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执行蒙特利尔议定书
多边基金执行委员会
第三十一次会议
2000 年 7 月 5 日至 7 日，日内瓦

项目提案：巴西

本文件是基金秘书处对下述项目提案的评论和建议:

泡沫塑料

● Fabbrini 在连皮泡沫塑料和模制软泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术	开发计划署
● Mach-Plast 在连皮泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术	开发计划署
● Massimo 在模制软泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术	开发计划署
● Menaf 在连皮硬泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术	开发计划署
● PPU 在连皮泡沫塑料和模制软泡沫塑料生产中淘汰 CFC-11, 转用水发泡和 HCFC-141b 技术	开发计划署
● Prosola 在连皮泡沫塑料(鞋垫)生产中淘汰 CFC-11, 转用水发泡技术	开发计划署
● Sector Co. 在连皮聚氨酯泡沫塑料和模制聚氨酯软泡沫塑料生产中淘汰 CFC-11, 转用水发泡和 HCFC-141b 技术	工发组织
● Injepol 在连皮泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术	开发计划署
● Jetpol 在连皮泡沫塑料、模制软泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11, 转用水发泡和 HCFC-141b 技术	开发计划署
● Montreal 淘汰 CFC-11, 在连皮泡沫塑料和硬泡沫塑料生产中转用水发泡技术	开发计划署

● Multispuma 在聚氨酯软方块泡沫塑料生产中淘汰 CFC-11，转用二氯甲烷/低指数/添加剂技术，在模制软泡沫塑料生产中淘汰 CFC-11，转用水发泡技术，在连皮软泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 技术	开发计划署
● 以 Plastquim 为配方供应中心的 50 家企业和 10 家批发公司在聚氨酯硬泡沫塑料和模制/连皮软泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 和以水为基础的技术	开发计划署
● Trantor 在模制软泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11，转用水发泡技术	开发计划署
● Packo Plurinox 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 技术	开发计划署
● Politermo 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 技术	开发计划署
● Polyfoam 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 和以水为基础的技术	开发计划署
● Refripor 在聚氨酯软泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 技术	开发计划署

制冷

● Schmit 在冷藏室和夹层板以及硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b，淘汰 CFC-12，转用 HFC-134a，淘汰 R-502，转用 R-404 a	开发计划署
● Domnick Hunter Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	工发组织
● Ingecold Ltda. 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	工发组织
● Kalten Ltda 淘汰 CFC-12 和 R-502，转用 HFC-134a 和 HFC-404A，淘汰 CFC-11，转用 HCFC-141b	工发组织
● Klima Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	工发组织
● Metalplan Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	工发组织
● Tecnigel Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	工发组织
● 执行汽车空调 CFC-12 制冷剂回收和再循环国家方案	开发计划署

项目评价表
巴西

行业：	泡沫塑料	本行业使用的 ODS(1999 年)：	1,919.7 ODP 吨
次行业成本效益阈值：		连皮泡沫塑料	16.86 美元/公斤

项目名称：

(a) Fabbrini 在连皮泡沫塑料和模制软泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术
(b) Mach-Plast 在连皮泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术
(c) Massimo 在模制软泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术
(d) Menaf 在连皮硬泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术

项目数据	连皮泡沫塑料			
	Fabbrini	Mach-Plast	Massimo	Menaf
企业消费量(ODP 吨)	29.00	29.50	8.00	10.70
项目作用(ODP 吨)	29.00	29.50	8.00	10.70
项目期限(月)	36	36	36	36
原始申请数额(美元)	124,887	188,951	52,279	80,994
项目最后费用(美元)				
增支资本费用 (a)	50,000	80,000	30,000	50,000
酌处经费 (b)	5,000	8,000	3,000	5,000
增支经营费用(c)	69,887	100,951	19,279	25,994
项目总费用(a+b+c)	124,887	188,951	52,279	80,994
地方所有权(%)	100%	100%	100%	100%
出口部分(%)	0%	0%	0%	0%
申请数额(美元)	124,887	188,951	52,279	80,994
成本效益值(美元/公斤)	4.31	6.40	6.53	7.57
是否已确认对应资金?	无资料	已确认	无资料	无资料
国家协调机构	PROZON			
执行机构	开发计划署			

秘书处的建议：				
建议供资额(美元)	124,887	188,951	52,279	80,994
项目作用(ODP 吨)	29.00	29.50	8.00	10.70
成本效益值(美元/公斤)	4.31	6.40	6.53	7.57
执行机构支助费(美元)	16,235	24,564	6,796	10,529
多边基金的费用总额(美元)	141,122	213,515	59,075	91,523

项目评价表
巴西

行业：	泡沫塑料	本行业使用的 ODS（ 1999 年 ）：	1,919.7 ODP 吨
次行业成本效益阈值：		连皮泡沫塑料	16.86 美元/公斤

项目名称：

(e) PPU 在连皮泡沫塑料和模制软泡沫塑料生产中淘汰 CFC-11，转用水发泡和 HCFC-141b 技术
(f) Prosola 在连皮泡沫塑料（ 鞋垫 ）生产中淘汰 CFC-11，转用水发泡技术
(g) Sector Co. 在连皮聚氨酯泡沫塑料和模制聚氨酯软泡沫塑料生产中淘汰 CFC-11，转用水发泡和 HCFC-141b 技术

项目数据	连皮泡沫塑料		
	PPU	Prosola	Sector Co.
企业消费量(ODP 吨)	10.00	18.10	18.25
项目作用(ODP 吨)	9.40	18.10	17.74
项目期限（ 月 ）	36	36	30
原始申请数额(美元)	64,568	214,118	179,088
项目最后费用(美元)			
增支资本费用 (a)	45,000	155,000	99,000
酌处经费 (b)	4,500	15,500	9,900
增支经营费用(c)	15,068	43,618	21,590
项目总费用(a+b+c)	64,568	214,118	130,490
地方所有权(%)	100%	100%	100%
出口部分（ % ）	0%	0%	0%
申请数额（ 美元 ）	64,568	214,118	130,490
成本效益值（ 美元/公斤 ）	6.87	11.83	7.50
是否已确认对应资金?	无资料	已确认	已确认
国家协调机构	PROZON		环境部
执行机构	开发计划署		工发组织

秘书处的建议：			
建议供资额（ 美元 ）	64,568	214,118	130,490
项目作用（ ODP 吨 ）	9.40	18.10	17.74
成本效益值（ 美元/公斤 ）	6.87	11.83	7.50
执行机构支助费（ 美元 ）	8,394	27,835	16,964
多边基金的费用总额（ 美元 ）	72,962	241,953	147,454

项目评价表
巴西

行业： 泡沫塑料 本行业使用的 ODS（ 1999 年 ）： 1,919.7 ODP 吨
次行业成本效益阈值： 多个次级行业 各异* 美元/公斤

项目名称：

(h) Injepol 在连皮泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术
(i) Jetpol 在连皮泡沫塑料、模制软泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11, 转用水发泡和 HCFC-141b 技术
(j) Montreal 淘汰 CFC-11, 在连皮泡沫塑料和硬泡沫塑料生产中转用水发泡技术
(k) Multispuma 在聚氨酯软方块泡沫塑料生产中淘汰 CFC-11, 转用二氯甲烷/低指数/添加剂技术, 在模制软泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术, 在连皮软泡沫塑料生产中淘汰 CFC-11, 转用 HCFC-141b 技术
(l) 以 Plastquim 为配方供应中心的 50 家企业和 10 家批发公司在聚氨酯硬泡沫塑料和模制/连皮软泡沫塑料生产中淘汰 CFC-11, 转用 HCFC-141b 和以水为基础的技术
(m) Trantor 在模制软泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11, 转用水发泡技术

项目数据	多个次级行业					
	Injepol	Jetpol	Montreal	Multispuma	Plastquim	Trantor
企业消费量(ODP 吨)	23.00	29.60	11.80	24.20	165.40	19.60
项目作用(ODP 吨)	23.00	29.00	11.80	24.05	153.40	19.60
项目期限（ 月 ）	36	36	36	36	36	36
原始申请数额(美元)	107,678	234,400	93,117	123,929	1,354,835	102,234
项目最后费用(美元)						
增支资本费用 (a)	47,500	139,000	120,000	60,000	721,500	50,000
酌处经费 (b)	4,750	13,900	12,000	6,000	69,650	5,000
增支经营费用(c)	55,428	61,700	28,437	57,929	440,946	47,234
项目总费用(a+b+c)	107,678	214,600	160,437	123,929	1,232,096	102,234
地方所有权(%)	100%	100%	100%	100%	100%	100%
出口部分（ % ）	0%	0%	0%	0%	0%	0%
申请数额（ 美元 ）	107,678	214,600	83,117	123,929	931,599	102,234
成本效益值（ 美元/公斤 ）	4.68	7.40	7.04	5.15	6.08	5.22
是否已确认对应资金?	已确认	已确认	已确认	无资料	已确认	无资料
国家协调机构	PROZON					
执行机构	开发计划署					

秘书处的建议：						
建议供资额（ 美元 ）	107,678	214,600	83,117	123,929	931,599	102,234
项目作用（ ODP 吨 ）	23.00	29.00	11.80	24.05	153.40	19.60
成本效益值（ 美元/公斤 ）	4.68	7.40	7.04	5.15	6.08	5.22
执行机构支助费（ 美元 ）	13,998	27,898	10,805	16,111	112,476	13,290
多边基金的费用总额（ 美元 ）	121,676	242,498	93,922	140,040	1,044,075	115,524

*这些数字是综合成本效益阈值。各企业连皮泡沫塑料和聚氨酯硬泡沫塑料的成本效益阈值（ 美元/公斤 ）分别是：1)Injepol: 4.67; 4.70; 2)Jetpol: 9.79; 5.32; 3)Montreal: 6.64; 7.83; 4)Multispuma: 4.13; 5.63; 5)Plastquim: 3.18; 6.98。（ 向 Plastquim Systems House 提供的 27,500 美元没有计算在成本效益阈值中。 ）6) Trantor: 10.87; 4.35。

项目评价表

巴西

行业： 泡沫塑料 本行业使用的 ODS(1999 年)： 1,919.7 ODP 吨
次行业成本效益阈值： 硬泡沫塑料 7.83 美元/公斤

项目名称：

(n) Packo Plurinox 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11, 转用 HCFC-141b 技术
(o) Politermo 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11, 转用 HCFC-141b 技术
(p) Polyfoam 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11, 转用 HCFC-141b 和以水为基础的技术
(q) Refripor 在聚氨酯软泡沫塑料生产中淘汰 CFC-11, 转用 HCFC-141b 技术

