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执行委员会
第四十二次会议
2004 年 3 月 29 日至 4 月 2 日，蒙特利尔

# 项目提案：印度尼西亚

本文件载有基金秘书处对以下项目提案的评论和建议：

泡沫塑料

- 在泡沫塑料行业逐步淘汰剩余的 CFC 世界银行

# 项目评估表

# 印度尼西亚

行业：泡沫塑料　　行业消耗臭氧层物质使用量(2002 年)：　1 270.8 ODP 吨

次级行业成本效益临界值：　　连皮　　16.86 美元/公斤
硬质　　7.83 美元/公斤

***项目名称：***

（a） 在泡沫塑料行业逐步淘汰剩余的 CFC

| 项目数据 | 多边 |
|---|---|
| 消费总量 (ODP 吨) | 352.0 |
| 逐步淘汰计划的影响 (ODP 吨) | 333.1 |
| 项目期限 (月) | 60 |
| 计划总费用 (美元) | 4 616 640 |
| 为计划申请的初始总金额 (美元) | 3 280 243 |
| 最终计划费用 (美元)： | |
| (a) 增加基本建设费用 (美元) | 1 369 000 |
| (b) 应急费用 (美元) | 136 900 |
| (c) 增加经营费用 (美元) | 2 765 340 |
| (d) 管理费用 (美元) | 345 400 |
| 计划总费用 (a+b+c+d) | 4 616 640 |
| **为计划申请的总金额 (美元)** | 3 280 243 |
| 计划的成本效益 (美元) | 10.62 |
| 执行机构支助费用总额 (美元) | 246 018 |
| 向多边基金申请的计划总费用 (美元) | 3 526 261 |
| 拨付次数 (部分) | 4 |
| 目前部分是第几次 (期) | 第一次 |
| 以前拨付的经核准的计划经费的金额 (美元) | 0 |
| 剩余的经核准的计划经费的金额 (美元) | 3 280 243 |
| 为目前部分申请的金额 (美元) | 1 740 000 |
| 目前部分的影响 (ODP 吨) | 129.8 |
| 目前部分的成本效益 (美元/ 公斤) | 13.41 |
| 核准目前部分后剩余的金额 (美元) | 1 540 248 |
| 国家协调机构 | 环境部 |
| 执行机构 | 世界银行 |

| ***秘书处的建议*** | |
|---|---|
| 建议金额 (美元)<br>项目影响 (ODP 吨)<br>成本效益 (美元/公斤)<br>执行机构支助费用 (美元) | |
| 向多边基金申请的总费用 (美元) | |

# 项目介绍

行业背景

CFC (附件 A 第一组)的消费量和逐步淘汰情况

| | |
|---|---|
| 根据第 35/57 号决定，印度尼西亚选择了选择办法 1 作为起点，总量为： | **3 951.4** ODP 吨 |
| - 在第四十二次会议之前为供资核准的 CFC 的数量 | 3 576.8 ODP 吨 |
| - 在第四十二次会议上符合资助条件的剩余的 CFC 消费量 (根据第 35/57 号决定，但书 B) | 374.5 ODP 吨 |
| - 对重复计算的消费量进行调整后在第四十二次会议上符合资助条件的剩余的 CFC 的消费量(见下表 2 和表 3) | 610.5 ODP 吨 |
| - 在第四十二次会议上为获得资助提出的所有 CFC 项目(气雾剂行业和泡沫塑料行业)的影响 | 592.3 ODP 吨 |
| - 提交第四十二次会议的项目获得核准后符合资助条件的剩余的 CFC 消费量 | 18.2 ODP 吨 |

在印度尼西亚泡沫塑料行业淘汰剩余的 CFC

1. 世界银行代表印度尼西亚政府提交了一个计划，目的是在印度尼西亚泡沫塑料行业的聚氨酯连皮泡沫塑料次级行业和硬质泡沫塑料次级行业中逐步淘汰剩余的 CFC 消费量。

2. 计划目标是确保通过实施行业计划以及目前正在进行的个别项目，到 2007 年在泡沫塑料行业彻底淘汰 CFC。这样一来印度尼西亚就能够根据《蒙特利尔议定书》履行它现在和将来的义务。

3. 计算的计划总费用为 4 616 640 美元，其中 3 280 243 美元及机构支助费用 246 018 美元向多边基金申请。据报告，泡沫塑料行业经证实的剩余的 CFC 消费量为 325 ODP 吨，其中的 298 ODP 吨被确定为符合资助条件的消费量。为行业计划申请的经费包括用于技术支持系统的 207 900 美元，以帮助不符合资助条件的企业淘汰 54 ODP 吨的 CFC 消费量。

查明符合资助条件的企业和 CFC 消费量

4. 世界银行在印度尼西亚泡沫塑料行业进行了调查以查明还有多少泡沫塑料生产企业仍在消费 CFC。经查明，有 30 个泡沫塑料企业仍在消费 CFC，其中有 20 个硬质泡沫塑料企业和 10 个连皮泡沫塑料企业，报告的消费量为 298.11 吨。另外，列出了符合资助条件的 85 个企业，估计的消费总量为 705 ODP 吨。在这 85 个符合资助条件的企业中有 14 个(3 个连皮泡沫塑料和 11 个硬质泡沫塑料)的消费总量经调查证实为 53.6 ODP 吨。剩下的 71 个企业或者已经不存在了，或者找不到地方，或者拒绝参与调查，或者在企业提供的

材料的基础上被认为可能不符合资助条件。可能不符合资助条件的企业包括通过个别项目在以前的会议上获得了资助的三家企业。它们的 CFC 消费量为 145 ODP 吨，资助额为 715 550 美元。不过，三家公司，GANESHA RATTESKO PRIMA (IDS/FOA/31/INV/150)、SOLINDAH KITA (IDS/FOA/36/INV/144) 和 TRIAS RANTAIMAS (IDS/FOA/31/INV/119) 不是两个团体项目的参与者，并且它们的 CFC 消费量不影响剩余的 CFC 消费量的水平。其 CFC 消费量经过证实并且包括在行业计划中的企业名单见表 1。

表 1：未获资助的印度尼西亚泡沫塑料企业及其经证实的 CFC 消费量一览表 i

A. 符合资助条件的企业

| # | 公司 | 泡沫塑料应用 | 基准设备 | CFC 使用量 ODP 吨 |
|---|---|---|---|---|
| 1 | Bintang Mas, UD | RPF – 保温桶 | 手工 | 5.63 |
| 2 | Cipta Karya, CV | RPF – 喷射 | Gusmer | 3.79 |
| 3 | Mayasari Utama, PT | RPF – 喷射 | H/P-Gusmer FF1600 | 3.08 |
| 4 | Langgeng Makmur Industri Tbk, PT | RPF – 保温桶 | Canon C 15 RF 2 | 15.00 |
| 5 | Hadi Puteri Kartika Paqsi, PT | RPF – 嵌板 | 手调混合 | 9.00 |
| 6 | Pangaji Mario Refconindo, PT | RPF – 嵌板 | H/P- KM 40/40 &L/P Canon C60 | 6.30 |
| 7 | Bernadi Utama, PT | RPF – 保温桶 | Gusmer H2000 & H II | 2.60 |
| 8 | Willich Isolasi Pratama, PT | RPF – 管子 | Gusmer H 2000 | 2.05 |
| 9 | Sadana Ekapraya Amitra, PT | RPF – 嵌板 | 手工 | 0.79 |
| 10 | Indomatic | RPF – 嵌板 | 手工 | 1.91 |
| 11 | Citradinamika Interindo | RPF – 嵌板 | 手工 | 3.90 |
| 12 | Sigma Engineering | RPF – 嵌板 | 手工 | 4.64 |
| 13 | Harrison, UD | RPF – 嵌板 | 手工 | 0.53 |
| 14 | Sengon Harpindo Sejati | RPF – 嵌板 | 低压注入机 | 41.60 |
| 15 | Ditta Insulindo | RPF – 嵌板 | 低压注入机 | 35.67 |
| 16 | Sinar Baja Walandra | RPF – 嵌板 | 低压注入机 | 29.00 |
| 17 | Sumber Sejahtera Raya | RPF – 嵌板 | 低压注入机 | 27.61 |
| 18 | Ero Fibre Glass | RPF – 嵌板 | 低压注入机 | 11.00 |
| 19 | Shirabu | RPF – 嵌板 | 低压注入机 | 11.00 |
| 20 | Belga Jaya Perkasa | RPF – 嵌板 | 低压注入机 | 0.00 |
| 21 | Biru SCK, PT | ISF | H/P Canon C 30 & 40 | 4.00 |
| 22 | Yamahato, CV | ISF | L/P Desma Klockner 583/24 | 3.60 |
| 23 | Rizata Wijaya | ISF | L/P Canon 15 FL2 | 6.80 |
| 24 | Osaga Mas Utama. PD | ISF | L/P Italy BGM Elite 60 | 10.00 |
| 25 | Sinar Mulia, UD | ISF | Green 900 g/min | 6.00 |
| 26 | Kumala Indah Tata, PT | ISF | L/P Elastogran F70 | 13.50 |
| 27 | SS Utama, PT | ISF | (3) L/P BGM | 25.00 |
| 28 | Restindo Dayatama, PT | ISF | 手工 | 0.79 |
| 29 | Lion Metal Works TBK, PT | ISF | L/P Canon C15 FL2 | 1.62 |
| 30 | Jaly Indonesia Utama, PT | ISF | LP BGM, MTB | 11.70 |
| | 总计 | | | **298.11** |

* RPF：硬质聚氨酯泡沫塑料
ISF：连皮泡沫塑料

B. 不符合资助条件的企业

| # | 公司 | 泡沫塑料的应用 | 基准设备 | CFC 使用量 ODP 吨 |
|---|---|---|---|---|
| 1 | Bertindomas Ciptasatya | 嵌板 | 手工 | 1.14 |
| 2 | Cahaya Kencana Srikandi, PT | 嵌板 | H/P-Gusmer | 1.00 |
| 3 | Duta Eka Abadi, CV | 嵌板 | 手工 | 0.00 |
| 4 | Framindex Indah Lestari (Yapindex) | 构造 | KF – IS402 | 1.28 |
| 5 | Mitra Niaga Kencana Lestari, PT | 嵌板 | SAIP K 60 | 7.43 |
| 6 | Pungut Permai Perkasa PT | 构造 | 手工 | 0.25 |
| 7 | Restu Ibu, PT | 喷射 | n/k | 0.00 |
| 8 | Wika Intrade, PT | 保温桶 | 小的 | 3.89 |
| 9 | Yuriko Teknik | 嵌板 | 手工 | 1.36 |
| 10 | Binder Indonesia, PT | 管子 | n/k | 12.10 |
| 11 | Megametal Perdana, PT | 嵌板 | L/P Li Peng (Taiwan) | 11.99 |
| 12 | Astra Otopart, Tbk, PT. | ISF | H/P KM & Rim Star | 4.20 |
| 13 | Jaya Mulya | ISF | Ex Import | 6.00 |
| 14 | Yufo Sumber Mas | ISF | n/k | 3.00 |
| | 合计 | | | **53.64** |

符合资助条件的剩余的 CFC 消费量

5. 根据第 35/57 号决定，到第四十一次会议结束时印度尼西亚剩余的符合资助条件的 CFC 消费量为 374.5 ODP 吨，正如上面的 CFC 消费量和淘汰情况说明中所指出的。世界银行提交泡沫塑料行业和气雾剂行业的两个项目供基金秘书处第四十二届会议审议，这两个行业的消费总量为 592 ODP 吨，需要对剩余的符合资助条件的 CFC 消费量进行评估。

6. 关于这一评估，世界银行提供在上述调查中获得的数据，调查表明在印度尼西亚泡沫塑料行业符合资助资格的 CFC 消费量中存在一些重复计算的情况，其原因是一些参与在第二十三次会议上核准由世界银行执行的两个为 60 个软质方块泡沫塑料企业和 26 个软质浇铸泡沫塑料企业开展的总体项目(IDS/FOA/23/INV/77 和 78)的企业后来通过由其他机构编制的个别项目获得了资助。

7. 调查还表明团体项目迟迟得不到执行的部分原因是社会经济困难，由于这一原因，一些原来参加两个团体项目的企业停止了泡沫塑料的生产或者不知所踪了。不过，在第四十次会议上，执行委员会通过第 40/13 号决定指示不得用新企业取代脱离团体项目的企业。因此，在这些企业的消费量被列入团体项目的同时，也被列入了其他个别项目中，这导致了其获得资助的 CFC 淘汰量的重复计算。

8. 秘书处对世界银行提供的数据的分析见下表 2。分析表明，由于两个团体项目的部分实施而被认为符合资助条件的 CFC 消费量达到 236 ODP 吨，而不符合资助条件的消费量为 237.5 ODP 吨。因此，印度尼西亚符合资助条件的剩余的 CFC 消费总量为 610.5ODP 吨(即 347.5 加 236.0 ODP 吨)，正如下表 3 中所示，而不是 CFC 消费量和逐步淘汰情况中指出的 374.5 ODP 吨。

表 2：经过核准的世界银行团体项目对泡沫塑料行业中剩余的 CFC 消费量的影响

| | 总计 (a) | 关闭的/不存在的 (b) | 拒绝参加的 (d) | 工发组织项目 (d) | 开发计划署项目 (e) | 日本项目 (f) | 合计符合资助条件的 (g) c+d+e+f | 合计不符合资助条件的 (h) (b) | 合计不参加的企业 | 团体项目的最终范围 |
|---|---|---|---|---|---|---|---|---|---|---|
| 软质方块泡沫塑料项目 (IDS/FOA/23/INV/77) | | | | | | | | | | |
| 企业数量 | 60 | 10 | 2 | 2 | 1 | -- | 5 | 10 | 15 | 45 |
| CFC 消费量 | 954 | 161.5 | 59 | 57 | 23 | -- | 139 | 161.5 | 300.5 | 653.5 |
| 软质浇铸泡沫塑料项目 (IDS/FOA/23/INV/78) | | | | | | | | | | |
| 企业数量 | 26 | 5 | 1 | 2 | 3 | 1 | 7 | 5 | 12 | 14 |
| CFC 消费量 | 370 | 76 | 5 | 51 | 29 | 12 | 97 | 76 | 173 | 197 |
| 企业总数 | 86 | 15 | 3 | 4 | 4 | 1 | 12 | 15 | 27 | 59 |
| 世界银行项目中的 CFC 总量 | 1 324 | 291.5 | 64 | 108 | 52 | 12 | 236 | 237.5 | 473.5 | 850.5 |

表 3： 印度尼西亚剩余的 CFC 消费量

| | ODP 吨 |
|---|---|
| 按照第 35/57 号决定剩余的符合资助条件的消费量 | 374.5 |
| 来自重复计算项目的符合资助条件的消费量 | 236.0 |
| 符合资助条件的剩余的消费总量 | 610.5 |
| 泡沫塑料行业中剩余的 CFC 消费总量 (298.1 + 53.6) | 351.7 |
| 泡沫塑料行业中符合资助条件的剩余的 CFC 消费总量 | 298.1 |

## 企业背景

9. 二十家硬质泡沫塑料企业中的十四家生产嵌板，剩下的生产保温桶、管子和喷射泡沫塑料。七家企业使用手工操作，剩下的(喷射泡沫塑料生产商除外)主要使用低压泡沫塑料机器。十家连皮泡沫塑料生产商中有九家使用泡沫塑料机，主要是低压泡沫塑料机，一家企业使用手工操作。

## 技术选择

10. 根据印度尼西亚普遍的社会经济环境特别是泡沫塑料行业的背景以及目前替代技术的发展状况，详细审查了所有可利用的替代技术。HCFC-141B 技术被选作硬质泡沫塑料

