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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Twenty-fifth Meeting
Montreal, 29-31 July 1998

COUNTRY PROGRAMME: NIGERIA

This document consists of:

- Country Programme Evaluation Sheet (prepared by the Fund Secretariat)
- Comments and Recommendations of the Fund Secretariat
- Transmittal Letter from the Government of Nigeria
- Country Programme Cover Sheet
- Country Programme (Executive Summary)

NIGERIA COUNTRY PROGRAMME EVALUATION SHEET

National Ozone Office, Federal Environmental Protection Agency (FEPA)

Status of ratification of the Vienna Convention and the Montreal Protocol

	Signature	Ratification	Entry into force
Vienna Convention (1985)		31-Oct-88	29-Jan-89
Montreal Protocol (1987)		31-Oct-88	29-Jan-89
London Amendment (1990)			
Copenhagen Amendment (1992)			

Production of controlled substances: No controlled substances produced

Consumption of controlled substances (1996) 1,895.3 metric tonnes
1,684.8 weighted tonnes (ODP)

(tonnes)	CFC-11	CFC-12	CFC-113	CFC-114	CFC-115	TOTAL Halon1211	Halon1301	TOTAL	CTC	MCF	TOTAL	Me-Br
ODS	624.6	850.9		15.6	0.8	1,491.9	3.9	3.9	109.6	289.9	399.4	
ODP	624.6	850.9		15.6	0.5	1,491.6	39.0	39.0	120.5	29.0	149.5	

Distribution of ODP by substance: CFC 88.5% Halon 2.3% CTC and MCF 8.9%

Distribution of ODP by sector:	Aerosol	Foam	Halon	Refrigeration	Solvent	Other
Consumption (ODP tonnes):	0.0	617.1	39.0	879.2	149.5	0.0
Percent of total:		36.6%	2.3%	52.2%	8.9%	

Country Programme

Duration of country programme: 13 years (1998-2010)

ODS phase out target: 55% reduction by 2001. 86% reduction by 2005. Complete phaseout by 2010

Phase out priority area: Refrigeration, foam and solvent sectors

Cost of activities in country programme: \$17,900,000

Strategy:

The Government is committed to phasing-out the consumption of ODS in a cost-effective manner. The Government is proposing, inter alia, to establish a permit and tracking system of ODS imports into the country, regulating ODSs imported into the country with a decreasing amount allowable for each year; implementing an import ban for ODS-based equipment by 2000 and a ban on all ODS by 2010; encouraging multinational corporations to employ the same non-ODS technologies; intensifying awareness and enlightenment programmes in ODS phase-out; encouraging recycling of ODS and training and certification of servicing technicians handling ODS; and ensuring the development of a supply of hydrocarbon substitutes for ODS for use in relevant sectors.

COMMENTS AND RECOMMENDATIONS OF THE FUND SECRETARIAT

COMMENTS

1. The Country Programme conforms to the format of the approved guidelines. In the sector dealing with industry structure, the document provides information on the major ODS consuming industries.
2. The total consumption in Nigeria in 1996 was estimated at 1,684.8 ODP tonnes. About 89 per cent of total ODS consumption in the country is in the refrigeration and foam sectors. Nearly 9 per cent of the consumption is in the solvent sector. Basic information on ODS consumption in the country was gathered through questionnaires and two sectoral phase out strategy reports (foam and refrigeration) prepared with the assistance of the Multilateral Fund. The methodology used in the preparation of the country programme is detailed in the Executive Summary.
3. The country programme included a detailed framework to construct a refrigerant management plan, which is based on most recent estimates available on refrigerants, characteristics of the refrigeration equipment and the service sector, technology adoption rates and ODS-reduction measures.
4. So far the Executive Committee has approved 17 projects in the foam and refrigeration sectors and granted over US \$5 million for their implementation. In total, 654 ODP tonnes, equivalent to 39 per cent of the total ODS consumption, will be phased out.
5. The Executive Committee decided at its 23rd Meeting that no new investment projects could be submitted for Nigeria until the country programme had been approved (Decision 23/47).

