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执行蒙特利尔议定书
多边基金执行委员会
第五十八次会议
2009 年 7 月 6 日至 10 日，蒙特利尔

世界银行 2009 年工作方案修正案

基金秘书处的评论和建议

1. 世界银行请执行委员会为其 2009 年工作方案修正案核准 794,001 美元，外加机构支助费用 59,550 美元。

2. 世界银行工作方案修正案提议的活动列示于下表 1：

表 1：世界银行工作方案修正案

国家	活动/项目	申请数额（美元）	建议数额（美元）
A 部分：建议一揽子核准的活动			
A1. 消耗臭氧层物质废物管理试点项目：			
墨西哥	消耗臭氧层物质处置试点项目的编制	50,000	50,000
	A1 小计：	50,000	50,000
B 部分：建议个别审议的活动			
B1. 体制建设项目的延长：			
约旦	体制建设项目的延长（第八阶段）	147,333	*
泰国	体制建设项目的延长（第六阶段）	346,668	*
	B1 小计：	494,001	
B2. 技术援助			
全球	为淘汰氟氯烃和获得气候共同惠益调集资源	250,000	*
	B2 小计：	250,000	
A 部分和 B 部分共计		794,001	50,000
机构支助费用（7.5%用于项目编制和体制建设及超过 250,000 美元的其他活动；9%用于低于 250,000 美元的其他活动）：		59,550	3,750
共计：		853,551	53,750

* 供个别审议或待定的项目。

A 部分：建议一揽子核准的活动

A1. 消耗臭氧层物质废物管理试点项目：

墨西哥：消耗臭氧层物质处置试点项目的编制：50,000 美元

项目说明

3. 世界银行正在请求向项目开发工作追加 50,000 美元的资金，用于编制墨西哥消耗臭氧层物质处置试点项目。墨西哥的拟议活动将示范如何应用世界银行正在开展的消耗臭氧层物质处置研究所制定的消耗臭氧层物质处置方法和标准。这将会考虑如何管理在墨西哥能效装置方案（同样也由世界银行制定）下从制冷机和空调中收集的无用消耗臭氧层物质。

预计将编制一份项目开发文件，用于研究如何根据相关自愿碳市场的条款有效利用针对消耗臭氧层物质处置工作的共同供资。将履行的任务包括开展一项实地研究，进行项目开发并与自愿碳市场的有关利益方进行协商。根据设想，该项目将力争获得相关市场的认可，以获得用于处置从旧装置中收集的 CFC-11 和 CFC-12 的费用。

秘书处的评论

4. 执行委员会第五十七次会议决定，优先考虑包括墨西哥在内的六个国家的消耗臭氧层物质处置试点项目。该次会议还核准向工发组织提供 50,000 美元经费，用于编制墨西哥的这一试点项目。在随后的讨论中，达成的谅解是将由世界银行和工发组织共同编制和执行墨西哥消耗臭氧层物质处置试点项目。根据讨论，除工发组织已获核准的资金外，世界银行获得的任何供资将从该项目今后有待获得核准的资金中扣除，并且其数额取决于执行委员会作为向消耗臭氧层物质处置项目供资的限额而可能商定的最大金额。

5. 如第五十七次会议所商定，在与秘书处开展讨论时，世界银行证实这些资金将用于编制一项根据相关自愿碳市场的条款有效利用针对消耗臭氧层物质处置工作的共同供资的提案。它还将借鉴世界银行正在制定、通过贷款融资的墨西哥能效装置项目的经验，并采用清洁发展机制。世界银行还向秘书处提供了墨西哥的书面协定，其指出将在执行委员会规定的供资限额内，从该国今后因编制工作而获得的任何供资中扣除申请资金。

秘书处的建议

6. 秘书处建议根据上文表 1 所示金额，一揽子核准申请的追加资金，用于编制关于有效利用针对墨西哥消耗臭氧层物质处置工作的共同筹资的研究报告，但条件是将根据执行委员会作为向消耗臭氧层物质处置项目供资的限额而可能商定的最大金额，从墨西哥今后有待获得核准的供资中扣除这些资金。

B 部分：建议个别审议的活动

B1. 体制建设项目的延长：

约旦（第八阶段）：147,333美元
泰国（第六阶段）：346,668美元

项目说明

7. 如上文所列，世界银行提交了关于延长约旦和泰国体制建设项目的请求。关于这些国家的请求说明载于本文附件一。

秘书处的评论

8. 基金秘书处审查了世界银行为支持延长请求而代表这两个国家提交的体制建设最终报告和行动计划，它发现其报告均符合会议规则以及此类项目的各项要求。这些国家也均充分遵循了《蒙特利尔议定书》2007 年的各项目标，2008 年国家方案报告中的数据表明其也充分遵循了该年的目标。按照惯例，这些呈件为这些国家将体制建设延长两年的请求提供了有利支持。

9. 在第五十七次会议上，执行委员会在第 57/36(b)号决定中特别决定“在执行委员会第五十八次会议最终解决该事项前，将于 2010 年 12 月底之前继续以目前的供资水平资助延长体制建设项目的请求”。秘书处还注意到将在议程项目 10 下讨论就 2010 年以后的供资办法而再次发放的文件（UNEP/OzL.Pro/ExCom/58/48）。为此，考虑到申请阶段的完成日期在 2010 年 12 月之后，秘书处要求委员会就按照惯例是否可以目前的供资水平向这些延长请求提供整整两年的经费进行指导。

