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Report No: 25200

IMPLEMENTATION COMPLETION REPORT
(TF-22007)

ON A

GRANT

IN THE AMOUNT OF US$5 MILLION

TO THE ORIENTAL REPUBLIC OF

URUGUAY

FOR THE
MONTREAL PROTOCOL REDUCTION OF THE CONSUMPTION OF OZONE-DEPLETING SUBSTANCES PROJECT

12/06/2002

CURRENCY EQUIVALENTS

(Exchange Rate Effective June 11, 1995)

Currency Unit	=	UR$
UR$	=	US$ 0.067
US$ 1	=	UR$ 14.77

FISCAL YEAR

January 1 December 31

ABBREVIATIONS AND ACRONYMS

ACRONYMS

BROU	Banco de la República Oriental del Uruguay
CAS	Country Assistance Strategy
CFC	Chlorofluorocarbons
COGO	Comisión Técnica Gubernamental de Ozono (Governmental Ozone Technical Commision)
CS	Controlled Substances
DINAMA	Dirección Nacional de Medio Ambiente, National Directorate for the Environment
ExCom	Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol
GOU	Government of Uruguay
LATU	Laboratorio Tecnológico del Uruguay, Technological Laboratory of Uruguay
MP	Montreal Protocol on Substances that Deplete de Ozone Layer
MPMF	Montreal Protocol Multilateral Fund
MT	Metric Tons
MVOTMA	Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente, Ministry of the Housing, Land and the Environment
ODP	Ozone Depleting Potential
ODS	Ozone Depleting Substances
UNDP	United Nations Development Program

Vice President:	David De Ferranti
Country Manager/Director:	Axel van Trotsenburg
Sector Manager/Director:	John Redwood
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URUGUAY
Montreal Protocol Reduction of the Consumption of Ozone-Depleting Substances Project

CONTENTS

Project ID: P036004	*Project Name:* Montreal Protocol Reduction of the Consumption of Ozone-Depleting Substances Project
Team Leader: Horacio Terraza	*TL Unit:* LCSEN
ICR Type: Core ICR	*Report Date: December 10, 2002*

1. Project Data

Name: Montreal Protocol Reduction of the Consumption of Ozone-Depleting Substances Project

L/C/TF Number: TF-22007

Country/Department: URUGUAY

Region: Latin America and Caribbean Region

Sector/subsector: Other industry (96%); Central government administration (4%)

KEY DATES

			Original	*Revised/Actual*
PCD:	01/09/1995	*Effective:*	06/01/1995	12/08/1995
Appraisal:	11/23/1995	*MTR:*		
Approval:	04/04/1996	*Closing:*	06/30/1997	06/30/2002

Borrower/Implementing Agency: Oriental Republic of Uruguay/Ministry of Housing, Land & Environment (MVOTMA)

Other Partners:

STAFF	Current	At Appraisal
Vice President:	David de Ferranti	Shahid Javed Burki
Country Manager:	Axel van Trotsenburg	Gobind Nankani
Sector Manager:	John Redwood	Asif Faiz
Team Leader at ICR:	Horacio Terraza	Fernando Manibog
ICR Primary Author:	Horacio Terraza	

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: HS

Sustainability: HL

Institutional Development Impact: SU

Bank Performance: S

Borrower Performance: S

	QAG (if available)	ICR
Quality at Entry:	S	S
Project at Risk at Any Time:	No	

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

3.1 Original Objective:

By ratifying the "Montreal Protocol (MP) on Substances that Deplete the Ozone Layer", the Oriental Republic of Uruguay (ORU) committed itself to reduce CFC consumption to the "freeze level" (average consumption 1995-97) in 1999; by 50% of the freeze level in 2005, and to phase out ozone-depleting substances (ODS) by 2010. In December 1995, the Ozone Projects Trust Fund Grant Agreement (OTF 22007) was signed between the World Bank and ORU to contribute to this goal. The main objectives of the Grant Agreement were (i) to support Uruguay's commitment to reduce ODS consumption through the provision of technical assistance and technology conversion projects and (ii) to strengthen the institutional framework in Uruguay in order to identify, prepare, evaluate and manage sub-projects throughout the country.

In 1992, the Ozone Secretariat reported that Uruguay consumed 305 tons of CFC, most of which was used in the foam and refrigeration sectors. The 305 ODS tons were allocated in the following industrial sectors:

Sector	1992
Aerosol	23
Refrigeration manufacturing	18
Solvents	9
Air conditioning and refrigeration service	148
Foams	107
Total	**305**

Source: National Country Program 1993

The objectives of this project were embodied in the Grant Agreement. The OTF Grant was established to support Uruguay in adhering to its timetable to phase out ODS by 2010. This implied a reduction of ODS consumption between 30% and 40% from its 1992 level (91.5 to 122 ODS tons). Reducing consumption to a range between 213.5 and 183 ODS tons by 1998 and establishing the institutional framework to replace CFC use in the country by alternative substances would allow Uruguay to phase out ODS by 2010.

3.2 Revised Objective:

The original objectives were not revised. However, at the request of the Government of Uruguay, the Project closing date was extended twice since 1997. The first extension was from 1997 to 2000 and the second was from 2000 to 2002.

The first extension was requested because additional time was needed to complete projects under implementation (Colder, Echepare-Gil, Nevol, Recovery and Recycling project). The second extension was granted because a new project was identified to completely phase out CFC consumption in the rigid foam sector in Uruguay (Terminal Program for CFC-11 in Foams). This second extension also responded to the realization that Uruguay still needed policy advice in order to meet its MP obligations.

3.3 Original Components:

To support Uruguay's phase-out schedule, a grant amount was calculated according to the country's ODS consumption levels in 1992, the thresholds per sectors established by the Executive Committee (ExCom) of the Multilateral Fund of the Montreal Protocol (MPMF), and the estimated demand growth. The OTF Grant Agreement in Uruguay was signed for U$S 5,000,000, which corresponded only to an indicative ceiling. This implied that, as an implementation agency, the World Bank could present individual sub-project proposals on behalf of the Government of Uruguay for a combined maximum value of U$S 5,000,000. If ODS reduction was more effective than originally planned due to e.g. MP policies, government regulations, market conditions, or new cost-effective technology, the level of funds requested could be much lower.

The project had two main components:
(a) The investment component: established to provide grants to the private firms to assist them in switching from use of ODS to non-ODS and technologies
(b) The technical assistance component: was set to strengthen Comisión Técnica Guvernamental de Ozono (COGO) as the executing unit in supporting Ministerio de Vivienda Ordenamiento Territorial y Medio Ambiente (MVOTMA) to provide assistance to the private beneficiaries in the identification, preparation, evaluation and administration of sub-projects.