RECOMMENDATIONS

The Fund Secretariat recommends as follows:

1. To approve the Nigeria Country Programme. Approval of the Country Programme does not denote approval of the projects identified therein or their funding levels.
2. To request the Government of Nigeria to present annually information to the Executive Committee on progress being made in the implementation of the country programme, in accordance with the decision of the Executive Committee on implementation of country programmes (UNEP/OzL.Pro/ExCom/10/40, para 135). Using the approved format, the initial report, covering the period 1 August 1998 to 31 December 1999, should be submitted to the Fund Secretariat no later than 1 May 2000.

THE PRESIDENCY

FEDERAL ENVIRONMENTAL PROTECTION AGENCY

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FEPA/IPA/NOO/20/II/XX
OUR REF.....
YOUR REF.....
DATE..... 11TH MAY, 1998

OFFICE OF THE DIRECTOR GENERAL/CHIEF EXECUTIVE

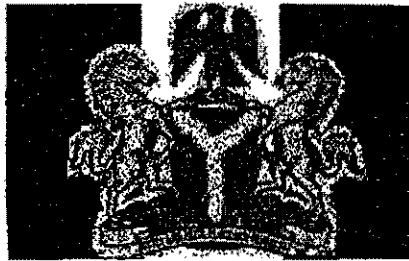
Dr. Omar El-Arini
The Chief Officer
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SUBMISSION OF NIGERIA'S COUNTRY PROGRAMME

I have the honour to submit herewith the Country Programme of the Federal Republic of Nigeria for the consideration and approval of the Multilateral Fund for the Implementation of the Montreal Protocol.

2. I wish to express our sincere appreciation to the Secretariat of the Multilateral Fund and the Executive Committee for their understanding and support to our already approved ODS Phase-out Projects in Nigeria.
3. Please accept, the assurances of my highest regards.

Dr. R.O. Adewoye
Director General/Chief Executive.



**Federal Republic of Nigeria:
Country Programme for the Phase-Out
of Ozone Depleting Substances**

May 1998

*Prepared by the Federal Environmental Protection Agency (FEPA),
The Presidency, Abuja, Nigeria*

COUNTRY PROGRAMME COVER SHEET

Country: Nigeria

Date Received: May 1998

Lead National Agency: Federal Environmental Protection Agency of Nigeria (FEPA)

Period Covered by Country Programme: 1998-2010

1. Phase-Out Schedule^a

<i>SUBSTANCE</i>	1996 ^b Consumption in ODP metric tons	Planned Total Consumption, 1997- 2010, in ODP metric tons	Planned Year of Phase-out
CFC 11	624.26	3762	2010
CFC 12	850.94	5061	2010
CFC 114	15.60	47	2010
CFC 115 ^c	3.46	21	2010
Halon 1301	39.00	32	2010
Carbon Tetrachloride	120.51	896	2010
1,1,1 Trichloroethane	28.99	214	2010
TOTAL	1684.76	10,045	2010

^a The phase-out schedule does not include methyl bromide because Nigeria has not ratified the Copenhagen

Amendments to the Montreal Protocol

^b 1996 represents the most recent year for which ODS consumption data have been collected for Nigeria.

^c CFC 115 includes 51.2% of the refrigerant blend R-502.

1. Government Action Plan

The Government Action Plan consists of technical measures and policy measures.

Technical Measures

- Substitution of methylene chloride for CFC-11 in blowing of non-insulating foam, using MFMP funds to cover incremental costs, to achieve phase-out in this subsector by 2002.
- Substitution of HCFC-141b, HFC-134a, cyclopentane, or other non-ODS blowing agents for CFC-11 in blowing of insulating foam, using MFMP funds to cover incremental costs, to achieve phase-out in this subsector by 2002.
- Conversion of domestic refrigerators and self-contained commercial refrigeration units to drop-in blends at time of servicing. This measure will be initiated through demonstration programmes funded by MFMP. By around 2005, all service calls for units still operating on ODS refrigerant will include conversion to a drop-in blend.