秘书处的建议

10. 谨建议执行委员会根据第 57/36(b)号决定审议这些请求。一旦核准，谨建议执行委员会向这些国家政府传达本文件附件一所示的评论。

B2. 技术援助

全球：为淘汰氟氯烃和获得气候共同惠益调集资源 250,000 美元

项目说明

11. 世界银行向第五十七次会议提交了一份供资额为 250,000 美元的调集资源技术援助项目请求，以将氟氯烃淘汰的气候惠益最大化。世界银行再次提交该请求，以供本次会议审议。该提案还载有一份概念说明，其中阐述了这一项目的各项目标、行动以及预期成果。

12. 根据世界银行的介绍，该项目旨在探索各种选择办法，用于率先防止由于发展中国家淘汰氟氯烃而导致的氢氟碳化物需求，或任何其他全球升温潜能值很高的气体在消费行业出现增长。该研究将审查和探讨为向全球升温潜能值较低的替代品进行过渡的潜在融资机制，包括发展中国家以及经济转型国家氢氟碳化物计划的减少。为使整体能源收益实现最大化，该项目还将处理能效收益与全球升温潜能值较低的气体之间的技术限制和权衡问题。

13. 研究将探讨：（一）氟氯烃技术向全球升温潜能值较低的替代品进行转换所涉的费用和障碍；（二）与发展中国家氟氯烃的消费和生产相关的氟氯碳化物数量和其他替代品的 CO_2 当量，其中包括其他化学流程的副产品；（三）用于支助采用更好的限制使用氟氯烃做法和无害气候技术的潜在供资来源（即多边基金、气候公约、碳交易市场、碳伙伴关

系基金、清洁技术基金等）。它还将提供有关各种供资方法的建议，如评价和设定氢氟碳化物的基准消费量和产量以及计划减少量的方法。此外，该项目还将调查执行这些活动的有效形式，以确保多边基金资助的活动与可能由其他供资来源资助的活动之间的协同增效作用。

14. 世界银行指出，该请求将首次提出将于 2009 年 7 月提交执行委员会第五十八次会议审议的研究报告的详细工作范围。研究将需要 12 个月来完成。研究的最后报告将在 2010 年最后一次会议上提交执行委员会。

15. 下表提供了世界银行申请的 250,000 美元款项的明细：

要素	说明	美元
潜在的二氧化碳当量的减排数量	审查当前的氟氯烃装置和现有的无氟氯烃替代品；对于各种替代品的渗透性（全球升温潜能值高/低）进行市场分析，并估计能效改进后产生的惠益（将技术和经济评估小组以及臭氧业务专家组进行的工作考虑在内）	35,000
具有基准能源和资源效率的氟氯烃技术转换为具有改进的能源和资源效率的全球升温潜能值较低的替代品的相关障碍	对选定的一些作为各氟氯烃应用的主要技术供应商的第 5 条国家和第 2 条国家进行行业调查	50,000
氟氯烃的消费量和产量	开展以第 5 条国家和非第 5 条国家的化学品生产商为重点的行业调查；针对项目趋势进行市场分析	10,000
潜在的供资来源	审查由各种供资机制资助的现有活动或项目；审查现有的清洁发展机制和非清洁发展机制方法；与第 5 条国家预期的受益人进行会谈；确定潜在的融资来源；制定保障这类资源的方法和项目模式	55,000
供资标准/方法的制定	开发获得多边基金以外共同融资资源的工具	70,000
有关利益方协商会议	三次协商会议	30,000
总计		**250,000**

秘书处的评论

16. 缔约方第十九次会议 XIX/6 号决定第 11(b)段向执行委员会提供了指导，其中特别要其在研究氟氯烃淘汰项目时，“给予那些将环境的其他影响（包括气候影响）最小化的替代品以优先考虑，并将全球升温潜能值、能源使用和其他相关要素考虑在内”。执行委员会第五十四次会议商定了一套氟氯烃淘汰管理计划编制准则，并在第五十五次和第五十六次会议上核准了 115 个国家的氟氯烃淘汰管理计划的编制供资。第 54/39 号决定商定的准则包括，要求第 5 条国家考虑财务激励措施以及在其氟氯烃结束性淘汰管理计划中共同融资的机会，这可关系确保氟氯烃淘汰工作产生上述第 XIX/6 号决定第 11(b)段所述的惠益。

17. 秘书处还指出，世界银行提议的研究结果仅在 2010 年可用，它在氟氯烃淘汰管理计划第一阶段的执行过程中以及在审查第二阶段编制工作的共同融资选择办法时酌情向各机构提供指导，以此来帮助各个国家。此外，秘书处还说明，迄今执行委员会未就氟氯烃淘汰的气候惠益需要多少花费以及这些费用是否可以视为多边基金下的增量成本进行指导。

18. 执行委员会第五十七次会议讨论了从贷款和其他来源获得补充收入的机制（UNEP/OzL.Pro/ExCom/57/64 号文件），并在第 57/37 号决定中决定秘书处提供有关该机制的进一步分析报告，以供委员会第五十八次会议审议。秘书处注意到再次提交该提案是为了在本次会议就这一机制做出最后决定，从而使调集供资资源成为可能。