The Grant Agreement did not specify in which sectors the World Bank would get involved. It only specified that a maximum of U$S 5,000,000 could be used for the project, of which U$S 4,853,000 were available for the first component, the investment projects, and U$S 147,000 for the second component, technical assistance. The total investment amount was based on the costs of the four sub-projects already approved by the MPMF plus an undetermined number of projects to be identified in the future.

Estimated Project Costs and Grant Proceeds

Components	US$ Thousand Equivalent
Investment	
(1) Approved Sub-projects	1,192
(2) Future Sub projects (estimated)	3,661
Technical Assistance	0,147
Grant Total	5,000

The Investment (1) component comprised the following four sub-projects:

Project	**Approved Funding (US$ 1000)**	**Approved ODP phase out**
Etchepare Gil S.A. (James)	227	3.4
Colder, S.A.	316	10.8
Indunor, S.A.	435	17.9
TEM, S.A.	214	5.0

Total	**1.192**	**37.1**

3.4 Revised Components:

The World Bank is one of four implementing agencies that channel funds from the MPMF to individual countries. The other agencies are the United Nations Development Program (UNDP), United Nations Industrial Development Organization (UNIDO), and United Nations Environmental Program (UNEP). It is usual practice that the grant recipient country assigns the different MP sectors to the different participating agencies.

By the time the Grant Agreement was signed, UNDP had already prepared projects in the foam sector that targeted some of the largest foam manufacturers in the country and was already involved in the aerosols and halon, sectors, while UNIDO was involved in the methyl bromide sector. As a result, the World Bank could only target the remaining consumption in the refrigeration (manufacturing and service) sector and remaining rigid and integral foam sub-sectors. This limitation within the scope of the project was not taken into consideration during project appraisal and preparation.

As part of the Investment (2) component, The World Bank and Direccion Nacional de Medio Ambiente (DINAMA) agreed to focus on identifying the remaining companies with relatively high CFC-12 and CFC-11 consumption in the rigid and integral foam and refrigeration sectors . This case by case strategy led to the preparation of the following projects:

Project	Approved Funding (US$ 1000)	Approved ODP phase out
Nevol, S.A.	142.5	9.6
Recovery and Recycling project	87.5	3.5
Total	**230**	**13.1**

Moreover, in 1997 a survey was conducted to evaluate the use of CFC-12 and CFC-11 throughout the country. The survey confirmed a considerable fall in consumption from 1992 to 1996 that was mentioned above. According to this study, consumption had dropped partly because of the projects that were underway, both from UNDP and The World Bank. However, there were also market conditions that had forced this reduction. For instance, domestic refrigerators were being imported from abroad as well as the fact that some consumers of CFC-12 were already switching to alternative refrigerants such as HCFC-22 at their own expenses. As a result, the survey concluded that a new approach had to be taken to phase out the remaining ODS use in the refrigeration and foam sectors.

This new approach resulted in two comprehensive terminal projects, one for the refrigeration sector and the other one for the foam sector. A Refrigeration Management Plan was undertaken by UNEP, while The World Bank and DINAMA designed a terminal umbrella program for the elimination of CFC-11 in the manufacturing of rigid foams:

Project	Approved	Approved ODP

	Funding (US$ 1000)	phase out
Terminal program for the elimination of CFC-11 in the manufacturing of polyurethane foam	91.2	4.4

This project was carried out as part of component Investment (2). The objective of the project was to completely eliminate CFC-11 use in the manufacturing of rigid polyurethane foams in Uruguay by means of technical assistance and reconversion of several small enterprises.

3.5 Quality at Entry:

Satisfactory

Quality at Entry is rated satisfactory. A QAG assessment carried out in September 2000 rated this component as satisfactory, citing that the project achieved its initial objective in reducing ODS consumption over the first three years.

The project was consistent with the Bank's Country Assistance Strategy (CAS) and the GOU/MVOTMA which rated the implementation of the national MP program as a priority due to its international commitments with the MPMF. A CAS discussion in May 2000 with the Executive Directors assessed that Uruguay was "well advanced in achieving the targets in mitigating substances that contribute to ozone depletion, as called for by the Montreal Protocol."

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

Highly Satisfactory

The project success can be measured by three main indicators. First, the fundamental objective of the project was to ensure that Uruguay could meet its MP targets to phase out ODS by 2010. To do so, the OTF Grant was established to ensure that Uruguay's ODS consumption would decrease from 305 tons to a range between 213.5 and 183 by 1998 in order to comply with the MP freeze level in 1999. This decrease would be equivalent to a drop between 30% and 40% in ODS consumption. Second, success can be assessed from the results of the individual sub-projects that were targeted by the World Bank. Third, institutional building indicates success of the project because guarantees the sustainability of the program bringing long term benefits to the beneficiary country.

Uruguay and its MP obligations

The data on ODS consumption in Uruguay has been very encouraging since 1992. There has been a tremendous drop from 305 tons in 1992 to 102 in 2001, as seen in the table bellow:

Sector	1992	1996	2001
Aerosols	23	6	14
Refrigeration manufacturing	18	9	0
Solvents	9	3	0
Air conditioning and refrigeration service	148	113	87

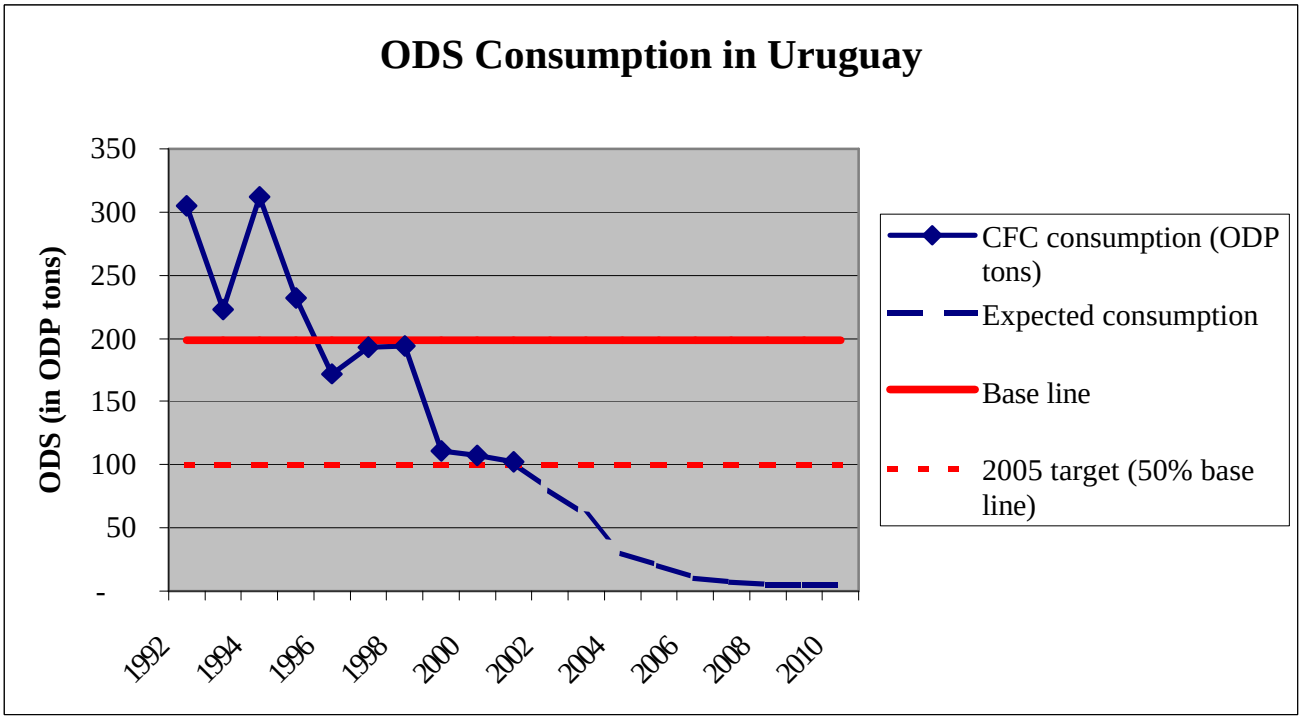
Foams	107	41	1
Total	**317**	**173**	**102**