- Adoption of refrigerant conservation measures for all refrigeration and air-conditioning equipment. This measure will be initiated through programmes funded by MFMP. By around 2005 all servicing and replacements of equipment will use refrigerant conservation techniques. In addition, a certification programme for maintenance technicians in the Refrigeration and Air Conditioning sector will accompany the recycling equipment purchase.
- Conversion of manufacturing facilities to non-ODS models by around 2002 for all refrigeration and air conditioning equipment manufactured in Nigeria. The incremental costs will be covered by MFMP.
- Conversion to aqueous cleaning, alternative organic solvents, or other technologies for all solvent cleaners by 2010. Incremental costs for all will be covered by MFMP.
- Conversion of remaining production facilities using ODS (CFC-114) for aerosol by 2000, using MFMP funds to cover incremental costs.
- Gradual reduction for fire control, first by conservation methods, then by replacement with non-ODS substitutes to reach zero by 2010. Incremental costs for the conservation methods will be funded by the MFMP.

Policy Measures

- Permitting and tracking system with declining import quotas. This measure establishes a permitting and tracking system of ODS imports into Nigeria. Nigeria will regulate the amount of ODS imported into the country annually, decreasing the allowable amount each year (the rate of decline will be based on a schedule that meets the ODS phase-out requirements for Article 5 countries). Importers will be issued permits for certain percentages of the overall annual quota. Importers trying to import more than their permit allows will be unable to place orders for additional chemical. Due to market forces, ODS prices are expected to rise gradually as supply is restricted, and ODS consumers will seek alternative non-ODS substances.
- An import ban by 2000 for ODS-based equipment, especially refrigerators, air conditioners and freezers.
- A ban on all ODS imports to take effect in 2010.
- FEPA will encourage multinational oil and gas corporations to employ the same non-ODS technology in Nigeria as employed in other countries in which these companies operate.
- Strengthen Nigeria's national ozone office to enhance implementation of the ODS phase-out strategy.
- FEPA, in collaboration with the State EPAs and other relevant stakeholders, will intensify its awareness and enlightenment programmes in ODS phase-out.
- FEPA, in collaboration with relevant regulatory agencies, will put in place "ecolabelling."
- FEPA will build capacity in ODS phase-out strategies for the country.
- FEPA will encourage recycling of ODS and training/certification of technicians handling

- FEPA, in collaboration with implementing agencies, will ensure that stakeholders and target groups who have started or voluntarily completed phase-out programme(s) on ODS will also have access, where possible, to the MFMP.
- FEPA will intensify its efforts to facilitate enterprises' access to MFMP funding for the technical measures.
- The Nigerian Government, working with the Nigerian National Petroleum Corporation (NNPC) and other enterprises in Nigeria, will work to ensure the development of a supply of hydrocarbon substitutes for ODS for use in relevant sectors.

1. Project Summary

Several industrial projects have been identified and approved for reduction of ODS. The projects, along with their approximate costs and reductions are:

APPROVED INDUSTRIAL PROJECTS FOR PHASE-OUT OF CFCs

Company	Project Cost (millions USD)	ODS Reduction (MT/Yr)
Eleganza Industries Ltd.	0.314	48.3
Royal Foam Products	0.034	43.0
Sara Products Ltd.	0.107	27.7
Teju Industries Ltd.	0.075	47.0
Mouka Ltd.	0.144	30.3
Safa Foam	0.146	24.4
Bajabure Ind. Complex Ltd.	0.135	32.3
Ugochukwa Chem. Ind. Ltd.	0.408	118.6
Elico Ind. Ltd.	0.134	25.7
Eleganza Group	0.568	73.8
Alumaco	0.038	11.5
Winco Foam Ind. Ltd.	0.117	19.1
Debo Ind. Ltd., Lagos (foam & refrigerant)	1.048	52.0
Thermocool Eng. Co. PLC (foam & refrigerant)	1.466	82.0
Polyurethane Manufacturers Ltd. (Polyma)	0.080	18.5
Total, foams and refrigeration sectors *	4.814	654.2

* Numbers may not equal totals due to rounding.