转换的最适合的技术。为连皮泡沫塑料企业选择的技术是使用水基配方原料，如果没有水基配方原料或者最终的产品性能令人不满意的话可以使用 HCFC-141B。

项目费用的计算

11. 根据次级行业泡沫塑料生产特征以及技术选择，利用标准费用的组成部分及计算泡沫塑料项目费用的规则为每个企业计算了增加的基本建设费用。因此，就硬质泡沫塑料转换而言，现有低压注入机将被与之相当的高压注入机取代，而对连皮泡沫塑料转换来说，现有低压注入机将做适当改型。在基准中没有机器的情况下，将对对方出资减少费用，减少额相当于新的高压机器费用的 50%和新的低压机器费用的 25%。同样，将对太旧的机器(使用 10 年以上)适当降低费用。

硬质泡沫塑料

12. HCFC-141B 技术导致增加的基本建设费用根据下述费用组成部分计算。

| | |
|---|---|
| 高压注入机 | 每台机器 80 000 |
| FF1600 改型 | 每台机器 6 000 美元 |
| 2000 改型 | 每台机器 12 000 美元 |
| 实验 | 每个企业 5 000 |

13. 在上述组成部分的基础上，增加的基本建设费用的计算依据是：用高压注入机取代 17 台低压注入机，包括三台太旧的基准注入机，提供 7 台高压注入机用于手调混合以及对 4 台喷射泡沫塑料机器进行改型，计算得出的增加的基本建设费用总额为 1 334 300 美元，包括 10%的应急费用。

连皮泡沫塑料

14. 水基技术导致增加的基本建设费用根据下述组成部分计算：

| | |
|---|---|
| 低压注入机 | 每台机器 25 000 美元 |
| 低压注入机的改型 s | 每台机器 25 000 美元 |
| 浇铸空调 | 每个企业 2 000 美元(非鞋设计) |
| 实验 | 每台机器 5 000 美元 |

15. 增加的基本建设费用包括对三台注入机进行改型以及用一台低压注入机取代手调混合，总费用为 171 600 美元，包括 10%的应急费用。

增加经营费用

16. 根据标准规则和以 CFC 为基础的化学配方原料的市价与以 HCFC-141B 和水为基础的配方原料的市价之差来为每组企业计算增加的经营费用，价格差异如下表 4 所示：

表 4： 化学配方原料的价格

| 次级行业 | 以 CFC 为基础的配方原料 美元/公斤 | 以替代品为基础的配方原料 美元/公斤 | 价格差 美元/公斤 | 差异百分比 |
|---|---|---|---|---|
| 硬质泡沫塑料 | 2.50 | 2.80 | 0.30 | 12 |
| 连皮泡沫塑料 | 2.50 | 3.00 | 0.50 | 20 |

17. 在上表 4 中列出的泡沫塑料配方原料价格差异的基础上，硬质泡沫塑料和连皮泡沫塑料企业所需的 1 811 吨和 1 142 吨泡沫塑料配方原料导致增加的经营费用(两年的净现值)分别达到 1 319 400 美元和 1 445 940 美元。硬质泡沫塑料部分导致增加的经营费用包括在转换后为增加泡沫塑料的密度可给予的补偿。

计划的投资费用

18. 上述计算得出的增加的基本建设费用和经营费用的总额见下面的表 5。

表 5： 行业计划的投资费用

| | 增加的基本建设费用 美元 | 应急费用 美元 | 增加的经营费用 美元 | 总计 美元 |
|---|---|---|---|---|
| 连皮泡沫塑料 | 156 000 | 15 600 | 1 445 940 | 1 617 540 |
| 硬质泡沫塑料 | 1 213 000 | 121 300 | 1 319 400 | 2 653 700 |
| 总计 | 1 369 000 | 136 900 | 2 765 340 | 4 271 640 |

## 管理费用和技术支持

执行和监督单位

19. 计划将以 137 500 美元的费用成立一个由全职人员组成的项目执行和监督单位，以便向政府提供必要的支持来开展计划中提出的所有活动。该单位承担与条例的制订和执行、项目执行、提高公众认识和监督有关的各项任务。单位的费用包括用于政策支持和提高公众认识的 45 000 美元和供一个专家使用的 80 000 美元的活动费用。

技术支持系统

20. 除了执行和监督单位外，还计划以 207 900 美元的费用成立一个技术支持单位。该单位的主要目的是协助淘汰被看作是不符合资助条件的 CFC 消费量。技术支持单位的费用的主要组成部分是技术转让和培训费用 100 000 美元、支持费用 25 000 美元和用于向特别小的和不经常使用 CFC 的用户提供技术援助的 64 000 美元。

21. 计划的管理机构的总费用为 345 000 美元。

计划总费用

22. 在泡沫塑料行业淘汰剩余的 CFC 消费量的计划的总费用概述如下。

| 项目费用摘要 | 美元 |
|---|---|
| 增加基本建设费用 | 1 505 900 |
| 增加经营费用 | 2 765 340 |
| 项目的执行和监督单位 | 137 500 |
| 技术支持系统 | 207 900 |
| 总计 | 4 616 640 |
| 申请金额 | 3 280 243 |
| CFC 消费总量 (298.1 + 53.6) | 351.7 ODP 吨 |
| 计划的影响(导致的 HCFC 的使用量) | 333.1 ODP 吨 |
| 计划的成本效益 | 美元 9.85/kg |

行动计划

23. 世界银行提交的文件中包括一个行动计划，该计划在 2001 年 2 651 ODP 吨的 CFC 消费量和 3 280 243 美元的申请经费的基础上提供了逐步淘汰 CFC 和拨付经费的时间表。不过，印度尼西亚向基金秘书处报告的数据表明，2002 年泡沫塑料行业中 CFC 的消费量是 1 270.8 ODP 吨，大大低于前一年世界银行为编制 CFC 时间表使用的消费量。在这些数据的基础上还制订了 2005-2009 年年度执行方案。下面是提出的逐步淘汰 CFC 和拨款时间表。

| 行 | | 基准 (2001) | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 逐步淘汰目标和项目影响 (公吨) | | | | | | | | | | | |
| 1. | 国内消费目标 | 2651 | 2583 | 2515 | 2046 | 1270.2 | 688.4 | 232.7 | [66.2*] | [66.2*] | 0 |
| 2. | 被定为合同目标的对 ODP 的影响 | 0 | 0 | 145 | 130 | 55 | 53 | 0 | 0 | 0 | 0 |
| 3. | 正在进行的项目在目前的影响 | -- | 68 | 469 | 775.8 | 452 | 300 | 100 | 0 | 0 | 0 |
| 4 | 行业计划对逐步淘汰的影响 | 0 | 0 | 0 | 0 | 129.8 | 155.7 | 66.5 | 0 | 0 | 0 |
| 供资申请 (1000 美元) | | | | | | | | | | | |
| 5. | 投资项目 | 0 | 0 | | 1 600 | 1 200 | 135 | 0 | 0 | 0 | 0 |
| 6 | 国家的 SPMCU 和支持活动 | 0 | 0 | | 70 | 30 | 20 | 17.5 | 0 | 0 | 0 |
| 7. | 技术支持系统 | 0 | 0 | | 70 | 62 | 52 | 23.9 | 0 | 0 | 0 |
| 8. | 总计 | 0 | 0 | | 1 740 | 1 292 | 207 | 41.4 | 0 | 0 | 0 |

## 秘书处的评论和建议

### 评论

24. 对印度尼西亚泡沫塑料行业数据的分析似乎证实，符合资助资格的 CFC 消费量超过了 374.5ODP 吨的记录的剩余消费量。该分析表明，在第二十三届会议所核定的 69%针对方块泡沫塑料、53%针对软质浇铸泡沫塑料的两个团体项目中所涉及的 CFC 消费量水平以及相应的项目成本效益的基础上，世界银行有望退给多边基金为方块泡沫塑料项目核准的约 400 万美元中的 128 万美元以及为软质浇铸泡沫塑料团体项目核准的 350 万美元中的约 170 万美元。

25. 关于泡沫塑料行业调查结果所揭示的一些经过核准的项目接受资助的资格问题，已经要求有关执行机构予以澄清，并且将告知执行委员会。

26. 秘书处发现了一些与投资及管理费用的计算有关的问题。秘书处正在与世界银行讨论这些问题。

27. 鉴于用来编制减少 CFC 的时间表的基础消费数据已经过时，世界银行被要求对逐步淘汰 CFC 行动计划进行修订以反映更新的消费数据。因此，不可能就提案起草一个协定草案。在就行业计划的供资水平和对行动计划的必要修订达成一致后，将按照第 41/80 号决定，向执行委员会提交协定草案。

### 建议

28. 有待提出。

## PROJECT COVER SHEET

| | |
|---|---|
| **COUNTRY:** Indonesia | **IMPLEMENTING AGENCY:** The World Bank |
| **PROJECT TITLE:** | **PHASEOUT OF RESIDUAL CFCs IN THE INDONESIAN FOAM SECTOR** |
| **PROJECT IN CURRENT BUSINESS PLAN:** | YES |
| **SECTOR:** | Foam |
| **SUB-SECTORS COVERED:** | Rigid (RPF), Flexible Molded/Integral Skin (FMF/ISF) |
| **ODS USE IN SECTOR: (2001)** | 2,651 MT ODP |
| **PROJECT IMPACT:** | 333.1 MT ODP (Remaining eligible consumption addressed in the project document). |
| **PROJECT DURATION:** | **5** years |
| **PROJECT COSTS:** | **Investment Costs:** **US$ 4,271,240**<br>**Management Costs:** **US$ 345,400**<br>**TOTAL:** **US$ 4,616,640** |
| **LOCAL OWNERSHIP:** | 100 % |
| **EXPORT COMPONENT:** | 0 |
| **REQUESTED GRANT:** | **US$ 3,280,243 ($2,934,843 investment; $345,400 non-investment)** |
| **IA SUPPORT COSTS:** | **US$ 246,018** |
| **TOTAL COST OF PROJECT TO MLF:** | **US$ 3,526,261** |
| **COST EFFECTIVENESS (weighted average):** | US$ 10.52/kg ODP (composite threshold US$ 10.52/kg ODP) |
| **STATUS OF COUNTERPART FUNDING:** | N/A |
| **PROJECT MONITORING MILESTONES:** | **INCLUDED** |
| **NATIONAL COORDINATING AGENCY:** | Ministry of Environment of Indonesia |


### PROJECT SUMMARY

With the completion of this sector plan, all CFC-11 consumption in the foam sector in Indonesia will be eliminated. The funding request targets the remaining eligible consumption of CFC-11, and will be carried out through a series of annual programs. In conjunction with presently ongoing foam projects, this project will result in complete phaseout of CFC-11 use for foam applications in Indonesia by the end of 2007. Investment projects are included for 20 rigid foam and 10 integral skin foam enterprises. The plan proposes to replace present ODS-based technology with a combination of non-ODS and, where not feasible, low-ODS technologies (water-based ($CO_2$) and HCFC-141b). A Technical Service Support program includes workshops to effect conversion at enterprises too small for investment projects. Conversion projects will be accompanied by associated policy actions to ensure that the phaseout proceeds on schedule, and that ineligible enterprises are also compelled to stop use of CFC-11. An action plan indicating annualized phaseout targets is included in the proposal.


### IMPACT ON THE COUNTRY'S MONTEAL PROTOCOL OBLIGATIONS

This project will allow Indonesia to complete its obligations for the foam sector with the Montreal Protocol, eliminating the use of CFCs in the production of polyurethane foam.

**Prepared by: Edrola/Rappa** **Date: December, 2002**
**Reviewed by: Dr. Mike Jeffs, OORG Technical Reviewer** **Date: February, 2003**

# PHASEOUT OF RESIDUAL CFCs
# IN
# THE INDONESIAN FOAM SECTOR

February 4, 2003

(Revised January 29, 2004)

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# EXECUTIVE SUMMARY

1. ***Background:*** The Government of Indonesia started its Ozone Layer Protection Program in 1992 by ratifying the Vienna Convention, the Montreal Protocol and the Copenhagen Amendment through Presidential Decree No. 23/1992, and subsequently established a program for actions to phaseout the use of ODS. It has so far received US$ 35,607,902 to phaseout the annual use of 7,012 t ODS.

2. ***Project Objective:*** In conjunction with presently ongoing foam projects, this project will result in complete phaseout of the use of CFCs from the foam sector in Indonesia by the end of 2007. These actions will help Indonesia to meet its present and future obligations under the Montreal Protocol. The project has been developed by the Government of Indonesia's National Ozone Unit with assistance of the World Bank. The identified remaining un-addressed consumption in the sector amounts to 352 t CFCs from which 298 t is deemed eligible for financial assistance. The non-eligible consumption will be phased out through policy options.

3. ***Scope and Content***: The plan proposes to replace present ODS-based technology with a combination of alternative technologies, including HCFC-141b for rigid PU foam applications, and water-blown technologies for integral skin PU foam applications. Conversion projects will be accompanied by associated policy and management actions to ensure proper recipient verification, to keep the phaseout on schedule, and to assure that non-eligible enterprises are also compelled to stop use of CFC-11. A consolidated action plan is included.

4. ***Data:*** The foam sector has been surveyed through questionnaires and verification visits. The data have been cross-checked with the approved projects data base as well as existing preparation portfolio's of other Agencies. There are estimated to be more than 40 very small foam enterprises with unchecked CFC consumption in Indonesia whose CFC consumption is sporadic and low. The survey data were used to establish consolidated consumption data, to determine eligibility of enterprises for MLF support and to establish the required technical and economical assumptions for this project. Data analysis resulted in calculation of project costs based on 30 eligible enterprises – 20 rigid foam and 10 integral skin foam enterprises.

5. ***Costs calculations:*** Based on enterprise data and following MLF guidelines, actual conversion costs have been calculated for the 30 eligible enterprises. MLF-imposed thresholds were then applied to calculate fundable conversion costs. The proposed funding in the project has been based on the lower of those two calculations. Using this approach, the requested funding amounts to US$ **$2,934,843** for incremental investment costs. Management and technical Support Services costs of $345,400 are also requested to fund the activities required for implementation and monitoring, and technical support at the national level. As a sector phaseout plan, it is understood that the Government of Indonesia has flexibility in allocating the approved funding in order to efficiently achieve the objectives of total ODS phaseout in the foam industry in Indonesia.

6. ***Adjustment for HCFC-141b consumption:*** The use of all water-based systems and of hydrocarbons has been considered in the conversion of rigid foam applications. However, all-water-based systems that can provide the insulation properties required in these applications are at this time not available in Indonesia. The economic threshold of ~50 t CFCs/y for hydrocarbon-based systems is approached by a few of the recipients, but due to the very large capital investment costs required for hydrocarbon conversions and the limited funding for the entire foam sector, the use of hydrocarbons has not been selected. Therefore, the replacement technology chosen for rigid foam is HCFC-141b. Adjustment has been made for the resulting residual ODP. It is estimated that the impact of HCFC-141b consumption will amount to approximately 19 t/y (at baseline conditions).

***7.*** ***Annual Phaseout targets:*** it has been assumed that the first year of implementation will be needed for preparatory action and beginning signing contracts with enterprises. The eligible CFCs will after that be phased out over three years and the non-eligible consumption in the last year (or as otherwise required by the government):

| Year Of Program | Total Consumption in Foam Sector | Estimated Ineligible & Not Identified Consumption | Impact Targeted In given Year | Estimated Actual Impact of On-going | Annual Reduction of CFC Demand | Accumulated Reduction of CFC's (baseline T) |
|---|---|---|---|---|---|---|
| 2001 | 2,651.0 | 0.0 | 0.0 | 0.0 | 68.0 | 68.0 |
| 2002 | 2,583.0 | 66.2 | 0.0 | 68.0 | 68.0 | 136.0 |
| 2003 | 2,515.0 | 66.2 | 0.0 | 469.0 | 469.0 | 605.0 |
| 2004 | 2,046.0 | 66.2 | 0 | 775.8 | 775.8 | 1380.8 |
| 2005 | 1270.2 | 66.2 | 129.8 | 452.0 | 581.8 | 1962.6 |
| 2006 | 688.4 | 66.2 | 155.7 | 300.0 | 455.7 | 2418.3 |
| 2007 | 232.7 | 66.2 | 66.5 | 100.0 | 232.7 | 2,651.0 |
| **Sub-Total** | | | **352** | | | |
| Adjustment for HCFC-141b Consumption | | | (18.9) | 0.0 | 0.0 | |
| **Grand Total** | | | **333.1** | **2164.8** | **2,651.0** | **2,651.0** |

* plus consumption by not yet validated foam producers

8. ***Agency support costs:*** Agency support costs of 7.5% are included in the proposal.