When the Country Program was established in 1992, Uruguay consumed 305 ODS tons. The MP phase-out commitment established three main reduction targets: the first one was the 1999 ODS consumption freeze (national average consumption 1995-97), second a 50% ODS reduction in consumption from a 1999 freeze-level by 2005, and the third one was a complete phase-out by 2010. The 1999 freeze was established at 199 ODS tons. The remarkable success of the program was evident in the consumption data sent by DINAMA to the MP Secretariat soon after the implementation of the freeze: i*n 1998 consumption was 194 ODS tons, 36% below the 1992 baseline consumption level and by 1999 the national consumption was 111 ODS tons, 44% below the MP freeze level and 63% below the 1992 baseline level.*

Consumption in 2001 was about 102 ODS tons, representing a reduction of 67% from the 1992 baseline level and 49% below the 1999 freeze consumption level, bringing the country just 2.5 ODS tons short of its future 2005 commitment (99.5 ODS tons) and ensuring that it is well on schedule to phase out ODS by 2010.

This decrease proves that World Bank projects have been successful in contributing to the ODS phase-out targets. While it is true that market contractions and enterprise closedowns have also determined this trend, the projects implemented by the World Bank and other agencies ensure that the reconversion to non-ODS technologies are sustainable and prevent a recurrence of ODS use over the long term.

Projections made by the World Bank show that Uruguay is well prepared to meet its MP commitments and complete phase-out by 2010. The following graph provides an estimated projection of ODS phase-out in Uruguay:



This graph shows that Uruguay is on its path to successfully eliminate ODS consumption by 2010. The World Bank contributed to ensure that Uruguay's ODS phase-out strategy remains on track and that the remaining 100 tons are phased out over the next eight years.

Success of Sub-projects

The Ozone Projects Trust Fund Grant was successful in contributing to the elimination of ODS use in Uruguay. Five out of the seven approved projects were implemented and phased-out close to 30 ODP tons. The remaining two projects (Indunor and TEM) were not implemented because the companies closed down due to a regional economic crisis. The following table shows the combined impact of the five implemented projects:

Project	Approved ODP phase out	Actual ODP phase out
Etchepare Gil S.A. (James)	3.43	4.23
Colder, S.A.	10.8	10.75
Nevol, S.A.	9.55	5.67
Recovery and Recycling project*	3.5	4.13
Terminal Program for CFC-11 in Foams	4.35	4.35
Total	**27.28**	**29.13**

*Note: this reflects estimated ODP phase-out per year

The original sub-project objectives were to phase out about 50 ODP tons, but that included 23 tons from the two companies that closed down. Hence, out of the 27 ODP tons targeted, the five implemented projects phased out 29 ODP tons.

Institutional building

The project effectively contributed to the institutional strengthening of DINAMA, helping this institution to achieve its goals. DINAMA had the responsibility to implement the elimination schedule for ODS set in the national country program. The Ozone Unit reached the first control goal established by the MP of the consumption freezing level for 1999 and the country expects to be able to comply with the schedule ahead (2005 50% reduction freeze level). DINAMA has gained valuable experience in promoting and coordinating the implementation of the Montreal Protocol. The undertaken activities made it possible to gain different capabilities (identification and supervision of projects, negotiations at international level, better understanding of the mechanisms of the different agencies of the United Nations); these capabilities are transferred to other units within MVOTMA, like Climate Change Unit, Biodiversity, etc. and benefit Uruguay. The Ozone Unit has played an important role in reducing ODS and achieved the following international awards:

- Outstanding National Ozone Unit Award, issued by UNEP in September 1997 and in September 2000.
- The Stratospheric Ozone Protection Award, issued by EPA, USA, 2000.

Moreover, DINAMA and Laboratorio Tecnologico del Uruguay (LATU) implemented the "Ozono Amigo" seal, with the message "The manufacturer of this product chose to protect the ozone layer", intended for consumers to easily identify which products are ozone-friendly. This message is clear and easy to understand by most of the consumers, and it was meant to turn supply and demand towards ODS phase out. The activities of the companies that use this seal are monitored and samples from production line and finished products are periodically taken, in order to verify that non-CFC technology is being used. All the companies that implemented sub-projects with the World Bank (foam production, domestic refrigerators, etc.) received the authorization to use the Ozono Amigo seal.

4.2 Outputs by components:

A QAG assessment carried out in September 2000 rated this project as follows:

Categories	Supervision Assessment
Focus on Development Effectiveness	Satisfactory
Supervision of Fiduciary / Safeguard Aspects	Satisfactory
Adequacy of Supervision Inputs and Processes	Satisfactory
Quality and Realism of Reporting	Marginal
Overall Assessment	**Satisfactory**

Supervision during FY00 was also assessed as satisfactory overall as well as in all but one of the

summary categories. The exception was "Quality and Realism of Reporting" which was found marginally satisfactory. This was due mainly to the fact that PSRs for MP projects were not required until FY00. Nonetheless, action has been taken since this QAG assessment and PSR write ups have been incorporated in the system giving MP projects the same treatment as regular lending projects.