秘书处的建议

19. 谨建议执行委员会根据上述信息并根据议程项目 11，从贷款和其他来源获得补充收入的机制，来审议该提案。

附件一

体制建设项目提案

约旦：体制建设的延长

项目概述和国情简介	
执行机构：	世界银行
以前所核准的体制建设的数额（美元）： 第一阶段：1992 年 6 月 第二阶段：1997 年 5 月 第三阶段：1999 年 7 月 第四阶段：2001 年 7 月 第五阶段：2003 年 7 月 第六阶段：2005 年 7 月 第七阶段：2007 年 7 月	 170,000 113,333 113,333 113,333 147,333 147,320 147,333
总计	951,985
要求用于项目延长的数额（第八阶段）（美元）：	147,333
建议用于核准第八阶段的数额（美元）：	
机构支助费用（美元）：	
多边基金体制建设第八阶段的总费用（美元）：	
由于体制建设第八阶段同等数量氟氯化碳淘汰成本为 12.1 美元/公斤（ODP 吨）：	暂缺
国家方案核准日期：	1991 年
国家方案报告的消耗臭氧层物质消费量（1991 年）（ODP 吨）：	575.3
受控物质的基准消费量（ODP 吨）： (a) 附件 A 第一类物质（各类氟氯化碳）（1995-1997 年平均数） (b) 附件 A 第二类物质（哈龙）（1995-1997 年平均数） (c) 附件 B 第二类物质（四氯化碳）（1998-2000 年平均数） (d) 附件 B 第三类物质（甲基氯仿）（1998-2000 年平均数） (e) 附件 E（甲基溴）（1995-1998 年平均数）	 673.3 210 40.3 18.2 176.3
根据第 7 条最新报告的消耗臭氧层物质消费量（2008 年）（ODP 吨）： (a) 附件 A 第一类物质（各类氟氯化碳） (b) 附件 A 第二类物质（哈龙） (c) 附件 B 第二类物质（四氯化碳） (d) 附件 B 第三类物质（甲基氯仿） (e) 附件 E（甲基溴） (f) 附件 C 第一类物质（氟氯烃） 总计	 6 30.4 0.4 0 0 59 95.8
已报告的国家方案执行数据的年份：	2008 年
核准的项目供资数额（美元）：	18,222,883
支付的数额（截至 2009 年 5 月）（美元）：	16,663,094
将淘汰的消耗臭氧层物质（ODP 吨）：	2,223.1
已淘汰的消耗臭氧层物质（截至 2009 年 5 月）（ODP 吨）：	1,800.9

1. 活动概况及执行委员会核准的供资数额：

活动概况		核准的供资数额（美元）
(a)	投资项目：	14,733,580
(b)	体制建设：	951,985
(c)	项目编制、技术援助、培训和其他非投资项目：	2,537,318
	总计：	18,222,883

进度报告

2. 约旦政府目前正在执行其体制建设项目的第七阶段，其在日益关注氟氯烃的同时，努力到 2010 年消除氟氯化碳和哈龙消费量方面取得长足进步。2007 年至 2009 年期间，国家臭氧机构主要侧重于完成附件 A 和 B 所列物质的淘汰工作，并确保实现持续淘汰。通过继续提高约旦海关的能力并对非法进口活动进行控制和监测，已在此方面取得了一些成果。它还在全国范围内针对 100 多名教师和培训人员举办了训练班，来保持对消耗臭氧层物质和国家义务的认识。国家臭氧机构还与工发组织、世界银行和德国技术合作公司在若干项目领域开展了密切合作。在这方面，通过开展协商会议并核查不同冷风机装置的基准数据，国家臭氧机构于 2007 年和 2008 年率先开展了关于氟氯化碳冷风机替换活动的项目编制工作。在多边基金资助的项目活动以及即将完成的国家消耗臭氧层物质淘汰计划（预计将于 2009 年底完成）的支助下，它还确保在 2007 年之前淘汰 88%的甲基溴消费量。在氟氯烃方面开展的新工作包括，收集氟氯烃数据，向臭氧秘书处报告，从而获得对氟氯烃淘汰管理计划编制的供资。

3. 除这项工作外，国家臭氧机构还实施了其常规年度工作计划，其中包括执行配额制度并对许可证制度进行管理。正在开展的其他工作包括，开展公共宣传，对完成转换的企业进行监测，落实对使用无害臭氧层物质的新产品进行标注的制度，并向臭氧秘书处及多边基金秘书处报告。最后，臭氧机构充分、积极参与了环境署西亚网络会议、执行委员会第五十二次至第五十七会议，以及蒙特利尔议定书缔约方第十九次和第二十次会议。

行动计划

4. 约旦体制建设项目第八阶段的工作重点是最终淘汰维修行业（包括冷风机次级行业）中的氟氯化碳剩余消费量。其目标是，完成国家消耗臭氧层物质淘汰计划及冷风机替换项目，并确保全部有关利益方都能够实现持续淘汰。体制建设项目第八阶段的第二年将启动与氟氯烃相关的活动，其中包括编制氟氯烃淘汰管理计划；提高公众对氟氯烃及其替代品的认识；以及审查和完善氟氯烃立法。鉴于预计将从冷风机替换项目等举措中收集无用的消耗臭氧层物质，约旦政府将力争在体制建设项目的这一阶段销毁消耗臭氧层物质。延长体制建设项目还将使国家臭氧机构得以进一步增强能力，确保遵守《蒙特利尔议定书》中

