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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
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Montreal, 14-16 July 1999

PROJECT PROPOSALS: NIGERIA

This document consists of the comments and recommendations of the Fund Secretariat on the following projects:

Foam

- Phaseout of CFC-11 by conversion to liquid carbon dioxide blown technology in the manufacture of molded flexible polyurethane foam at Automotive Component Industries Ltd — UNDP
- Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at Diamond Foam Nigeria Ltd — UNDP
- Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at Tinuola Bay Industries Nig. Ltd. — UNDP
- Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at United Foam Products Nig. Ltd.. — UNDP

Refrigeration

- Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Onward Electrical Industry Ltd. — UNIDO
- Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Soesons Ltd. — UNIDO
- Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at United Technologies Ltd. — UNIDO

PROJECT EVALUATION SHEET
NIGERIA

SECTOR: Foam ODS use in sector (1995): 663 ODP tonnes

Sub-sector cost-effectiveness thresholds: Flexible Slabstock US $6.23/kg
Integral Skin/Flexible Molded US $16.86/kg

Project Titles:

(a) Phaseout of CFC-11 by conversion to liquid carbon dioxide blown technology in the manufacture of molded flexible polyurethane foam at Automotive Component Industries Ltd.
(b) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at Diamond Foam Nigeria Ltd.
(c) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at Tinuola Bay Industries Nig. Ltd.
(d) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at United Foam Products Nig. Ltd.

Project Data	**Flexible Molded**	**Flexible Slabstock**	**Flexible Slabstock**	**Flexible Slabstock**
	Automotive	**Diamond**	**Tinuola Bay**	**United**
Enterprise consumption (ODP tonnes)	37.00	22.70	21.00	25.00
Project impact (ODP tonnes)	37.00	22.70	21.00	25.00
Project duration (months)	24	24	24	24
Initial amount requested (US $)	230,510	118,340	121,420	147,350
Final project cost (US $):				
Incremental capital cost (a)	339,000	109,000	115,400	136,000
Contingency cost (b)	33,900	10,900	11,540	13,600
Incremental operating cost (c)	-126,200	-7,750	-7,530	-12,290
Total project cost (a+b+c)	246,700	112,150	119,410	137,310
Local ownership (%)	83%	100%	100%	100%
Export component (%)	0%	0%	0%	0%
Amount requested (US $)	204,761	112,150	119,410	137,310
Cost effectiveness (US $/kg.)	5.53	4.94	5.69	5.49
Counterpart funding confirmed?	Yes	Yes	Yes	Yes
National coordinating agency	Federal Environmental Protection Agency			
Implementing agency	UNDP	UNDP	UNDP	UNDP

Secretariat's Recommendations				
Amount recommended (US $)	204,761	112,150	119,410	137,310
Project impact (ODP tonnes)	37.00	22.70	21.00	25.00
Cost effectiveness (US $/kg)	5.53	4.94	5.69	5.49
Implementing agency support cost (US $)	26,619	14,580	15,523	17,850
Total cost to Multilateral Fund (US $)	231,380	126,730	134,933	155,160

PROJECT DESCRIPTION

(a) Phaseout of CFC-11 by conversion to liquid carbon dioxide blown technology in the manufacture of flexible polyurethane foam at Automotive Component Industries Ltd.

(b) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam at Diamond Foam Nigeria Ltd.

(c) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam at Tinuola Bay Industries Nig. Ltd.

(d) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam at United Foam Products Nig. Ltd.

Sector Background

- Latest available total ODS consumption (1997)		5,503	
- Baseline consumption* of Annex A Group I substances (CFCs)		3,650.3	
- 1998 consumption of Annex A Group I substances		Not Available	
- Baseline consumption of CFCs in foam sector		Not reported	
- 1998 consumption of CFCs in foam sector		Not reported	
- Funds approved for investment projects in foam sector as of March 1999 (27th Meeting)	US $	3,803,300	
- Quantity of CFC to be phased out in foam sector as of March 1999 (27th Meeting)		833.4	ODP tonnes
- Quantity of CFC phased out in foam sector as of March 1999 (27th Meeting)		0	ODP tonnes

*Baseline consumption of Annex A controlled substances refers to average of the consumption for the years 1995-1997 inclusive.