4.3 Net Present Value/Economic rate of return:

MP projects do not require an NPV nor an ERR calculation. The main criteria that determines the level of eligible funding for MP projects is the estimated ODS reduction expressed in Kg multiplied by pre-determined thresholds for each sector. Rigid foam projects, for example, are eligible for US$7.83 per kg ODP phased-out. However, in the case of low-volume-ODS-consuming countries (LVC), such as Uruguay, thresholds do not apply. In these countries, the MPMF recognized that phase-out costs would be assessed on a project-by-project basis.

The policies of the MPMF define that "approval of projects in low-volume-ODS-consuming countries [LVC] should be based upon a more appropriate project-appraisal approach reflecting the particular circumstances encountered by the countries referred to above" (UNEP/OzL.Pro.7/12 Decision VII/25).

In Uruguay, all funding that was approved for sub-projects was disbursed, except for the two sub-projects that were canceled (i.e. Indunor and TEM - these funds were returned to the MP Multilateral Fund). The final "indicative" cost effectiveness per project is reflected in the table bellow:

Project	Actual ODP phase out (in kg)	Funds Disbursed	Cost effectiveness
Etchepare Gil S.A. (James)	4,230	228,200	53.9
Colder, S.A.	10,750	315,600	29.4
Nevol, S.A.	5,670	141,512	25.0
Recovery and Recycling project	4,130	87,575	21.2
Terminal Program for CFC-11 in Foams	4,350	91,300	21.0
Total/Average	**29,130**	**864,187**	**30,6**

The cost effectiveness in foam and refrigeration projects ranged from US$21 to US$54 per ODP kg phased-out. As for refrigeration service (recovery and recycling project), cost effectiveness was just over US$21 per ODP kg.

These levels compare to other projects in the region. In Chile, for example, foam projects reached cost effectiveness levels of up to US$31 per kg (Frigo Car LTD, Inversiones Overjuna, Polimin LTDA) and refrigeration projects up to US$30 per kg (Supermercado Macul Ltda, Supermercados Plaza Egaña). They are also comparable to other projects in LVC such as Sri

Lanka, which has projects in the domestic refrigeration sector with a cost effectiveness raging from US$35.22 to US$45.13 per kilogram.

4.4 Financial rate of return:

See section above

4.5 Institutional development impact:

The project's institutional development impact was high. It contributed to the institutional strengthening of the Ozone Unit, DINAMA, and improving its capabilities in project management. Moreover, DINAMA and LATU implemented the "Ozone friendly" seal that was used in all World Bank sub-projects. The team at DINAMA was rewarded with two international awards (Outstanding National Ozone Unit Award issued by UNEP and the Stratospheric Ozone Protection Award issued by the US Environmental Protection Agency (EPA).

The project has left in place an operating Ozone Unit that has gained considerable experience in identification and supervision of projects, regulatory control, negotiations at international level, better understanding of the mechanisms of the different agencies of the United Nations, etc. As a result, the ORU is benefited by the transfer of these capabilities to other units within MVOTMA such as Climate Change Unit, Biodiversity, etc.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

The economic difficulties that have affected Uruguay since the Grant Agreement was signed have favored a reduction of ODS consumption in the country. As the economy contracted, demand for products in the refrigerating and foams sectors, among others, have decreased. In some cases, ODS consuming companies were forced to closed down. This contributed to the strong reduction of ODS consumption, which went from 305 ODS tons in 1992 to194 ODS tons by 1998.

5.2 Factors generally subject to government control:

The Government of Uruguay has shown a strong commitment to adhere to its MP phase-out schedule. The Government carried out different activities in connection with the diffusion of ozone layer depletion issues: mass awareness-raising activities in educational centers, radio broadcasting of messages leading to protect the ozone layer and to avoid the sun exposure, meetings with ODS industrial users, journalists and political leaders, etc. DINAMA had all of the required support from the Ministerio de Vivienda, Ordenamiento Territorial y Medio Ambiente (MVOTMA, Ministry of Housing, Land and Environment) to fully implement all approved World Bank subprojects. The only setback experienced was a delay of a regulatory project prepared by DINAMA to forbid the import and manufacture of equipment containing or using CFCs. Although Congress approved two laws to protect the ozone layer (one related to import restrictions of CFC equipment, the other related to a license restriction on imports of CFC and other ODS), an Executive decree was required to make the law effective. This decree was delayed and, since 2000, a new government has been reevaluating the laws. The Ministry of Economy has been studying this case and it is expected to release its conclusions once all bureaucratic steps are approved.

5.3 Factors generally subject to implementing agency control:

The project experienced an initial delay in the approval of the Grant Agreement. When the overall draft of the agreement was finalized, the World Bank estimated about one year for its approval by the Government of Uruguay. Although the President of the Republic accepted the overall commitment to phase out ODS, a detailed study was commissioned to review the overall implementation schedule and impact of the foreseen ODS projects. This process delayed the Grant Agreement signature for 24 months. Moreover, the Grant had to be extended twice to complete projects under implementation (Colder, Echepare-Gil, Nevol, Recovery and Recycling project) and to provide additional time to implement a newly identified project (Terminal Program for CFC-11 in Foams). These extensions also responded to the realization that Uruguay still needed policy advice in order to meet its MP obligations.

5.4 Costs and financing:

Out of the US$5,000,000 indicative ceiling established by the Grant, only US$0.889 millions were requested to the MP Multilateral Fund. This represents about 18% of all available funds and 100% of them were disbursed. The original indicative ceiling had been set according to ODS consumption figures in Uruguay in 1992. However, consumption had dramatically decreased by 1996 (from 305 to 172 ODP tons) and UNDP projects that were already approved were showing encouraging ODS reduction achievements. As a result, fewer projects had to be implemented in order to adhere to the country's phase-out schedule. The objectives set by the Grant Agreement were accomplished with the five projects that were implemented by the World Bank, and thus no additional funding had to be used from the Grant. In other words, the project was more efficient that expected.

Approved funding for the five sub-projects and institutional strengthening was disbursed as planned. Disbursement delays were not significant, and they responded mainly to the delay in the signature of the Grant Agreement.

6. Sustainability

6.1 Rationale for sustainability rating:

The project sustainability is rated as highly likely. Uruguay has shown a strong commitment to adhere to its MP obligations and should completely phase out ODS consumption by 2010. The 2001 data show that only 102 ODS tons are consumed in the country, most of which is in the end user sector, and Uruguay should not have problems in adhering to its 2005 commitment of reducing consumption to 99.5 ODS tons. The terminal projects implemented by the World Bank and UNDP (Terminal Program for CFC-11 in Foams and the Refrigeration Management Plan, respectively) should address the remaining consumption. Moreover, the Government of Uruguay has created mass-awareness to protect the ozone layer and consumers are looking to purchase non-ODS products. Companies that received MPMF funding had to dispose their CFC equipment and DINAMA supervised the destruction of such equipment. Finally, regulation to ban CFC equipment has been presented to legislators and, despite some delays, all parties involved believe it is just a matter of time before it is enacted.