项目数据	硬泡沫塑料			
	Packo Plurinox	**Politermo**	**Polyfoam**	**Refripor**
企业消费量(ODP 吨)	14.80	56.40	64.50	12.00
项目作用(ODP 吨)	13.40	50.20	41.90	10.90
项目期限(月)	36	36	36	36
原始申请数额(美元)	39,750	393,066	285,958	85,350
项目最后费用(美元)				
增支资本费用 (a)	60,000	110,000	195,150	70,000
酌处经费 (b)	6,000	11,000	19,515	7,000
增支经营费用(c)	13,500	98,136	-35,792	10,858
项目总费用(a+b+c)	79,500	219,136	178,873	87,858
地方所有权(%)	50%	100%	100%	100%
出口部分(%)	0%	0%	0%	0%
申请数额(美元)	39,750	219,136	178,873	85,350
成本效益值(美元/公斤)	2.97	4.37	4.27	7.83
是否已确认对应资金?	已确认	已确认		已确认
国家协调机构	PROZON			
执行机构	开发计划署			

秘书处的建议：				
建议供资额(美元)	39,750	219,136	178,873	85,350
项目作用(ODP 吨)	13.40	50.20	41.90	10.90
成本效益值(美元/公斤)	2.97	4.37	4.27	7.83
执行机构支助费(美元)	5,168	28,488	23,253	11,096
多边基金的费用总额(美元)	44,918	247,624	202,126	96,446

项目说明

行业背景

－ 最新 ODS 总消费量(1999 年)*	9,460.50	ODP 吨
－ 附件 A 一类物质(各种 CFC)基准消费量	11,050.90	ODP 吨
－ 1999 年附件 A 一类物质消费量	8,209	ODP 吨
－ 泡沫塑料行业各种 CFC 基准消费量	2,337.00	ODP 吨
－ 1999 年泡沫塑料行业各种 CFC 消费量	1,780.00	ODP 吨
－ 截至 1999 年年底已核准泡沫塑料行业投资项目资金	18,171,629.00	美元
－ 截至 1999 年年底泡沫塑料行业投资项目应淘汰的 CFC 数量	2,488.27	ODP 吨
－ 截至 1999 年年底泡沫塑料行业投资项目实际淘汰的 CFC 数量	946.80	ODP 吨
－ 1999 年核准泡沫塑料行业各投资项目应淘汰的 CFC 数量	895.70	ODP 吨
－ 1999 年核准泡沫塑料行业投资项目资金	5,951,817.00	美元

*资料来源：2000 年 5 月向基金秘书处报告的数据。

连皮泡沫塑料和模制软泡沫塑料

Fabbrini, Mach Plast, Massimo, Menaf, PPU 和 Sector

1. 这六家公司生产模制软泡沫塑料和/或连皮泡沫塑料，用于各种用途，包括办公室家具的模制软泡沫塑料垫(密度：53 公斤/立方米)，汽车座垫、扶手(密度：45 公斤/立方米)，连皮软泡沫塑料和硬泡沫塑料，例如，室外装饰板条、防磨板、婴儿恒温箱，等等。所有这些公司都使用低压注入机，它们的生产将转用完全以水为基础的配方，Multispuma, PPU 和 Sector 除外，这三家公司将以 HCFC-141b 技术替换连皮原料。各公司项目的费用不同，因基准情况而异。增支资本费用是以改造现有低压注入机为基础计算的，但有下述例外，提案提议在 Mach Plast 项目中以一台新低压注入机替换一台旧低压注入机， 在 Sector 项目中，以高压注入机替换两台低压注入机。增支资本费用包括改造或替换费用、技术转让、测试和训练。提案根据将淘汰的 CFC-11 数量，为每个项目申请了增支经营费用。

2. 下表 1 是六家公司的概况。

表 1: 连皮泡沫塑料/模制软泡沫塑料厂家概况

企业名称	淘汰 CFC 数量	基准注入机*	I.C.C.** 总额 (美元)	酌处经费 (美元)	I.O.C.*** (美元)
Fabbrini	29.00	L.P. Equifiber, L.P 15 公斤/分钟 Transtecnica 1974	50,000.00	5,000.00	69,887.00
Mach-Plast	29.50	L.P.15 公斤/分钟 Equifiber 1993, L.P. 30 公斤/分钟 Ransburg 1994	80,000.00	8,000.00	100,951.00
Massimo	8.00	L.P. 15 公斤/分钟 Transtecnica 1988	30,000.00	3,000.00	19,279.00
Menaf	10.70	L.P. Sintenor 1988	50,000.00	5,000.00	25,994.00
PPU	9.40	L.P. 7 公斤/分钟 Sulpol 1995	45,000.00	4,500.00	15,068.00
Sector	17.74	L.P. 15 公斤/分钟 Sintenor 1985. L.P. 30 公斤/分钟 Sintenor 1988	132,000.00	13,200.00	33,888.00

* L.P.: 低压

** I.C.C.: 增支资本费用

*** I.O.C.: 增支经营费用

Prosola

3. Prosola 创建于 1994 年, 是一家合资企业, 巴西拥有 30%股份, 乌拉圭拥有 70%股份。它生产主要以聚酯为基础(占配方 95%)的鞋垫, 其泡沫塑料配方是较高密度的水发泡配方, Prosola 在此基础上添加 CFC-11, 以增加模型厚度, 生产一种耐用和不透水的连皮, 为此目的, 它在配方中添加 1.8%的 CFC-11。其 CFC-11 平均消费量(1996-1998 年)为 18.1 吨。它使用三台低压注入机, 即: 1995 年安装的 BMG 注入机、1994 年购买的 1980 年型号 Transtecnica 注入机和一台 1997 年型号 Sulpol 注入机。

4. 据报告, Prosola 充分评估了聚醚和聚酯两种水发泡配方, 在此基础上, 它选择转用完全以水发泡的聚醚配方。测试表明, 需要安装自动清洗混合头, 以维持目前的生产水平。如果不安装自动清洗混合头, 则必须增加冲洗频率, 以处理催化剂比率增加的问题, 增加催化剂比率是为了避免使脱模时间增加 25%。

5. 将改造该公司的 BMG 注入机, 为其配备一个自动清洗混合头, 费用为 30,000 美元。将以一台自动清洗开放灌注式高压注入机替换 Transtecnica 低压注入机, 费用为 95,000 美元。该企业将负责酌情替换或改造 Sulpol 注入机。

6. 鉴于使用 CFC-11 的主要目的是制造厚实和耐用的连皮, 而不是降低密度, 预计转用后不会增加密度。其他费用包括测试(三台机器, 15,000 美元)、技术转让和训练(15,000 美元)以及根据使用完全水发泡泡沫塑料在价格上造成的差异和增加使用异氰酸盐的情形计算的增支经营费用(43,618 美元)。项目总费用为 214,118 美元。

多个次级行业

Injepol, Jetpol, Montreal 和 Trantor

7. 这四家公司(Injepol, Jetpol, Montreal and Trantor)生产聚氨酯模制软泡沫塑料(FMF)、连皮泡沫塑料(ISF)和硬泡沫塑料(FPF), 其用途如下表所示。除 Injepol 外, 所有这些公司都是 1995 年 7 月 25 日以前创建的, 据报告, Injepol 是 1997 年 3 月作为一个叫做 Corsico 的公司的子公司而建立的, 其目的是作为一个单独企业, 继续 Corsico 的泡沫塑料生产。Injepol 的工厂与 Corsico 设在一起, 其 100%的泡沫塑料产品被 Corsico 用于装配其产品。表 1 所显示的公司概况显示的是这些公司的 CFC 消费量、基准设备和其他有关资料。

8. 除 Jetpol 外, 所有这些公司都将在模制泡沫塑料和连皮泡沫塑料生产中转用水发泡技术, Jetpol 的连皮生产将转用 HCFC-141b。转换费用主要是改造费用, 但 Jetpol 除外, 在 Jetpol 项目中, 提案提议替换两台低压注入机(各 40,000 美元)。用于包装的硬泡沫塑料生产的转换费用也是改造现有低压注入机的费用。其他费用包括测试、技术转让和训练, 费用在 10,000 至 20,000 美元之间, 视生产线数量而定。提案申请下文表 2 所示增支经营费用。

9. 表 2 显示四家公司连皮和硬泡沫塑料生产的有关资料。

表 2: 多个次级行业各公司概况

		CFC 消费量 (ODP 吨)		产品			增支资本费用 (美元)		增支经营费用 (美元)		
企业	CFC 总消费量 ODP 吨	RMF /ISF	RPF	ISF/ FMF	RPF	生产设备	FMS/ ISF	RPF	FMS/ ISF	RPF	项目总费用
Injepol	23	无资料	无资料	用于电线外罩的连皮硬泡沫塑料 密度 =600 kg/m^3	用于包装 D=25 kg/m^3	(1) 30 kg 低压 Sulpol (199)	无资料	无资料	无资料	无资料	107,678
Jetpol	29.6	14.1	15.5	连皮软泡沫塑料, D=150-250 kg/m^3, D=400-600 kg/m^3, HR molded foam D=45-60kg /m^3	用于包装的泡沫塑料 D=15-20 kg/m^3	(2) 7.5 kg/min 低压 Equifiber (1988) (3) 15 kg/min Sintenor 1988 (2), 1986 (1)	140,800	49,500	13,992	21,468	234,300

		CFC 消费量 (ODP 吨)		产品			增支资本费用 (美元)		增支经营费用 (美元)		
企业	CFC 总消费量 ODP 吨	RMF /ISF	RPF	ISF/ FMF	RPF	生产设备	FMS/ ISF	RPF	FMS/ ISF	RPF	项目总费用
Montreal	11.8	7.8	4	燃料罐内的防磨板用连皮软泡沫塑料 D=200 kg/m^3	包装用半应泡沫塑料 D=18 kg/m^3	15 kg/min 低压 Transtechnica (1985) 60 kg/min 高压 Hennecke (1979)	33,000	99,000	18,797	9,640	160,437
Trantor	19.6	2.6	17		包装用半应泡沫塑料	7.5 kg/min 低压 Sulpol (1994) 15 kg/min 低压 Transtechnica (1991)	22,000	33,000	6,266	40,968	102,234

1. Injepol 所有产品都在一台机器上生产,它不能按每个次级行业划分 CFC 消费量, 因此, 使用了综合成本效益值。分析表明, 项目费用没有超过各自的成本效益阈值。
2. Jetpo 有两家工厂, 一家在里约热内卢(使用一台机器), 一家在圣保罗, 使用四台机器。