Other relevant information:

1. Four projects are being submitted to the 28th Executive Committee Meeting in the foam sector. When approved and implemented 105.7 ODP tonnes of CFC-11 will be phased out.

Impact of the Projects

2. The 105.7 tonnes of CFC-11 to be phased out constitutes 2.9% of Nigeria's baseline consumption of Annex A Group I substances.

(a) Phaseout of CFC-11 by conversion to liquid carbon dioxide blown technology in the manufacture of flexible polyurethane foam at Automotive Component Industries Ltd.

3. Automotive Component Industries Ltd uses 37 tonnes of CFC-11 in the manufacture of molded flexible polyurethane foam. The production is to be converted to a liquid carbon dioxide (LCD) blown technology. The company will install two new LCD Systems (US $280,000)

comprising: booster pumps to increase the CO_2 pressure, LCD metering units, mixing heads, cooling equipment to maintain CO_2 in Liquid phase, a storage tank and transfer system for liquid CO_2 (US $24,000)and will retrofit the existing molding machine and the building (US $5,000) to accommodate the installation and operation of LCD technology. Other costs include trials for the two machines (US $20,000) and technology transfer (US $10,000). The incremental operating benefits of LCD use (US $126,200) are subtracted from the requested grant. The foreign ownership portion has also been deducted from the project costs.

(b) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam at Diamond Foam Nigeria Ltd.

4. Diamond Foam Nigeria Limited uses 22.7 tonnes of CFC-11 in the manufacture of flexible polyurethane foam. The production is to be converted to Methylene Chloride (MC) technology. The company will install a MC storage and metering system on a new continuous production line (US $29,000), a storage and metering systems for a softening additive (US $10,000), will upgrade the enclosure and ventilation of the production line and hall (US $45,000), and will install MC detectors (US $8,000) for the flexible foam machine. Other costs include trials (US $15,000) and technology transfer (US $10,000). The incremental operating benefits of MC use (US $10,360) are subtracted from the requested grant.

(c) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam at Tinuola Bay Industries Nig. Ltd.

5. Tinuola Bay Industries Nig. Ltd. uses of 21.0 tonnes of CFC-11 in the manufacture of flexible polyurethane foam. The production is to be converted to Methylene Chloride (MC) technology. The company will install a storage and metering system for MC (US $29,000) and for a softening additive (US $10,000); will upgrade the enclosure and ventilation system of the Box Foam machine and hall in the plant (US $45,000); and will install MC detectors and safety devices (US $8,000) for the flexible box foam machine. Other costs include trials (US $15,000) and technology transfer (US $10,000). The incremental operating benefits of MC use (US $7,280) are subtracted from the requested grant.

(d) Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam at United Foam Products Nig. Ltd.

6. United Foam Products (Nig.) Ltd. uses 25.0 tonnes of CFC-11 in the manufacture of flexible polyurethane foam. The production is to be converted to Methylene Chloride (MC) technology. The company will install a MC storage and metering system on the production line (US $31,000), a storage and metering system for a softening additive (US $10,000), will upgrade the enclosure and ventilation of the production line and hall (US $70,000), and will install MC Detectors and Safety devices (US $8,000) for the flexible foam machine. Other costs include trials (US $15,000) and technology transfer (US $10,000). The incremental operating benefits of MC use (US $ 11,050) are subtracted from the requested grant.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

Flexible Slabstock

1. The Fund Secretariat and UNDP discussed the projects and agreed that where the companies currently do not have CFC tank but meter from drums, 50% of the cost of installing a methylene chloride tank should be borne by the companies, in view of the upgrade in production efficiency. The affected companies are Diamond Foam and United Foam. Replacement of CFC storage tank at Tinuola Bay was costed at 90% (US $14,400) of the cost of the tanks to be installed at the other two companies due to its smaller size.