6.2 Transition arrangement to regular operations:

The success of the implemented sub-projects has minimized the need for special transition arrangements. Uruguay is on a path to meeting its 2005 phase-out commitments well in advance of schedule and the terminal foam and refrigeration projects should ensure that the 2010 phase-out objective is met without problems.

Remaining consumption in the country (102 ODS tons) will be addressed by the Refrigeration Management Plan and the CFC-import restriction laws (see Section 5.2). Also, the Ozone Unit that is left in place was strengthened and is adequately staffed to ensure that Uruguay adheres to its 2010 phase-out commitment.

7. Bank and Borrower Performance

Bank

7.1 Lending:

Satisfactory

Throughout the project life, Bank staff worked closely with DINAMA, LATU, and MVOTMA to ensure proper identification, preparation and implementation of sub-projects. Local consultants were hired for project preparation and implementation. The Bank also provided valuable support to the Government of Uruguay on the strategic policy design and during its negotiations at the MP Executive Committee's meetings.

Project preparation spanned eighteen months. The first Bank preparation mission took place in March 1994 , appraisal took place in November 1994 and negotiations started on May 1995. While project objectives were well defined and realistic, the scope of the project was too optimistic. Market forces and MP sector's distribution among the implementing agencies were not envisaged. However, from the point of view of the program itself, these two factors demonstrated to be key in the marked acceleration in the implementation of Uruguay's national phase out strategy.

While Project Risks were adequately identified during project preparation, risk mitigation was not completely effective. At early stage of project life, implementation delays were experienced due to (i) the lack of experience in implementing MP projects and (ii) mainly to the complicated and long lasting administrative processes on both sides DINAMA and The World Bank. Project implementation became more efficient during the last phase of the project. In addition, market power (CFC price), regional economic crisis and commercial risks (close down of companies, counterpart funding, etc) were also determinant reasons for the delay in implementation, but mitigation of these factor were beyond Bank's capability.

Disbursement practices followed the Bank's procedures BP 10:21 Annex F "Disbursement under Ozone Projects Trust Fund Grant Agreements" and procurement was in accordance with the Guidelines on Procurement under IBRD Loans and IDA credits (January 1995, revised 1997 and 1999).

7.2 Supervision:

Satisfactory

Supervision was adequate and Bank staff worked closely with DINAMA performing several supervision missions during lifespan of the project. The Bank visited the companies with projects under implementation and provided guidance and technical support to these companies. At the same time, the companies were supervised and assisted by DINAMA all along the implementation process. Reports were also prepared on a constant basis (Business Plans, Progress Reports, and Project Completion Reports) and submitted to the Bank and to the MPMF Secretariat. In an effort to mainstream MP operations, PSRs were introduced for MP operations in FY00. Previously, PSRs were not required. In addition, during the first phase of the project, it was not mandatory to elaborate aide memoirs after preparation and supervision missions

7.3 Overall Bank performance:

Satisfactory

The QAG assessment in September 2000 rated the project as satisfactory. The assessment stressed that the project had achieved its initial objective in reducing ODS consumption over the first three years. All five sub-projects were implemented with success and institutional strengthening was achieved, as witnessed by the high level of competence achieved by DINAMA.

Borrower

7.4 Preparation:

Satisfactory

The Government of Uruguay was responsible of identifying the sub-projects and industrial sectors that would request funding from the MPMF. With the support of the World Bank, UNDP, and other international agencies, the Government established a clear strategy to create awareness of ozone depletion and prepare sub-projects in different industrial sectors. The leadership and vision provided by the Government of Uruguay ensured that the program that was developed was appropriate to adhere to the ODS phase-out schedule of the MP, and hence its performance is assessed as satisfactory.

7.5 Government implementation performance:

Satisfactory

Government of Uruguay implementation performance is satisfactory due to the reasons outlined in section 7.4. Aside from the two projects that were canceled due to the closure of the companies, the remaining projects were implemented as planned.

7.6 Implementing Agency:

Satisfactory

DINAMA performance is assessed as satisfactory due to the reasons outlined in section 4.1.

7.7 Overall Borrower performance:

The overall performance of the Government during the project is assessed as satisfactory due to the reasons mentioned above. The objectives of the Grant have been met and Uruguay is well prepared to completely phase out ODS by 2010.

8. Lessons Learned

The Project was successful because of the following three main reasons:

(1) Uruguay reduced its ODS consumption by about 63% from 1992 to 1999, 44% below the enacted freeze control. The combined total reduction from 1992 to 2001 is of about 67%. These reductions exceeded the objectives of the Grant Agreement and have ensured that Uruguay will adhere to its MP phase-out commitments.
(2) The World Bank investment projects implemented in Uruguay phased out about 30 ODP tons, and the Recovery and Recycling project will contribute to further phase out about 4 ODP tons per year. Reduction in the assigned World Bank MP sectors averaged 50% of the sector's consumption. These contributions have allowed Uruguay to be ahead of its phase-out schedule.
(3) Technical Assistance and Institutional strengthening has been very successful and contributed to the general design and implementation of DINAMA's national phase out strategy and policy and regulation elaboration. It worth mentioning that Uruguay obtained two international awards as a result of its Program.

The main lessons that can be drawn from this project are:

ODS Estimates at Project Preparation

In 1992, the Country Program for Uruguay indicated a rather high consumption of 305 ODS tons in the country. By the time the Grant Agreement was signed between the Bank and the Government of Uruguay, consumption had dropped to about 220 ODS tons. Hence, the project scope was not aligned with the actual consumption figures. Although the project still contributed to a desired reduction of ODS in the country, more efforts should have been done to use up-to-date data in order to improve and set up more realistic project goals. Moreover, the implementing agency and the county should better define the MP sectors that will be targeted by the agency prior to the signature of the Grant Agreement. This would allow a better definition of the project scopes. This lesson was utilized in the design of the second generation of MP projects throughout the LAC region.

Moreover, instead of calculating the company's future consumption based on their last years, future consumption was based on the company's future selling expectations, which in most of the cases was too optimistic. This was a MP recommended practice which was revised for the second phase of the program by the MP ExCom and the Bank team.

Project Duration

Although the targets for ODS reduction were exceeded, the original project duration did not take into account that the identification of new projects required an extension of the project deadline. A the request of the Government of Uruguay, the project was extended to ensure that policy advice from the Bank would not be interrupted until the country would be well on its path to meet its MP phase-out obligations. As with other MP experiences, projects should set a longer-term target that contributes to institutional strengthening even after main ODS phase-out subprojects have been completed.

