyst		
<b>Supervision</b> June 1997 - December 2000		2	Economist/Engineer	HS	HS
		1	Local Accountant		
		1	Refrigeration Teacher		
			Procurement Specialist		
		1	Project Analyst		
		1	Project Officer		
<b>ICR</b> October 2000 - June 2001 Karin Shepardson Paola Meta Elena Klochan David Gibson		1	Economist/Engineer		
		1	Project Analyst		
		1	Project Officer		
		1	Refrigeration Teacher		

### (b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ ('000)
Identification/Preparation	66	330
Appraisal/Negotiation		
Supervision	60	196
ICR	10	31
Total	136	

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

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

	<i>Rating</i>
<input checked="" type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H <input type="radio"/> SU <input checked="" type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Sector Policies</i>	<input checked="" type="radio"/> H <input type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Physical</i>	<input type="radio"/> H <input checked="" type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" 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 checked="" type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H <input checked="" type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Environmental</i>	<input checked="" type="radio"/> H <input 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 type="radio"/> M <input type="radio"/> N <input checked="" 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 checked="" type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H <input checked="" type="radio"/> SU <input type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<i>Sustained operations of infrastructure critical to public safety of public health, such as in the case of halon charged fire suppression systems, or of medical, commercial and agricultural refrigeration infrastructure.</i>	
<input checked="" type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H <input type="radio"/> SU <input checked="" type="radio"/> M <input type="radio"/> N <input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Public sector management</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>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

Lending

HS  S  U  HU

Supervision

HS  S  U  HU

Overall

HS  S  U  HU

### 6.2 Borrower performance

Rating

Preparation

HS  S  U  HU

Government implementation performance

HS  S  U  HU

Implementation agency performance

HS  S  U  HU

Overall

HS  S  U  HU

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

Belarus ODS Phaseout Country Programme  
Beneficiary Enterprise Project Appraisal Assessments  
Beneficiary Enterprise Financial Assessments  
Exchange Rate Sensivity Analysis  
Beneficiary Enterprises Project Completion Reports  
Environmental Reviews for each investment sub-project  
Sub-grant Agreements with each beneficiary enterprise  
Equipment disposal and destruction certificates