2. The project costs were agreed as:

Diamond Foam	US $112,150
Tinuola Bay	US $119,410
United Foam	US $137,310

Integral Skin

3. As the original project document of Automotive Component Industries was not consistent with the format of flexible molded foam projects (integral skin sub-sector) UNDP was requested to revise it. The revision resulted in the change in incremental operating savings from US $85,300 to US $126,200. The incremental capital cost remained the same i.e. US $372,900 (including 10% contingency).

4. Comparison made with water-blown technology showed that the LCD technology was more cost-effective.

5. The total project cost amounted to US $246,700. Therefore, the eligible grant based on the 83% national ownership amounted to US $204,761.

RECOMMENDATIONS

1. The Fund Secretariat recommends blanket approval of the four projects – Automotive Component Industries, Diamond Foam, Tinuola Bay and United Foam – with the funding levels and associated support costs indicated below.

	Project Title	Project Cost (US$)	Support Cost (US$)	Implementing Agency
(a)	Phaseout of CFC-11 by conversion to liquid carbon dioxide blown technology in the manufacture of molded flexible polyurethane foam at Automotive Component Industries Ltd.	204,761	26,619	UNDP
(b)	Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at Diamond Foam Nigeria Ltd.	112,150	14,580	UNDP
(c)	Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at Tinuola Bay Industries Nig. Ltd.	119,410	15,523	UNDP
(d)	Phaseout of CFC-11 by conversion to methylene chloride in the manufacture of flexible polyurethane foam (slabstock) at United Foam Products Nig. Ltd.	137,310	17,850	UNDP

PROJECT EVALUATION SHEET
NIGERIA

SECTOR: Refrigeration ODS use in sector (1998): 994.8 ODP tonnes

Sub-sector cost-effectiveness thresholds: Domestic US $13.76/kg

Project Titles:

(a) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Onward Electrical Industry Ltd.
(b) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Soesons Ltd.
(c) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at United Technologies Ltd.

Project Data	**Domestic**	**Domestic**	**Domestic**
	Onward	**Soesons**	**United**
Enterprise consumption (ODP tonnes)	11.30	17.10	10.10
Project impact (ODP tonnes)	10.70	16.10	9.60
Project duration (months)	18	18	18
Initial amount requested (US $)	146,927	221,353	130,579
Final project cost (US $):			
Incremental capital cost (a)	133,570	201,230	118,708
Contingency cost (b)	13,357	20,123	11,871
Incremental operating cost (c)			0
Total project cost (a+b+c)	146,927	221,353	130,579
Local ownership (%)	100%	100%	100%
Export component (%)	0%	0%	0%
Amount requested (US $)	146,927	221,353	130,579
Cost effectiveness (US $/kg.)	13.74	13.75	13.60
Counterpart funding confirmed?	Yes	Yes	Yes
National coordinating agency	Federal Environmental Protection Agency		
Implementing agency	UNIDO	UNIDO	UNIDO

Secretariat's Recommendations			
Amount recommended (US $)	146,927	221,353	130,579
Project impact (ODP tonnes)	10.70	16.10	9.60
Cost effectiveness (US $/kg)	13.74	13.75	13.60
Implementing agency support cost (US $)	19,101	28,776	16,975
Total cost to Multilateral Fund (US $)	166,028	250,129	147,554

PROJECT DESCRIPTION

(a) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Onward Electrical Industry Ltd.

(b) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Soesons Ltd.

(c) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at United Technologies Ltd.

Sector Background

– Latest available total ODS consumption (1998)	6,142 ODP tonnes
– Baseline consumption* of Annex A Group I substances (CFCs)	Not reported
– 1998 consumption of Annex A Group I substances	
– Baseline consumption of CFCs in refrigeration sector	Not reported
– 1998 consumption of CFCs in refrigeration sector	994 ODP tonnes
– Funds approved for investment projects in refrigeration sector **as of March 1999**	US $3,740,341
– Quantity of CFC to be phased out in refrigeration sector **as of March 1999**	
– Quantity of CFC phased out in refrigeration sector **as of March 1999**	213.5 ODP tonnes

*Baseline consumption of Annex A controlled substances refers to average of the consumption for the years 1995-1997 inclusive.