D: 密度

Multispuma

10. Multispuma 创建于 1985 年, 生产软方块泡沫塑料板、模制软泡沫塑料和连皮泡沫塑料。Multispuma 还使用 Plastquim 供应的化学配方生产水发泡模制软泡沫塑料。在过去 12 个月(1999 年 5 月至 2000 年 4 月)里，该公司使用了 24.2 ODP 吨 CFC-11。方块泡沫塑料生产使用 16 吨，模制软泡沫塑料和连皮泡沫塑料分别使用 6.6 吨和 1.6 吨。方块泡沫塑料生产将转用二氯甲烷/低指数/添加剂技术。模制软泡沫塑料生产将转用以水为基础的配方，而连皮泡沫塑料生产则将转用 HCFC-141b 技术，这是一项临时办法。项目包括以软化剂和计量器改造两台现有方块泡沫塑料注入机(30,000 美元)。由于基准注入机较新(1997 年和 1998 年), 仅为转换模制软泡沫塑料和连皮泡沫塑料生产申请了增支经营费用。其他费用包括测试(15,000 美元)、技术转让和训练(15,000 美元)。为方块泡沫塑料申请了四年增支经营费用(40,576 美元), 为模制软泡沫塑料和连皮泡沫塑料申请了两年增支经营费用(17,353 美元)。

Plastquim 集团项目

11. Plastquim 是一家配方供应商，该公司创建于 1990 年 3 月，它向泡沫塑料生产厂家供应化学剂和泡沫塑料配方。Plastquim 的许多大型客户已经参加淘汰 ODS 的项目。在该项目中，其 50 家常往来的小型客户将在它协助下转换生产。其中有 14 家企业是在 1995 年 7 月 25 日以后创建的。35 家企业生产硬泡沫塑料产品，15 家企业生产模制软泡沫塑料和/或连皮泡沫塑料产品。这些企业共消费 184 吨，其中硬泡沫塑料厂家消费 128 吨，模制软泡沫塑料和连皮泡沫塑料厂家消费 56 吨。隔温硬泡沫塑料和连皮软泡沫塑料生产将转用 HCFC-141b，这是临时步骤，可能采用的永久办法是以水为基础的配方或液态 HFC 配方。模制软泡沫塑料、非隔温硬泡沫塑料和连皮硬泡沫塑料的生产将转用以水为基础的配方。

12. 提案提议在硬泡沫塑料生产中以高压注入机替换现有的低压注入机(12 台注入机＝360,000 美元)，为目前不使用设备的企业共购买 17 台小型高压注入机，企业出资 25%(净额为 382,500 美元)。在连皮软泡沫塑料生产中，将改造两台低压注入机(20,000 美元)，以便能够使用 HCFC-141b，并为目前采用手工混合技术的一家连皮硬泡沫塑料客户购买一台新的注入机，企业出资 25%(净额为 26,250 美元)。将为模制软泡沫塑料(FMF)客户购买两台低压注入机(净额为 60,000 美元)。此外还提议为 Plastquim 购买两台样品注入机(各 30,000 美元)和一台 K-因素测试器(6,000 美元)。其他费用包括测试(110,000 美元)和技术转让(90,000 美元)以及增支经营费用(654,991 美元)。申请的赠款额是根据各范畴适用的阈值逐个企业计算的。下表提供了这 50 家企业的有关资料。

13. 除 50 家企业外，提案还建议向 10 家化学剂批发公司提供 169,400 美元，它们向年消费量在 0.1—1 吨之间的非常小型的厂家供应配方，将没有办法向这些厂家提供注入设备。

表 3：Plastquim 集团受惠企业概况

公司	创建日期	CFC 消费量	项目作用淘汰 ODP 量 (t/y)*	ICC** 美元	IOC*** 美元	项目总费用 美元	申请数额 美元	成本效益值 美元/公斤
第一类 – 硬泡沫塑料客户								
AUDEN	1994	4	3.6	69,960	12,320	82,280	28,188	7.83
BULCHOLZ	1992	2	1.8	36,960	6,160	43,120	14,094	7.83
FURGÕES CAMBÉ	1996	3	2.7	36,210	9,240	37,950	21,141	7.83
FURGÕES CASCAVEL	1981	4	3.6	35,960	12,320	38,280	28,188	7.83
M.V.C	1993	7	6.4	3,960	21,560	25,520	25,520	3.99
POLYPLASTIC	1996	2	1.8	3,960	6,160	10,120	10,120	5.62
REFRICOL	1982	6	5.4	36,210	18,480	47,190	42,282	7.83
REFRIGERACA	1960	4	3.6	3,960	12,320	16,280	16,280	4.52

公司	创建日期	CFC 消费量	项目作用淘汰 ODP 量 (t/y)*	ICC** 美元	IOC*** 美元	项目总费用 美元	申请数额 美元	成本效益值 美元/公斤
O FRIOLAR								
SATIERF	1972	4	3.6	36,210	12,320	41,030	28,188	7.83
THERMOTOTA	1982	4	3.6	3,960	12,320	16,280	16,280	4.52
NAVAL FIBRAS	1996	4	3.6	36,460	12,320	43,780	28,188	7.83
BERNAUER	1994	4	3.6	36,210	12,320	41,030	28,188	7.83
MEGA BRASIL	1996	2	1.8	36,210	6,160	34,870	14,094	7.83
FAPER	1970	2	2.0	36,210	4,820	33,530	15,660	7.83
ZERO GRAU	Sept. 1995	4	3.6	3,960	12,320	16,280	16,280	4.52
BISELLI	1960	3	2.7	36,660	8,316	41,976	21,141	7.83
SEIKAN	1974	4	3.6	36,210	12,320	41,030	28,188	7.83
ISOMIL	1989	5	4.5	36,210	15,400	44,110	35,235	7.83
FUNIBRÁS	1988	2	1.8	35,960	6,160	32,120	14,094	7.83
FURGÃO ALVORADA	1984	3	2.7	36,210	8,316	37,026	21,141	7.83
TRUKAN	1996	4	3.6	36,210	12,320	41,030	28,188	7.83
H.W.	1998	6	6.0	36,210	14,460	43,170	43,170	7.20
INDREL	1966	3	2.7	36,960	8,316	45,276	21,141	7.83
ISOFORMA	1992	4	3.6	3,960	12,320	16,280	16,280	4.52
CLIMA	1987	5	4.5	36,210	15,400	44,110	35,235	7.83
MAMPLAST	1985	4	3.6	36,210	12,320	41,030	28,188	7.83
ANCEL	1974	3	2.7	3,960	8,316	12,276	12,276	4.55
COSMOPLAST	1987	3	2.7	36,960	8,316	45,276	21,141	7.83
BLUMENGLAS	1985	3	2.7	36,960	8,316	45,276	21,141	7.83
LEANDRO	1993	5	5.0	36,210	12,050	40,760	39,150	7.83
POLIUMETKA		4	3.6	35,960	12,320	38,280	28,188	7.83
OESTE	1960	2	1.8	35,960	6,160	32,120	14,094	7.83
RACKS	Apr. 1995	2	1.8	36,210	6,160	34,870	14,094	7.83
TREVISAN	1987	5	1.8	36,210	6,160	34,870	14,094	7.83
A ATUAL	1991	2	4.5	36,210	15,400	44,110	35,235	7.83
小计		***128***	***116.6***	***1,078,050***	***379,986***	***1,282,536***	***824,105***	***7.07***

*t/y: 吨/年

**ICC: 增支资本费用

***IOC: 增支经营费用

公司	创建日期	CFC 消费量	项目作用淘汰 ODP 量 (t/y)*	ICC** 美元	IOC*** 美元	项目总费用 美元	申请数额 美元	成本效益值 美元/公斤
第二类 – 模制软泡沫塑料(FMF)/连皮泡沫塑料(ISF)客户								
DAUD	1936	5	5.0	3,960	12,050	16,010	16,010	3.20
MANCHESTER FIBRAS.	1992	3.8	3.8	3,960	9,158	13,118	13,118	3.45
V.M Tec	1992	8	8	3,960	19,280	23,240	23,240	2.90
ODISSÉIA	1993	4	3.6	3,960	3,420	7,380	7,380	2.05
BRUDDEN	1980	3.6	3.3	14,960	3,135	18,095	18,095	5.48
FIBERBRAS	1996	4.2	3.8	3,960	3,610	7,570	7,570	1.99
LUCARELI	1992	3	3.0	3,960	7,230	11,190	11,190	3.73
SCHWANZER	1991	1.3	1.3	41,585	3,133	35,968	21,918	16.86
JOINT	1992	2.4	2.4	3,960	5,784	9,744	9,744	4.06
AIR MICRO	Feb. 1995	3.6	3.3	3,960	3,135	7,095	7,095	2.15
ECOR	1988	5	5.0	3,960	12,050	16,010	16,010	3.20
INJEFOX		3.6	3.3	14,960	3,135	18,095	18,095	5.48
QUISPUMA	1988	3	3.0	46,960	7,230	44,190	44,190	14.73
BARBRA	1993	1.5	1.5	3,960	3,615	7,575	7,575	5.05
SONHOS	Dec. 1995	4	4.0	46,960	9,640	46,600	46,600	11.65
小计		***56.0***	***54.3***	***205,025***	***105,605***	***281,880***	***267,830***	***4.93***

硬泡沫塑料

Packo Plurinox, Polithermo 和 Refripor

14. 这三家公司生产各种隔温用途的硬泡沫塑料，包括冷藏、食物冰箱、牛奶储藏、太平间冷藏室，等等。所有三家企业都是 1995 年 7 月 25 日以前创建的，都使用低压注入机。所有三家企业的生产都将转用 HCFC-141b 技术。

15. 转换费用包括，在 Packo Plurinox 和 Refripor 以高压注入机替换 Olin 型和 Sulpol 型低压注入机，每台 45,000 美元，在 Polithermo 改造 Transtecnica 型低压注入机，费用为50,000美元。其他费用包括技术转让和训练(10,000美元)以及测试(5,000至 10,000 美元)。申请了增支经营费用。没有提出密度增加的问题，但是，Polithermo 要求提供 227,940 美元，以支付泡沫塑料厚度增加而引起的费用，导致泡沫塑料厚度增加的原因是继续使用低压注入机。

16. 下文表 4 是这四家公司的概况。

表 4: 硬泡沫塑料企业概况

企业名称	CFC 淘汰量	基准注入机	增支资本费用总额 (美元)	增支经营费用/增加经营节省 (美元)	密度增加引起的增支经营费用 (美元)
Packo Plurinox	14.80	L.P. 15 kg/min Sulpol 1997, L.P.16 kg/min Olin 1989	60,000.00	13,500.00	不适用
Polithermo	50.20	(2) L.P. 30 kg/min Transtecnica 1994	70,000.00	326,250.00	227,940.00
Polyfoam	41.90	无, 手工混合	195,150.00	(35,792.00)	(150,423.00)
Refripor	10.90	L.P. 15 kg/min Sulpol 1993	70,000.00	7,000.00	不适用