9. ***OORG Review:*** The proposal has been reviewed and approved for submission by the Bank's OORG reviewer for the foam sector. His comments are attached at Annex I.

# I. INTRODUCTION

## A. BACKGROUND

1.1 Indonesia ratified the Montreal Protocol in June 1992 and was classified as an Article 5 country as the consumption per capita was less than 0.3 kg ODP/capita. Indonesia qualifies for a grace period of 10 years in the Protocol's implementation schedule and is eligible for financial support and technical assistance from the Multilateral Fund (MLF) of the Montreal Protocol to reduce the financial impact to the country caused by the ODS phaseout and introduction of substitutes. Indonesia's obligation under the Multilateral Fund is to reduce its CFC consumption to 4,166 tons by 2005, 1,250 tons by 2007 and 0 by 2010.

1.2 In 1994, Indonesia prepared a Country Programme (CP) incorporating a national strategy and action plan to phaseout ODS. The action plan proposed addressing each of the ODS consuming industry sectors, through institutional and regulatory measures, incentives and disincentives, awareness and information dissemination, financial and technical assistance and monitoring. Complete ODS phase-out was targeted ambitiously for 1998.

1.3 In 1998, the Government initiated preparation of a Country Programme Update (CPU) with assistance of the World Bank, UNDP and the industry. One of the planned activities was to re-survey the ODS consuming sectors. The CPU renewed and reinforced Indonesia's commitment, strategy and action plans to eliminate ODS and is intended to serve as a guideline for future activities to meet Indonesia's obligations under the Montreal Protocol. Realizing the needs of the industry and the economy, the CPU revised the target date for complete ODS phase-out to the end of 2007.

1.4 Activities to implement the Montreal Protocol are coordinated through the National Ozone Unit (NOU) in the Atmosphere and Climate Change Division of the Ministry of Environment (LH). The Government has taken the following initiatives and actions:

a) A licensing system for import of ODS was set up in 1998 where 22 substances of CFC were encoded, and one CFC registered importer and three registered methyl Bromide importers were appointed by the Government to handle CFC importation.
b) Ban on imports of goods containing ODS from 1998.
c) Amendment of licensing system for import of ODS on 2 December 2002 was issued where 5 substances of CFC are allowed to be imported through three CFC registered importers and three registered importers for methyl Bromide .
d) Amendment of ban on imports of goods containing ODS on 2 December 2002 where 5 substances of CFC namely CFC-11, CFC-12, CFC-113, CFC-114 and CFC-115 are allowed to be imported until 31 December 2007.
e) Monitoring the use and import of ODS to minimize illegal trade and capacity-building of customs officials in line with ASEAN agreements
f) Active monitoring of the progress of implementation of projects funded by MLF
g) Formulating guidelines and regulations as necessary for policy implementation
h) Supporting awareness initiatives promoting ozone layer protection at consumer level.
i) Interaction with other ministries, departments, industry representatives and implementing agencies for information dissemination related to impact of policies
j) Promoting research and use of ozone-friendly technologies
k) Developing incentives and rewards for the use of ozone-friendly technologies

1.5 Along with the progress of ODS phaseout activities in the Halon, RAC, MAC, Solvent, and Tobacco sectors, ODS phaseout in the Foam sector has become critical in Indonesia. This sector comprises many small and medium sized enterprises and poses a major challenge in paring limited funding with the management of geographically dispersed small CFC users.

1.6 The Plan aims at complete phaseout of CFC-11 in the foam sector. It will establish an efficient mechanism to promote phaseout activities, to reach out to small users, to promulgate and monitor suppliers, and to develop suitable reporting and auditing structures on phaseout activities and fund utilization. The plan is described in Chapter VII. With most ODS-producing countries gradually phasing out the production of CFC-11, the availability of CFC-11 will decline every year, and will stop completely in 2010. The schedule for consumption phaseout of CFC-11 will address this decline.

## B. PREPARATION OF A CFC PHASEOUT PLAN FOR THE INDONESIAN FOAM SECTOR

1.7 This Foam Sector Project has been developed to satisfy the Government's obligations under the Montreal Protocol, and in line with Indonesia's Country Program Update, while taking into account the principles established in other sector plans approved by the ExCom and applicable MLF guidelines for the foam sector.

1.8 Main considerations in the preparation of the Plan were:

a) The Government's obligations under the London Amendment of the Montreal Protocol on Substances that Deplete the Ozone Layer;
b) Principles laid down in the CP from 1994 and the CPU from 2000;
c) The national strategy for economic and social development;
d) The need to ensure that the development of the foam sector itself will not be jeopardized by ODS phaseout;
e) The Government's commitment to comply with agreed-upon overall and annual phaseout targets—assuming that the MLF approves the Sector Plan and disburses funds according to the Annual Programs, and
f) Phaseout of the use of ODS in the foam sector in a cost-effective way.

1.9 The Foam Sector Plan avoids any double counting by deducting ODS phaseout amounts and costs from the baseline for foam projects already approved by the ExCom. Implementation of the PU foam Sector Plan will not affect implementation of projects already approved.

1.10 The Foam Sector CFC Phaseout Plan includes investment project for 30 individual enterprises, and a Technical Support Service component to provide technical support for those 30 enterprises, as well as to conduct workshops to effect ODS phaseout for enterprises too small to be considered for investment projects. Table 1.1 shows the breakdown of the investment projects included in the Plan.

**Table 1.1 Investment Projects in the Foam Sector CFC Phaseout Plan**

| Sub-Sector | Eligible Enterprises | Identified Eligible Use(MT) | ODP Phased Out (MT) | MLF threshold (US$/kg) | Requested Funding (US$/kg) |
|---|---|---|---|---|---|
| RPF | 20 | 215 | 196.1 | 7.83 | 1,535,463 |
| FMF/ISF | 10 | 83 | 83 | 16.86 | 1,399,380 |
| TOTAL | 30 | 298 | 279.1 | | **2,934,843** |

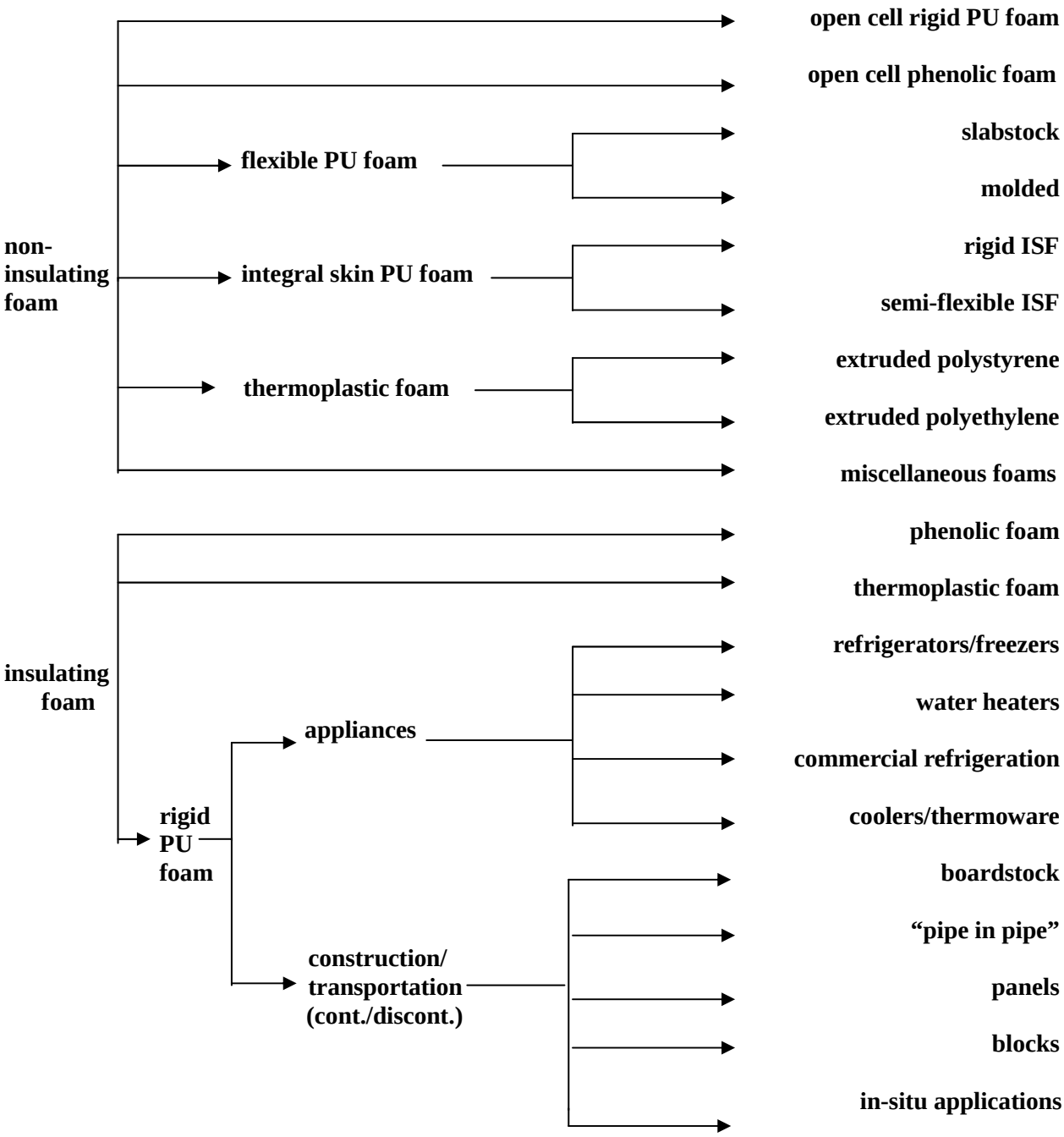
1.11 The total project impact is 333.1 ODP tons. From investment projects for phaseout of eligible consumption, the impact is 279.1 ODP tons, and from policy actions to phaseout identified ineligible consumption, the phaseout amount is 54 ODP tons.

1.12 Of the total project impact of 333.1 ODP tons, 75% (or 250.4 ODP tons) is accounted for by the reassignment of eligible tonnage from two previously approved projects -- IDS/FOA/INV/77 and 78. This tonnage is reassigned to remaining eligible consumption after the complete identification and verification process was finished for those projects. Decision 40/13 effectively prohibits substitution of enterprises into those projects; therefore the remaining tonnage is reallocated to this project. The impact of the remaining consumption for funding is 82.7 ODP tons.

# II. THE FOAM SECTOR IN INDONESIA

## A. GENERAL BACKGROUND

2.1 Foamed plastics can be classified on the basis of composition, chemical and physical characteristics, manufacturing process or application. These main categories can then be further divided and subdivided into functional groups as follows:



2.2 The most prevalent use of **open cell rigid PUR foam** is for packaging applications ("pour in place" foam), mostly when small lots are involves, such as in the return of repaired items. Another application is "back-foaming" of crash panels, such as automotive dashboards. **Open cell phenolic foam** is mainly used for flower arrangements. **Flexible PUR foam** constitutes the largest group of non-insulating foams. Comfort applications, such as bedding and furniture, dominate in the use of **slabstock—continuous or boxfoam**—followed by lining for textiles. **Molded** foam is used in the automotive industry and, in much smaller amounts, for office furniture. **Rigid integral skin foams** (ISFs) are used for recreational purposes, such as surf boards, and in imitation wood. **Semi-flexible ISFs** are used in the automotive industry for arm rests and steering wheels, in office furniture and in shoe soles (micro-cellular). **Extruded polystyrene foam sheet** is used for food service and food packing applications (meat trays, egg cartons, plates, cups, etc). **Extruded polyethylene foam sheet and plank** is mostly used for packaging purposes. Some examples of **miscellaneous foams** are floor mats for cars and one component foams, such as in spray canisters. Closed cell **phenolic foam** is used for building insulation. **Thermoplastic foams** for thermal insulation purposes consist mostly of **extruded polystyrene insulation board** in construction applications and of **extruded polyethylene tubing** for pipe insulation. **Rigid PUR foams** for thermal insulation is by far the most significant group of insulating foams. Its insulation value exceeds any other foam by a significant margin. There are numerous applications in appliances as well as construction. In appliances, refrigerators dominate, but specifically in commercial refrigeration and small appliances, there is a diverse and frequently unexpected large use of foam. Examples are:

- Thermos bottles
- Water containers, cool boxes (fish industry!)
- Boilers
- Milk containers
- Casseroles/hot pots
- Vendor carts (ice cream, drinks)
- Insulated trucks
- Mortuary coolers

Examples of applications in construction are:

- Sprayfoam (chicken/hog farms, commercial buildings, cold storage)
- Roof panels
- Cold storage structural panels
- Pipe insulation

Examples of miscellaneous applications are:

- Floatation devices (buoys, surf planks)
- Boat filling (floatation as well as insulation)
- Bus insulation (thermal, sound)

2.3 The most prevalent categories in Indonesia are flexible foams, integral skin foams,

closed-cell rigid foams and thermoplastic foams. The sector has been sub-divided accordingly.

2.4 The Indonesian foam sector has developed rapidly over the past 20 years. Growth rates for extruded (PE/PS) foams have been less than for other foam sub-sectors, based on the 2reduction of plastics in packaging applications and adverse environmental publicity (landfill concerns). The total number of CFC-consuming foam enterprises is estimated to be 140.

2.5 Foam manufacturers are mostly relatively small and medium sized enterprises. Production technology is not very labor-intensive, capacity utilization is low and the technologies used generally not very sophisticated.

## B. CFC CONSUMPTION

2.6 The foam sector initially accounted for nearly 50% of the country's CFC consumption but this has decreased rapidly in the last two years. Most of the larger-sized enterprises have in the mean time phased out or have approved phaseout projects. In addition, three group projects for smaller enterprises have been approved, from which one has been completed. For the remaining smaller enterprises, the adoption of a consolidated phaseout strategy is the only effective way to eliminate the entire CFC consumption in the sector.

2.7 Table 2.1 shows consumption patterns for the industry:

**Table 2.1 CFC Consumption and Related Foam Production (2001)**

| Classification | Code | Main Products | Number of Enterprises | ODS Type | CFC use (t) *) | Production (t) |
|---|---|---|---|---|---|---|
| Continuous foam | FPF | Furniture, mattresses | 1 | CFC-11 | 200 | 3,700 |
| Box foam | FPF | Furniture, mattresses | 60 | CFC-11 | 954 | 9,500 |
| PU Rigid foam | RPF | Insulation materials, boards, pipes | 46 | CFC-11 | 773 | 4,355 |
| Integral skin & Flexible molded | ISF FMF | Auto parts, furniture | 46 | CFC-11 | 689 | 800 |
| Extruded PS/PE | XPE/ PS | Dishware, packaging | 1 | CFC-12 | 35 | 175 |
| **Total** | | | **154** | | **2,651** | **18,530** |

*) CFCs Consumption based on on-going projects and sectoral plan funded by MLF

2.8 Table 2.2 below shows the CFC consuming enterprises by sub-sector:

**Table 2.2: Number of foam enterprises and CFC consuming enterprises**

| | FPF | RPF | FMF/ISF | XPS/PE | Total |
|---|---|---|---|---|---|
| Total enterprises | 121[++] | 66[++] | 55[++] | 4[++] | 246[++1] |
| Total CFC consuming enterprises[2] | 61[3] | 51 | 46 | 1 | 159 |
| **MLF funded enterprise** | **121** | **32** | **42** | **4** | **199** |
| CFC consuming enterprises identified by SPP survey | 0 | 34 | 13 | 0 | 47 |
| Eligible enterprises identified by SPP survey | 0 | 23 | 10 | 0 | 33 |
| Non-eligible enterprises as identified by SPP survey | 0 | 11 | 3 | 0 | 14 |

[1] Completed, on-going and sector plan funded by MLF

[2] Total CFC consuming enterprises comprises of on-going and sectoral plan funded by MLF

[3] Consisting of 60 boxfoam and 1 continuous producer

2.9 Table 2.3 shows shifts in consumption in the CFC-11 consuming sectors over the last years. Data was estimated based on best available information from the import control system at the time of the CP update. The import control system has not been reliable in the past, and in fact has received ExCom funding to improve its operation. Therefore, the figure of 2,625 tons remaining consumption as calculated in Table 2.1 above is considered a more accurate and reliable figure than the officially reported 1600 tons in the CP update, and is the figure upon which the Sector Phaseout Plan is based.

