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EXECUTIVE COMMITTEE OF
THE MULTILATERAL FUND FOR THE
IMPLEMENTATION OF THE MONTREAL PROTOCOL
Fifty-ninth Meeting
Port Ghalib, Egypt, 10-14 November 2009

PROJECT PROPOSALS: CROATIA

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

Foam

- Phase-out of HCFC-141b from the manufacturing of polyurethane rigid foam at PAVUSIN company UNIDO
- Phase-out of HCFC-141b from the manufacturing of polyurethane rigid and integral skin foams at POLI-MIX company UNIDO

**PROJECT EVALUATION SHEET – NON-MULTI-YEAR PROJECT
CROATIA**

PROJECT TITLE(S) BILATERAL/IMPLEMENTING AGENCY

(a) Phase-out of HCFC-141b from the manufacturing of PU rigid foam at PAVUSIN	UNIDO
(b) Phase-out of HCFC-141b from the manufacturing of PU rigid and integral skin foams at POLI-MIX companies	UNIDO

NATIONAL CO-ORDINATING AGENCY	Ministry of Environment Protection, Physical Planning and Construction
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LATEST REPORTED CONSUMPTION DATA FOR ODS ADDRESSED IN PROJECT

A: ARTICLE-7 DATA (ODP TONNES, 2008, AS OF OCTOBER 2009)

HCFCs	7.5		

B: COUNTRY PROGRAMME SECTORAL DATA (ODP TONNES, 2008, AS OF OCTOBER 2009)

ODS				
HCFC-141b	3.71			
HCFC-22	3.80			

CFC consumption remaining eligible for funding (ODP tonnes)	0.0
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CURRENT YEAR BUSINESS PLAN ALLOCATIONS		Funding US \$	Phase-out ODP tonnes
	(a)	Based on decision 55/43 (b)	n/a

PROJECT TITLE:	Pavusin	Poli-Mix
ODS use at enterprise (ODP tonnes):	1.95	1.76
ODS to be phased out (ODP tonnes):	1.95	1.76
ODS to be phased in (ODP tonnes):	0	0
Project duration (months):	24	24
Initial amount requested (US \$):	349,800	287,941
Final project costs (US \$):		
Incremental Capital Cost:	263,000	102,000
Contingency (10 %):	26,300	10,200
Incremental Operating Cost:	(36,300)	46,421
Total Project Cost:	253,000	158,621
Local ownership (%):	100	100
Export component (%):	40% ¹	0
Requested grant (US \$):	253,000	158,621
Cost-effectiveness (US \$/kg):	129.74 (14.27 metric)	90.13 (9.91 metric)
Implementing agency support cost (US \$):	18,975	11,897
Total cost of project to Multilateral Fund (US \$):	271,975	170,518
Status of counterpart funding (Y/N):	n/a	n/a
Project monitoring milestones included (Y/N):	Yes	Yes
SECRETARIAT'S RECOMMENDATION	For individual consideration	

¹ Export to Article 5 countries only

PROJECT DESCRIPTION

1. On behalf of the Government of Croatia, UNIDO has submitted to the 59th Meeting of the Executive Committee two project proposals to phase out 3.71 ODP tonnes (33.73 tonnes) of HCFC-141b used by two foam manufacturing companies in Croatia, Pavusin and Poli-Mix. The total cost of the project as submitted is US \$637,741 plus agency support costs of US \$47,831 for UNIDO.

Pavusin Company

2. The project is expected to phase out 1.95 ODP tonnes (17.7 metric tonnes) of HCFC-141b used in the manufacturing of rigid polyurethane foam at Pavusin, a company founded in 1998. The company manufactures steel-faced polyurethane foam sandwich panels used for roofs, walls and fascias in the building construction industry. The panels are produced by the use of a multiple press and high pressure dispenser equipped with a lance, which is used to pour the foam between the steel plates.

3. Pavusin will convert its manufacturing operations to the use of n-pentane as blowing agent, which will require the retrofit of its current high pressure dispenser, installation of related facilities and institution of required measures to ensure safe use of n-pentane. The total incremental capital cost of the project is US \$386,100 (including 10 per cent contingency). Implementation of the project will result in operating savings of US \$36,300 over a two-year period.

Poli-Mix Company

4. This project aims to phase out 1.76 ODP tonnes (16.0 tonnes) of HCFC-141b used in the manufacturing of rigid and integral skin polyurethane foams. The company, founded in 1998, produces rigid polyurethane foam blocks for the building construction and shipyard industries as well as flexible moulded and integral skin foams for furniture, sport equipment and rail coaches.