Institutional Strengthening

The project effectively contributed to the institutional strengthening of DINAMA. This Ozone Unit gained considerable experience in project management, negotiation techniques at international levels, and a better understanding of the mechanisms of several agencies of the United Nations. As a result, these capabilities were also transferred to other units within MVOTMA (such as the Climate Change Unit and the Biodiversity Unit) that benefited Uruguay. Moreover, the decision to centralize all operations in as single entity, DINAMA, proved to facilitate implementation of the project.

Technological Conversions in Small Developing Countries

Projects based on technological reconversions in small developing countries like Uruguay greatly depend on alternative available technologies. In the present case, the initial reconversions depended on the availability of chemicals (HCFC-141b, HFC-134a, polyols, etc.) with national distributors of international producing companies. The domestic market for these chemicals had not been developed, and thus little information was available on these technologies and higher prices had to be paid for environmentally friendly products. It is the opinion of the companies and local implementation unit that the Bank should seek the international chemical suppliers to actively participate in these environmental friendly projects in low-volume-ODS-consuming countries.

Public Awareness Campaigns

The Government's efforts to create awareness on ozone depletion greatly contributed to the success of the project. Both consumers and producers realized the importance to convert to non-ODS technologies, and products that carried the "Ozone Friendly" seal were highly valued by consumers.

9. Partner Comments

(a) Borrower/implementing agency:

DINAMA shares the Bank's evaluation findings presented in the present report. DINAMA considers the project a success, since Uruguay has greatly reduced ODS consumption. The reconversion projects clearly contributed to this reduction and helped to introduce new environmentally friendly technology in the country.

The project effectively contributed to the institutional strengthening of DINAMA, helping this institution to achieve its goals. The Ozone Unit has reached the goal of the freezing level for 1999 for the average consumption of 1995-1997 and the country expects to be able to comply with the schedule ahead.

DINAMA has gained valuable experience in promoting and coordinating the implementation of the Montreal Protocol. The undertaken activities made it possible to gain different abilities (identification and supervision of projects, negotiations at international level, better understanding of the mechanisms of the different agencies of the United Nations); these abilities are transferred to other units within MVOTMA, like Climate Change Unit, Biodiversity, etc.

(b) Cofinanciers:

There were no co-financiers in the Grant, although some beneficiary companies of the MF had to allocate some counterpart funding. Counterpart funding accounted for a very small proportion of the grant. In the case of the Etchepare-Gil subproject, the company received US$204,770 in MP funding and had to allocate US$7,000 to purchase a machine that was slightly above the threshold level. While total co-financing on the private sector's side amounted to US$16,217, Government's in kind contribution is estimated at: US$156,150.

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

Individual beneficiaries of the MP funding were very satisfied with the projects. The Director of Colder, for example, stressed that the technology conversion benefited not only the environment, but also the quality of his products. The Chief Engineer at Etchepare-Gil expressed that the result of the project was very positive, but that chemical suppliers should have been involved more actively in these projects. This comment was shared by the Director of Nevol who believes that by project implementation would be improved by further involving chemical and equipment suppliers (Please see supporting material for a summary of selected interviews with beneficiary companies.)

10. Additional Information

The network that was created among the different Ozone Units in Latin America and the Caribbean greatly contributed to the success of the project. Although this point is often taken for granted, the shared knowledge among country officers, international experts, and international agencies contributed to develop an effective strategy for ODS phase out in Uruguay.

Annex 1. Key Performance Indicators/Log Frame Matrix

(i) ODS Consumption in Uruguay and its MP Obligations (in MT)

	Indicator *	Expected	Actual
1	Support Uruguay's program to reduce ODS consumption by 30% to 40% with respect to 1992 levels by providing TA and technological conversion assistance.**	By 1998, consumption should be between 213 and 183 ODS tons.	In 1998, consumption was 194 ODS tons.
2	Support Uruguay in achieving the first MP control measure: the 1999 consumption freeze. The freeze was calculated as the national average consumption of 1995-1997.	Consumption freeze for 1999 was set at 199 ODS tons.	In 1999, consumption was 111 ODS tons (44% below the MP freeze level).
3	Support Uruguay in its program to achieve its future commitments, i.e. the 50% reduction in ODS consumption by 2005.	Consumption in 2005 should be 99.5 ODS tons.	In 2001, consumption was estimated at 102 ODS tons(67% reduction to the 1992 consumption levels), bringing the country just 2.5 tons short of its future commitment in 2005.

*There were not indicators specifically developed for the project. These indicators have been elaborated based on the project objectives, particularly the 2 and 3.
**Documents did not specified the deadline for this reduction. It is assume 1998, the agreement's closing date.

The following table shows official CFC consumption in Uruguay since 1992:

	1992	1993	1994	1995	1996	1997	1998	1999	2000
CFC consumption (ODP tons)	305	223	312	232	172	193	194	111	107

Source: Ozone Secretariat

(ii) Sub-Project Implementation

The following table reflects the impact of the World Bank implemented projects in the sectors opened for Bank activities:

Sector	1992 tons	2001 tons	Total ODS reduction (%)	Other Agencies reduction (%)	Reduction due to Market reasons (%)	World Bank Projects Reduction (%)	Observations
Domestic and Commercial Refrigeration	18	0	100	0	66.1	**33.9**	INDUNOR ceased its activities
Air conditioning and refrigeration service	148	87.3	41	37.1	22.8	**40**	
Rigid foams	76*	4.01	94.7	84	4	**12**	TEM ceased its activities.

Sources:

1992 consumption reported in the Country Report for Uruguay, 1992
2001 reflect World Bank estimates
*Estimated

It worth noticing that 78% of the national consumption in the rigid foam sector had been assigned by COGO to UNDP in 1994, which in time implemented an umbrella spray foams project. At the time of the rigid foams terminal project preparation by the Bank, 1998, the consumption in this sector had been reduced to 10 tons. As a result, the project efficiency in reducing the remaining ODS national consumption was about 90% instead of the 12% indicated in the chart.

(iii) Institutional Building *

	Indicator	Expected	Actual
1	Strengthen institutional structure of Ozone Unit and its operational capacity.	Institutional and Operational Strategy for ODS reduction	The strategic approach implemented by the Ozone unit led to the achievement of the 1999 freeze.
		Develop a ODS regulatory framework	The unit drafted a regulatory project to forbid the import and manufacture of CFC containing equipment. The law was approved by congress almost two years ago and has yet to be enacted.
		Develop project management capacity	The unit has successfully implemented 5 projects for the World Bank and about 10 more with the other implementing agencies.
		Gain experience in other environmental international negotiations and improve local capacity in Environmental management	The manager of the Ozone unit created and is currently the leader of the Climate Change unit and the Biodiversity Unit at DINAMA.