*L.P.: 低压

Polyfoam

17. Polyfoam 创建于 1987 年，该企业生产聚氨酯冲浪板以及隔温用的聚氨酯硬方块泡沫塑料和夹层板。该公司的主要业务是生产冲浪板，最初是根据澳大利亚 Bennet Foam 给予的许可证生产(该公司的商标 Bennet 即由此而来)，现在仍然与该公司保持着密切联系。据指出，CFC-11 平均消费量(1997—1999)为 64.5 吨，其中 21.2 吨用于夹层板和方块泡沫塑料生产，43.3 吨用于冲浪板生产。在方块泡沫塑料生产中， 该公司使用一台 1990 年安装、经过翻新的 Viking 型注入机，其他生产—即夹层板和冲浪板生产—均以手工进行。

18. 硬夹层板和硬方块泡沫塑料生产所用的化学剂是从 Plastiquim 购买的预混配方，其多元醇中已经预混 30%的 CFC-11。在此基础上，该企业再添加 20%的 CFC-11。考察该工厂的专家认为，就生产的产品密度(夹层板和方块泡沫塑料均为 40 公斤/立方米) 而言，添加 CFC-11 是不必要的，这部分 CFC-11 很可能挥发掉了。

19. 冲浪板生产所用的化学配方是从澳大利亚 Dion Chemicals 购买的， 该公司是澳大利亚 Bennett Surfboard Ltd. 公司的母公司。购买的配方不含 CFC，Polyfoam 在树脂配料中添加 50%的 CFC-11，CFC-11 一直被冷藏，并预混于多元醇，多元醇也一直被冷藏。然后，在一个罐内用一个开放钻床式混合机混合异氰酸盐，然后将混合好的化学剂直接倒入玻璃纤维和树脂液压模具中，让其起化学反应。

20. 上述专家认为，由于配料被冷藏，可能不会有挥发损失，但低冷的温度也很可能阻碍 CFC-11 泡沫塑料完全成型的效率。Polyfoam 还在多元醇中添加颜料膏、$Ti0_2$ 颜料和 UV 稳定剂。

21. 冲浪板生产将转用由 Dion Chemicals 供应的水发泡配方。给转换项目申请了下述资金：搅拌颜料和 UV 稳定剂的搅拌机，费用为 25,000 美元; 配备喷枪和圆筒计量泵的 40 公斤/分钟高压注入机, 费用为 100,000 美元; 单轨铁路, 费用为 30,000 美元; 设备总费用为 185,000 美元。

22. 夹层板生产将转用 HCFC-141b 技术。为此目的，申请了一台 40 公斤/分钟高压注入机, 费用为 70,000 美元。硬方块泡沫塑料生产也将转用 HCFC-141b 技术，为此目的，将以一台半自动方块泡沫塑料机替换 Viking 型注入机，费用也是 70,000 美元。

23. 在没有基准设备的生产项目方面，企业将自负 25%的注入机费用，这笔资金已减去。如果考虑挥发损失，将有 35,792 美元的增加经营节省。

使用 HCFC-141b 的说明

24. 在所有有关项目中，开发计划署在每个项目文件中提出了使用 HCFC-141b 的说明，包括转用 HCFC-141b 对企业可能产生的“技术经济”影响，并将说明作为附件附加在项目文件后，但 Sector Co.除外，工发组织为 Sector Co.提出了这项说明。据指出，在编制这些项目之前，就多边基金项目中使用 HCFC 的各种问题与各企业进行了详细讨论，各企业是在这个基础上作出技术选择的。

25. 鉴于开发计划署提交的所有项目说明和技术经济影响文本都相似，本评价表后附有一份开发计划署说明和技术经济影响范本，并附有工发组织的说明和政府的信。

项目作用

26. 在执行后，这些项目将淘汰 462.34 ODP 吨，这将是巴西 1999 年附件 A 一类物质消费量的 5.6%。

27. 由于使用 HCFC-141b，将仍需消费 39.51 吨。

秘书处的评论和建议

评论

1. 基金秘书处酌情与执行机构(Sector Co.项目是工发组织，其他项目是开发计划署)讨论了与这些项目有关的各种问题，包括替换或改造泡沫设备和相关费用、化学剂价格、成本效益值等问题。项目评价表显示的是商定的项目费用。项目文件作了必要修订，以反映商定的更改。

2. 在公司生产属于两个或更多次级行业泡沫塑料的项目中，已经保证每个次级行业生产的相关费用符合该次级行业的供资阈值限制。

3. 除 Plastquim 集团项目外，没有申请密度增加引起的费用，Plastquim 集团项目为硬泡沫塑料厂家申请了因密度增加 7.5%而引起的配方费用。

Plastquim 集团项目

4. 该集团项目中，有 12 家企业创建日期不明或据报告是在 1995 年 7 月 25 日之后创建的。开发计划署还申请向 10 家化学配方批发公司提供 169,400 美元，使其向非常小规模的泡沫塑料厂家提供配方。经过讨论该项目，双方同意，申请向批发公司提供的资金不属于合格的增支费用。此后，开发计划署还进一步了解了各参与企业的背景。因此，

它修订了该项目，删除了为批发公司申请的资金，并删除了为资格无法确认的 5 家企业申请的资金，这 5 家企业是，Zero Grace, Polimolita, Injefox, Quispuma 和 Sonhos。

5. 此外，还提供了其他 8 家企业（英文原文如此）的订正创建日期，其创建日期如下:

Fuergoes Cambe	1995 年 5 月
Polyplastic	1995 年 5 月
Naval Fibres	1995 年 3 月
Truker	1995 年 5 月
HW	1995 年 4 月
Clima	1995 年 5 月
Fiberbras	1995 年 3 月

6. 在考虑各公司以及配方供应公司(Plastquim)的基准情况后，在考虑各项适用的规则、特别是考虑关于总体项目的规则后，就项目费用取得了共识。

7. 经商定，配方供应公司(Plastquim)参与项目的相关费用为 27,500 美元（其中包括 10%的应急资金）。其具体分配如下:

实地 K 值测量器	5,000
测试、技术转让和训练	20,000

8. 商定的 Plastquim 客户增支费用如下:

	美元
增支资本费用总额:	847,000
因机龄或无基准设备而减除的数额:	(150,000)
应急资金:	69,650
增支经营费用:	440,946
项目总费用	1,207,096
聚氨酯硬泡沫塑料企业的合格赠款:	764,197
模制软泡沫塑料/连皮泡沫塑料企业的合格赠款:	139,902

9. 该项目赠款总额为 931,599 美元，其中包括向配方供应公司提供的资金。

行业战略

10. 第二十八次会议核准了一个类似的集团项目(Pulsol 集团项目)，其核准条件是，“在核准巴西泡沫塑料行业中小型企业淘汰 ODS 的其他项目之前，巴西政府需提交该次级行业合格企业淘汰 ODS 的战略文件或计划。”

11. 根据核准 Pulsol 集团项目的条件， 开发计划署提交了一份题为《行业最新战略

----泡沫塑料行业》的文件，并将该文件附加在 Plastquim 集团项目文件之后。

12. 该文件以泡沫塑料用途以及以行业和活动范围划分这些中小型企业，它列出了 605 家泡沫塑料行业消费 ODS 的中小型企业，其 1998 年的消费量为 1,765 ODP 吨，占巴西泡沫塑料行业 1998 年消费量的 49%，预计到 2000 年，这个比率将上升到 90%。

13. 战略文件提出了向巴西中小型企业项目提供资金的方式，主要方式是象 Plastquim 项目一样，使用配方供应公司。提议的另一个方式是将资金分配给批发公司，由批发公司向小型企业提供配方。秘书处与开发计划署在 Plastquim 项目中讨论了这种方式，双方同意，这种方式不符合供资资格。

14. 该文件的结论是，巴西政府预计，多数项目将在 2000-2001 年期间编制妥当，并将在核准后约两年内完成。当然，执行机构可利用的资金数额及其业务计划将影响政府规划的时间表。但是，政府计划的时间表将受到执行机构业务计划和可利用资金数额的影响。

15. 该战略文件作为本文件附件二提交，供执行委员会审议。

建议

1. 基金秘书处建议一揽子核准 the Fabbrini, Mach-Plast, Massimo, Menaf, PPU, Prosola, Sector, Injepol, Jetpol, Montreal, Multispuma, Plastquim, Trantor, Packo Plurinox, Politermo, Polyfoam 和 Refripor 项目，其供资额和相关支助费用如下表。

	项目名称	项目费用（美元）	支助费用（美元）	执行机构
(a)	Fabbrini 在连皮泡沫塑料和模制软泡沫塑料生产中淘汰 CFC-11，转用水发泡技术	124,887	16,235	开发计划署
(b)	Mach-Plast 在连皮泡沫塑料生产中淘汰 CFC-11，转用水发泡技术	188,951	24,564	开发计划署
(c)	Massimo 在模制软泡沫塑料生产中淘汰 CFC-11，转用水发泡技术	52,279	6,796	开发计划署
(d)	Menaf 在连皮硬泡沫塑料生产中淘汰 CFC-11，转用水发泡技术	80,994	10,529	开发计划署
(e)	PPU 在连皮泡沫塑料和模制软泡沫塑料生产中淘汰 CFC-11，转用水发泡和 HCFC-141b 技术	64,568	8,394	开发计划署
(f)	Prosola 在连皮泡沫塑料（ 鞋垫 ）生产中淘汰 CFC-11，转用水发泡技术	214,118	27,835	开发计划署
(g)	Sector Co. 在连皮聚氨酯泡沫塑料和模制聚氨酯软泡沫塑料生产中淘汰 CFC-11，转用水发泡和 HCFC-141b 技术	130,490	16,964	工发组织