Some additional industrial projects, all in the refrigeration and air conditioning sector, have been identified but have not yet been approved:

INDUSTRIAL PROJECTS NOT YET APPROVED FOR PHASE-OUT OF CFCs

Company	Project Cost (millions USD)
Kolinton Technical Industries Ltd.	1.150
Nigeria Engineering Works (New) Ltd.	0.892
A.G. Leventis Nig. Plc.	0.822
Gacol Nig. Ltd.	0.605
Total	3.469

Identification of industrial projects will continue, resulting in additions to the list of identified industrial projects.

In addition to the industrial projects, it is estimated that \$3.995 million will be needed for institutional strengthening to oversee the phase-out, of which \$1.4 million is foreseen to be MFMP-funded. Also, three prospective MFMP-funded capacity building projects in the refrigeration and air conditioning servicing sector have been identified: domestic refrigeration, MACs, and self-contained commercial (\$1,600,000); remote commercial refrigeration (\$200,000); and transport refrigeration (\$200,000).

1. Costs

Total incremental costs of activities and projects in Country Programme are estimated at \$53.3 million. This is also equal to the cost of the complete phase-out. Of this, \$17.9 million is foreseen to come from the MFMP, while the remainder (\$35.4 million) will be covered by enterprises and the government in Nigeria. The overall cost effectiveness of the phase-out is projected at about \$26.20 per kilogram.

2. Comments

The single most expensive element of the phase-out is the retrofitting of self-contained refrigeration systems (domestic refrigerators and commercial display units). The refrigerant management plan reveals that these retrofits must be undertaken in order to meet the phase-out schedule. Although capacity building projects that address the retrofitting are included in the MFMP-funded portion of the cost estimate, the vast majority of the cost of the retrofitting is included in the portion to be funded by Nigeria.

E. EXECUTIVE SUMMARY

E.1 BACKGROUND

Under the auspices of the United Nations Environment Programme (UNEP), the governments of the world participated in The Vienna Convention on the Protection of the Ozone Layer in 1985. Through this Convention, governments committed themselves to protect the ozone layer and to co-operate with each other in scientific research to improve the understanding of atmospheric processes. The Montreal Protocol on Substances that Deplete the Ozone Layer was developed as an international reaction to limit the adverse effects of chlorofluorocarbons (CFCs) and halons on the stratospheric ozone layer. It was agreed upon in September 1987 in Montreal, Canada and came into force on 1 January 1989. At that time, it had been ratified by 29 countries and the European Economic Community (EEC) representing approximately 82 percent of the world's consumption of ozone-depleting substances (ODS). At inception, the Protocol defined measures that signatory countries must take to limit production and consumption of five CFCs and three halons. In June 1990, the Protocol was amended to include controls on ten more CFCs, carbon tetrachloride (CTC), and 1,1,1-trichloroethane (methyl chloroform, MCF). The Protocol sets the "elimination" of ODS as its "final objective."

In addition, the agreement contains clauses to cover special circumstances of several groups of countries, especially developing countries with low consumption rates (below 0.3 kg per capita, referred to as Article 5 countries) to assure that the Protocol does not hinder their development. Currently, 155 countries are Parties to the Protocol, of which well over 100 are developing nations.

Nigeria acceded to the Vienna Convention and signed and ratified the Montreal Protocol on 31 October 1988. Nigeria actively participated in all negotiations leading to the Protocol and co-sponsored the resolution of Article 5 concerning the special needs of developing countries. Since becoming a member, the country has taken steps towards the protection of the ozone layer. One example includes empowering the Federal Environmental Protection Agency (FEPA) with decrees 42 and 58 of 1988 which aim to control environmentally harmful substances. FEPA has been collaborating with the World Bank, the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), and the United Nations Industrial Development Organisation (UNIDO) on efforts directed at implementation of the Protocol. In addition, FEPA has established an ozone office and the National Advisory Ozone Committee (NAOCOM) to advise government on all matters related to the implementation of the Protocol in the country. ODS importers, ODS-using industries, relevant government agencies, higher institutions, and non-governmental organisations (NGOs) are represented in NAOCOM.