**Table 2.3 CFC-11 Consumption (in t)**

| CFC- 11 Consumption | 1995 | 21996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|
| PU foam sector | 2,887 | 3,808 | 3,243 | 2,489 | 2172 | 1909 | 2625* |
| PU Refrigeration insulation foam | 310 | 300 | 250 | 0 | 0 | 0 | 0 |
| Tobacco sector | 90 | 35 | 35 | 30 | 15 | - | - |
| Commercial refrigeration sector | 816 | 720 | 735 | 696 | 696 | 696 | NA |
| Air conditioning | 135 | 135 | 135 | 135 | 135 | 132 | NA |
| **National consumption CFC-11** | **4238** | **4998** | **4398** | **3350** | **3018** | **2737** | ***** |

* The 2001 CFC-11 use is presently under review based on information collected during the sector project preparations

2.10 CFC-12 is consumed in foams, refrigeration and aerosols. Historic data of CFC-12 consumption is shown in Table 2.4 below.

**Table 2.4: CFC-12 Consumption (in t)**

| CFC-12 Consumption | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|
| **National consumption CFC-12** | **4,008** | **3,910** | **3,214** | **2,810** | 2810 | 2652 | 2600 |
| Foam sector (XPE/PS) | 721 | 819 | 693 | 526 | 526 | 373 | NA |
| Refrigeration sector | 1,487 | 1,591 | 1721 | 1584 | 1584 | 1579 | NA |
| Aerosol sector | 1800 | 1500 | 800 | 700 | 700 | 700 | NA |

2.11 Table 2.5 show the identified remaining CFC use in the Foam Sector:

**Table 2.5: 2001 Residual CFC Consumption in the Foam Sector (t)**

| | FPF | | RPF | | ISF/FMF | | XPE/PS | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Total** | **Eligible** | **Total** | **Eligible** | **Total** | **Eligible** | **Total** | **Eligible** | **Total** | **Eligible** |
| Identified enterprises | 1,154 | 1,154 | 773 | 732 | 689 | 676 | 35 | 35 | 2,651 | 2,597 |
| Residual CFC consumption in the PU foam sector to be phased out | | | | | | | | | **2,651** | **2,597** |
| CFC Consumption not covered by ongoing projects | | | | | | | | | 352 | 298 |
| CFC 11 & CFC 12 consumption to be phased out by ongoing MLF funded projects | | | | | | | | | 2,299 | 2,299 |
| **Total 2001 CFC consumption** | | | | | | | | | **2,651** | **2,597** |

2.12 While at a later stage more CFC users in the foam industry may be found, the only way to quantify this would be through CFC import data. These data are not yet available for 2001 and may not be reliable as they do not reflect stockpiling. In the current situation this may occur. There are reports of as much as 800+ additional tons of non-eligible consumption that has not been verified.

2.13 The consumption of CFC-11 in the PU foam sector in the base year is shown below:

**Table 2.6 Consumption of CFCs in the foam sector in the base year (2001)**

| | **MT** |
|---|---|
| Consumption by ongoing projects approved before 2002 | 2,051 |
| Projects approved in 2002 | 248 |
| **Subtotal** -- consumption by ongoing projects | **2,299*** |
| Identified eligible consumption for the sector plan | 298 |
| Non-eligible consumption and consumption by not yet identified enterprises to be phased out under the sector plan | **54*** |
| **Total consumption of CFC 11 (base year 2001)** | **2651** |

* Based sector preparation information.

## C. PREVIOUS PHASEOUT ACTIVITIES IN THE FOAM SECTOR

**Policies and Regulations:**

2.14 The Indonesian Government has issued the following regulations to help control ODS consumption:

- Establishment of a licensing system for import of ODS (1998)
- A ban on imports of goods containing ODS (1998)
- Amendment of licensing system for import of ODS on 2 December 2002 was issued where 5 substances of CFC are allowed to be imported through three CFC registered importers and three registered importers for methyl Bromide
- Amendment of ban on imports of goods containing ODS on 2 December 2002 where 5 substances of CFC namely CFC-11, CFC-12, CFC-113, CFC-114 and CFC-115 are allowed to be imported until 31 December 2007

The Government also trains customs officers and monitors ODS imports to minimize uncontrolled importation of these substances.

**ODS Phaseout Activities:**

2.15 As of November 2002, there were 69 MLF approved projects in the foam sector, accounting for 209 enterprises. Of these, 34 were rigid PU foam projects, 14 were flexible PU foam projects, 17 were PU integral skin foam projects and 4 were extruded polystyrene/polyethylene projects. The total ODP phaseout amount through these projects is 4,214 t ODP. More detailed information can be found in the following table:

**Table 2.7: Approved MLF Projects in Foam Sector (end 2002)**

| Sub-sectors | No. Projects | Investment Projects (US$) | Non-Investment Projects (US$) | ODP to be Phased out (MT) | ODP already Phased out (MT) |
|---|---|---|---|---|---|
| **CFC-11** | | | | | |
| FPF | 14 | 7,332,097 | 1,600,000[1] | 2,107 | 593 |
| ISF/FMF | 17 | 8,234,830 | | 913 | 271 |
| RPF | 34 | **4,698,278** | | 824.8 | 355 |
| **CFC-12** | | | | | |
| XPE/PS | 4 | 1,480,000 | | 369 | 369 |
| **Total** | **69** | **21,745,205** | **1,600,000** | **4,214** | **1,588** |

[1]a TA project for 50 boxfoam producers

2.16 There are two large ODS phaseout group projects for SMEs currently under implementation. Both are under execution by the Indonesian Foam Association (AFI) and were approved at the 23th ExCom Meeting. One project covers flexible PU boxfoam (954 t ODP/60 participants) and is a terminal project, implying that no additional funding will be requested for this application. The other covers flexible molded PU foam (370t ODP/26 participants) and has no terminal character. Both projects include confirmation of the listed companies after approval. It was expected that some additional enterprises may be identified and added, specifically in the (terminal) boxfoam project.

2.17 The implementation of the projects was delayed due to a period of civil unrest and financial uncertainty in Indonesia which halted the certification process for an extended period.

2.18 When the certification process was resumed, it was found that that the financial and civil crisis had resulted in changes of ownership, relocations, temporary stop of production etc. This was affecting recipients' ability to provide the necessary documentation to prove their eligibility and stretched the certification process considerably. This, again, delayed the national phaseout process to an extent that the Government raised concerns regarding the impact on its ability to meet applicable ODS reduction targets.

2.19 It also raised concerns at the MLF in view of implementation time. The ExCom decided on its 40th meeting:

> **"To request the World Bank to implement the two SME foam projects in Indonesia (IDS/FOA/INV/77 and 78) as per the original project document and to return any funds and agency fees associated with the remaining enterprises that had been closed or did not provide required data in project IDS/FOA/23/INV/78" (Decision 40/13 (d)).**

2.20 The implementation status for **IDS/FOAM/23/INV/77 – FLEXIBLE PU BOX FOAM** at time of this decision was as follows:

60 Baseline units (companies) were included in the original project
2 companies refused cooperation
8 companies have been closed
3 companies have been double counted
**47 Original units are leftover**
11 Eligible enterprises have been found and verified in 2002, prior to Decision 40/13
**58 Baseline units (= Companies) were identified and presented by AFI**

2.21 Out of the 58 companies, 4 were unable to provide full documentation and have been taken from the list during the 2002/03 validation process. As no additional enterprises can be added anymore following decision 40/13, the project will be limited to 54 enterprises, 6 short of the original expectations. These enterprises represent a consumption of 95.4 t ODP which will now have to be added to the aggregate CFC consumption eligible for MLF funding as part of the sector phaseout plan.

2.22 To speed up implementation, AFI decided to purchase equipment in tranches. 30 units have been ordered July 2003 and a second batch of 24 will follow in March 2004.

2.23 The status for **IDS/FOAM/23/INV/78 – FLEXIBLE PU MOLDED FOAM** at time of decision 40/13 was as follows:

31 Baseline units (26 companies)
7 units (5 companies) have been closed or could not been found anymore
5 units (5 companies) double counted
**19 Baseline units (17 companies) were identified and presented by AFI**

2.24 Out of the 17 companies, one was unable to qualify and has been taken from the list during the 2002/03 validation process and the eligibility of two units is still under investigation. As no additional enterprises can be added anymore following decision 40/13, the project will be limited to 16 enterprises, 10 short of the original expectations. These enterprises represent a consumption of 155 t ODP which will now have to be added to the aggregate CFC consumption eligible for MLF funding as part of the sector phaseout plan.

2.25 The large amount of double counting concerns companies that received projects through other Agencies despite being previously approved under the SME projects.

2.26 The project was originally narrowly defined as FMF, although ISF applications are technically virtually identical to FMF and have the same financial threshold value. By mid-2002 it was clear that the project could not be filled with FMF recipients alone and the inclusion of FMF/ISF and ISF was started. However, decision 40/13 disallowed any reconsideration and limited therefore the participation to FMF only.

2.27 The 10 ISF recipients that are included in the sector phaseout plan would exactly fit the SME project that is 10 recipients short. Rather than cutting this project short and transferring the surplus ODP to the aggregate eligible consumption the MLF may consider reconsidering decision 40/13 and allowing inclusion of ISF recipients. This would accelerate implementation as all validation, procurement preparation and national/international technical support is already in place.

## D. SURVEY OF REMAINING CFC CONSUMPTION

2.28 The World Bank, after consulting the Government of Indonesia, appointed a local consulting firm, Edrola, to conduct a comprehensive survey of the remaining CFC consumption in the foam sector. The consultant was directed to keep close contact with other Implementing Agencies to assure that any existing project pipelines, data banks and other information available from these Agencies would be included in the survey. The work was completed in November 2002 and the results have been forwarded to the NOU for validation.

The consultant was also directed to follow pertinent guidelines from the MLF ExCom on classification and determination of eligibility.

2.29 The average annual foam production of all PU foam producers in Indonesia is about 132 t/y, while the average for the 30 eligible enterprises under this Plan is approximately 146 t/y. This is relatively small by international standards. Indonesian foam producers generally produce for local and regional rather than national markets because of the difficulty and the high cost of transporting foam products over long distances within the Indonesian archipelago.

2.30 Tables 2.8 and 2.9 present information for the identified (not yet funded) rigid PU foam companies on baseline equipment, CFC-11 consumption and eligibility. Enterprise eligibility has been calculated based on ExCom decision *17/7 para.15*. Equipment eligibility has been based on capacity installed before July 25, 1995.

**Table 2.8: Identified CFC-11 Consumption for PU Rigid Foam**

| | # of enterprises | Number of eqt | Number of eligible equipment | | CFC-11 Consumption (MT) | | | Average size (MT) | Eligible consumption |
|---|---|---|---|---|---|---|---|---|---|
| | | | type I | type II | 1999 | 2000 | 2001 | | |
| **All enterprises** | 31 | 20 | 17 | 3 | 219.84 | 245.97 | 255.53 | 8.24 | **256** |
| **Eligible enterprise** | 20 | 14 | 13 | 1 | 195.13 | 212.98 | 215.09 | 10.75 | **215** |
| **Ineligible enterprises** | 11 | 6 | 4 | 2 | 24.71 | 32.99 | 40.44 | 3.68 | **41** |

2.31 Foam equipment has been categorized as follows:

a) Type I refers to equipment installed before July 1995. CFCs consumed by this equipment is eligible for compensation.

b) Type II refers to equipment installed after July 1995 but as replacement for retired equipment installed before July 1995, with no increase in capacity. CFC-11 consumed by this equipment is eligible for compensation.

c) Equipment installed after July 1995 is new production capacity. CFC-11 consumed by this equipment is not eligible for compensation.

**Table 2.9 Distribution of Equipment Application in Rigid PU Foam**

| | Number of enterprises | | | | | | Number of eligible spray equipment | | Number of eligible dispenser equipment | | | | ineligible eqt | total eqt |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Spray | Structural | Panel | Pipe | Thermowa re | Total | H-P spray (import) | L-P spray (Import) | H-P dispenser import | H-P domestic dispenser | L-P import dispenser | L-P domestic dispenser | | |
| All enterprises | 3 | 2 | 20 | 2 | 4 | 34 | 1 | 1 | 4 | 0 | 11 | 0 | 3 | 20 |
| Eligible enterprises | 2 | 0 | 14 | 1 | 3 | 23 | 1 | 1 | 3 | 0 | 8 | 0 | 1 | 14 |
| Ineligible enterprises | 1 | 2 | 6 | 1 | 1 | 11 | 0 | 0 | 1 | 0 | 3 | 0 | 2 | 6 |

2.32 Of the 10 eligible integral skin foam producing enterprises, four produce shoesoles, and six produce automotive parts. Table 2.10 summarizes the findings related to eligibility and equipment for the integral skin foam group.

**Table 2.10: Identified CFC-11 Consumption for Integral Skin Producers**

| Eligibility & Size of Enterprises | Number of enterprises | No. of equipment | No. of eligible equipment | Consumption (MT) | | | Average size (MT) |
|---|---|---|---|---|---|---|---|
| | | | | 1999 | 2000 | 2001 | |
| All Enterprises | 13 | 14 | 6 | 74.47 | 84.88 | 96.21 | 7.40 |
| Eligible Enterprises | 10 | 12 | 5 | 61.77 | 71.68 | 83.01 | 8.30 |
| Ineligible Enterprises | 3 | 2 | 1 | 12.70 | 13.20 | 13.20 | 4.40 |

2.33 The integral skin foam enterprises identified as eligible for inclusion in this project would fit extremely well within the AFI project for flexible molded foam. However, decision 40/17 would seem to preclude this substitution. From a technical standpoint, this would be the optimal solution, since there is no technical difference in implementation between the flexible molded and integral skin foam categories – identical technology and equipment.

## E. ISSUES

2.34 The main issues for CFC phaseout in foam sector include:

a) **Identification of all CFC users**. Not only potential recipients should be identified but also non-eligible enterprises, as they need to be briefed as well.

b) **Need for an efficient phaseout approach**. Most remaining foam enterprises are very small, privately owned and widely distributed over the country. Phaseout of the residual CFCs through a project-by-project approach is too time-consuming to meet the Montreal Protocol requirements. A group mechanism based on common applications or regional locations will be faster and more cost-effective.

c) **Suitable alternative technologies.** Following criteria for the selection of alternative technologies apply:

- Proven and reasonably mature
- Cost effective in conversion
- Locally available
- Acceptable priced
- Support available from the local suppliers
- Critical properties to be maintained in the end product
- Meeting established standards on health, safety and environment
- Zero ODP technology should be chosen whenever feasible.

d) **Awareness.** Enterprises, especially small users, do not have sufficient knowledge about CFC phaseout policies, technical options and costs, and they also do not have sufficient knowledge about their obligations and rights in the ODS phaseout process.

e) **Market competition** Since the production costs for CFC technology and alternative technology are different, the differentials in production costs would result in challenges for converted enterprises, etc.