有关所有受控物质的规定。因此，行动计划也纳入了定期开展年度监测、报告和公共宣传活动。

泰国：体制建设的延长

项目概述和国情简介	
执行机构：	世界银行
以前所核准的体制建设的数额（美元）：	
第一阶段：1993 年 3 月	400,000
第二阶段：1998 年 7 月	266,667
第三阶段：2003 年 7 月	346,667
第四阶段：2005 年 7 月	346,668
第五阶段：2007 年 7 月	346,668
总计	1,706,670
要求用于项目延长的数额（第六阶段）（美元）：	346,668
建议用于核准第六阶段的数额（美元）：	
机构支助费用（美元）：	
多边基金体制建设第六阶段的总费用（美元）：	
由于体制建设第六阶段同等数量氟氯化碳淘汰成本为 12.1 美元/公斤(ODP 吨)：	暂缺
国家方案核准日期：	1991 年
国家方案报告的消耗臭氧层物质消费量（1991 年）（ODP 吨）：	4,109
受控物质的基准消费量（ODP 吨）：	
(a) 附件 A 第一类物质（各类氟氯化碳）（1995-1997 年平均数）	6,082.1
(b) 附件 A 第二类物质（哈龙）（1995-1997 年平均数）	271.7
(c) 附件 B 第二类物质（四氯化碳）（1998-2000 年平均数）	7.5
(d) 附件 B 第三类物质（甲基氯仿）（1998-2000 年平均数）	54.6
(e) 附件 E（甲基溴）（1995-1998 年平均数）	183
根据第 7 条最新报告的消耗臭氧层物质消费量（2007 年）（ODP 吨）：	
(a) 附件 A 第一类物质（各类氟氯化碳）	321.6
(b) 附件 A 第二类物质（哈龙）	0
(c) 附件 B 第二类物质（四氯化碳）	0
(d) 附件 B 第三类物质（甲基氯仿）	0
(e) 附件 E（甲基溴）	122
(f) 附件 C 第一类物质（氟氯烃）	873
总计	1,316.6
已报告的国家方案执行数据的年份：	2008 年
核准的项目供资数额（美元）：	52,476,037
支付的数额（截至 2009 年 5 月）（美元）：	42,030,266
将淘汰的消耗臭氧层物质（ODP 吨）：	7,774.7
已淘汰的消耗臭氧层物质（截至 2009 年 5 月）（ODP 吨）：	6,850.5

5.　活动概况及执行委员会核准的供资数额：

活动概况		核准的供资数额（美元）
(a)	投资项目：	46,241,478
(b)	体制建设：	1,706,670
(c)	项目编制、技术援助、培训和其他非投资项目：	4,527,889
	总计：	52,476,037

进度报告

6.　在报告所述期间，向国家臭氧机构提供了支助，以继续圆满执行国家氟氯化碳淘汰计划。国家臭氧机构继续在参与国家计划的各机构之间发挥协调作用，并向计划简述的各项承诺提供了重要的管理支助。特别是，国家臭氧机构与海关总局密切合作，确保有效执行现有的进口控制制度。臭氧机构还与国家氟氯化碳淘汰计划的各受益者以及协会紧密协作，跟踪和监测维修行业各类氟氯化碳的使用情况，从而率先防止转换工作出现任何拖延。国家臭氧机构还继续与农业局进行协调，执行卓有成效的国家甲基溴淘汰计划。国家臭氧机构成功启动了经修订的哈龙管理项目，还一直与必要和非必要哈龙使用者密切合作，对非必要使用者进行了最终转换，并制定了一项国家哈龙战略。根据计划，国家臭氧机构于 2007-2009 年期间开展了公共宣传运动和培训活动。

行动计划

7.　提议延长体制建设项目将有助于国家臭氧机构及其伙伴机构努力执行泰国综合消耗臭氧层物质淘汰战略。这些努力包括但不仅限于：与其他政府机构进行协调，确保一致执行国家氟氯化碳淘汰计划；制定一项管理信息系统，以便于所有相关机构报告消费数据，并监测氟氯化碳和甲基溴年度削减目标的情况；监测维修行业最后一年使用各类氟氯化碳的情况及其淘汰情况；执行哈龙管理项目；与海关总局合作，控制各类氟氯化碳非法贸易活动；与农业局协调，帮助执行国家甲基溴淘汰计划；并编制一项国家氟氯烃淘汰战略。原定的公共宣传和传播活动将仍然是国家臭氧机构今后两年活动的主要部分。

附件二

执行委员会对提交给第五十八次会议的延长体制建设项目的意见

约旦

1. 执行委员会审查了随同约旦哈希姆王国体制建设项目延长请求提交的最终报告，并赞赏地注意到约旦已远远实现了《蒙特利尔议定书》及其国家消耗臭氧层物质淘汰计划规定的各项淘汰目标。执行委员会还注意到，约旦在体制建设项目框架内，采取了重要步骤来淘汰其他领域的消耗臭氧层物质消费，并继续发挥积极作用。执行委员会鼓励约旦在 2010 年及以后，继续致力于完成并持续淘汰附件 A 和 B 所列各种物质，具体方法是完成国家消耗臭氧层物质计划；其冷风机替换项目；其甲基溴战略；正在开展的监测和提高公众认识活动；并有效执行降低消耗臭氧层物质非法贸易活动的风险的各项措施。