* Eventhough the Institutional Strengthening was envisaged as one objective, IS Outcomes were not developed during project preparation

Annex 2. Project Costs and Financing

Table 1: Project Cost by Component (US$ million equivalent)

	Appraisal Estimate	**Actual**
Project Cost By Component	US$ million	US$ million
Investment		
(1) Approved Subprojects	1,192	0,544
(2) Future Subprojects	3.661	0.320
Sub-total	4,853	0,864
Technical Assistance	0,147	0.025
Total Project Costs	5.00*	0.889

* This amount represents an indicative ceiling, a maximum for which the implementing agency can propose projects and request funding on behave of the GOU

Table 2: Project Costs by Procurement Arrangements (Appraisal Estimate) (US$ thousands)*

Expenditure Category	**ICB**	**Procurement NCB**	**Method Other**	**Total Cost**
1. Goods, works, services ad local freight	---	---	5.853	5.853
			(4.853)	(4.853)
2. Equipment and Materials	---	---	0.047	0.047
			(0.047)	(0.047)
3. Consulting Services	---	---	0.100	0.100
			(0.100)	(0.100)
Total	---	---	6,000	6,000
			(5,000)	(5,000)

* Figures in parentheses are the respective amounts financed by the Ozone Projects Trust Fund Grant

Table 3: Project Costs by Procurement Arrangements (Actual) (US$ thousands)

Expenditure Category	***ICB***	**Procurement NCB**	**Method Other***	**N.B.F.**	**Total Cost**
1. Goods, works, services and local freight	---	---	0.864	---	0.873
			(.864)		(0.864)
2. Equipment and Materials	---	---	0.024		0.047
			(0.024)		(0.047)
3. Consulting Services	---	---	0.001		0.026
			(0.001)		(0.026)
Total	---	---	0.889		0.889

* Figures in parenthesis are the amounts to be financed by the Ozone Projects Trust Fund grant.

Table 4: Project Financing by Category (US$ million equivalent)

Category	Appraisal Estimate*		Actual		Percentage of Appraisal	
	Bank	**Govt.**	**Bank**	**Govt.**	**Bank**	**Govt.**
1. Goods, works, services and local freight	4.853	---	0.864	--	18	--
2. Equipment and Materials	0.047	0.009	0.024	0.005	0.59	0.59
3. Consultant Services	0.100	0.020	0.001	0.0002	0.01	0.01
Total	**5.00**	**0.029**	**0.889**	**0.005**		

*****This amount represents an indicative ceiling, a maximum for which the implementing agency can propose projects and request funding on behave of the GOU

Annex 3. Economic Costs and Benefits

N/A. See section 4.3

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
Identification/Preparation*				
March 1994	*2*	Environmental Consultants		
September 1994	*2*	Environmental Specialist and Consultant		
Supervision				
October 1994	*2*	Environmental Consultants		
May 1995**	*2*	Environmental Consultants		
June 1996**	*1*	Environmental Consultants		
March 1997**	*2*	Task Manager and Environmental Consultan		
December 1999	*2*	Task Manager and Environmental Consultan		
April 2000	*2*	Task Manager and Environmental Consultant		
November 2000	*1*	Environmental Consultants		
September 2001	*1*	Environmental Consultant		
March 2002	*1*	Task Manager and Environmental Consultant		
October 2002	*2*	Task Manager and Environmental Consultant		
ICR				

* Due the particular characteristics of MP projects, in most of the cases there objective of the mission is a combination of identification, preparation and supervision.

**It was difficult to identified the missing missions during the period 1995-1999 because till the year 2000 the team did not prepare Aide Memoires for every mission. The information provided is based on PSRs from December 1999 on, correspondence between the client and the Team, and couple of Aide Memoires found in the Archives from before 1999.

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US$ ('000)
Identification/Preparation*	2.3	4.8
Supervision	96.19	205.3
ICR	1.55	22.5
Total	127	282

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

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

	Rating
☐ *Macro policies*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Sector Policies*	○ *H* ● *SU* ○ *M* ○ *N* ○ *NA*
☐ *Physical*	● *H* ○ *SU* ○ *M* ○ *N* ○ *NA*
☐ *Financial*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Institutional Development*	● *H* ○ *SU* ○ *M* ○ *N* ○ *NA*
☐ *Environmental*	● *H* ○ *SU* ○ *M* ○ *N* ○ *NA*
Social	
☐ *Poverty Reduction*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Gender*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Other (Please specify)*	○ *H* ○ *SU* ○ *M* ○ *N* ● *NA*
☐ *Private sector development*	○ *H* ● *SU* ○ *M* ○ *N* ○ *NA*
☐ *Public sector management*	○ *H* ● *SU* ○ *M* ○ *N* ○ *NA*
☐ *Other (Please specify)*	○ *H* ○ *SU* ○ *M* ○ *N* ● *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

1. Aide Memories and Project Status Reports, December 2000 to Octuber 2002.
2. Audit Reports, DINAMA/COGO, 1997 – 2001
3. Business Plans, prepared by DINAMA/COGO and the MP World Bank Regional Team
4. CAS 2000 and 2002, TheWorld Bank
5. Comments from beneficiary enterprises, Several Enterprises, September 2002
6. Financial and Procurement information by DINAMA/COGO
7. Grant Agreement, Ozone Projects Trust Fund Grant Reduction of the Consumption of Ozone-Depleting Substances in Uruguay (ODS Phaseout I), World Bank, December 1995
8. Memorandum to the Vice-president , The World Bank, June 1995
9. Progress Reports, prepared by DINAMA/COGO, 1997-2001
10. Project Completion Report (PCR) of each sub project, prepared by DINAMA/COGO for the MPMF
11. Project Document, prepared by DINAMA/COGO, benficiary companies and the MP World Bank Regional Team
12. Quality Assurance Group (QAG) Report, 10/12/2000
13. Sub Grant Agreements , DINAMA/COGO and beneficiary companies.

Annex 8. Individual Subproject Information

COMPANY	Colder S.A.
SECTOR	Rigid Foam and Refrigeration
PROJECT TITLE	Conversion of a commercial refrigeration plant. Replacement of the CFC-11 used as a blowing agent with HCFC-141b and the CFC-12 used as refrigerant with HCFC-134a
PRODUCTS MANUFACTURED	Cold storage chambers and glass display cases
ODS TO BE PHASED OUT	11.7 tons
ODP TO BE PHASED OUT	10.76 tons
ACTUAL ODP PHASED OUT	10.76
APPROVED GRANT (in US$)	315,600
FUNDS DISBURSED (in US$)	315,600
COST EFFECTIVENESS ($/kg)*	29.3
STATUS	Completed

*Note: Uruguay is a low volume ODS consumer country, and therefore the cost effectiveness thresholds are not applicable. The value provided should be used as an indicative reference.