# III. PHASEOUT STRATEGY

## C. INTRODUCTION

3.1 The foam sector phaseout strategy has been established based on the historical development and the present structure of the foam industry in Indonesia, including the present status of ODS phaseout, as well as forecasts of production and consumption of CFCs and their substitutes, with the objective of developing and implementing the most efficient and cost-effective phaseout program possible. It is very important that the strategy is designed to minimize any adverse impact on the development of the foam sector.

3.2 The PU foam sector plan phaseout targets are as follows:

a) All eligible CFC-11 consumption will be phased out by the end of 2007;
b) All ineligible CFC-11 consumption in ineligible enterprises will be phased out by controlling CFC-11 supply; and
c) total phaseout of CFC-11 consumption will be achieved by the end of 2007.

## D. APPROACH TO PHASEOUT CFC-11 IN PU FOAM SECTOR

3.3 The overall approach to the phaseout of CFC-11 under this sector plan will include multiple approaches to reflect the diverse structure of the industry, such as the size and number of enterprises, and the characteristics of the sub-sector. The phaseout targets in the plan will be achieved by a series of annual programs. The main operating mechanisms to implement the sector plan include:

- Selection of enterprises for participation according to existing MLF policies
- Inclusion of a technical support system to assist small enterprises
- Policy initiatives to effect elimination of CFC use in ineligible enterprises

3.4 Schedule: According to the Indonesian targets for CFC phaseout in the country, the CFC phaseout for the foam sector must be complete by the end of 2007. This plan aims to achieve the phaseout within that timeframe. The plan is presented as a sector phaseout plan based on a performance agreement.

3.5 Selection of enterprises: As described in Section IID, an extensive survey was conducted identifying remaining foam producing enterprises in Indonesia. Selection of enterprises for participation in this sector phaseout strategy was made according to established MLF criteria, including:

- Enterprise establishment prior to 25 July 1995
- Verified CFC-11 consumption, corrected if based on equipment installation dates
- Corrections for foreign ownership and exports, as necessary

3.6 Technical Support System (TSS): Because of limitations in technology, information collection and management expertise, small enterprises may face difficulties in selecting and using the most appropriate substitute technology. A technical support system will be set up to provide substitute technologies, formulation and technical consultation to such enterprises, etc. In addition, this Technical Support System will provide for conduction of a series of workshops to inform and train very low-consuming foam enterprises (who are not eligible for investment projects) on ODS phaseout requirements.

3.7 Policy initiatives for addressing Ineligible enterprises: Ineligible enterprises will not be funded under the sector plan. The CFC-11 consumption phaseout of these enterprises will be realized via the following policy initiatives and measures: (1) ban on new production facilities which use ODS, (2) quota systems for CFCs, etc.

## E. SELECTION OF SUBSTITUTE TECHNOLOGY

3.8 The following factors are to be considered when selecting substitutes and substitute technology. The chosen technology should :

a) be benign to the Ozone Layer and the environment;
b) ensure worker safety and health;
c) discourage replacement with low ODP substance or high GWP substance;
d) provide equal capacity as former substances and technologies used; and
e) be cost effective.

3.9 Rigid Foam: The three currently prevailing phaseout technologies for PU rigid foam products are pentanes, water and HCFC-141b technologies. Other technologies such as HCFC-22/142b and HFC-134a can also be used but these technologies always require extensive adjustment of the current production process.

*a)* *Pentane* technology is commercially proven and extensively used. It has zero ODP and GWP, but is flammable and needs careful review of manufacturing operations. Because of the related safety costs, it is not cost-effective to use pentanes in smaller enterprises. In the foam sector, no enterprise in Indonesia has implemented pentanes. Cyclopentane has been implemented in domestic refrigeration conversions in Indonesia.

b) *Water blown (CO2)* technology is another zero ODP technology and is commercialized in Indonesia for the application of non-insulation foam. The disadvantage of water blown technology is that it requires changes of foaming machines and formulations. It is not applicable for insulating rigid foams, as it does not provide the insulation properties required in the final products. Water-based formulations tend therefore to be most applicable in relatively less critical applications, such as acoustical application and floatation devices

c) *HCFC-141b* has an ODP of 0.11. Its application is proven, mature, relatively cost-effective and it is locally available. HCFC-141b can, however, be destabilizing in higher concentrations, being a strong solvent, which would lead to the need to increase the foam density. As an interim option, its application would only be recommended if permanent options do not provide acceptable solutions. Most rigid foam conversion in MLF projects in Indonesia have been made using HCFC-141b.

d) *HCFC-22* has an ODP of 0.05 and is under ambient conditions a gas. It is not offered as a premixed system and would require an on-site premixer. It has at times been promoted as a co-blowing agent with HCFC-141b to increase the cell-pressure and thus to decrease potential shrinkage. However, this technology never has gained significant market recognition, mostly because of the general presumption against HCFCs in this area.

e) *HFC-134a* is under ambient conditions a gas. It is not offered in the applicable regional area as a premixed system and would require an on-site premixer. It is also less energy efficient, and expensive compared to most other technologies.

3.10 Integral Skin Foam: The presently available substitute technologies for integral skin foams are hydrocarbons, water blown and HCFC-141b.

a) *Hydrocarbons* are zero ODP solutions that have been used by some European companies, and is used in many shoesole applications. The drawback is the inherent flammability of these systems, requiring process exhaust as well as a gas sensing/alarm system. It is generally applicable only with enterprises that are large enough to warrant it from a cost and safety standpoint.

b) *Water-blown* systems have no ODP, making water blown a favorable final solution. However, the skin formed is much thinner and there is an increased friability. In-mold coating is frequently required, which increases cost and production time. The durability of the product is less than with CFCs, HCFCs or hydrocarbons. Water-blown polyester polyol formulations do provide the required physical properties, but are more expensive and require equipment that can handle the higher viscosity.

c) *HCFC-141b* is an interim solution. The process conditions of HCFC-141b is very similar to that of CFC-11. The safety issue is minor and the quality of the final product will be very close to that of CFC-11. The disadvantage of this option is that HCFC-141b still has an ODP of 0.11.

d) *HFC-134a based systems* are generally offered by suppliers from the USA. The resulting product approximates the old CFC-11 blown products but the skin is thinner. The shrinkage rates are approximately the same as for CFC-11 systems. Handling of HFC-134a can be problematic. It is a gas at room temperature, and must

be dissolved into the polyol system. Special equipment is required, including pressurized tanks and a gas handling system for dissolving the gas in the polyol component. It can be supplied pre-mixed, and when handled properly, can be kept dissolved in the polyol. However, the user should have facilities available to re-dissolve the material in the polyol. Storing the pre-mix under a blanket of HFC-134a helps to keep the gas in solution. In tropical climates, handling may become quite difficult.

e) *LIQUID HFCs* (HFC-245fa, HFC-365mfc) are not yet commercially available but suitable systems are already technically developed. They are expected to commercially emerge in 2002/2003 and their application will certainly focus on those countries limiting the use of HCFCs. The systems are much like HCFC-141b but will be significantly more expensive. They will not be considered in this project as they do not meet the requirement of commercial availability.

### 3.11 Selection of Alternative Technologies

a) For the rigid foam applications, the conversion technology selected is HCFC-141b, based on the size of the enterprises involved (small) and the products produced (generally having insulation requirements). HCFC-141b is an interim technology with residual ODP of 0.11, and enterprises are required to convert to a non-ODS solution at their own expense by 2040.

Cyclopentane is limited to larger operations, which will qualify for enough funding to cover the expense of a pentane installation with all of its required safety features. Three of the panel manufacturers approach this threshold, but due to the very large capital investments required, the funding limitations for the remaining foam sector phaseout, and the fact that hydrocarbon technology has not been implemented in any foam project in Indonesia to date, this technology option is not selected, even for the larger enterprises.

Water-based systems do not provide the required physical properties in the end product.

With HCFC-141b, enterprises that already have high pressure foaming machines will need to retrofit their baseline equipment to apply new HCFC-141b systems. Enterprises with low pressure foaming machines will in most cases need to purchase high pressure foaming machines in order to use HCFC-141b.

b) The technology choice for the integral skin foam enterprises is water-based formulations for most enterprises, based on the types of products produced and the

requirements for skin formation. In exceptional situations (for instance, when skin formation is vital and appropriate coatings are not available or are too expensive) HCFC-141b may be used as an interim solution. Exceptional circumstances can include availability of water-based systems, and final product performance of water-based systems.

**Information on Equipment and Chemical Suppliers**

3.12 Foam equipment in Indonesia is supplied by both domestic and international suppliers.

3.13 **Foam Dispensers:** The major international suppliers for high-pressure foam dispensers are:

| | |
|---|---|
| Cannon | Hennecke |
| Krauss-Maffei | OMS |
| SAIP | GMA |

3.14 A typical standard high pressure dispenser consists of a pair of chemical tanks (polyol, isocyanate) with auto-refill system from chemical storage drums. The tanks most often include thermal control for temperature conditioning of the chemical components. Chemicals are recirculated to a three-way valve at the mixing head. The mixing head is generally a self-cleaning impingement mixer, which can be mounted on a boom, or on a movable beam, to allow it to reach all required dispensing points. The entire dispenser could also be mounted on a lorry and rail system if plant layout requires such an arrangement. These are generally PLC controlled dispensers, and include ancillary equipment such as chillers and driers. Some of these suppliers have also developed compact versions of a high pressure dispenser which offer almost the same foam quality with fewer of the sophisticated options, and at generally lower prices.

3.15 Suppliers for small, mobile machines tend to include:

| | |
|---|---|
| GFT | Glas-Craft/Glas-Mate |
| Gusmer | Graco |
| Intergun | TecMac |

3.16 Dispensers in this category are generally small mobile high pressure dispensers with output from 7 to 20 kg/min, although there are some mobile dispensers on the market with higher outputs to 25-30 kg/min. Piston pumps are typical with no chemical recirculation, and mixheads may be either pneumatically or hydraulically actuated. Mixheads are generally hand-held guns that can be configured in a variety of ways. A wide variety of options is available within this general category of small, mobile dispensers. This category includes sprayfoam dispensers, pour-in-place dispensers and mobile high pressure dispensers.

3.17 Other dispensers that may be required could include standard low pressure dispensers, or boxfoam dispensers geared either to flexible or rigid boxfoam production.

3.18 Chemical Suppliers: The chemical suppliers in Indonesia are as follows:

a) Bayer
b) BASF
c) Dow Chemical
d) Huntsman
e) Small regional/domestic suppliers

3.19 Survey to major chemical suppliers provides the estimated polyol demands as per 2002 for domestic consumption as described below:

| CHEMICAL SUPPLIER | POLYOL CONSUMPTION OF 2002 (MT) | | |
|---|---|---|---|
| | Rigid Foam | MOLDED | Integral Skin |
| Huntsman (principal) | 900 | 100 | 50 |
| BASF (principal) | 100 | N/A | 60 |
| Vecto (principal) | 100 | N/A | N/A |
| Dow (principal) | 50 | 300 | N/A |
| Bayer (principal) | N/a | 300 | N/A |
| Tansri Gani (Distributor) | 150 | 40 | 60 |
| Jaya Abadi (Distributor) | 250 | 250 | 40 |
| Others; unidentified demands | 150 | 100 | 50 |
| TOTAL | 1600 | 1190 | 260 |

3.20 Most regional/domestic suppliers are local and much smaller than these large international corporations. All chemical suppliers can provide CFC-11 and HCFC-141b systems, while only international suppliers and leading domestic suppliers can provide hydrocarbon and water blown systems.

# IV. POLICIES

## F. INTRODUCTION

4.1 Enterprises in the foam sector face several operating challenges which limit their willingness to phase out CFC on a voluntary basis: lack of readily available and low cost substitute technologies, limited capital resources, and the need to maintain quality, market share and profitability. Even though they can receive some financial assistance from the MLF, many enterprises are still reluctant, or lack motivation, to phase out CFCs because they prefer the familiar existing techniques, and would be averse to the uncertainties and disadvantages of changing technological processes (with potentially higher operating costs, lower product quality, or higher safety and health concerns).

4.2 The Government will therefore establish a policy structure to complement MLF funding to ensure CFC phaseout in the sector, and will promote the transfer and dissemination of suitable substitute technologies, and to provide training for workers. Only by establishing and enforcing policies and regulations, can it influence the activities of enterprises and consumers to participate actively and quickly in PU foam conversion. While the key policy instrument for CFC-11 phaseout in the foam sector will focus on the supply side, by controlling and monitoring the production and import of CFC-11 to ensure that consumption targets are reached, it is also necessary to meet the demand for blowing agent and maintain growth in the foam sector by ensuring supply of alternative technology and substitutes.

## G. POLICY OBJECTIVES

4.3 The objectives of the phaseout policies are to achieve the following:

a) Ensure that the consumption of CFC-11 in the foam sector is reduced as scheduled;

b) Provide incentives for enterprises to phaseout CFC-11 and adopt environmentally benign substitute technologies;

c) Ensure the phaseout target of CFC-11 consumption in the foam sector is achieved according to schedule;

d) Encourage the propagation of low cost, technically suitable substitutes to replace CFC-11 blowing agent;

e) Promote the development and dissemination of substitute technology;

f) Encourage consolidation and regrouping of enterprises; and

g) Ensure that the growth of the foam sector is not affected by meeting the phaseout targets.

## H. POLICY DESIGN INPUTS

4.4 The following factors are relevant for a policy framework for the foam sector:

a) Description of existing regulations;
b) The specific Indonesian situation, taking into account the characteristics of the foam sector, such as large numbers of geographically scattered enterprises, demands for foam production, etc.;
c) The framework of policies for ODS phaseout in the Country Program;
d) The need to maintain continuity and consistency of these policies with the existing policy and regulation system;
e) Ensuring feasibility of the policies, as also continued supervision and management; and
f) Economic efficiency and fairness.

## I. DESCRIPTION OF POLICY INSTRUMENTS

**Table 4.1:Policy Framework for ODS Foam Sector**

| OBJECTIVES | POLICY |
|---|---|
| Control supply of CFC | To be covered by the overall control import system |
| Control consumption of CFC | To be covered by the overall control import system |
| Encourage phaseout activities on a voluntary basis | Public awareness |
| Guarantee safety and health with substitute technology | Technical support system |
| Encourage complete phaseout in the specific regions | Public awareness |
| Encourage selection of environmentally friendly substitute technology | Technical support system |

**4.5 Import license system :** The Government of Indonesia currently operates a CFC import licensing system. Importation, while controlled, is allowed until 2007. After completion of an ODS phaseout project, a company will not anymore be eligible for an import license.

It is foreseen to more aggressively pursue this license system to limit CFC consumption and to counter unlicensed importation. To this purpose, the MLF has separately approved a study of CFC imports that will develop the necessary policy instruments and technical assistance programs to prevent unauthorized import of CFCs

**4.6 Safety regulations for using flammable substitutes as blowing agent:** As some substitutes are flammable, safety regulations will be promulgated to prevent fire accidents and guarantee the safety of workers.

**4.7 Promotion of environmentally friendly substitute technology:** Indonesia will promote the selection of environmentally-friendly, safe and cost-effective substitute technologies, considering not only ozone depletion but other environmental effects as well.

**4.8 Regional policies:** Each region will be encouraged to promulgate its own ban on CFC-11 consumption in the foam sector ahead of phaseout schedule based on its own situation. Regrouping and consolidation of enterprises in the region will be encouraged.

**4.9 Ban on consumption of CFC-11:** A ban on CFC-11 consumption will be promulgated by January 2007, and CFC-11 use in the foam sector will be banned from January 1, 2010.