1. Data on total ODS consumption is available, however with significant gaps 1995 (1,918.6 ODP tonnes), 1996 (5,247 ODP tonnes), and 1997 (5,871 ODP tonnes). ODS consumption of substances under Annex A Group I was 4,764 ODP tonnes in 1998.

2. In 1994, the number of domestic refrigerators and freezers produced in Nigeria was about 88,000. In 1996, about 119,859 domestic refrigerators and freezers (an increase of 35.6% from 1994 level) were produced in Nigeria. A total of 2.2 million refrigerators and freezers were estimated to be in use by the end of 1996, and 15% of which were needed to be recharged consuming about 176 ODP tonnes of CFC-12 annually.

3. The approval of the three proposed projects will help Nigeria to phase out a total of 36.4 ODP tonnes and will assist the country to meet the country's obligations under the Montreal Protocol.

(a) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Onward Electrical Industry Ltd.

4. This project will phase out 10.7 ODP tonnes CFC consumption in the production of domestic refrigeration equipment at Onward Electrical Industries Ltd.. It will be achieved by converting foam operations to HCFC-141b as the blowing agent and refrigeration operations to HFC-134a as the refrigerant. The company operates one low-pressure foam dispenser, two charging units, one vacuum pump, and one leak detector. All of the above will be replaced. The project will include incremental capital costs covering one high pressure foaming machine (US $85,000), one automatic charging unit (25,000), two manual charging units (US $2,000), one vacuum pump system (US $2,500), one leak detector (US $6,000), and redesign/testing/trials/consultancy (US $14,070). No incremental operating cost is claimed.

(b) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Soesons Ltd.

5. This project will phase out 16.1 ODP tonnes CFC consumption in the production of domestic refrigerators and freezers at Soesons Ltd. It will be achieved by converting foam operations to HCFC-141b as the blowing agent and refrigeration operations to HFC-134a as the refrigerant. The company operates one low-pressure foaming machine, five charging units, five vacuum pumps, and four leak detectors. All of the above will be replaced. The project will include incremental capital costs covering one high pressure foaming machine (US $85,000), two automatic charging units (US $50,000), three manual charging units (US $2,900), five vacuum pumps (US $12,500), four leak detectors (US $24,000), testing equipment/accessories (US $11,730), and consultancy (US $15,000). No incremental operating cost is claimed.

(c) Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at United Technologies Ltd.

6. This project will phase out 9.6 ODP tonnes CFC consumption in the production of domestic refrigeration equipment at United Technologies Ltd. It will be achieved by converting foam operations to HCFC-141b as the blowing agent and refrigeration operations to HFC-134a as the refrigerant. The company operates one low-pressure foaming machine, one automatic charging/evacuation unit, one leak detector. All of the above will be replaced. The project will include incremental capital costs covering one high pressure foaming machine (US $75,000), one automatic charging unit (US $25,000), retrofit of nine vacuum pumps (US $1,800), one leak detector (US $6,000), and consultancy (US $11,908). No incremental operating cost is claimed.

Justification for the Use of HCFC-141b

7. The three companies have selected HCFC-141b technology to replace CFC-11 in foam blowing operations, and justifications were provided for each individual company by the implementing agency. The Government's concurrence of the use of HCFC technology has been provided in accordance with Executive Committee Decision 27/13 and is attached to this evaluation.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat discussed with UNIDO inconsistencies in total ODS consumption data and in the refrigeration sector in particular. Additional information was provided which is reflected in the evaluation. The Secretariat has also discussed the cost of replacement of a low pressure machine in Soesons. Additional information has been furnished by UNIDO to justify the requested cost.

RECOMMENDATION

1. The Fund Secretariat recommends blanket approval of the three projects with funding level and associated support cost as indicated in the table below.

	Project Title	Project Cost (US$)	Support Cost (US$)	Implementing Agency
(a)	Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Onward Electrical Industry Ltd.	146,927	19,101	UNIDO
(b)	Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at Soesons Ltd.	221,353	28,776	UNIDO
(c)	Replacement of refrigerant CFC-12 with HFC-134a and foam blowing agent CFC-11 with HCFC-141b in the manufacture of domestic refrigeration at United Technologies Ltd.	130,579	16,975	UNIDO