(h)	Injepol 在连皮泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11，转用水发泡技术	107,678	13,998	开发计划署
(i)	Jetpol 在连皮泡沫塑料、模制软泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11，转用水发泡和 HCFC-141b 技术	214,600	27,898	开发计划署
(j)	Montreal 淘汰 CFC-11，在连皮泡沫塑料和硬泡沫塑料生产中转用水发泡技术	83,117	10,805	开发计划署
(k)	Multispuma 在聚氨酯软方块泡沫塑料生产中淘汰 CFC-11，转用二氯甲烷/低指数/添加剂技术，在模制软泡沫塑料生产中淘汰 CFC-11，转用水发泡技术，在连皮软泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 技术	123,929	16,111	开发计划署
(l)	以 Plastquim 为配方供应中心的 50 家企业和 10 家批发公司在聚氨酯硬泡沫塑料和模制/连皮软泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 和以水为基础的技术	931,599	112,476	开发计划署
(m)	Trantor 在模制软泡沫塑料和硬泡沫塑料生产中淘汰 CFC-11，转用水发泡技术	102,234	13,290	开发计划署
(n)	Packo Plurinox 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 技术	39,750	5,168	开发计划署
(o)	Politermo 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 技术	219,136	28,488	开发计划署
(p)	Polyfoam 在聚氨酯硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 和以水为基础的技术	178,873	23,253	开发计划署
(q)	Refripor 在聚氨酯软泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b 技术	85,350	11,096	开发计划署

ANNEX I

Additional Justification for Using HCFC-141b Technology (UNDP)

The UNDP technical expert appraised the enterprise in March 1999, prior to the preparation of this project document, and had discussions with the company's representatives about the choice of technology for replacing the existing CFC-based technology. The enterprise was briefed in detail about the following:

(a) An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.
(b) The "techno-economic impact" of each technology on the products manufactured, and the processes and practices employed.
(c) Possible implications of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, etc.
(d) It was emphasized to these enterprises that HCFC technologies are interim technologies due to their residual ODP and therefore may continue to adversely affect the environment, although at a lower rate than CFCs.
(e) It was further explained that HCFCs may become controlled substances under present or future international conventions and will therefore also need to be phased out at a future date, and any investments required for their phase-out and for conversion to a permanent technology will have to be borne by the enterprises themselves.

The main conclusions reached by the enterprise through discussions with the UNDP technical expert were:

1. For the flexible molded foam, water-based formulations are available and applicable.

2. For the flexible integral skin formulations, permanent technologies are not yet available in Brasil; therefore, use of HCFC-141b is necessary in the interim.

3. Water based formulations are not yet available for this application in Brasil.

4. Pentane is technically possible to use for the integral skin foam application, but not economically practical due to the relatively small amount of ISF production. The enterprise is not comfortable with the use of flammable substances, and the expert agreed.

In view of the above, the technology selected for the flexible integral skin application is HCFC-141b based systems in the interim, until permanent technology (either water based of HFC-based systems) is available and can provide the required physical properties.

Projected Techno-economic Impact of Zero-ODP Technologies (UNDP)

The projected impact of applying various zero-ODP technologies with respect to the selected technology (HCFC-141b) in this project is summarized as below:

Water based technologies are not available locally. Therefore, the costs associated with water-based technology are not considered.

HFC-134a based systems are not offered in the applicable regional area and are not a feasible zero-ODP option.

Pentane could be used, but would result in significant incremental capital costs as a result of purchase of a new high pressure pentane dispenser, installation of a pentane premixing system, and ventilation and other safety related improvements to the production area. These costs are conservatively estimated at $350,000. These costs are significantly higher than the alternative.

Thus, the selection of HCFC-141b based systems, as the preferred conversion technology, is justified taking into account all the technical, commercial and cost factors.

Justification for Selection of HCFC-141b in Integral Skin Production (UNIDO)

The following criteria were considered while evaluating the alternatives:

Environmental acceptability
Location of the company
Physical properties of end products
Maturity of the technology
Safety and applicability in the enterprise factory environment
Price, product availability, and cost-effectiveness
Energy efficiency impact
CFC-11 replacement technology selected by competitors
MLF ExCom decisions relating to HCFC and hydrocarbon technologies

To assist the enterprises in the selection of a CFC-11 replacement technology, separate project budgets were prepared for the HCFC-141b, and n-pentane technology options.

Whilst recognising the environmental benefits of n-pentane versus HCFC-141b, Sector Co. selected HCFC-141b as a first stage, interim, replacement for CFC-11. The decision in favour of HCFC-141b was based on the lower investment cost, and the fact that it is more appropriate to the existing skill level of the work forces at the enterprise.

Sector Co. understands the implications of the selection of HCFC-141b technology, and the potential cost of subsequent replacement of HCFC-141b at an undetermined future date. They accept and commit to a future change from HCFC-141b to a zero-ODP technology, and that they will have to bear all associated costs.

Other factors also influenced the enterprise decisions in favour of HCFC-141b technology:

- HCFC-141b is the technology adopted by most of their existing, or potential, competitors in Brazil and Latin America. With no local supplies, no other local demand, and its own small requirements, the enterprise was concerned about both product availability, and the price of pentanes in Brazil.

- Whilst MLF ExCom decisions relating to CFC-11 replacement technology selection may "presume" against the use of HCFCs, such HCFC based technologies are not prohibited and may still be considered eligible for MLF assistance. The Brazilian Ministry of Environment, the responsible Government counterpart, supports the selection of HCFC-141b as an Ainterim@ CFC replacement technology at Sector Co.

- The company is located in a residential area**.** Sector Co. expressed concern regarding the longer term safety issues related to the introduction of a flammable blowing agent technology into their factory environment and their choice *at the present time* is a non-flammable HCFC replacement.

The selection of HCFC-141b technology by the enterprise in this project as the immediate replacement of CFC-11 is a realistic and sensible choice under the prevailing circumstances. *The enterprise understands that HCFC-141b is an interim solution* that will require a change to an appropriate zero-ODP technology at some future date. Based on the present status of non-flammable zero-ODP technologies, *they expect to utilize HCFC-141b* ***technology until approximately 2005***.

FAX

RECEIVED MAY 5 2000

MINISTRY OF ENVIRONMENT
BRAZIL

TO:	**Mr. Frank J. Pinto – Principal Technical Advisor and Chief Montreal Protocol Unit**
Organization:	UNDP
FAX Number	001 212 906 6947 **DATE:** 04/May/2000
FROM:	**Mrs. Izabella M. Teixeira** Secretaria de Qualidade Ambiental nos Assentamentos Humanos Director
PHONE:	55-61-317-1225 **FAX:** 55-61-226 8050
N° of PAGES: (including this one)	01

MESSAGE Doc. 040

Dear Mr. Pinto,

In reference to the project submission to the 31th ExCom Meeting, I previously authorize you to submit for approval the investment projects of the following enterprises: EVEREST-MASTER FRIO, FABBRINI, INJEPOL, JETPOL, MACH PLAST, MASSIMO, MENAF, POLITHERMO, POLYFOAM, PPU, PROSOLA and SCHMIT.

In line with the Decision 27/13 of the Executive Committee and in recognition of Article 2F of the Montreal Protocol, the Government of Brazil:

1. Verifies that it has reviewed the specific situation involved at the enterprise presented above as well as its commitments under the Article 2F;
2. States that, based on prevailing circumstances at the said enterprises, at present time the conversion of these enterprises requires the use of HCFC-141b for the interim period as stipulated in the Montreal Protocol;
3. Confirms that the Government and the recipient enterprises understood that no funding would be available from Multilateral Fund for the conversion from HCFCs for the said enterprises whenever such conversion to other alternatives will be required.

Best regards,

Izabella M. Teixeira
Director
Ministry of Environment
Brazil

FAX

RECEIVED
MAY 0 8 2000

MINISTRY OF ENVIRONMENT
BRAZIL

TO:	**Mr. Frank J. Pinto – Principal Technical Advisor and Chief Montreal Protocol Unit**
Organization:	UNDP
FAX Number	001 212 906 6947 **DATE:** 08/May/2000
FROM:	**Mr. Fernando Vasconcelos de Araujo**
PHONE:	55-61-317-1225 **FAX:** 55-61-226 8050
N° of PAGES: (including this one)	01

MESSAGE

Dear Mr. Pinto,

On behalf of Mrs. Teixeira and in reference to the projects submission to the 31th ExCom Meeting, I previously authorize you to submit for approval the investment projects of the following enterprises: PACKO PLURINOX, REFRIPOR and TRANTOR.

In line with the Decision 27/13 of the Executive Committee and in recognition of Article 2F of the Montreal Protocol, the Government of Brazil:

1. Verifies that it has reviewed the specific situation involved at the enterprise presented above as well as its commitments under the Article 2F;
2. States that, based on prevailing circumstances at the said enterprises, at present time the conversion of these enterprises requires the use of HCFC-141b for the interim period as stipulated in the Montreal Protocol;
3. Confirms that the Government and the recipient enterprises understood that no funding would be available from Multilateral Fund for the conversion from HCFCs for the said enterprises whenever such conversion to other alternatives will be required.

Best regards,

Fernando V. Araujo
Manager
Brazilian Ozone Unit
Ministry of Environment

FAX

RECEIVED MAY 10 2000

MINISTRY OF ENVIRONMENT
BRAZIL

TO:	**Mr. Frank J. Pinto – Principal Technical Advisor and Chief Montreal Protocol Unit**
Organization:	UNDP
FAX Number	001 212 906 6947 **DATE:** 09/May/2000
FROM:	**Mr. Fernando Vasconcelos de Araújo** **Secretaria de Qualidade Ambiental nos Assentamentos Humanos**
PHONE:	55-61-317-1225 **FAX:** 55-61-226 8050
N° of PAGES: (including this one)	01

MESSAGE

Dear Mr. Pinto,

On Behalf of Ms. Teixeira and in reference to the project submission to the 31th ExCom Meeting, I authorize you to submit for approval the investment projects of the following enterprises: MONTREAL, MULTIESPUMA and PLASTIQUIM.

In line with the Decision 27/13 of the Executive Committee and in recognition of Article 2F of the Montreal Protocol, the Government of Brazil:

1. Verifies that it has reviewed the specific situation involved at the enterprise presented above as well as its commitments under the Article 2F;
2. States that, based on prevailing circumstances at the said enterprises, at present time the conversion of these enterprises requires the use of HCFC-141b for the interim period as stipulated in the Montreal Protocol;
3. Confirms that the Government and the recipient enterprises understood that no funding would be available from Multilateral Fund for the conversion from HCFCs for the said enterprises whenever such conversion to other alternatives will be required.