In order to help finance the incremental costs of meeting the requirements of the Protocol

in developing countries and promote an accelerated phase-out of ODS, participating countries established the Multilateral Fund of the Montreal Protocol (MFMP). Countries, such as Nigeria, which meet the requirements set under Article 5 of the Protocol, qualify to receive financial assistance from the fund. A prerequisite for obtaining this assistance is the preparation of a Country Programme. In accordance with the Executive Committee's guidelines for Country Programme preparation, this report contains an examination of the recent and projected pattern of ODS consumption in Nigeria, analysis of ODS consumption and phase-out scenarios, and a description of the recommended phase-out strategy, including estimates of the incremental costs of a complete phase-out. In addition, the report provides an action plan for ODS phase-out in the country.

E.2 CONSUMPTION AND PRODUCTION OF ODS IN NIGERIA

There is no production of ODS in Nigeria. Importation of ODS is estimated at approximately 2000 metric tons.¹ Consumption of ODS in Nigeria in 1997² is estimated to consist of the following (non-ODP-weighted):

	Metric tons
• CFC-12 in refrigeration and air conditioning:	890
• CFC-11 in refrigeration and air conditioning:	6
• CFC-115 in refrigeration and air conditioning:	7 ³
• CFC-11 in foams:	689 ⁴
• CFC-114 in aerosol products:	12
• Halon 1301 in fire control:	5
• Carbon tetrachloride in solvent cleaning:	117
• 1,1,1-trichloroethane in solvent cleaning:	306
TOTAL	2,032

If demand were unconstrained, that is, if Nigerian government and industry were to take no further action to increase substitution for ODS beyond the degree of substitution already achieved in 1997, it is estimated ODS consumption would be over 3,300 metric tons (mt) by 2010.

If demand is constrained as recommended in this Country Programme, ODS consumption will drop to less than 1,550 mt in 2000, to less than 375 mt in 2005, and to zero in 2010.

¹ The importation estimate excludes ODS contained in imported finished products.

² The 1997 consumption estimate is based on the most recent data collected for Nigeria, 1996.

³ Some of the CFC-115 is consumed as a component of Refrigerant 502, referred to also as R-502.

⁴ Figure shown includes the CFC-11 used for insulating foams.

E.3 METHODOLOGY OF THE COUNTRY PROGRAMME PREPARATION

The Federal Environmental Protection Agency (FEPA) has enlisted the support of ICF Incorporated, USA (ICF) and its subcontractor Jawura Environmental Services Limited, Nigeria (JESL) in developing its Country Programme. This team has adopted the following nine-step approach:

Step 1. Questionnaires were developed for the purpose of gathering the national-level information in Nigeria needed to produce recommendations for phase-out measures and projections of cost and ODS consumption. The data sought in the questionnaires are those that ICF has learned, through its experience with Country Programmes in several other countries and with input from JESL, are key in conducting the analysis and formulating useful recommendations and projections. The questionnaires focus on two types of data: 1) technical information, and 2) policy-related information.

Step 2. JESL gathered as much of the information to complete the questionnaires as possible. Gathering of the information was hindered by a lack of realisation among some respondents about the importance of the needed information. FEPA was informed of this problem, and to address it, communicated to the respondents the importance of the data through news media advertisements. These communications helped in obtaining some, but not all, of the remaining needed information. ICF drew on its experience in other countries and used correlation with general economic data to address data gaps. In addition, ICF drew heavily upon the following documents provided to it by FEPA in making the estimates and producing the draft Country Programme:

- “Final Report on Preparation of CFC Phase-Out Strategy for Refrigeration and Air-Conditioning Industries and Services in Nigeria,” and
- “Phase-Out Strategy Report for ODS in the Nigeria Foam Sector.”

Step 3. ICF prepared analytical tools. First, it updated project costs contained in its “ODS World” model, which estimates the cost of ODS phase-out. Second, it developed a spreadsheet model to use in preparing the refrigerant management plan, a key portion of the Country Programme.