泰国

2. 执行委员会审查了随同泰国体制建设项目延长请求提交的报告。委员会赞赏地注意到泰国已有效、及时执行了其国家氟氯化碳淘汰计划及国家甲基溴淘汰计划，并注意到其已在过去两年期间成功履行了这两个方案简述的各项承诺。委员会承认为削减其消耗臭氧层物质总体消费量，泰国政府采取了多项步骤，它将继续对此给予支持。除其他外，这些行动包括，努力进行机构间协调，以确保国家遵循《蒙特利尔议定书》的各项承诺，开展培训、监测和强制执行活动以及提高认识运动。执行委员会希望，泰国政府今后将继续采取战略性方法，淘汰消耗臭氧层物质，并进一步努力淘汰氟氯烃。

2009 WORK PROGRAM AMENDMENT

PRESENTED TO THE 58th MEETING
OF THE EXECUTIVE COMMITTEE

WORLD BANK IMPLEMENTED
MONTREAL PROTOCOL OPERATIONS

May 11, 2009

WORK PROGRAM AMENDMENT FOR WORLD BANK-IMPLEMENTED MONTREAL PROTOCOL OPERATIONS

1. The World Bank 2009 – 2011 Business Plan and the 2009 Work Program were submitted for the consideration of the 57th Meeting of the Executive Committee (ExCom) in March 2009. The 2009 -2011 Business Plan includes, among others, three renewals of existing institutional strengthening projects, one global study on resource mobilization to maximize climate benefits from HCFC phase-out, four demonstration projects, and three pilot ODS disposal projects.

2. The funding requests for preparation of the global study on resource mobilization, four demonstration projects, and three pilot ODS disposal projects were made as part of the 2009 Work Program submission for the consideration of the 57th Meeting of the ExCom.

3. At the 57th Meeting of the ExCom, project preparation funds for three demonstration projects for China, and two pilot ODS disposal projects for Indonesia and the Philippines, were approved. The proposed pilot ODS disposal project for Mexico was agreed at the meeting of the Contact Group established by the ExCom, to consist of two components. The first component will be developed by UNIDO and the second component will be developed by the World Bank.

4. On the project preparation fund to develop the second component of the pilot ODS disposal project for Mexico, the Bank was advised by the Multilateral Fund Secretariat to submit this request at the 58th Meeting of the ExCom with the understanding that the project preparation fund to be approved from the Bank will be considered as part of the funding cap ($500,000) of the pilot ODS disposal project.

5. With regard to the proposed global study on resource mobilization to maximize climate benefits from HCFC phase-out, the ExCom decided that the activity should be maintained in the World Bank 2009 – 2001 Business Plan. The funding request to prepare this study as presented in the 2009 Work Program was not approved at the 57th Meeting as this proposal should be considered along with the on-going analysis of the Multilateral Fund Secretariat on the facility for additional income from loans and other sources. The Multilateral Fund Secretariat was requested by the ExCom to submit a revised paper on this issue to the 58th Meeting of the ExCom.

6. According to the ExCom's decision regarding the World Bank 2009 – 2011 Business Plan and decisions pertaining to pilot ODS disposal activities and the proposed global study on resource mobilization, the World Bank 2009 Work Program Amendment proposes funding requests to support the following activities: (i) renewal of existing institutional strengthening projects for Jordan and Thailand; (ii) project preparation funds for the second component of the Mexico pilot ODS disposal project; and (iii) preparation funds for conducting the global study on resource mobilization.

7. Descriptions of four work program activities are included in Table 1.

Table 1: Project Preparation Funding Requests Submitted for Consideration of the 58th Meeting of the Executive Committee

Country	Request (US$)	Duration	Description
Jordan	147,333	July 2009 – June 2011	Renewal of institutional strengthening project
Thailand	346,668	July 2009 – June 2011	Renewal of institutional strengthening project
Mexico	50,000	August 2009 – December 2010	Preparation of the second component of the pilot ODS disposal project. (The proposed activity for Mexico will demonstrate the employment of ODS disposal methodologies and criteria developed by the ODS disposal study to unwanted ODS to be collected from refrigerators and air-conditioners under the Mexico energy efficiency appliances program being developed by the World Bank. Both CFC-12 and CFC-11 from the old units will be collected and disposed of.)
Global	250,000	August 2009 – December 2010	Resource Mobilization for HCFC Phase-out Co-benefits (Concept Note and cost breakdown included in Annex I)
Support Cost	59,550		
Total	**853,551**		

Annex I

CONCEPT NOTE
RESOURCE MOBILIZATION FOR
MAXIMIZING CLIMATE BENEFITS OF HCFC PHASE-OUT

BACKGROUND

The Montreal Protocol on Substances that Deplete the Ozone Layer has been considered as one of the most successful global environmental treaties, as it has proven to be an effective instrument in bringing down consumption and production of the most potent ozone depleting substances (ODS) by more than 400,000 Mt within the last two decades.[1] Consumption and production of CFCs, halons, and CTC will be completely phased out in less than 12 months, except for a limited quantity for essential uses.

As most ODS are high global warming gases, phase-out of CFCs, halons, and CTC has also brought climate benefits. The Montreal Protocol in the last two decades has resulted in avoided emissions of high global warming gases equivalent to 25 billion tons of CO2, in comparison with the 2 billion tons of CO2-equivalent to be achieved under the first commitment period of the Kyoto Protocol.[2]

However, phasing out of these potent ODS has resulted in increasing demand for several high global warming gases, including gases regulated under the Kyoto Protocol.[3] For example, the demand for HFC-134a, a primary alternative for CFC in new refrigeration and air-conditioning applications, was more than 133,000 MT in 2002[4] and could exceed 400,000 Mt by 2015.[5] In the short term, replacing CFCs, which have significant higher global warming values than HFCs, resulted in significant climate benefits as mentioned above. With continuing growth in the demand for refrigeration and air-conditioning equipment particularly in developing countries, however, continuing dependence on HFCs could eventually pose a significant burden to the climate in the long run.