Best regards,

Fernando V. Araujo
Manager
Brazilian Ozone Unit
Ministry of Environment

ANNEX II

UPDATED SECTOR STRATEGY

(a) THE FOAM SECTOR

1. INTRODUCTION

The foam industry, including domestic refrigeration, with 35.08% of the total ODP consumption is the second largest sector in Brazil. The sector can be divided by type of application and by type of foam. The tables below show the applications per foam type in percentage and tons, following the categories established by the MLF's Executive Committee:

Use of Foam Types by Application 1998 (%)

Application	Flexible	Molded/ Integral skin	Rigid	Thermoplastic
Automotive	--	98	2	--
Construction	--	10	90	--
Furniture/Bedding	46	54	--	--
Refrigeration	--	0.3	99.7	--
Miscellaneous	--	45	46	9

Use of Foam Types by Application 1998 (tons)

Application	Flexible	Molded/ Integral skin	Rigid	Thermo-Plastic	Total
Automotive	--	280	6	--	286
Construction	--	34	300	--	334
Furniture/Bedding	200	233	--	--	433
Refrigeration *	--	7	2248		2255
Miscellaneous		125	127	25	277
Total	**200**	**679**	**2681**	**25**	**3585**

* including domestic refrigeration

The SME study identified 605 ODS-consuming enterprises in this sector, 535 of which meet the MLF's criteria for an SME—an ODS consumption of less than 10 or 25 t ODP/y, depending on the subsector[1]:

[1] The study did not actually include the flexible slabstock/boxfoam (FPF) producing enterprises. These are relatively large enterprises but, as most enterprises have to a large extent converted to non-ODS technologies, they only use small amounts of CFCs. They are, therefore, according to the MLF definition, SMEs. The FPF data has been included based on information from the revised Country Programme and ABRIPUR.

Number of Identified Enterprises by Application (1998)

Application	Enterprises	Flexible	FMF/ISF	Rigid	Thermo-Plastic	Total
Automotive	Total	--	83	2	--	85
	SMEs	--	69	1	--	70
Construction	Total	--	6	59	--	65
	SMEs	--	5	50	--	55
Furniture/ Bedding	Total	30	95	--	--	125
	SMEs	30	85	--	--	115
Refrigeration	Total	--	--	245	--	245
	SMEs	--	--	220	--	220
Miscellaneous	Total	--	42	42	1	85
	SMEs	--	37	37	1	75
Total	Total	**30**	**226**	**348**	**1**	**605**
	SMEs	**30**	**196**	**308**	**1**	**535**

SMEs accounted for 49.2% of the identified sector consumption in 1998. The survey shows that they are expected to be responsible for almost 90% of the consumption in 2000.

ODS Consumption in the Foam Sector (ODP tons)

Enterprises	1997	1998
Total	4291	3585
SMEs	2185	1765

Including domestic refrigeration

Following is a short description of each application.

1.1 Automotive

Foam use for automotive applications includes molded and integral skin polyurethane foams for seats, backs, steering wheels, headrests, armrests lever, carpet backing, headliners sound insulation and various smaller applications. It is responsible for 7.9% of the ODP consumption in the foam sector. The survey identified 85 companies, 70 of which are SMEs.

ODS Consumption for Automotive Applications (ODP tons)

Enterprises	1997	1998
Total	333	286
SMEs	300	272

1.2 Construction

Applications in this segment include rigid polyurethane foams for thermal and acoustical insulation (panels, pour-in-place or sprayfoam systems). It accounts for 9.3% of the ODP consumption in the foam sector. The survey identified 65 companies, 55 of which are SMEs.

ODS Consumption in Construction Applications (ODP tons)

Enterprises	1997	1998
Total	388	334
SMEs	349	317

1.3 Furniture/Bedding

Companies in this sector manufacture flexible/integral skin polyurethane foams for upholstery and bedding. It accounts for 12.1% of the ODP consumption of the Foams sector. The survey identified 95 companies, 85 of which are SMEs.

ODS Use in Furniture Applications (ODP tons)

Enterprises	1997	1998
Total	471	433
SMEs	444	422

1.4 Refrigeration

Rigid polyurethane foams are used in thermal insulation applications in refrigerators, freezers, display cabinets/counters, walk-in-coolers, industrial cold storage, refrigerated trucks etc. There is also some minor use of integral skin foam for protection of the cabinets/counters. It is responsible for 62.9% of the ODP consumption in the manufacture of foams. The survey identified 245 companies, 220 of which are SMEs.

ODS Use in Refrigeration Applications (ODP tons)

Enterprises	1997	1998
Total	2776	2255
SMEs	702	628

Including domestic refrigeration

1.5 Miscellaneous Applications

Companies that cannot be classified in any of the previous applications are included under "miscellaneous applications". These include bicycle and motorcycle seats, ornamentals, surfboards, packaging and thermoware. They account for 7.7% of the ODP consumption of the foam sector. The survey identified 85 companies, 75 of which are SMEs.

ODS Use in Miscellaneous Applications (ODP tons)

Enterprises	1997	1998
Total	322	277
SMEs	290	263

2. PHASEOUT STRATEGY

As mentioned above, there are 605 enterprises in the Brazilian foam industry still consuming CFCs. Following is a breakdown per application and size, based on the foam survey:

ODS Consuming Enterprises per Application

Application	Enterprises, Total	Small/Medium Sized (SME)	Large/Medium Sized (LME)
Automotive	85	70	15
Construction	65	55	10
Furniture	125	115	10
Refrigeration	245	220	25
Miscellaneous	85	75	10
Total	**605**	**535**	**70**

2.1 Medium/Large Sized Enterprises

The aim of this report is to provide information and propose a phaseout strategy for SMEs, the latter defined as using less than 10/25 t ODP/year. However, the related market survey provided some unexpected information on larger consumers ("LMEs") as a "fringe benefit". Expected phaseout costs for these companies is detailed in the following table:

Phaseout Costs for Identified Large/Medium Sized Enterprises (LMEs)

Application	ODP (tons)	Foam type	Threshold (US$/kg/y)	Phaseout Costs (US$)
Automotive	14	Flexible molded, integral skin	16.86	236,000
Construction	17	Rigid	7.83	133,000
Furniture	11	Flexible molded, integral skin	16.86	185,000
Refrigeration (not including domestic refrigeration)	441 5	Rigid Integral skin	7.83	3,453,030 84,000
Miscellaneous	14	Miscellaneous	9.53	133,000
Total	**521**			**4,224,030**

Concurrent phaseout of residual CFC used in larger enterprises is important—and even critical to the SME program—to avoid competitive distortion.

Virtually all ODS phaseout projects in the Brazilian foam sector have been prepared for LMEs and on an individual basis. Most projects were initially identified through the National Plastics Institute (INP) and recently through the newly instituted Brazilian Polyurethane Association (ABRIPUR). As the chemical suppliers—critical in the identification of ODS users in the foam industry—participate in both organizations, there have been no problems in identifying potential projects—as a matter of fact, there is currently a considerable "pipeline" of projects, as following table shows:

Status of Project Preparation in the Foam Sector (ODP tons/ yr.)

Foam Type	Approved[1]	Completed	Pipeline[2]	Consumption[3]
	As of 11/99	As of 11/99	2000-2002	
Flexible	0	0	200	200
Integral Skin/Molded	746.5	204	557	1,099.5
Rigid Foam	1055.1	286	556	1,325.1
Rigid Foam (Refrigeration)	398.2	0	491	889.2
Polystyrene/ Polyethylene	163.5	0	0	163.5
Miscellaneous	124.3	0	101	225
(i) **Total**	**2,487.6**	**490**	**1,905**	**3,902.6**

[1] as per MLF Nov 1999 Inventory of approved project
[2] as per UNDP information
[3] (Estimated consumption = approved minus completed MLF projects) + (projects identified in UNDP Pipeline) in ODP tons

Implementation schedules have been favorable and the relatively large number of projects under implementation have kept support costs within the MLF constraints. As the system has worked well so far, there appears to be no reason to change it for this category of enterprises and the LME information derived from this survey should be consolidated with the current project pipeline.

2.2 Small/Medium Sized Enterprises (SMEs)

The survey shows that the overwhelming majority of SMEs (80%) are located in the South/Southeast:

Location of SME per Region

Region	Percentage of SMEs
Center West	2.5 %
Northeast	10.0 %
North	7.5 %
Southeast	52.5 %
South	27.5 %
Total	100%

It was further learned that:

- The average CFC-consumption per SME is 3.1 tons /year.
- Enterprises are well informed on ozone layer issues. 50% know about the need to phaseout CFCs and 37% participated in information dissemination seminars. Perceived phaseout problems are related to investment and technology.

- 70% of the companies have never tried to use alternative technologies and 30% have already carried out some evaluation, but none of these actually operate with alternatives.
- The most important obstacle to use alternatives was related to investment requirements (80%)[2], followed by technical problems perceived in changing in equipment and technology (73%).
- For 73%, suppliers are the source of technology, while 47% stated that they try to develop alternative technologies using their own resources. 3% are not free to choose their technology due to an association with other manufacturers and 8% intend to hire outside experts to access new technologies.
- 80% of the companies invest with their own resources; 15% rely on credit.
- 68% train their employees in the handling of CFCs, 50% internally and 25% using outside expertise.
- SMEs are looking to the government for initiatives to promote the phaseout of ODS, the financial means to do so, as well as for information and training on alternative technologies.
- 87% feel they need financial help to phaseout CFCs and 45% believe that they need technical support and training.

In sum, SME enterprises, while aware of the need to phaseout CFCs, are looking to the government for initiatives promoting ODS phaseout, the financial means to do so, as well as information/training on alternative technologies.

The MLF approved in July 1999 (28th ExCom) funds for the ODS phaseout in forty SMEs involving 137 tons of CFCs. The activities will be implemented through two system houses, dedicated suppliers to these enterprises. The—locally owned—system houses will be provided with the financial and technical means to adapt their systems. The system houses function as providers of baseline information and technical support for the recipients. Similar projects have been successfully pioneered in Mexico and preliminary results show that the same will be the case in Brazil.

Based on experience drawn from these projects, the following phaseout plan is proposed for the SME sector:

1. There are 535 SMEs identified in the Brazilian Foam Industry. The CFC-phaseout of forty of these has already been addressed through two approved projects. This leaves 495 SMEs to be addressed. The annual consumption is calculated to be (1905 – 137 =) 1,768 tons CFC/year (1998).
2. The 30 FPF manufacturers formulate in-house. A group project for these manufacturers is recommended, following examples from Indonesia, Malaysia, etc.
3. The "SME/System House" approach as used in Mexico and for the two approved Brazilian SME projects is recommended for about 210 of the remaining 455 SMEs. These are manufacturers that purchase their chemicals as systems from a consistent source in quantities representing more than one ton CFC-11/year. Indonesia, Malaysia etc.

[2] Please note that percentages do not always add to 100% as some questions allowed multiple choices.

4. The remaining SMEs are thought to be so called "spot buyers"—companies that buy too little and too infrequently to be considered regular customers. They are generally buying through distributors for local system houses. It is proposed to deal with these enterprises through the issuance of two years of IOC-compensation to the distributor in exchange of their commitment not to sell any CFC-containing chemicals anymore. This can be achieved by including distributors in a specific ODS phaseout project for the system house it represents.

