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Executive Committee of
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Implementation of the Montreal Protocol
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PROJECT PROPOSALS: IRAN

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

Refrigeration

- Replacement of CFC-11 foam blowing agent with HCFC-141b in manufacture of commercial refrigeration equipment at Yazd Arg Metal, Yazd Sardin and Shervin Electric UNIDO
- Replacement of CFC-11 foam blowing agent with HCFC-141b and CFC-12 refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Sobouhi Refrigeration UNIDO

PROJECT EVALUATION SHEET **IRAN**

SECTOR: FOAM / REFRIGERATION ODS use in sector (1993): 1,639 ODP tonnes

Sub-sector cost-effectiveness thresholds: Commercial Refrigeration US \$15.21/kg
Rigid Foam US \$7.83/kg

Project Titles:

- (a) Replacement of CFC-11 Foam Blowing Agent with HCFC-141b and CFC-12 Refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Yazd Arg Metal, Yazd Sardin and Shervin Electric, in Yazd province of Iran
- (b) Replacement of CFC-11 Foam Blowing Agent with HCFC-141b and CFC-12 Refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Refrigeration, Isfahan, Iran

Project Data	Commercial/Rigid Foam	
	Yazd Arg Metal, Yazd Sardin and Shervin Electric	Sobouhi
ODS phase-out (ODP tonnes)	62.2	17.32
Proposed project duration (months)	24	24
Incremental capital cost (US \$)	289,280	88,715
- including contingency (%)	10	10
Incremental operational cost (US \$)	454,710	149,132
Total project cost (US \$)	743,990	237,847
Local ownership (%)	100	100
Export component (%)	0	0
Amount requested (US \$) {Original}	752,461	252,747
{Revised}	743,990	237,847
Cost effectiveness (US \$/kg)		
Commercial refrigeration	13.17	12.95
Rigid foam	0.4	1.40
National Coordinating Agency	Department of the Environment, Ozone Cell	
Implementing Agency	UNIDO	
Technical review completed?	Yes	

Secretariat's Recommendations:		
Amount recommended (US \$)	743,990	237,847
Project impact (ODP tonnes)	62.2	17.32
Cost effectiveness (US \$/kg)		
Commercial refrigeration	13.17	12.95
Rigid foam	0.4	1.4
Implementing Agency support cost (US \$)	96,750	30,920
Total cost to Multilateral Fund (US \$)	840,740	268,767

PROJECT DESCRIPTION

- (a) Replacement of CFC-11 Foam Blowing Agent with HCFC-141b and CFC-12 Refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Yazd Arg Metal, Yazd Sardin and Shervin Electric, in Yazd province of Iran**
- (b) Replacement of CFC-11 Foam Blowing Agent with HCFC-141b and CFC-12 Refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Sobouhi Refrigeration, Isfahan, Iran**

1. The total ODS consumption in the commercial refrigeration sector was 1,639 ODP tonnes in 1993. The Executive Committee approved four projects for the phaseout of 230 MT ODS annual consumption for four Iranian commercial refrigeration companies. The approval of the two proposals will assist Iran in meeting its obligations under the Montreal Protocol.

2. Both projects include the following justification for use of HCFC technology: "Cyclopentane is widely used in the production of domestic refrigeration units, but it is less widespread in commercial equipment. All US and many European manufacturers still use HCFC-141b. Cyclopentane's flammability would require rigorous training in an environment not familiar with dangerous substances, and its use would require new foaming machines. The companies were informed that no further assistance would be made by the MFMP for the phase out of the transitional HCFC 141b at a later date."

3. All companies involved have formally committed to scrapping equipment made redundant by the conversion to non-CFC technology.