Project Description

The project consisted of substituting CFC-11 as blowing agent for HCFC-141b and CFC-12 for HFC-134a as a refrigerant. Since the new technology requires more accurate control systems (temperature, mixture, etc), a high-pressure dispenser machine (CANNON A-40 with accessories and molds) was acquired. For the substitution of CFC-12 as refrigerant with HFC-134a, the project included the review of the refrigeration circuit, the training by an international expert, a leak detector and charge and service equipment.

The company has the adequate capacity to fully use and maintain the new equipment. The quality of products after conversion has improved. More stable foam has been obtained and the discarded products during production have been significantly reduced.

COMPANY	Etchepare-Gil S.A.
SECTOR	Rigid Foams
PROJECT TITLE	Replacement of the CFC-11 used in the production of rigid foam with HCFC-141b.
PRODUCTS MANUFACTURED	Electric Water Heaters
ODS TO BE PHASED OUT	4.4 tons
ODP TO BE PHASED OUT	3.43 tons
ACTUAL ODP PHASED OUT	4.23 tons
APPROVED GRANT (in US$)	228,200
FUNDS DISBURSED (in US$)	228,200
COST EFFECTIVENESS ($/kg)*	53.9
STATUS	Completed

*Note: Uruguay is a low volume ODS consumer country, and therefore the cost effectiveness thresholds are not applicable. The value provided should be used as an indicative reference.

Project Description

The project consisted of substituting CFC-11 as blowing agent for HCFC-141b. A high-pressure dispenser machine (CANNON A-40) with accessories was acquired because the new technology requires more accurate control systems (temperature, mixture, etc). A preheating oven was also built because of the conditions of the new technology. Additional benefits included the elimination of solvents due to the use of high pressure injectors. No major technological problems were encountered except some unforeseen equipment in the project document.

The bankruptcy of a local competitor of ETCHEPARE GIL led to an increase in its production and a thus a higher elimination of CFC-11 than originally targeted. Actual ODP phase out was 4.23 tons compared to the 3.43 targeted.

COMPANY	Recovery and Recycling project
SECTOR	Industrial Refrigeration Service
PROJECT TITLE	CFC-12 Recovery-Recycling and Training in Refrigeration Maintenance and Repair.
PRODUCTS MANUFACTURED	Service of refrigerants
ODS TO BE PHASED OUT	3.5 tons
ODP TO BE PHASED OUT	3.5 tons
ACTUAL ODP PHASED OUT	4.13 tons
APPROVED GRANT (in US$)	87,575
FUNDS DISBURSED (in US$)	87,575
COST EFFECTIVENESS ($/kg)*	21.2
STATUS	Completed

*Note: Uruguay is a low volume ODS consumer country, and therefore the cost effectiveness thresholds are not applicable. The value provided should be used as an indicative reference.

Project Description

This Demonstration Project provided 15 refrigerant recycling machines and associated equipment to major refrigeration service shops in Uruguay. The elimination of 4.13 ton/year of CFC-12 used in the industrial refrigeration sector was achieved through:

a) Recovery and recycling of CFC-12 by means of a decentralized system. This was intended to demonstrate the viability of this system for possible application in other countries.
b) The dissemination of information and the training of refrigeration technicians in this sector in the proper procedures for the maintenance of industrial refrigeration units with respect to reducing CFC emissions.

15 selected workshops received:

-Recovery equipment (ROBINAIR) with capacity to handle the liquid and gas phases with oil separation and adequate recovery velocities.
-Recycling equipment (ROBINAIR) with filters to remove moisture, particles and purge non condensable gases.
-Electronic leak detector for CFC-12.
-Two cylinders to store CFC-12.
-Spare parts.

This equipment has allowed the technicians to recover the CFC-12 from industrial equipment and to recycle it in their own machines. ODP phase out target has been exceeded and approximately 4.13 tons are being phased out per year.

COMPANY	Nevol S.A.
SECTOR	Domestic Refrigeration
PROJECT TITLE	Conversion of a domestic refrigeration plant. Replacement of the CFC-12 used as a blowing agent with HCFC-141b and the CFC-12 used as a refrigerant with HFC-134a
PRODUCTS MANUFACTURED	Domestic refrigerators
ODS TO BE PHASED OUT	10.46
ODP TO BE PHASED OUT	9.55
ACTUAL ODP PHASED OUT	5.67
APPROVED GRANT (in US$)	141,512
FUNDS DISBURSED (in US$)	141,512
COST EFFECTIVENESS ($/kg)*	25.0
STATUS	Completed

*Note: Uruguay is a low volume ODS consumer country, and therefore the cost effectiveness thresholds are not applicable. The value provided should be used as an indicative reference.

Project Description

The project objectives were:

a) Complete the full conversion of Uruguay's domestic refrigerator manufacture sector.
b) The substitution of the use of CFC-11 as blowing agent in the production of rigid polyurethane foam and substitute the use of CFC-12 as refrigerant in the production of domestic refrigerators. HCFC-141b and HFC-134a will be used as replacements.

The project consisted of the reconversion of the foaming process to use HCFC-141b. For this purpose, a high pressure injection CANNON machine was bought.
The refrigeration circuit was redesigned and charging and service equipments were purchased. An international expert participated in the redesign of the circuit , training of the staff and initial tests.

The phase-out plan was based on projected production, but the market forces led to a decrease in production. Consequently the real phase-out was only 5.67 ODP tons instead of the 9.55 planned.

COMPANY	Terminal Program for CFC-11 in Foams
SECTOR	Foams
PROJECT TITLE	Terminal program for the elimination of CFC-11 in the manufacture of polyurethane foam through the use of HCFC-141b technology in the foam sector in Uruguay by means of technical assistance and reconversion to different companies.
PRODUCTS MANUFACTURED	Rigid foams and integral skin
ODS TO BE PHASED OUT	4.78 tons
ODP TO BE PHASED OUT	4.35 tons
ACTUAL ODP PHASED OUT	4.35 tons
APPROVED GRANT (in US$)	91,300
FUNDS DISBURSED (in US$)	91,300
COST EFFECTIVENESS ($/kg)*	21.0
STATUS	Completed

*Note: Uruguay is a low volume ODS consumer country, and therefore the cost effectiveness thresholds are not applicable. The value provided should be used as an indicative reference.

Project Description

The project objectives were to completely eliminate the use of CFC-11 in the manufacture of polyurethane foams in Uruguay. This objective was achieved by providing technical assistance to a group of small and medium size enterprises (average consumption of 1.2 ODS tons) in the framework of a low volume consuming country.

Four companies were originally identified for this project: Topsy, Bromyros, Ferroco, and Fuyama. Shortly after the project was approved, Topsy closed down and Bromyros decided to stop using CFC-11 (only little ODS was used for repair purposes). Hence, only Ferroco and Fuyama participated in the project.