5. There are in total thirteen significant system houses in Brazil. Six of these system houses include SMEs as well as distributors in their customer base. With two system houses already carrying out projects, four system houses are left to deal directly with 210 manufacturers (an average of 35 per system house). Indirectly, these system houses would also deal through their distributors with the "spot buyers".

6. This phaseout effort should be followed by Government measures banning the use of CFCs. If all relevant projects have not been completed—or approved—at time of issuance, it is suggested to issue waivers to enterprises that can prove inclusion in a proposed or approved, but not completed, project.

7. The Government of Brazil intends to deal with the SMEs in the foam sector through one Implementing Agency, as the proposed approach requires close involvement in the selection of manufacturers per system house to avoid overlap. This would be difficult to manage when more Agencies are involved.

8. The implementation steps would be the following:
   - Meet with all system houses and ensure acceptance of the approach as well as cooperation;
   - Prepare participation lists per system house;
   - Address with input from the Secretariat reasonable compensation for the system house for appraisal and technical support as well as for their own conversion;
   - Identify with help of the system houses, distributors involved with "spot buyers";
   - Prepare project proposals;
   - *Submit and reconcile with review bodies*;
   - Execute.
   - Conduct an awareness campaign through PROZON.
   - Prepare a terminal umbrella project for the sector covering any ODS consumers that have been *previously left out*.

9. To calculate the actual and eligible costs of phasing out the use of CFCs in foam-SMEs two approaches are offered:

   - The FPF phaseout costs are estimated at US$ 1,250,000.
   - From experience with the already approved group projects, it is calculated that the actual phaseout costs for the other SMEs will be around US$ 16.00/kg or around US$ 25,000,000. The eligible costs under standard MLF—no special SME window—would be US$ 9.50/kg or around US$ 15,000,000.
   - The total phaseout costs would be US$ 16,250,000

   Another way is to calculate, as for the LMEs, per application and per foam type using applicable MLF thresholds. The MLF contribution calculated in this way are detailed in the following table:

Phaseout Costs for Identified Small/Medium Sized Enterprises (SMEs)

Application	ODP (tons)	Foam type	Threshold (US$/kg/y)	Phaseout Costs
Automotive	272	Flexible molded, integral skin	16.86	4,586,000
Construction	317	Rigid	7.83	2,482,000
Furniture	211	Flexible molded, integral skin	16.86	3,557,000
	200	Flexible Slabstock	6.23	1,246,000
Refrigeration	500	Rigid	7.83	3,915,000
	2	Integral skin	16.86	34,000
Miscellaneous	263	Miscellaneous	9.53	2,506,000
Total	**1765**			**18,326,000**

Based on the previous calculations, eligible phaseout costs for SMEs in the foam industry are expected to amount to US$ 17,500,000

10. The Brazilian Government expects most projects to be prepared during the year 2000-2001 and implementation to be completed about two years after approval. Implementation date will depend on date of approval by the MLF. Of course, funds available for the Implementing Agencies and their Business Plan will impact on the timeline planned by the Government.

项目评价表
巴西

行业：	制冷	本行业使用的 ODS（ 1999 年 ）：	6,272 ODP 吨
次行业成本效益阈值：		商用	15.21 美元/公斤

项目名称：

(a) Schmit 在冷藏室和夹层板以及硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b，淘汰 CFC-12，转用 HFC-134a，淘汰 R-502，转用 R-404 a
(b) Domnick Hunter Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b
(c) Ingecold Ltda. 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b
(d) Kalten Ltda 淘汰 CFC-12 和 R-502，转用 HFC-134a 和 HFC-404A，淘汰 CFC-11，转用 HCFC-141b

项目数据	商用			
	Schmit	**Domnick**	**Ingecold**	**Kalten**
企业消费量(ODP 吨)	45.50	1.20	1.70	8.60
项目作用(ODP 吨)	43.30	1.20	1.70	8.10
项目期限（ 月 ）	36	36	36	36
原始申请数额(美元)	332,720	17,971	25,320	122,151
项目最后费用(美元)				
增支资本费用 (a)	231,500	27,652	25,320	111,774
酌处经费 (b)	23,150	2,300		10,377
增支经营费用(c)	34,114			
项目总费用(a+b+c)	288,764	29,952	25,320	122,151
地方所有权(%)	100%	60%	100%	100%
出口部分（ % ）	0%	0%	0%	0%
申请数额（ 美元 ）	288,764	17,971	25,320	122,151
成本效益值（ 美元/公斤 ）	6.67	15.15	15.02	15.14
是否已确认对应资金?	已确认	已确认	已确认	已确认
国家协调机构	PROZON	PROZON		环境部
执行机构	开发计划署	工发组织		工发组织

秘书处的建议：				
建议供资额（ 美元 ）	288,764	17,971	25,320	122,151
项目作用（ ODP 吨 ）	43.30	1.20	1.70	8.10
成本效益值（ 美元/公斤 ）	6.67	15.15	15.02	15.14
执行机构支助费（ 美元 ）	37,539	2,336	3,292	15,880
多边基金的费用总额（ 美元 ）	326,303	20,307	28,612	138,031

项目评价表
巴西

行业： 制冷	本行业使用的 ODS(1999 年)：	6,272 ODP 吨
次行业成本效益阈值：	商用	15.21 美元/公斤
	家用	13.76 美元/公斤

项目名称：

(e) Klima Ltda 淘汰 CFC-12, 转用 HFC-134a, 淘汰 CFC-11, 转用 HCFC-141b
(f) Metalplan Ltda 淘汰 CFC-12, 转用 HFC-134a, 淘汰 CFC-11, 转用 HCFC-141b
(g) Tecnigel Ltda 淘汰 CFC-12, 转用 HFC-134a, 淘汰 CFC-11, 转用 HCFC-141b

项目数据	家用		
	Klima	**Metalplan**	**Tecnigel**
企业消费量(ODP 吨)	5.20	1.80	2.40
项目作用(ODP 吨)	5.70	1.90	2.50
项目期限(月)	36	36	36
原始申请数额(美元)	86,464	28,885	34,000
项目最后费用(美元)			
增支资本费用 (a)	64,740	26,532	34,000
酌处经费 (b)	5,724	2,353	
增支经营费用(c)	16,000		
项目总费用(a+b+c)	86,464	28,885	34,000
地方所有权(%)	100%	100%	100%
出口部分(%)	10%	0%	0%
申请数额(美元)	86,464	28,885	34,000
成本效益值(美元/公斤)	15.16	15.02	13.63
是否已确认对应资金?		已确认	已确认
国家协调机构		PROZON	
执行机构		工发组织	

秘书处的建议：			
建议供资额(美元)	86,464	28,885	34,000
项目作用(ODP 吨)	5.70	1.90	2.50
成本效益值(美元/公斤)	15.16	15.02	13.63
执行机构支助费(美元)	11,240	3,755	4,420
多边基金的费用总额(美元)	97,704	32,640	38,420

项目说明

行业背景

－最新 ODS 总消费量(1999 年)*	11,039.00	ODP 吨
－附件 A 一类物质(各种 CFC)基准消费量	11,050.90	ODP 吨
－1998 年附件 A 一类物质消费量	9,542.90	ODP 吨
－制冷行业各种 CFC 基准消费量	无资料	
－1998 年制冷行业各种 CFC 消费量	6,272.00	ODP 吨
－截至 2000 年 3 月(第三十次会议)已核准制冷行业投资项目资金	15,477,975	美元
－截至 2000 年 3 月(第三十次会议)制冷行业投资项目应淘汰的 CFC 数量	2,337.2	ODP 吨

*巴西政府通知秘书处,1999 年数据是初步数据。

1. 制冷行业 1999 年 ODP 总消费量(6,272 ODP 吨)可进一步分为新制冷设备生产消费(1,172 ODP 吨)和维修消费(5,100 ODP 吨)。

2. 巴西家用制冷设备厂家转换活动处于最后阶段。该次级行业不再提交项目。根据巴西政府通过的立法，到 2000 年年底，该次级行业将完成转用无 ODS 技术的活动，淘汰 1,633 ODP 吨。

3. 根据 1998 年数据，商用制冷次级行业新制冷设备生产消费量估计为约 1,000 ODP 吨。

4. 执行委员会已为制冷行业新制冷设备生产企业核准24个项目，约1,550万美元，淘汰 2,337 ODP 吨 CFC。

(a) Schmit 在冷藏室和夹层板以及硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b，淘汰 CFC-12，转用 HFC-134a，淘汰 R-502，转用 R-404 a

5. Schmit 生产商用制冷产品，包括冷藏室夹层板和冷藏柜，使用 44.8 ODP 吨 CFC-11，0.6 ODP 吨 CFC-12 和 0.5 ODP 吨 R-502。目前，该企业在泡沫塑料生产中使用两台 10 公斤/分钟低压注入机和一台压力容器系统。制冷基准设备包括三台真空泵、一台注入机、十二条管线和七台检漏器。

6. 该项目将淘汰 CFC-11，转用 HCFC-141b 作为发泡剂，淘汰 CFC-12 和 R-502，分别转用 HFC-134a 和 R-402 b 制冷剂，共淘汰 40.75 ODP 吨。该项目包括以两台高压注入机替换两台低压注入机和高压传输系统(148,000 美元)，并根据基准注入机机龄扣除一定数额，此外还提供一台机动泡沫喷剂成型机(25,000 美元)。在制冷方面，申请了一台半自动注入平台(15,000 美元)和真空泵(一台新的和两台改造的真空泵)(4,500 美元)。其他费用包括泡沫塑料测试(15,000 美元)、研制样品(15,000 美元)、训练和技术

转让(泡沫塑料：15,000 美元；制冷：5,000 美元)以及 10%的酌处经费。该项目还包括两年的增支经营费用 41,770 美元，这是化学剂成本增加造成的。

使用 HCFC-141b 的说明

7. 在发泡作业中，该企业选择 HCFC-141b 技术替代 CFC-11。秘书处收到一封信，信中通知，政府决定使用 HCFC 技术，本评价表后附有这封信和执行机构的说明。

(b) Domnick Hunter Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b
(c) Ingecold Ltda. 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b
(d) Kalten Ltda 淘汰 CFC-12 和 R-502，转用 HFC-134a 和 HFC-404A，淘汰 CFC-11，转用 HCFC-141b
(e) Klima Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b
(f) Metalplan Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b
(g) Tecnigel Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b