The ozone and climate communities recognize the linkage between their efforts in protecting the ozone layer and the climate. Increasing efforts have been asserted in order to ensure synergy between the two associated global conventions. When the Parties of the Montreal Protocol decided in 2007 to accelerate the phase-out of HCFCs,[6] it was

[1] 2007 Consolidated Progress Report, Multilateral Fund Secretariat, July 2008.
[2] Velder and al. 2007. The Importance of the Montreal Protocol in Protecting Climate, Vol 104. PNAS,
[3] Emissions of greenhouses regulated under the first commitment period of the Kyoto Protocol (2008-2012) are CO_2, CH_4, N_2O, HFCs, PFCs and SF_6.
[4] Consumption of HCFCs grew at an average growth rate of more than 20% a year from 1995 – 2001. Consumption continues to grow at almost the same rate from 2002 – 2007.
[5] IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System Chapter 11
[6] HCFCs are controlled by the Protocol since 1994 as “Annex C” substances. In 2007, the Parties of the Montreal Protocol negotiated an accelerated schedule of phase-out by ten years for all Parties for HCFCs. Developing countries have agreed to phase-out HCFCs by 2030.

recognized that selection of alternative technologies for HCFCs should take into consideration climate impact and benefits. However, the accelerated phase-out of HCFCs could result in an unintentional growth of HFC demand as was the case for CFC phase-out; therefore, efforts should be made to ensure that more consideration be given to low GWP alternatives despite the fact that some alternatives will require higher investment capital.[7]

Under the current regulatory frameworks, neither the Montreal Protocol nor the Kyoto Protocol is systematically covering the costs associated with a transition to low GWP technologies. The Kyoto Protocol is covering the mitigation of emissions, while the concern will be at the production and consumption levels. The Montreal Protocol has proven to be an effective instrument to deal with phasing out of ODS at the production and consumption levels; however, HFCs, which are primarily used to replace ODS in the air-conditioning sector, are regulated under the Kyoto Protocol, a protocol that has demonstrated, through the Clean Development Mechanism, the effectiveness of market instruments to leverage funding for technology transfer in developing countries.[8] Elements from both conventions can therefore be analyzed and compared to preempt an increase in the demand for HFCs or high GWP gases.

OBJECTIVES

The objective of this study is to explore options for preempting an increase in the demand for HFCs or any other high global warming gases as a result of HCFC phase-out in developing countries. The study will review and examine potential mechanisms available for financing the transition to low GWP alternatives, including a scheduled phase-down of HFCs in developing countries and transition economies. This study will focus on direct emissions of chemicals; however, it recognizes that actions to reduce indirect emissions, such as energy efficiency improvement, can have a significantly higher impact than focusing strictly on chemical use.[9] Therefore, the proposed study will also addresse technologies limitations and the tradeoff between energy efficiency gains and low GWP gases in order to maximize overall energy benefits.

HCFCS PHASE-OUT SCHEDULE OF THE MONTREAL PROTOCOL

As per Article 7 data reporting requirements under the Montreal Protocol, the total consumption of HCFCs of all developing country Parties in 2006, mainly HCFC-141b, HCFC-142b, and HCFC-22, is approximately 352,000 MT. Consumption of other HCFCs (for example, HCFC-123) represents only a small fraction of the HCFC

[7] Use of certain low alternatives may result in higher capital due to toxicity and/or flammability of product and the necessity to ensure that manufacturing facilities, production and servicing personnel are trained and equipped with appropriate safety equipment.

[8] The State and Trends of the Carbon Market 2008, World Bank, 2008 reported a cumulative committed investment to CDM projects activities over 2002-2007 of about US$59 billion, for an average leverage ratio of 3.8.

[9] I IPCC/TEAP Special Report: Safeguarding the Ozone Layer and the Global Climate System Chapter 11.

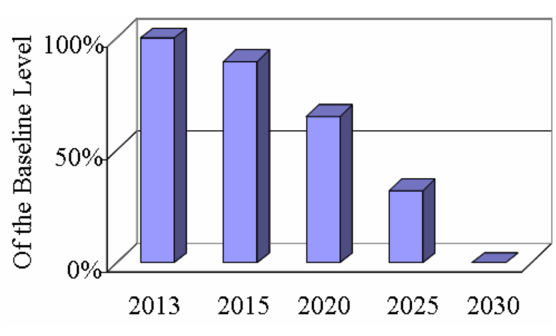
consumption of most developing countries. It is expected that consumption of HCFCs would continue to grow if there were no Montreal Protocol obligations, as demand for refrigeration and air-conditioning, and better insulation in developing countries is growing at a rapid pace. Based on the aggregate HCFCs consumption trends of developing countries in previous years, a growth rate of 9-10% per annum could be expected. By applying a 9% growth rate to the demand for each type of HCFCs, the total demand for HCFCs in developing countries could reach a level of as much as 2.78 million tons in 2030. The breakdown of projected HCFC demand in 2030 is shown in Table 1.