Step 4. To develop cost estimates, ODS projections, and technical recommendations to produce the draft Country Programme, ICF applied the updated project costs and spreadsheet model from step 3 to input data assembled as described in step 2. The other sources mentioned under step 2 were also drawn upon to complete the document.

Step 5. After completing the draft Country Programme, ICF and JESL collaborated in a workshop intended to test and refine the assumptions underlying the draft country programme and the credibility of its conclusions and recommendations. The exercise, which drew upon JESL’s knowledge of local conditions and ICF’s experience with phase-

out measures, resulted in recommended refinements and additions to the draft Country Programme.

Step 6. FEPA organised the National Stakeholders' Workshop in December 1997 to consider the draft Country Programme. In addition, JESL presented policy options and recommendations from the earlier workshop (Step 5).

Step 7. The Final Draft Country Programme was produced taking into consideration the comments and recommendations from the National Stakeholders' Workshop.

Step 8. FEPA, JESL, and ICF collaborated in a workshop to review the Final Draft Country Programme, identified areas where questions remained, discussed those areas, and agreed on further refinements and additions.

Step 9. ICF completed the refinements and additions indicated under Step 8, resulting in this Country Programme.

E.4 ACTION PLAN

The action plan consists of technical measures and policy measures.

Technical Measures

- Substitution with methylene chloride for CFC-11 in blowing of non-insulating foam, using MFMP funds to cover incremental costs, to achieve phase-out in this subsector by 2002.
- Substitution with HCFC-141b, HFC-134a, cyclopentane, or other non-ODS blowing agents for CFC-11 in blowing of insulating foam, using MFMP funds to cover incremental costs, to achieve phase-out in this subsector by 2002.
- Conversion of domestic refrigerators and self-contained commercial refrigeration units to drop-in blends at time of servicing. This measure will be initiated through demonstration programmes funded by MFMP. By around 2005, all service calls for units still operating on ODS refrigerant will include conversion to a drop-in blend.
- Adoption of refrigerant conservation measures for all refrigeration and air-conditioning equipment. This measure will be initiated through programmes funded by MFMP. By around 2005 all servicing and replacements of equipment will use refrigerant conservation techniques. In addition, a certification programme for maintenance technicians in the Refrigeration and Air Conditioning sector will accompany the recycling equipment purchase.
- Conversion of manufacturing facilities to non-ODS models by around 2002 for all refrigeration and air conditioning equipment manufactured in Nigeria. The incremental costs will be covered by MFMP.

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Policy Measures

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- An import ban by 2000 for ODS-based equipment, especially refrigerators, air conditioners and freezers.
- A ban on all ODS imports to take effect in 2010.
- FEPA will encourage multinational oil and gas corporations to employ the same non-ODS technology in Nigeria as employed in other countries in which these companies operate.
- Strengthen Nigeria's national ozone office to enhance implementation of the ODS phase-out action plan.
- FEPA, in collaboration with the State EPAs and other relevant stakeholders, will intensify its awareness and enlightenment programmes in ODS phase-out.
- FEPA, in collaboration with relevant regulatory agencies, will put in place "ecolabelling."
- FEPA will build capacity in ODS phase-out strategies for the country.
- FEPA will encourage recycling of ODS and training/certification of technicians handling ODS.
- FEPA, in collaboration with implementing agencies, will ensure that stakeholders and target groups who have started or voluntarily completed phase-out programme(s) on ODS will also have access, where possible, to the MFMP.

- FEPA will intensify its efforts to facilitate enterprises' access to MFMP funding for the technical measures.
- The Nigerian Government, working with the Nigerian National Petroleum Corporation (NNPC) and other enterprises in Nigeria, will work to ensure the development of a supply of hydrocarbon substitutes for ODS for use in relevant sectors.

E.5 INCREMENTAL COSTS

The incremental costs to Nigeria of constraining consumption in the recommended way are estimated at USD 53.3 million. Of these, the estimated amount to be covered by the MFMP are USD 17.9 million.