8. 这些项目将在巴西 6 家企业(Dominick Hunter, Ingecold, Klima, Kalten, Metaplan 和 Tecnigel)商用制冷系统生产中共淘汰 21.1 ODP 吨，其途径是淘汰 CFC-11，转用 HCFC-141b 作为发泡剂，淘汰 CFC-12，转用 HFC-134a 作为制冷剂。所有这几家企业都生产类似的设备(展示柜、深度冷冻箱、冷藏自助餐桌)，但 Dominick Hunter 和 Metaplan 除外，这两家企业生产压缩空气系统设备，这些系统使用制冷机排除压缩空气中的潮气。一家企业(Kalten)还使用 R-502 作为制冷剂，将以 HFC-404a 替换 R-502。三家企业(Ingecold, Kalten and Klima)泡沫塑料成型的基准设备是低压注入机，另三家企业(Metaplan, Dominick Hunter and Tecnigel)目前使用手工混合技术。在制冷剂生产中，所有企业都使用真空泵、检漏器和注入平台。

9. Kalten 和 Klima 目前使用的泡沫塑料成型机将废弃，将以低压注入机(各 36,000 美元)
代替。使用手工混合技术的各公司(Metaplan, Dominick Hunter and Tecnigel) 以及 Ingecold 将以低压注入机替换现有的泡沫塑料成型机。这些公司中，基金将向每家公司提供 16,000 美元，其余款项由各企业自行负担。所有 6 家企业都需要注入设备、检漏设备和抽成真空设备。其他费用包括重新设计、投产和测试。由于成本效益阈值的限制，这些企业没有申请增支经营费用，但 Klima 除外，该企业申请 9 个月的费用 16,000 美元。
使用 HCFC-141b 的说明

10. 在发泡作业中，这些企业选择 HCFC-141b 技术替代 CFC-11。秘书处收到一封与执行机构为“Schmit”项目提交的信类似的范本信，信中通知，政府决定使用 HCFC 技术。

秘书处的评论和建议

评论

Schmit(开发计划署)

1. 秘书处与开发计划署讨论了泡沫塑料消费量和与安装冷藏室和管线相关的增支经营费用问题。秘书处还提出了泡沫喷剂成型机和制冷剂注入设备资本费用问题。所有这些问题都已得到解决，而且相关费用也作了相应的调整。

Dominick Hunter, Ingecold, Kalten, Klima, Metaplan and Tecnigel (工发组织)

2. 秘书处提出了 6 家小型公司项目执行期限(3 年)问题和有关里程碑问题。 秘书处认为，鉴于这些企业的规模和执行机构所需开展的工作，执行这些项目的期限似乎太长。 工发组织将 Dominick Hunter 的项目期限调整为 15 个月，其他 5 个项目的期限调整为 24 个月。

3. 秘书处讨论了真空泵等资本设备费用、压缩机增支费用和增支经营费用计算中使用的化学品价格等问题。所有这些问题都已得到解决，而且项目预算也作了相应的调整。

建议

1. 基金秘书处建议一揽子核准开发计划署和工发组织的各商用制冷项目，其供资额和相关支助费用如下表。

	项目名称	项目费用（美元）	支助费用（美元）	执行机构
(a)	Schmit 在冷藏室和夹层板以及硬泡沫塑料生产中淘汰 CFC-11，转用 HCFC-141b，淘汰 CFC-12，转用 HFC-134a，淘汰 R-502，转用 R-404 a	288,764	37,539	开发计划署
(b)	Domnick Hunter Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	17,971	2,336	工发组织
(c)	Ingecold Ltda. 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	25,320	3,292	工发组织
(d)	Kalten Ltda 淘汰 CFC-12 和 R-502，转用 HFC-134a 和 HFC-404A，淘汰 CFC-11，转用 HCFC-141b	122,151	15,880	工发组织
(e)	Klima Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	86,464	11,240	工发组织
(f)	Metalplan Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	28,885	3,755	工发组织
(g)	Tecnigel Ltda 淘汰 CFC-12，转用 HFC-134a，淘汰 CFC-11，转用 HCFC-141b	34,000	4,420	工发组织

ANNEX I

ADDITIONAL JUSTIFICATION FOR USING HCFC TECHNOLOGY (UNDP)

The UNDP technical expert appraised the enterprise in this project in fall 1998, prior to the preparation of this project document in May 1999, and had discussions with the company's representatives about the choice of technology for replacing the existing CFC-based technology. The enterprise was briefed in detail about the following:

(f) An overview of the available interim (low ODP) and permanent (zero ODP) replacement technologies.
(g) The "techno-economic impact" of each technology on the products manufactured, and the processes and practices employed.
(h) Possible implications of each technology, in terms of its known impact on environment, health and safety, such as ozone depleting potential, global warming potential, occupational health, etc.
(i) It was emphasized to these enterprises that HCFC technologies are interim technologies due to their residual ODP and therefore may continue to adversely affect the environment, although at a lower rate than CFCs.
(j) It was further explained that HCFCs may become controlled substances under present or future international conventions and will therefore also need to be phased out at a future date, and any investments required for their phase-out and for conversion to a permanent technology will have to be borne by the enterprises themselves.

The main conclusions reached by the enterprise through discussions with the UNDP technical expert were:

5. Water based formulations are not locally available, and do not offer adequate insulating properties for the application. Maintenance of the insulating value of the finished product is extremely important to the enterprise.

6. The enterprise considered using pentane, but decided they did not want to accept the safety risks associated with using the flammable substance. It would also be a very expensive solution, since there are two distinct production areas, therefore, two complete pentane installations would be required, or a very expensive rearrangement of the production layout would have to be done to avoid two complete installations. The complexity of this solution is prohibitive. In addition, the use of pentane for the in-field pour-in-place applications is not desirable from a safety standpoint.

7. Liquid HFCs aren't available and therefore are not an option.

In view of the above, the technology selected is HCFC-141b based systems in the interim, until permanent technology (most likely HFC-based (HFC-245fa) systems) are available locally.

Justification for Using HCFC Technology (UNIDO)

Table 11 shows the CFC-11 alternatives for foam blowing and their ozone depleting potentials.

Table 11. Alternative blowing agents to replace CFC-11

Foaming Agent	*Ozone Depleting Potential (ODP)*
HCFC-141b	0.11
HCFC-142b	0.065
HCFC-142b + HCFC 22	0.06
HFC-134a	0
Cyclopentane	0

It can be seen that HCFC-141b, HCFC-142b and the blend of HCFC-142b/HCFC-22 all have some ODP and are therefore accepted only as transitional substances.

When considering long-term replacements the field is narrowed to HFC-134a and cyclopentane. In Europe, HFC-134a was used as a blowing agent for a short time, but it was abandoned because it is very expensive compared to CFC-11 and cyclopentane. It is very unlikely that HFC-134a will become a widely used ultimate blowing agent for polyurethane foam in the refrigeration sector.

Lately, all major European manufacturers have already started using cyclopentane to produce polyurethane foam and similar trend is seen in many other parts of the world except North America.

Cyclopentane is an explosive chemical. Since cyclopentane and polyol cannot be delivered premixed in drums or tanks as is the case with CFC-11 and polyol it is necessary to provide an expensive explosion proof mixing station. The same applies for the foaming machine. In order to ensure operational safety when using the highly flammable and explosive cyclopentane and to meet the relevant requirements of the local authorities, it is necessary to install a gas detector system in the foaming department around the foaming machine. Due to the current layout of the plants where several machines are installed next to each other installation of comprehensive automatic sprinkler fire protection systems is inevitable. In order to prevent hazards and achieve compliance with established safety rules for the machinery and the plant, a safety exhaust system is also necessary in the foaming department in all areas where cyclopentane is in use and could escape. All machinery and equipment which may come into contact with pure cyclopentane or cyclopentane/polyol must be explosion-proof and/or encapsulated.

To make the foaming jigs explosion-proof, it is necessary to replace electrical contacts, switches, motors etc. with specially designed explosion-proof ones. All foaming jigs and plugs must be fitted with a good earth connection to avoid sparks generated by static electricity. The workers' clothes and shoes must be made of antistatic material and the floor must be covered with antistatic paint. As a precaution against static induced explosions, it is also necessary to inject nitrogen into the foaming cavity, immediately prior to the injection of the polyurethane material into the cabinet. This requires installation of N_2 tank, ring line and injection nozzles. An emergency motor-generator must be provided to supply electric energy for the safety system even in case of black-outs. Following completion of the installation an international institution in cooperation with local authorities must certify the safe operation of the foaming installation.

These measures would increase the cost of the project by at least US $300,000 which would make the cost effectiveness of the project unacceptable. The enterprise has no financial means to complement the grant with the additional funds required for the implementation of the project with cyclopentane technology.

Moreover, the recipient company is very small enterprise with weak technical support staff especially in the field of maintenance and the present staff would be not able to run the plant and carry out the required maintenance procedures.

On the basis of these considerations the recipient company decided to adopt HCFC-141b as a long term replacement for CFC-11 for foam blowing. Formulations with this substance are already in use in Brazil, so various system houses can supply the necessary compounds.

The management of the company is aware that no funding will be made available from the Multilateral Fund for the Implementation of the Montreal Protocol in case of conversion from HCFC-141b to a final substitute at a later stage.

FAX

MINISTRY OF ENVIRONMENT
BRAZIL

TO:	**Ms. Seniz H. Yalcindag** Montreal Protocol Branch - Director
Organization:	UNIDO
FAX Number	43-1-26026 6804 **DATE:** 09/05/2000
FROM:	**Mrs. Izabella M. Teixeira** Secretaria de Qualidade Ambiental nos Assentamentos Humanos - Director
PHONE:	55-61-317-1225 **FAX:** 55-61-226 8050
Nº of PAGES: (including this one)	01

MESSAGE

Dear Mrs. Yalcindag,

In reference to the project submission to the 31th ExCom Meeting, I authorize you to submit for approval the investment projects of the following enterprises: DOMNICK HUNTER, INGECOLD, KALTEN, KLIMA, METALPLAN, SECTOR and TECNIGEL.

In line with the Decision 27/13 of the Executive Committee and in recognition of Article 2F of the Montreal Protocol, the Government of Brazil:

1. Verifies that it has reviewed the specific situation involved at the enterprise presented above as well as its commitments under the Article 2F;
2. States that, based on prevailing circumstances at the said enterprises, at present time the conversion of these enterprises requires the use of HCFC-141b for the interim period as stipulated in the Montreal Protocol;
3. Confirms that the Government and the recipient enterprises understood that no funding would be available from Multilateral Fund for the conversion from HCFCs for the said enterprises whenever such conversion to other alternatives will be required.

Best regards,

Izabella M. Teixeira
Director
Ministry of Environment
Brazil