Table 1. Demand for HCFCs Under Business-as-Usual Scenario in Developing Countries (in MT)

HCFC/Year	2010	2015	2020	2025	2030
HCFC-141b	171,445	242,008	372,360	572,921	881,510
HCFC-142b	45,070	63,620	97,887	150,611	231,734
HCFC-22	324,594	458,191	704,983	1,084,704	1,668,951
Total	541,108	763,818	1,175,229	1,808,236	2,782,195

Actual demand for HCFCs is expected to be much lower than the business-as-usual scenario, as the Montreal Protocol requires Article 5 countries to freeze HCFC consumption by 2013, followed by interim reduction steps leading to a complete phase-out by 2030, excepting a small quantity for meeting the servicing tail up to 2040.

Fig. 1. HCFC Allowance Production and Consumption Schedule in Developing Countries

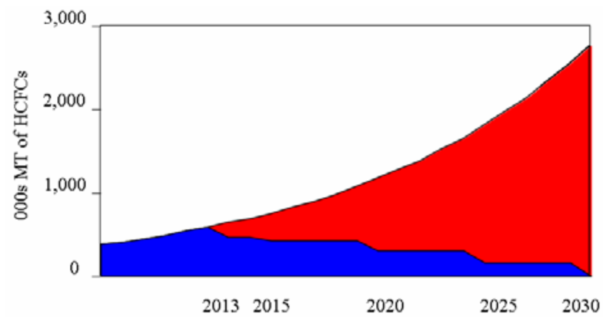


With the accelerated HCFC phase-out schedule of the Montreal Protocol, a total HCFC consumption of 21 million MT could be avoided during the period 2013-2030.[10] This avoided consumption would result in early introduction of alternatives. Climate impacts

[10] For illustration purposes, it is assumed that the same demand growth for the BAU scenario and the same reduction schedule are applied to each HCFC.

or benefits are, therefore, dependent on the choices of alternatives to be adopted by Parties to the Montreal Protocol.

Fig. 2 Estimated consumption of HCFCs and alternatives for 2013-2030



If the avoided consumption (the red area in Fig. 2) is replaced by low GWP alternatives, the total climate benefits from the accelerated HCFC phase-out schedule (excluding impacts from improved or inferior energy efficiency performances) could be as high as 30.5 Gt of CO_2 equivalent by 2030.[11] As early phase-out of HCFC-22 also results in avoided production of byproduct HFC-23, the accelerated HCFC phase-out schedule contributes therefore to additional indirect emission reductions of 5.6 Gt of CO_2 equivalent associated with avoided production of HFC-23.[12]

NON-HCFC ALTERNATIVES

Major applications of HCFC-22, HCFC-141b, and HCFC-142b in developing countries are in the refrigeration, air-conditioning, and foam sectors. Alternatives to these HCFC applications include HFCs, which have high global warming potential values, and hydrocarbons (HC), CO_2 and ammonia, which have lower GWP values. Currently available non-HCFC alternatives for various applications are summarized in Appendix 1.

Selection of alternatives depends on the desired product quality and safety. For example, hydrocarbons, which are flammable, may not be desirable for certain applications. Certain alternatives may also compromise product quality (such as insulation performance of insulation foam products.

[11] Assuming that HCFCs are replaced by only low GWP alternatives.

[12] Assuming 3% byproduct HFC-23 in the HCFC-22 production, refer to HCFC Phase-out under the Montreal Protocol - Introductory Note on a Programmatic Approach, Montreal Protocol Operations, World Bank, 2008

CLIMATE IMPACT OF HCFC PHASE-OUT

The ozone depleting substances (HCFCs) are also high global warming gases, the phase-out of these chemicals presents an opportunity to maximize climate benefits, including energy efficiency gains and uses of low GWP alternatives. Alternatives currently available for replacing HCFCs consist of high global warming gases such as HFCs, low GWP gases such as hydrocarbons, CO2 and ammonia.

Selection of these substances would have to take into account a number of factors ranging from desired product qualities, flammability, toxicity, and associated costs of using such alternatives, including energy consumption and servicing aspects.

In terms of climate benefits, the selection of alternative gases, should not only focus on low GWP of alternatives, but should also cover energy efficiency benefits that could be gained over the lifetime of the equipment. This is particularly true for the foam products, air-conditioning and refrigeration equipment that are generally made with a small quantity of HCFCs, but are characterized by long product lifetime. Alternatives could be categorized according their energy efficiency potential and GWP of the products (refer to appendix 2).

ADDITIONALITY OF CLIMATE BENEFITS ASSOCIATED WITH ACCELERATED HCFC PHASEOUT

To meet the accelerated HCFC phase-out schedule stipulated by the Montreal Protocol, major policies and actions must be undertaken to minimize the current demand of HCFCs and future dependence on HFCs. Restricting manufacturing of new HCFC-based equipment is also another important measure to avoid the build-up of HCFC demand for servicing this equipment in the future. Restricting production of new HCFC-based equipment and products could be applied to existing manufacturers or manufacturing capacity by providing them with incentives for early conversion. Establishment of new manufacturing capacity based on HCFC technologies should also be prohibited.

Recovery, recycling and reuse of HCFCs, particularly HCFC-22 which represents more than 80% of the total consumption in most developing countries, would assist countries to meet their Montreal Protocol obligations. Since the Montreal Protocol defines consumption as production plus import and minus export, recycled HCFC-22 would replace the need for production and/or import of virgin HCFC-22 which in turn assists countries in meeting their consumption limit.