## J. POLICY ACTIONS

4.10 Policy actions related to ODS phaseout in the foam sector will include the following:

a) Control supply of CFC-11 by aggressively enforcing the existing ODS import license system and the issuance of quotas;
b) Ban CFC-11 consumption in the PU foam sector by the end of 2007;
c) Decrease consumption by implementing phaseout projects;
d) Formulate and promulgate policies to ensure the implementation of the sector plan;
e) Conduct training and public awareness campaigns to promote substitute technologies and encourage enterprises to actively participate in phaseout activities;
f) Provide technical assistance to enterprises for selection of substitute chemicals, formulation and substitute technology; and
g) Formulate technical norms and safety standards of substitute and alternative technologies.

4.11 The Foam Sector Plan is expected to be executed with all Phaseout actions starting after approval and completed by end of 2007 as described in the Action Plan (Chapter VIII)

# V. INCREMENTAL COSTS ANALYSIS

## K. GENERAL PRINCIPLES

5.1 The incremental costs for the PU foam sector have been calculated using the following approach:

a) Calculate the remaining eligible consumption of CFC-11 in the sector;
b) using MLF guidelines, calculate the incremental conversion costs of the 30 eligible enterprises identified in the survey, according to the sub-sectors (rigid and integral skin (ISF/FMF));
c) calculate the phaseout costs ($) of each sub-sector;
d) compare these costs with the sub-sector thresholds under MLF guidelines, and use the lower of the two costs in each case to establish the eligible grant amount for the sector as a whole;

5.2 The costs calculation is based on information on the total number of eligible CFC consuming PU foam enterprises for which detailed baseline information has been collected. Actual conversion costs have been calculated based on baseline information.

**5.3 Chemical Prices used for IOC Calculation**. The chemical prices used for calculating IOC were derived from the following:

a) The prices used in the latest projects approved by ExCom;
b) Price information in completed projects; and
c) Current prices obtained from the market.

**Table 5.1 Chemical Prices used in the Sector Plan**

| **Chemical Systems (US$/Kg)** | | | |
|---|---|---|---|
| Application | CFC-11-based systems | HCFC-141b-based systems | Water-based systems |
| Price | 2.50 | 2.80 | 3.00 |

### Rigid Foam Sub-sector

5.4 Rigid foam is produced by a large number of companies of various sizes spread all over Indonesia. Thirty five rigid foam projects have so far been funded by the MLF. The main products include pipe, panels, refrigeration equipment, cold storage, construction insulation, and packing materials. The various products set specific requirements for the foaming equipment. In general, low pressure equipment can be used for products without insulation performance requirements. High pressure equipment must be used for products where insulation performance is essential.

5.5 The survey has identified 31 remaining CFC consuming enterprises in the rigid foam sub-sector, of which 20 are eligible for funding. The remainder were established after July 25, 1995 and are thus not eligible for funding.

5.6 The survey also revealed many rigid foam enterprises with a very low and irregular blowing agent consumption. Identifications of these enterprises led to conclusion that these enterprises have not been in PU business as core business, they procured chemical systems from second and third tier suppliers without sufficient knowledge on what blowing agent was used in the polyol. These enterprises are too small to be eligible for investment projects, and will receive training on ODS phaseout through a series of 8 technical workshops (corresponding to regions in Indonesia) under the Technical Support Service part of the plan.

5.7 The replacement technology selected by Indonesia for the remaining rigid foam enterprises is HCFC-141b. During implementation, commitment letters from the enterprises will be collected. Part of this process includes informing the enterprises fully on the implications of choosing HCFC-141b as an alternative technology, as well as presentation of the costs and consequences of other technology choices.

5.8 Of the 20 eligible enterprises, analysis of the baseline equipment reveals the following with the related required actions:

**Table 5.2 Equipment related actions**

| | | |
|---|---|---|
| Handmix (7) | | Replace by high-pressure dispenser |
| Low pressure Dispensers (10) | | Replace by high-pressure dispenser |
| High Pressure dispensers | Standard HPDs (1) | Use as is |
| | Gusmer (FF1600 and H-2000) | Retrofit |

5.9 The incremental capital costs for HCFC 141b technology are calculated based on:

| | |
|---|---|
| High pressure dispenser | $80,000/machine |
| Retrofit of FF1600 | $ 6,000/machine |
| Retrofit of H-2000 | $12,000/machine |
| Trials | $ 5,000/enterprise |
| Contingency | 10% of net ICC |
| Deductions | handmix – 50% |
| | Age of baseline as needed |

5.10 The calculation of the Incremental Capital Costs for the Rigid foam sub sector is as follows:

**Table 5.3 Calculation of Incremental capital Costs for Rigid Foam**

| Item | Unit Cost | Quantity | Total Cost |
|---|---|---|---|
| High Pressure dispenser | 80,000 | 17 | 1,360,000 |
| Deductions (handmix) | (40,000) | 7 | (280,000) |
| Deductions (age of baseline dispenser) | (3,000) | 1 | (3,000) |
| Retrofit of FF1600 | 6,000 | 2 | 12,000 |
| Retrofit of H2000 | 12,000 | 2 | 24,000 |
| Trials | 5,000 | 20 | 100,000 |
| **Sub-Total** | | | **1,213,000** |
| Contingency (10%) | | | 121,300 |
| **TOTAL** | | | **1,334,300** |

5.11 Density increase. The OORG report on density increase, (UNEP/Ozl.Pro/ExCom/31/61 read with Decision 31/44) is used for determining the density increases necessary to maintain product quality. The density increase does not address insulation performance. Based on weighted core density of baseline foam products and OORG density report, the following percentages in density increase are used:

| | Panel | Pipe | Spray foam |
|---|---|---|---|
| Baseline foam density (kg/m3) | 41-44 | 33-35 | 32-35 |
| Density increase in 1st year | 4% | 6% | 6 % |
| Density increase in 2nd year | 0% | 3% | 3% |

For costing purposes in this project, a 5% density increased has been applied for simplicity.

5.12 The incremental operating costs are based on current chemical systems prices. IOCs are calculated based on chemical systems usage, applying a 5% density increase as shown below:

**Table 5.4 Incremental operating costs for HCFC-141b blown foam**

| | CFC blown foam | | | HCFC-141b blown foam | | |
|---|---|---|---|---|---|---|
| Chemicals | Tons | $/kg | Unit costs | Tons | $/kg | Unit costs |
| Systems | 1,725 | 2.50 | $4,312,500 | 1,811 | 2.80 | $5,070,800 |

5.13 Based on these assumptions, the incremental operating costs in converting to HCFC 141b for the 20 identified eligible enterprises is $ 758,300/year. The net present value (NPV) at 10% for 2 years is:

$ 758,300 x 1.74 = $1,319,400.

5.14 Based on the above figures, the incremental costs for the rigid foam sub-sector conversion are:

**Table 5.5: HCFC-141b Conversion Costs for Identified Enterprises**

| | No of enterprises | Net Incremental equipment Costs | Trials | Contingency | IOCs | Total Costs |
|---|---|---|---|---|---|---|
| **Total** | **20** | **$ 1,113,000** | **$ 100,000** | **$ 121,300** | **$ 1,319,400** | **$ 2,653,700** |

5.15 The maximum allowable grant based on the rigid foam sub-sector threshold is:

196.1 ODP tons x US$7.83/kg ODP = **US$ 1,535,463**

## L. INTEGRAL SKIN FOAM SUB-SECTOR

5.16 There are 13 identified CFC consuming enterprises in the Integral Skin Foam sub-sector, of which 10 are eligible for funding. The other three were established after July 25, 1995 and are therefore ineligible. Of the 10 eligible enterprises, 4 manufacture shoesoles, and the other six manufacture foam for automotive and/or furniture (arm rests) applications.

5.17 The replacement technology selected by Indonesia for the remaining integral skin foam enterprises is water-based systems to the extent possible, with use of HCFC-141b if water-based systems are unavailable or final product performance is unsatisfactory.

5.18 Of the 10 eligible enterprises, analysis of the baseline equipment reveals the following with the related required actions:

**Table 5.6 Equipment related actions, ISF**

| | |
|---|---|
| Handmix (1) | Replace by low pressure dispenser |
| Low pressure Dispensers (10) | 3 eligible for retrofit for thermal control and new polyol pumps; remaining 7 not eligible for action |
| High Pressure dispensers (2) | Use as is |

5.19 The incremental capital costs for water-based (CO2) technology are calculated based on:

| | |
|---|---|
| Low Pressure dispenser | $ 25,000/machine |
| Retrofit of low pressure dispensers | $25,000/machine |
| Mold Temperature conditioning | $ 2,000/enterprise (non-shoe) |
| Trials | $ 5,000/machine |
| Contingency | 10% of net ICC |

5.20 The calculation of the Incremental Capital Costs for the Integral Skin foam sub-sector is as follows:

**Table 5.7 Calculation of Incremental capital Costs for Integral Skin Foam**

| Item | Unit Cost | Quantity | Total Cost |
|---|---|---|---|
| Low Pressure Dispenser | 25,000 | 1 | 25,000 |
| Retrofit of low pressure dispenser | 25,000 | 3 | 75,000 |
| Mold Conditioning (thermal control) | 2,000 | 3 | 6,000 |
| Trials | 5,000 | 10 | 50,000 |
| **Sub-Total** | | | **156,000** |
| Contingency (10%) | | | 15,600 |
| **TOTAL** | | | **171,600** |

5.21 The incremental operating costs are based on current chemical systems prices. IOCs are calculated based on chemical systems usage, applying a 10% density increase as shown below. For shoesoles, a density increase is probably not going to be experienced, although for the automotive and furniture applications, an increase up to 15% may be experienced. This density increase is required to replicate the thick skin achieved by CFC-11 blowing. With water-based foam, this skin must be achieved by packing; hence increased density.

**Table 5.8 Incremental operating costs for water blown ISF**

| | CFC blown foam | | | Water blown ISF | | |
|---|---|---|---|---|---|---|
| Chemicals | Tons | $/kg | Unit costs | Tons | $/kg | Unit costs |
| Systems | 1,038 | 2.50 | $2,595,000 | 1,142 | 3.00 | $3,426,000. |

5.22 Based on these assumptions, the incremental operating costs in converting to water-based ISF systems for the 10 identified eligible enterprises is $831,000/year. The net present value (NPV) at 10% for 2 years is:

$831,000 x 1.74 = $1,445,940

5.23 Based on the above figures, the incremental costs for the ISF sub-sector conversion are:

**Table 5.9: Water-based Conversion Costs for Identified Enterprises, ISF**

| | No of enterprises | Net Incremental equipment Costs | Trials, technology transfer, training | Contingency | IOCs | Total Costs |
|---|---|---|---|---|---|---|
| **Total** | **10** | **106,000** | **$50,000** | **15,600** | **$1,445,940** | **1,617,500** |

5.24 The maximum allowable grant based on the integral skin foam sub-sector threshold is:

83 ODP tons x US$16.86/kg ODP = $1,399,380

## M. CALCULATION METHODOLOGY

5.25 **Incremental costs calculation.** Incremental costs (IC) for CFC-11 phaseout in the foam sector are based on actual costs to the extent possible. Incremental operating costs are calculated based on systems usage and factor in average density increases as appropriate.

5.26 **Incremental Costs for technical assistance** activities may include some or all of the following activities:

a) technical assistance for preparing equipment specifications;
b) technical equipment bid evaluation from suppliers during the competitive bidding process;
c) technical guidance to the recipient enterprise during start-up with the new equipment or process, including instruction on the safe use of substitute technologies;
d) technical evaluation with the enterprise on the results of product and process trials;
e) resolution of problems with new equipment or processes (which in difficult cases can result in significant inputs of time, money and effort to achieve satisfactory conclusions);
f) technical project commissioning including final technical inspection of equipment and process for establishing completion and compliance with project objectives such as the destruction of the existing ODS equipment where applicable, verifying that no ODS stocks remain, and verifying that the non-ODS production process was in operation;
g) technical evaluation of enterprise reimbursement claims on equipment, raw materials, local works and other items and technical certification of the same;
h) technical clearance so that the Hand-over Protocol can be signed and the project closed;
i) collection during the Hand-over Protocol of enterprise data on use of IOCs and other production/consumption data as required under new format project completion reports.

## N. TOTAL INCREMENTAL COSTS

**Table 5.10: Summary of Incremental Costs of Eligible Consumption by Sub-Sectors**

| | Identified Eligible Consumption (MT) | ODP Phased Out (MT) | Incremental Capital costs (US$) | Incremental Operating costs (US$) | Total Incremental costs (US$) | MLF threshold (US$/kg) | Requested Funding (US$/kg) |
|---|---|---|---|---|---|---|---|
| Rigid foam | 215 | 196.1 | 1,334,300 | 1,319,400 | 2,653,700 | 7.83 | 1,535,463 |
| Integral skin foam | 83 | 83 | 171,600 | 1,445,940 | 1,617,540 | 16.86 | 1,399,380 |
| TOTAL | 298 | 279.1 | 1,505,900 | 2,765,340 | 4,271,240 | | **2,934,843** |

5.27 A schedule for phasing out CFC-11 is presented in Chapter VII. The real incremental phaseout cost to Indonesia is US$4,271,240, and is calculated based on relevant ExCom guidelines (summarized above). Considering the MLF thresholds, the funding request for phaseout of CFC-11 in the entire PU foam sector is adjusted to account for maximum allowable grants. The adjusted total funding request for investment costs is US$ **2,934,843**.

## O. MANAGEMENT COSTS AND TECHNICAL SUPPORT

5.28 It is proposed that a project implementation and monitoring unit be established to provide the Government with necessary support to carry out all activities proposed under this plan. This foam sector phaseout plan entails CFC phase out activities in the foam manufacturing sector. In total, this plan will involve CFC phase out activities in 25-30 private enterprises, in addition to a series of activities to establish a policy and regulatory framework to support sustainable CFC phase out in the foam sector. Implementation of this proposed plan will involve a significant amount of administrative work to facilitate the development of the policy and regulatory framework, identification of additional end-users, development of enterprise-level project proposals, resource allocation for investment activities, public awareness activities, and other activities including necessary audit works. Implementation of this plan requires a project implementation and monitoring unit with full-time staff.

The following activities, but not limited to, will be managed or carried out by the Project Implementation and Monitoring Unit:

### 5.29 Regulations

The project management team will assist the NOU to undertake the following:

- To develop sector specific phase-out schedules for CFC imports.
- To enforce existing prohibition on the use of CFC-11 in the foam production from 2007 onwards;
- To attach a condition prohibiting the sales of CFC-11 for the use as a blowing agent, to all import licenses issued from 2005 onwards;
- To ban the use of CFC-11 in the production of pre-mixed CFC-11 polyol;
- To include pre-mixed CFC-11 polyol in the list of restricted products whose imports require review and approvals, from 2007 onwards;

### 5.30 Project Implementation

The project management team will undertake the following activities under supervision of the NOU:

- Prepare standard implementation procedures for eligible enterprises that would like to seek funding from the resources provided by the Multilateral Fund;
- Assist eligible CFC consuming enterprises prepare proposals to obtain financial support from the funds provided by the Multilateral Fund to phase out their use of CFCs;
- Arrange technical support, on a need basis, to assist enterprises to identify appropriate non-ODS technology;

- Review and approve proposals submitted by eligible enterprises;
- Prepare an annual progress report of the overall implementation of the Foam Sector CFC phase out plan in accordance with any ExCom procedures for this task;

### 5.31 PUBLIC AWARENESS

The project management team will undertake the following tasks under supervision of the NOU:

- Disseminate information related to the Government's policy to phase out CFCs in the foam sector in 2007;
- Inform the industry of the availability of funds provided by the Multilateral Fund to support CFC phase out in the foam sector in Indonesia;
- Raise public awareness of the environmental and economic impact of ozone layer depletion to the public via newsletters, news articles, seminars, radio spots;

### 5.32 MONITORING

The project management team will assist NOU to carry out the following tasks:

- Update the information on the actual amount of imported CFCs with the Custom Department on a quarterly basis;
- Monitor import of HCFC-141b;
- Train Ministry of Environment officers to identify and monitor CFC use at the enterprise level;
- Inspect warehouse of CFCs and HCFCs importers;
- Report any incidents of illegal import of CFCs in the foam sector;
- Carry out safety and technical audits of all projects undertaken under this plan as needed;
- Update the consumption data at the end-user level once every two years and prepare a revised strategy, if necessary;
- Prepare progress reports and annual work plans for submission to the ExCom;
- Maintain good account of all the expenditures incurred by this project.