5. Poli-Mix will convert its manufacturing operations to HFC365/227 technology (blend of HFC-365mfc and HFC-227ea). The company operates three 25-year or older low pressure dispensers which were initially purchased second hand. It will replace one of the existing dispensers with a new low pressure dispenser and continue to use the two others until the end of their useful life. The total incremental capital cost of the project is US \$210,100 (including 10 per cent contingency), of which US \$57,000 was requested as technical assistance for the systems house operations by the company. Operating costs have been estimated at US \$77,841 over a two-year period.

SECRETARIAT'S COMMENTS AND RECOMMENDATION

COMMENTS

6. The Secretariat reviewed the projects in the context of the policy paper on the revised analysis of relevant cost considerations surrounding the financing of HCFC phase-out submitted to the 55th Meeting (UNEP/OzLPro/ExCom/55/47), relevant decisions adopted on HCFC phase-out, as well as relevant guidelines and policies relating to approval of foam projects under the Multilateral Fund.

Levels of HCFC phase-out

7. The completion of the projects will meet the HCFC phase-out requirements of Croatia beyond the first stage of its HCFC phase-out management plan (HPMP), and very likely up to the 2025 HCFC reduction requirement. In this regard UNIDO indicated that the Government of Croatia has already adopted a much stricter phase-out schedule for the HCFCs than it is stipulated under the Montreal Protocol. According to Croatian law, HCFCs have to be entirely phased-out in the country by 1 January

2016. Accession to the European Union before the above mentioned date may require additional measures to phase out HCFCs even earlier. In light of the above, Croatia needed very urgent actions and support to comply with its regulations. UNIDO also pointed out that the HPMP for Croatia addressing the complete phase-out of HCFCs is planned to be submitted to the 60th Meeting of the Executive Committee.

Selection of alternative technologies

8. In the case of Poli-Mix, the company has selected HFC365/227 as a foam blowing agent. The Secretariat pointed out that HFCs are among the gases controlled under the Kyoto Protocol, and that the Parties to the Montreal Protocol are considering proposals to include these gases under their Protocol. UNIDO indicated that although the main objective of the projects is to introduce low GWP technologies, with regard to Poli-Mix the very limited space in which the company operates, the high incremental capital cost and block foaming of large amounts of foam material and association levels of blowing agent required made the risks associated with foam production using hydrocarbon blowing agent highly unacceptable. Furthermore, other blowing agents like methyl formate, would not currently meet the essential physical properties required in polyurethane foam construction materials. Accordingly, Poli-Mix selected HFCs as the optimum technological option available under current circumstances.

Cost related issues

9. Pavusine plant company, which currently operates a discontinuous foaming process requested US \$95,000 for the enclosure of the production line, including ventilation, and a nitrogen supply system. This request as well as issues relating to the capacity of pentane storage tank and its cost and the cost of the safety system estimated to be US \$123,000 were discussed with UNIDO and resolved. The cost of the enclosure and of the storage tank and safety system were agreed as US \$40,000 and US \$90,000 respectively.

10. Several issues concerning the conversion at Poli-Mix plant were also discussed:

- (a) It was noted that the request for the installation of a new foam dispensing equipment (US \$70,000) did not take into account the old age of the baseline foaming equipment. Furthermore, disposal of the baseline equipment, once the project has been completed, was also not included. On this issue, it was agreed to include a new foaming machine at US \$50,000, the destruction of one of the current foaming machine, and the retrofit of the two other machines at no cost to the Fund, on the understanding that the Government of Croatia will guarantee that HCFCs will not be used at Poli-Mix once the plant has been fully converted;
- (b) The request for US \$30,000 for a premixing unit was considered as ineligible, since this equipment is not in the baseline;
- (c) Regarding the eligibility of the request of US \$57,000 for technical assistance for systems house, it was noted that, beside the mention of existence of a systems house operation in the company, there was no description of, *inter alia*, the operation, baseline conditions, and downstream enterprises served. Considering the various foam applications by the company, it was agreed to remove this funding request from the project and only to provide an additional US \$18,000 for technology transfer, training and trails;
- (d) Incremental operating costs were calculated using the ratio of HCFC:HFC of 1.00:1.20. It was noted that this issue was thoroughly considered by the Secretariat when developing the HCFC cost paper, using ratios of 1:0.75 to 1:0.50 that currently apply in non-A5 countries to reduce the higher cost of the blowing agent, without a penalty to the quality of the foam. In addition, this ratio would also reduce the impact on the climate due to the

use of a high GWP substance. After consultations with the plant, UNIDO reported that a ratio of 1.00:0.65 could be used. Accordingly, the incremental operating cost was adjusted to US \$46,421, over a 2-year period.