- (a) Replacement of CFC-11 Foam Blowing Agent with HCFC-1141b and CFC-12 Refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Yazd Arg Metal, Yazd Sardin and Shervin Electric, in Yazd province of Iran**

4. The proposals seek to phaseout 62 ODP tonnes consumed by a group of three commercial refrigeration enterprises in refrigerant and foam operations. All three companies have similar production methods, and they produce in a batch or made-to-order basis. Their products include refrigerated display cabinets, cold rooms, panels, milk coolers, drinking water coolers, transportable cold stores, and freezers. Cold stores and larger equipment items are often assembled on site, requiring portable charging and leak-detection equipment. The three companies produced about 33,000 units in 1997. They will all convert foaming equipment to HCFC-141b and adopt HFC-134a as refrigerant.

5. The conversion of the refrigeration systems to HFC-134a use in the three companies requires new production charging stations, vacuum pump sets, six handheld leak detectors, a basic test facility and two production leak detectors. Each company has also budgeted for redesign of main models, manufacture of prototypes, laboratory and field test, training, and expertise in production conversion.

6. The existing low pressure foaming machines can be used with HCFC-141b blowing agent with little modifications. Currently, CFC-11 is purchased in pre-mixed form with polyol.

HCFC-141b can be purchased and used in the same way. The conversion of the foam system to HCFC-141b requires the addition of electric heaters to the existing jigs which can be achieved with little expense.

7. Incremental operating cost is requested for one year at US \$330,581, and includes the higher cost of foam blowing agent, refrigerant, drier and compressor costs.

(b) Replacement of CFC-11 Foam Blowing Agent with HCFC-141b and CFC-12 Refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Sobouhi Refrigeration, Isfahan, Iran

8. Sobouhi Refrigeration consumes 31.6 tonnes/year of ODS in the production of commercial chest freezers, sandwich panels, large display cases, cold chambers, and coolers. Total refrigeration/freezer unit production in 1997 was 1300 units. The company will convert foaming equipment to HCFC-141b and adopt HFC-134a as refrigerant.

9. The equipment requested to convert to HFC-134a technology includes one production charging station, one portable charging unit, two new vacuum pumps set, one hand-held leak detector, one production leak detector, and a basic test facility. Funds are also requested for redesign of main models, manufacture of prototypes, laboratory and field test, and expert services in production conversion, and training.

10. The existing low-pressure machines can be used with HCFC-141b blowing agent with little modifications. The conversion of the foam system to HCFC-141b requires the addition of electric heaters to the existing jigs.

11. Incremental operating cost is requested for one year at US \$ 120,692, and includes the incremental cost of foam blowing agent, refrigerant, drier and compressor costs.

SECRETARIAT'S COMMENTS AND RECOMMENDATIONS

COMMENTS

1. The Secretariat discussed with UNIDO capital and operating costs associate with the separate production of commercial refrigeration units and insulation panels.

2. All the companies are using foam density 40 kg/cub. m. Such a high density does not require further density increase in HCFC-141b foam. Therefore, additional 10% cost of foam chemicals associated with the increased density was not recognized as eligible for funding. The Secretariat proposed also to use price of chemicals prevailing in the region. Incremental operating costs were recalculated accordingly.

3. The Secretariat recommended the cost of replacement of baseline portable leak detectors and portable charging units based on the price of non-ODS equipment of equivalent specifications. Capital cost was adjusted accordingly.

4. In the revised version of projects, UNIDO requested incremental operating costs for 18 months for production of commercial refrigeration equipment and two years for production of foam panels respectively. The requested incremental operating costs are: US \$ 454,710 in the project for three companies and US \$ 149,132 in Sabouhi project. The total requests for grant are within the established thresholds.

RECOMMENDATION

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

Project Title	Project Cost US \$	Support Cost US \$	Implementing Agency
Replacement of CFC-11 Foam Blowing Agent with HCFC-1141b and CFC-12 Refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Yazd Arg Metal, Yazd Sardin and Shervin Electric, in Yazd province of Iran	743,990	96,750	UNIDO
Replacement of CFC-11 Foam Blowing Agent with HCFC-1141b and CFC-12 Refrigerant with HFC-134a in manufacture of commercial refrigeration equipment at Refrigeration, Isfahan, Iran	237,847	30,920	UNIDO