5.33 Table 5.11 shows the requested for the costs of one additional technical specialist to be added to the Sector Project Management Coordination Unit (SPMCU) and consultancy services to cover the operation of the Implementation and Monitoring Unit in Indonesia during the implementation of this sector phaseout plan. One time costs are US$ 45,000 for Policy support and Public Awareness and US$ 80,000 is operational expenses for one expert for four years (US$20,000/year).

**Table 5.11 Project Implementation and Monitoring Unit (2003 – 2007)***

| Description | US $ |
|---|---|
| Regulatory and Policy Support | 15,000 |
| Project Implementation and Management | 50,000 |
| Public Awareness | 30,000 |
| Monitoring Activities | 30,000 |
| Sub-total | 125,000 |
| Contingency 10% | 12,500 |
| Total | 137,500 |

*After 2007, the remaining tasks will be carried out by the National Ozone Unit

5.34 Table 5.12 shows the requested funds for operation of the Technical Support System in Indonesia during the implementation of the Sector Phaseout Plan. This system will provide for technical support to small enterprises as described in the project document, as well as providing workshops and training for very small and irregular users who may not be eligible for investment projects due to their size and the nature of their business.

**Table 5.12 Technical Support System (2003 – 2007)**

| Description | US $ |
|---|---|
| Support System for Small Enterprises | |
| Technical Transfer | 50,000 |
| Training | 50,000 |
| Support cost | 25,000 |
| Technical Assistance for Very Small/Irregular Users | 64,000 |
| Sub-total | 189,000 |
| Contingency | 18,900 |
| Total | 207,900 |

## P. PROJECT IMPACT

5.35 The project costs and impact are summarized in Table 5.13 below.

**Table 5.13 Project Summary**

| **Description** | **ODP Phaseout Amount** | **Project Costs (US$)** | **Grant Request (US$)** |
|---|---|---|---|
| Investment Component | 279.1 | 4,271,240 | 2,934,843 |
| Management Costs | 0 | 137,500 | 137,500 |
| Technical Support | 54 | 207,900 | 207,900 |
| **Total** | **333.1** | **4,616,640** | **3,280,243** |

5.36 The grant effectiveness of the entire project is US$9.85/kg ODP. For the investment portion, the grant effectiveness is $10.52/kg ODP.

5.37 Of the ODP phaseout attributed to the project (333.1 ODP tons), a large portion of that is accounted for by the reallocation of remaining tonnage from two previously approved projects for AFI, leaving only 82.7 ODP tons to be accounted for from remaining consumption.

| | |
|---|---|
| ODP phaseout from sector phaseout project: | 333.1 ODP t |
| Reassigned from IDS/FOA/INV/77: | 95.4 ODP t |
| Reassigned from IDS/FOA/INV/78: | 155 ODP t |
| Remainder: | 82.7 ODP t |

# VI. OPERATING MECHANISMS

## Q. INTRODUCTION

6.1 Upon approval of this project, the Government of Indonesia will introduce additional policy measures and take other actions, as described in chapter IV, to achieve a rapid cost-effective CFC-11 phaseout in the foam sector. This chapter explains the funding arrangements, operating mechanisms, and the responsibilities of major institutions involved in implementation of this sector plan.

## R. UMBRELLA GRANT AGREEMENT

6.2 Indonesia and the World Bank have signed an Umbrella Grant Agreement which sets forth the terms and conditions under which grant resources approved by the ExCom in sector approaches in Indonesia would be carried out. The existing umbrella grant agreements between the Bank and Indonesia under which project-by-project activities are carried out will also be used for this project.

## S. FUNDING ARRANGEMENTS

6.3 **MLF Approval**.

It is understood that funding could either be provide as a one time funding at the 42nd meeting or in tranches over a four year period. It both cases, Indonesia would agree to a ceiling of import of CFC-11 for the foam sector as given in the table in the Executive Summary and in table under Action Plan. If the total amount is released at the 42nd meeting, the Bank would report consistent with progress reporting requirements. If released in tranches, the existing agreement for the refrigeration sector could be amended to include the foam sector. Funding would be released in tranches as described in the following and reporting would be through annual programs.

a) Firstly, the Government, through the World Bank, requests that the ExCom consider this overall sector plan and agree to fund the Foam Sector CFC-11 Phaseout with annual advances provided that Indonesia meets the annual phaseout target. Indonesia will also request ExCom to fund the first Annual Program.

b) From 2004 onwards, the Government would submit an annual program at the last ExCom meeting each year with a funding request. The amount of annual funding request would be consistent with the funding amounts indicated in the overall sector plan. For example, The World Bank, on behalf of the Government, would submit the 2005 annual plan to the ExCom in time to allow for funding approval by November 2004. The ExCom would be asked to release funds by December 2004 at the levels

agreed to in this sector plan based on achievement of previous phaseout targets, so that the annual program could start in January 2005. In general, approval of funds would be based on achievement of CFC-11 phaseout targets in the foam sector.

c) Annual plan program funding requests would be based on achievement of CFC-11 phaseout targets for the previous years and the semi-annual progress report for the current year. For example, 2004 funds would be approved based on 2002 phaseout results and the 2003 semi-annual progress report, and so on.

6.4 In the unlikely event that Indonesia were to fail to achieve phaseout targets for a given year (that is CFC-11 consumption in the foam sector exceeds the target, or contracts signed less than the phaseout target for the year), the Bank and Indonesia would agree on remedial actions. New funding requests to the ExCom would go forward only after phaseout targets had been met.

6.5 By the time any over-consumption for a previous year is confirmed, the current year's Annual Program would be most likely having already been started and be underway. Thus, the proposed approach to remedial action is to bring the program back on track by the end of the current year. For example, if over-consumption occurred in 2002, remedial actions would ensure that, by the end of 2003, cumulative CFC-11 consumption for the two years, 2002 and 2003 would not exceed the combined targets for the two years. The remedial actions taken to assure this result would be submitted along with the next year's funding request (refer to 2004 in the above-mentioned example). The ExCom would therefore be in a position to decide either to release funds or condition release funds for the next year's Annual Program upon accepted evidence showing that the remedial actions were successful and the cumulative consumption of the previous two years did not exceed the combined targets. This approach to remedial action allows the program to maintain momentum and keeps the phaseout schedule on track even if difficulties arise in a particular year.

6.6 If the program is still not back on track within two years, continued funding of the program could be based on a reduced level of compensation. Under this plan, grant funds would be released for Annual Programs and disbursed through the World Bank to Indonesia to achieve specific phaseout targets. Therefore, even if delays are expected in any given year, the Bank, on behalf of the Government will still submit request for funding approval for the next calendar year for phaseout targets in the following year. However, if it is proved that a delay is persistent and the phaseout targets could not be achieved within the schedule set in the approved Foam Sector Plan , funds proportional to phaseout shortfall would be returned to the Multilateral Fund.

6.7 Annual Program would contain the following sections:

a) sector phaseout schedule;

b) status of all activities of previous year(s) and any agreed remedial actions for the current year (not required for the first implementation program covering July 2003 to December 2004).
c) objectives of following year's Annual Program – phaseout targets and funding requirements for activities in the following year[2];
d) description of activities in the following year – enterprise level activities, policies to be implemented and technical assistance activities; and
e) performance indicators of the annual program.

6.8 The World Bank would approve the technical assistance consistent with the Annual Program based on the agreed TOR of TA (including the funding level of TA) in that year's Annual Program. Procurement of consultant services and equipment will be based on agreed Bank procurement procedures for all TA activities.

## T. DISBURSEMENT MECHANISM

**6.9 Multilateral Fund (MLF) disbursement to the World Bank** --The MLF will deposit the agreed annual funding to World Bank shortly after ExCom approval of the Annual Program.

**6.10 World Bank disbursement to Indonesia** – Method of disbursement of funds from World Bank to the government of Indonesia are established in the umbrella grant agreement between the World Bank and Indonesia. All such disbursements will follow the procedures as outlined in said agreement. Funds will be deposited in the ODS Phaseout Account for release to or for the benefit of eligible enterprises in the course of project implementation. All funding disbursements are conditional upon meeting the established phaseout targets and activities as planned for in the annual plans.

**6.11 Disbursement mechanism.**

a. Financial administration mechanism including disbursement modality of the project shall continue to apply the existing procedures by retaining existing Financial Administration Agent.

b. Incremental cost components (investment part of grant fund) would be disbursed directly from the ODS phaseout account to recipients through the Financial Administration Agent based on terms and conditions in the "Sub-grant Agreement" for enterprise activities, and

[2] Total grant funding for each year would be agreed along with this sector plan proposal. However, Indonesia would have flexibility in each Annual Program to allocate funds within enterprise-level or TA activities to achieve phaseout targets.

c. Non-investment components including training contracts for technical assistance activities will be administered and disbursed through Project Management Team with supervision from NOU.

## U. MANAGEMENT AND COORDINATION

6.12 This Sector Plan for CFC-11 Phaseout in Foam Sector will be executed by the National Ozone Unit. The National Ozone Unit will maintain responsibility for:

- Verification of eligibility of participating enterprises
- Monitoring procurement of equipment
- Coordinating technical assistance for phaseout projects at individual enterprises
- Verifying destruction of baseline equipment as applicable
- Verifying depletion of ODS inventory at participating enterprises
- Disbursement of funds to eligible enterprises as required
- Providing data for annual reports to the World Bank in a timely manner
- Resolving issues that might result in project delays

## V. MONITORING AND EVALUATION

6.13 **NOU's role** - core organization for monitoring implementation of Annual Programs for CFC-11 consumption phaseout in the foam PU sector and reporting to the World Bank.

6.14 **Role of World Bank** - independent annual verification as required by ExCom to verify CFC-11 consumption level. The Bank will supervise the implementation of Annual Programs including spot checks of the records of on-going projects and random factory visits.

6.15 **Audit.** There will an annual financial audit of the ODS Phaseout Account, conducted by an independent audit agency acceptable to the Bank.

6.16 **CFC-11 consumption verification.** Will be undertaken annually by an independent organization acceptable to the Bank and the report will be provided to the ExCom as part of the annual program reporting.

# VII. ACTION PLAN

| Line | | Baseline (2001) | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Phaseout targets and project impacts (MT) | | | | | | | | | | | |
| **1.** | Domestic consumption target | 2651 | 2583 | 2515 | 2046 | 1270.2 | 688.4 | 232.7 | [66.2*] | [66.2*] | 0 |
| **2.** | ODP impact targeted for contracts | 0 | 0 | 145 | 130 | 55 | 53 | 0 | 0 | 0 | 0 |
| **3.** | Actual impact of ongoing projects | -- | 68 | 469 | 775.8 | 452 | 300 | 100 | 0 | 0 | 0 |
| **4** | Phaseout impact of sector plan | 0 | 0 | 0 | 0 | 129.8 | 155.7 | 66.5 | 0 | 0 | 0 |
| Funding Request (000 US$) | | | | | | | | | | | |
| **5.** | Investment Projects | 0 | 0 | | 1,600 | 1,200 | 135 | 0 | 0 | 0 | 0 |
| **6** | National SPMCU and supporting activities | 0 | 0 | | 70 | 30 | 20 | 17.5 | 0 | 0 | 0 |
| **7.** | Technical support system | 0 | 0 | | 70 | 62 | 52 | 23.9 | 0 | 0 | 0 |
| **8.** | Total | 0 | 0 | | 1,740 | 1,292 | 207 | 41.4 | 0 | 0 | 0 |

Explanations: This is a rolling plan where the impact of an annual program is spread over subsequent years. Every annual program will provide detailed progress of all program activities of previous years, including policy implementation, enterprise activities, and technical assistance activities. The following explains lines 1 to 4 in the above table, as well as the composition of each Implementation/Annual program.

1. Line 1 – the domestic consumption target in the foam sector is derived from the following formula:

Consumption target in foam sector = total available consumption of CFC-11 in the country, minus CFC-11 consumption in all other CFC-11 consumption sectors.

2. Line 3 - Estimated actual impact of ongoing projects taking into account already achieved impact and actual consumption in 2001.

3. Indonesian Country Program requires that all consumption stops in 2007 and the consumption is zero in 2008. However, as this will be the Indonesian responsibility at its own costs, the agreement with ExCom should allow for 66.2 tons for 2008 and 2009.

4. **First Implementation Program** (for 2004): the following activities are 'captured' under this program:

    a. Line 2-Phaseout targets for the sector plan: new investment project contracts with enterprises for phasing out 275 MT of CFC-11 to be signed up to end of 2004.

    b. Line 3 -- Phaseout amount of previously approved projects: the phaseout of 68 MT in 2002, 469 MT in 2003 and 775.8 MT in 2004 from projects approved prior to the Sector plan (in 2002 and earlier), will be completed during this program.

    c. Line 4 -- Phaseout amount in sector plan: the impact will be 0 t in 2004.

    d. Verification of the disposal certification of equipment (and, where available, PCRs ) accounting for CFC phaseout of 469 MT (phase out impact of previously approved projects in 2002 from line 3) to be carried out in 2004 as part of this annual program.

    e. Agreement with the World Bank a TOR on the preparation of verification of the disposal certification of equipment and PCR for the entire foam sector.

5. **2005 Annual Program**: This will be prepared in mid-2004. It will consist of the following:

    a. Line 2 -- Phaseout targets for the sector plan: new investment project contracts with enterprises for phasing out 55 MT of CFC-11 to be signed up to end of 2005

    b. Line 3 -- Phaseout amount of previously approved projects: the phaseout of 452 MT from projects approved prior to the Sector Plan (in 2002 and earlier), will be completed during the year.

    c. Line 4 -- Phaseout amount in sector plan: the impact will be 129.8 in 2005.

    d. Verification of the disposal certification of equipment (and, where available, PCRs ) accounting for CFC phaseout of 775.8 MT (phase out impact of previously approved projects in 2002 from line 3) to be carried out in 2005 as part of this annual program.

6. **2006 Annual Program**: This will be prepared in mid-2005. It will consist of the following:

    a. Line 2 -- Phaseout targets for the sector plan: new investment project contracts with enterprises for phasing out 53 MT of CFC-11 to be signed up to end of year 2006.

    b. Line 3 -- Phaseout amount of previously approved projects: the phaseout of 300 MT from projects approved prior to the Sector Plan (in 2002 and earlier), will be completed during the year.

    c. Line 4 -- Phaseout amount in sector plan: the impact will be 155.7 MT in 2006

d. Verification of the disposal certification of equipment (and, where available, PCRs ) accounting for CFC phaseout of 452 MT (phase out impact of previously approved projects in 2002 from line 3) to be carried out in 2006 as part of this annual program.

e. Verification of the disposal certification of equipment (and , where available, PCRs ) accounting for CFC phaseout of 129.8 MT (phase out impact of sector plan) to be carried out in 2006 as part of this annual program.

7. **2007 Annual Program**: This will be prepared in mid-2006. It will consist of the following:

   a. Line 3 -- Phaseout amount of previously approved projects: the phaseout of 100 MT from projects approved prior to the Sector Plan (in 2002 and earlier), will be completed during the year.

   b. Line 4 -- Phaseout amount in sector plan: the impact will be 66.5 MT in 2006

   c. Verification of the disposal certification of equipment (and, where available, PCRs ) accounting for CFC phaseout of 300 MT (phase out impact of previously approved projects in 2002 from line 3) to be carried out in 2007 as part of this annual program.

   d. Verification of the disposal certification of equipment (and, where available, PCRs ) accounting for CFC phaseout of 155.7 MT (phase out impact of sector plan) to be carried out in 2007 as part of this annual program.