11. The total cost of the projects for the two enterprises as agreed is US \$411,621 (US \$401,500 incremental capital cost and US \$10,121 operating cost). The cost-effectiveness of the projects is US \$12.21/kg. A copy of the tables with agreed costs are attached as Annex I to this document.

Impact on the environment

12. The Secretariat attempted to make a preliminary calculation of the impact on the climate of HCFC consumption through the two foam projects in Croatia, based only on the GWP values of the blowing agents and their level of consumption before and after conversion. According to this methodology, once the project is completed, a total of 33.73 metric tonnes of HCFC-141b will be phased-out, 10.40 tonnes of HFC365/227 will be phased-in, and 13,758 tonnes of CO₂ that would have been emitted into the atmosphere would be avoided.

Substance	GWP	Tonnes/year	CO ₂ -eq (tonnes/year)
Before conversion			
HCFC-141b (Pavusin)	713	17.73	12,641
HCFC-141b (Poli-Mix)	713	16.00	11,408
Total	713	33.73	24,049
After conversion			
HC (Pavusin)	25	10.62*	266
HFC365/227 (Poli-Mix)	964	10.40**	10,026
Total			10,291
Net impact			-13,759
Pavusin			(12,376)
Poli-Mix			(1,382)
Grand total			(13,758)

(*) Based on a HCFC-141b:HC ratio of 1.00:0.60.

(**) Based on a HCFC-141b:HFC365/227 ratio of 1.00:0.65.

RECOMMENDATIONS

13. Recalling its decision 55/43(b) by which the Executive Committee invited bilateral and implementing agencies to prepare and submit project proposals to the Secretariat for those HCFC uses addressed in paragraphs (c), (d), (e) and (f) of the decision so that it could choose those projects that best demonstrated alternative technologies and facilitated the collection of accurate data on incremental capital cost and incremental operating costs or savings, as well as other data relevant to the application of the technologies, the Executive Committee may wish:

- (a) To consider approving the following HCFC foam projects at the funding levels indicated below, with the conditions stated in sub-paragraphs (b) and (c) below;

Project	Amount recommended (US \$)	Agency support cost (US \$)
Phase-out of HCFC-141b from the manufacturing of polyurethane rigid foam at Pavusin	253,000	18,975
Phase-out of HCFC-141b from the manufacturing of polyurethane rigid and integral skin foams at Poli-Mix	158,621	11,897

- (b) To request UNIDO and the Government of Croatia to deduct 3.71 ODP tonnes (33.73 metric tonnes) of HCFCs from the starting point for sustained aggregate reductions in eligible consumption to be established by Croatia's HCFC phase-out management plan (HPMP), and
- (c) To request UNIDO to provide to the Secretariat, at the end of each year of the projects' implementation period, progress reports that address the issues pertaining to the collection of accurate data in line with the objectives of decision 55/43(b), and to include these reports in the implementation reports of the HPMP, once it is approved.

Annex I
Agreed level of funding for the HCFC conversion of Pavusin and Poli-Mix plants in Croatia

Table 1. Pavusin project cost

Description	US \$
Retrofitting Hennecke Type: 650 H; high pressure foaming machine for use with n-pentane	40,000
n-Pentane supply system with 25m ³ buried storage tank and piping	50,000
Premixing unit	30,000
Retrofitting of machine tank of premixed polyol	8,000
Nitrogen supply system	20,000
Enclosure of foaming line, ventilation and exhaust system and antistatic floor	20,000
Gas sensors, alarm, monitoring system and fire protection for the plant	40,000
Safety certification	15,000
Technology transfer/training	25,000
Trials and commissioning	15,000
Sub-total incremental capital cost	263,000
Contingency (10 per cent)	26,300
Total incremental capital cost	289,300
Incremental operating savings	(36,300)
Total project cost	253,000

Table 2. Poli-Mix project cost

Description	UUS \$
HFC 365/227 supply system from drums	5,000
Foam dispensing equipment	50,000
Alarm system for HFC 365/227	7,000
Technology transfer and training	20,000
Trials and commissioning	20,000
Sub-Total incremental capital cost	102,000
Contingency (10 per cent)	10,200
Total incremental capital cost	112,200
Incremental operating cost	46,421
Total project cost	158,621

Table 3. Prices of blowing agents

Blowing agent	US \$/kg
HCFC-141b	2.88
n-Pentane	1.15
HFC-365mfc/227ea	8.35