8. **2008 Annual Program**: This will be prepared in mid-2007. It will consist of the following:

   a. Verification of the disposal certification of equipment (and, where available, PCRs ) accounting for CFC phaseout of 100 MT (phase out impact of previously approved projects in 2002 from line 3) to be carried out in 2008 as part of this annual program.

   b. Verification of the disposal certification of equipment (and, where available, PCRs ) accounting for CFC phaseout of 66.5 MT (phase out impact of sector plan) to be carried out in 2008 as part of this annual program.

9. **2009 Annual Program**: This will be prepared in mid-2008. It will consist of the following:

   a. PCR will be prepared covering all sector plan activities and be submitted to the ExCom during the year.

# ANNEX-1

# INVENTORY OF FOAM ENTERPRISES
# NOT YET ADDRESSED UNDER THE CFC PHASEOUT PROGRAM

## A. Eligible Enterprises

| # | COMPANY | SUB-SECTOR | BASELINE EQUIPMENT | CFC USE |
|---|---|---|---|---|
| 1 | Bintang Mas, UD | RPF - Thermoware | Manual | 5.63 |
| 2 | Cipta Karya, CV | RPF – Spray | Gusmer | 3.79 |
| 3 | Mayasari Utama, PT | RPF – Spray | H/P-Gusmer FF1600 | 3.08 |
| 4 | Langgeng Makmur Industri Tbk, PT | RPF - Thermoware | Canon C 15 RF 2 | 15.00 |
| 5 | Hadi Puteri Kartika Paqsi, PT | RPF – Panel | Hand Mix | 9.00 |
| 6 | Pangaji Mario Refconindo, PT | RPF – Panel | H/P- KM 40/40 &L/P Canon C60 | 6.30 |
| 7 | Bernadi Utama, PT | RPF - Thermoware | Gusmer H2000 & H II | 2.60 |
| 8 | Willich Isolasi Pratama, PT | RPF – Pipe | Gusmer H 2000 | 2.05 |
| 9 | Sadana Ekapraya Amitra, PT | RPF – Panel | Manual | 0.79 |
| 10 | Indomatic | RPF – Panel | Manual | 1.91 |
| 11 | Citradinamika Interindo | RPF – Panel | Manual | 3.90 |
| 12 | Sigma Engineering | RPF – Panel | Manual | 4.64 |
| 13 | Harrison, UD | RPF – Panel | Manual | 0.53 |
| 14 | Sengon Harpindo Sejati | RPF – Panel | LP Dispenser | 41.60 |
| 15 | Ditta Insulindo | RPF – Panel | LP Dispenser | 35.67 |
| 16 | Sinar Baja Walandra | RPF – Panel | LP Dispenser | 29.00 |
| 17 | Sumber Sejahtera Raya | RPF – Panel | LP Dispenser | 27.61 |
| 18 | Ero Fibre Glass | RPF – Panel | LP Dispenser | 11.00 |
| 19 | Shirabu | RPF – Panel | LP Dispenser | 11.00 |
| 20 | Belga Jaya Perkasa | RPF – Panel | LP Dispenser | 0.00 |
| 21 | Biru SCK, PT | ISF | H/P Canon C 30 & 40 | 4.00 |
| 22 | Yamahato, CV | ISF | L/P Desma Klockner 583/24 | 3.60 |
| 23 | Rizata Wijaya | ISF | L/P Canon 15 FL2 | 6.80 |
| 24 | Osaga Mas Utama. PD | ISF | L/P Italy BGM Elite 60 | 10.00 |
| 25 | Sinar Mulia, UD | ISF | Green 900 g/min | 6.00 |
| 26 | Kumala Indah Tata, PT | ISF | L/P Elastogran F70 | 13.50 |
| 27 | SS Utama, PT | ISF | (3) L/P BGM | 25.00 |
| 28 | Restindo Dayatama, PT | ISF | Manual | 0.79 |
| 29 | Lion Metal Works TBK, PT | ISF | L/P Canon C15 FL2 | 1.62 |
| 30 | Jaly Indonesia Utama, PT | ISF | LP BGM, MTB | 11.70 |
| | **TOTAL** | | | **298.11** |

**B. Ineligible Enterprises**

| # | COMPANY | SUB-SECTOR | BASELINE EQUIPMENT | CFC USE |
|---|---|---|---|---|
| 1 | Bertindomas Ciptasatya | Panel | Manual | 1.14 |
| 2 | Cahaya Kencana Srikandi, PT | Panel | H/P-Gusmer | 1.00 |
| 3 | Duta Eka Abadi, CV | Panel | Manual | 0.00 |
| 4 | Framindex Indah Lestari (Yapindex) | Structure | KF – IS402 | 1.28 |
| 5 | Mitra Niaga Kencana Lestari, PT | Panel | SAIP K 60 | 7.43 |
| 6 | Pungut Permai Perkasa PT | Structure | Manual | 0.25 |
| 7 | Restu Ibu, PT | Spray | n/k | 0.00 |
| 8 | Wika Intrade, PT | Thermoware | Small | 3.89 |
| 9 | Yuriko Teknik | Panel | Manual | 1.36 |
| 10 | Binder Indonesia, PT | Pipe | n/k | 12.10 |
| 11 | Megametal Perdana, PT | Panel | L/P Li Peng (Taiwan) | 11.99 |
| 12 | Astra Otopart, Tbk, PT. | ISF | H/P KM & Rim Star | 4.20 |
| 13 | Jaya Mulya | ISF | Ex Import | 6.00 |
| 14 | Yufo Sumber Mas | ISF | n/k | 3.00 |
| | **TOTAL** | | | **53.64** |

**C. Other Identified Ineligible Enterprises***

| # | COMPANY | SUB-SECTOR | BASELINE EQUIPMENT | CFC USE |
|---|---|---|---|---|
| 15 | IRC Inoac | FMF | n.k | 105 |
| 16 | Karya Bahana Utama | FMF | n.k | n.k |
| 17 | Sana Triputra Dinamika | FMF | n.k | 30 |
| 18 | Tunas Samudera Kurnia | FMF | n.k | 35 |
| 19 | Pramata Sentosa | FMF | n.k | n.k |
| 20 | Tunas Samudera | FMF | n.k | n.k |
| 21 | Dwisata Foam | FMF | n.k | n.k |
| 22 | Meta Prsindo Utama | FMF | n.k | n.k |
| 23 | Nusa Pima | FMF | n.k | n.k |
| 24 | Astanatha Buna Mandiri | FMF/ISF | n.k | 30 |
| 25 | Citra Christopher Mulia | FMF/ISF | n.k | 30 |
| 26 | Lawang Teknik | FMF/ISF | n.k | 25 |
| 27 | Surya Ahdi Kencana | FMF/ISF | n.k | n.k |
| 28 | Anugrah Foam | FMF/RPF Block | n.k | 50 |
| 29 | Putra Alam | ISF | n.k | n.k |
| 30 | Bogorindo | ISF | n.k | n.k |
| 31 | Indorevsco | ISF | n.k | n.k |
| 32 | Krekot Jaya | ISF Shoesole | n.k | 95 |
| 33 | Solindah Kita | ISF Shoesole | 1 Elastogran | 90 |
| 34 | Trias Rantai Mas | ISF Shoesole | n.k | 40 |
| 35 | Tikari Perdana | ISF Shoesole | n.k | n.k |
| 36 | Nikomas | ISF Shoesole | n.k | n.k |
| 37 | Ganesha Rattesko Prima | RPF | n.k | 15 |
| 38 | Albisia Jaya Industri | RPF | Home Made | 45 |
| 39 | Wijaya Karya | RPF | n.k | 15 |
| 40 | Lenteng Agung | RPF | n.k | n.k |
| 41 | Sami Jaya Perkasa | RPF | n.k | n.k |
| 42 | Sarana Fiberindo | RPF | n.k | n.k |

| | | | | |
|---|---|---|---|---|
| 43 | Aman Multi Mandiri | RPF | n.k | n.k |
| 44 | Besar Indah Gemilang | RPF | n.k | n.k |
| 45 | Cisang Garung Putra | RPF | n.k | n.k |
| 46 | Dansas Pan Suksesa | RPF | n.k | n.k |
| 47 | Daya Dumas Lestari | RPF | n.k | n.k |
| 48 | Ganesha RP | RPF | n.k | n.k |
| 49 | Gema Istana Arta | RPF | n.k | n.k |
| 50 | Inka Sakti | RPF | n.k | n.k |
| 51 | Inpaga Aman Sentosa | RPF | n.k | n.k |
| 52 | Jadi Sejati Perkasa | RPF | n.k | n.k |
| 53 | Kharisa Bayu Mandala | RPF | n.k | n.k |
| 54 | Kragu Nusanatara | RPF | n.k | n.k |
| 55 | Mahkota Agung Pratama | RPF | n.k | n.k |
| 56 | Multibrata Anugrah Utama | RPF | n.k | n.k |
| 57 | Cahaya Kencana | RPF Spray | n.k | 15 |
| 58 | Thermacelindo | RPF Spray | n.k | 30 |
| 59 | Perkasa Raya Laowomaru | RPF Spray | n.k | n.k |
| 60 | Tentram | RPF Spray | n.k | n.k |
| 61 | Cahaya Kencana Srikandi | RPF Spray | n.k | n.k |
| 62 | Sansenindo Makmur | RPF Panels | n.k | n.k |
| 63 | Tehnik Fajar | RPF Panels | n.k | n.k |
| 64 | Parliha Indonesia | RPF Panels | n.k | n.k |
| 65 | Refconindo | RPF Panels | n.k | n.k |
| 66 | Riatirta Nirwana Mas | n.k | n.k | n.k |
| 67 | Surya Ankasa | n.k | n.k | n.k |
| 68 | Alam Dinamika | n.k | n.k | n.k |
| 69 | Alfa Fumi Megah Indah | n.k | n.k | n.k |
| 70 | Busofa Karindo | n.k | n.k | n.k |
| 71 | Cahaya Indoniaga | n.k | n.k | n.k |
| 72 | Cahaya Ultra Poly | n.k | n.k | n.k |
| 73 | Elastic Foam | n.k | n.k | n.k |
| 74 | Fortuna | n.k | n.k | n.k |
| 75 | Garuda | n.k | n.k | n.k |
| 76 | Gesalunda Indah | n.k | n.k | n.k |
| 77 | Indoluhur | n.k | n.k | n.k |
| 78 | Karya Pluit | n.k | n.k | n.k |
| 79 | MusimasSejahtera Abadi | FPF Slabstock | Manual | 55.00 |
| 80 | Citra Sarana Makmur | FPF Boxfoam | Manual | n.k |
| 81 | Dakar Foam | FPF Boxfoam | Manual | n.k |
| 82 | Sumber Indah | FPF Boxfoam | Manual | n.k |
| 83 | Surya Cahaya Sakdi | FPF Boxfoam | Manual | n.k |
| 84 | PT Dayak Lestari Ekalaga | FPF Boxfoam | Manual | n.k |
| 85 | PT Rentang Buana Niaga Makmur | FPF Boxfoam | Manual | n.k |
| | **TOTAL** | | | **705++** |

*Most of these companies originate from the old (before the civil unrest) pipeline inventory from UNDP. The ones that could be located are included in list A and B. The ones in list C could not be located or were deemed ineligible from documentation provided. In addition, the list contains companies with canceled projects, companies that refused to cooperate, companies that were deemed ineligible under the SMS projects, etc. The listed consumption is based on self-reporting and not audited. LH will address them as part of its policy enforcement program.

# ANNEX II

# INDONESIA FOAM CFC PHASE-OUT PLAN – OORG REVIEW

## GENERAL AND MARKET INFORMATION

The plan covers the phase-out of a total of 329.3 ODP tons of CFC 11 use in foams in Indonesia in the polyurethane integral skin and rigid insulating foam sub-sectors. The ODS phase-out is net of the residual ODP of HCFC 141b used in some projects to phase out CFC 11.

There are obvious challenges in identifying the remaining CFC users in the foam sector and the consultants, Edrola have assisted in the task. Details have been obtained on 39 of these enterprises and a further 40, at least, have unchecked CFC consumption (Executive Summary item 4). There should be a list could be include, perhaps in an appendix, of all the enterprises by name, their sub-sectors, sizes and baseline equipment. An analysis of the uncertainties in the market description and a sensitivity analysis of the impact of there se uncertainties on project cost effectiveness would be useful. In addition, a plan to subsequently improve the information should be included. It is noted that more information may be obtained at a later stage via import data (section 2.12, page 8) but there is no indication of how this may be utilised.

In table 2.1 (page 8) there is an informative overview of the foam sector. There are a total of 18 eligible rigid foam enterprises and 11 which are not eligible for funding. From table 2.9 the rigid foam sub-sectors are spray, non-insulating, panel, pipe and thermoware. There are three “large” enterprises with average CFC consumptions of approximately 47 tons and are all in the panel sector.
There are 7 eligible integral skin enterprises all classified as medium or small producers. In addition, there are 3 ineligible enterprises. Of the eligible enterprises, three produce shoesoles and four produce automotive parts.

There are experienced and major suppliers of foam systems active in the Indonesian market. However, there does not appear to be a stated role for these companies to participate in the phase-out implementation strategy.

## TECHNOLOGY

The rigid foam applications in this project are all insulating applications. Three technology options are discussed – “all water” which is normally referred to as CO2(water), hydrocarbon/cyclopentane and HCFC 141b. However, it is not basically suitable for the insulating foam market because the insulation value is poor and deteriorates rapidly with time. Some enterprises approach the consumption level where the use of pentane technology can be considered but the capital outlay would still be very high and significant infrastructural and equipment changes and procedures have to be put in place to operate this technology. It should also be recorded that hydrocarbon technology is not yet proven for

the spray foam application irrespective of the size of the enterprise. The of HCFC 141b is supported by the reviewer

There is little discussion of HFC technologies for rigid foams and this is an omission to be corrected. Neither is there a discussion on the eventual replacement of transitional technologies such as HCFC 141b. See “SAFETY AND ENVIRONMENTAL ISSUES” for further comments.

The equipment considerations are explained and are supported. Decision 31/44 regarding density is applied in an effective manner.

For integral skin foams a wide range of options is considered. There is support for interim use of HCFC 141b for automotive applications. Polyester polyols and CO2(water) technology is normally only used in footwear applications. CO2(water) is normally fully suitable in furniture applications and the choice of a physical blowing agent can normally only be supported in some automotive applications. HFC 134a technology has been in use in the South East Asia region for the production of high quality automotive mouldings for a number of years but, as indicated, there have to be equipment changes.

**SAFETY AND ENVIRONMENTAL ISSUES**

There is no clear statement given as to whether the Indonesian government supports the use of HCFC 141b as now required by the ExCom. That is, unless Section 5.8 on page 26 implies this point. The transitional status of HCFC will require its phase-out by 2040. The enterprises should be informed of this and that subsequent conversion to a zero ODP technology should be at their own cost.

It is noted that technical assistance includes safe operation of flammable blowing agents and this is should include the safe use of HCFC141b-based systems.

**PROJECT COSTS**

The proposed grant is pegged at a weighted average of the thresholds for the rigid foam and integral skin sub-sectors.

The equipment cost proposals follow acceptable procedure with respect to replacement based on the type baseline equipment and its age.

In the incremental operating cost calculations it is noted that the same chemical prices are used for both rigid and integral skin applications. In the reviewer’s opinion the chemical costs are higher in the integral skin than in the rigid foam sector but this is not reflected here. The averaged prices may well reflect reality. For the integral skin calculation a density increases of 10% is used. This is supported.

**IMPLEMENTATION TIMEFRAME**

At this stage of the project the timetable seems to be realistic.

**RECOMMENDATION**

This project is supported.

Several points to follow during the implementation phase are listed

**M Jeffs**

06/02/2003