Replacement of HCFC-based equipment would also contribute to significant reduction in HCFC demand. Given that HCFC-based equipment or products (e.g., air-conditioning equipment, insulation foams, and etc.) have a long product life, early replacement of these items could be costly and not financially viable. Based on experience from CFC phase-out, early replacement of HCFC-based equipment or products could be viable when new products are more energy (and resource) efficient. As there have been a number of projects addressing this issue, this option will not be addressed in this proposed study.

As pointed out earlier, replacement of HCFCs in most applications could be done via both low and high GWP alternatives. In most cases, applications of low GWP technologies in the foam and refrigeration sectors could result in lower product costs. However, because of related toxicity and/or flammability issues of these low GWP alternatives, higher capital investments are required to ensure that manufacturing facilities, production and servicing personnel are trained and equipped with necessary safety equipment. Conversion costs could be prohibitive, particularly for small-and-medium scale enterprises.

The CFC phase-out experience clearly demonstrates that while cyclopentane is available as a foam blowing agent, all small-and-medium scale enterprises opt for HCFC-141b as initial investments are much lower. Hence, the preferred choice for phasing out of HCFC in the foam sector for small-and-medium scale enterprises could as well be HFCs, rather than cyclopentane. Common HFCs for foam blowing applications include HFC-134a, HFC-152a, HFC-245fa, HFC-365mc, and HFC-227ea. These chemicals have GWP many times higher than hydrocarbon alternatives (with GWP of less than 25) (Appendix 3).

Similarly, HCFC-22 refrigerant in the refrigeration and air-conditioning applications could be replaced by either low or high GWP refrigerants (i.e, hydrocarbons, ammonia, carbon dioxide, and HFCs). For developing countries in particular where the demand of residential air-conditioners is rapidly increasing, selection of appropriate alternatives to HCFC-22 refrigerant would render significant climate benefits. Currently, HFC-410A, which has a high GWP value, seems to be an alternative of choice. Extensive research and development has been put in place to improve energy efficiency of new HFC-410A residential air-conditioners. Providing that similar energy efficiency could be achieved by hydrocarbon technology, replacing HCFC-22 with hydrocarbon refrigerant could contribute additional benefits to the climate since GWP of hydrocarbon refrigerant are more than 100 times lower than HFC-410A. However, safety concerns on the flammability of hydrocarbons could prevent a large-scale adoption of this technology. Extensive training of production and servicing personnel may be required in order to employ this technology safely. More awareness for end-users is also equally important in order to educate consumers of the safe use of these products.

Recovery and recycling of HCFC-22 during servicing and maintenance of refrigeration and air-conditioning equipment is considered as an eligible activity for funding from the Multilateral Fund. Thus far, the Multilateral Fund has allocated significant resources to support establishment of recovery and recycling networks in almost all developing country Parties of the Montreal Protocol. In addition, training on better containment (reducing leak, recovery and recycling, and reuse) has also been one of the core activities funded by the Multilateral Fund.

Experience from CFC recovery and recycling, thus far, is not encouraging. Implementation of recovery and recycling practice is more desirable financially when servicing equipment with a large refrigerant charge size. For example, recovery and recycling of refrigerants in large industrial and commercial refrigeration systems and in large chillers are common. However, recovery and recycling of CFCs from mobile air-conditioning equipment and domestic refrigerators have not shown a similar success as the price of CFCs and the quantity of CFCs that could be recovered from each unit are low.

It is expected that the economic of recovery and recycling HCFC-22 from residential air-conditioning units would probably be similar to recovery and recycling of CFCs from mobile air-conditioning equipment and domestic refrigerators. A combination of the low price of HCFC-22 and a small charge size of HCFC-22 in each piece of equipment, and high transaction costs to implement recovery and recycling HCFC-22, makes the recovery and recycling practice less financial attractive to most service technicians.

Potential climate benefits of recovery and recycling HCFC-22 warrants further consideration as it leads to a lower requirement for production of virgin HCFC-22. Excluding the direct GWP associated with HCFC-22, recovery and recycling of one MT of HCFC-22 reduces emission of 30 kg of byproduct HFC-23 from production of one MT of virgin HCFC-22 or about 420 MT of CO_2 equivalent. This significant climate benefits render opportunity to mobilize additional resources to lower high transaction costs of implementing the recovery and recycling practice experienced by service technicians.

PROPOSED STUDY

As indicated above, HCFC phase-out could result in an increased use of HFCs . In order to maximize benefits of both ozone layer protection and climate protection, a synchronized strategy for managing the use of HCFCs and phasing-down HFCs could assist Parties to the Montreal Protocol to develop a conducive environment for climate friendly technologies. This would also assist industries in developing countries to avoid two-steps conversion to low GWP technologies (from HCFC to HFC and to low GWP alternatives). To support market penetration of low GWP technologies, financial incentives within and outside the Multilateral Fund should be considered in order to offset higher costs, if any, of adoption of low GWP technologies. In addition, consumption and production of HFCs including those produced as byproducts of other chemical processes will also be considered.

Since all Parties to the Montreal Protocol are now in the process of developing their HCFC phase-out strategies, it is an opportune time for Parties to also consider their HFC strategy as part of their response to the call for more consideration of other environmental benefits, particularly the climate benefits, when phasing out HCFCs. Based on the business-as-usual scenario, it is obvious that the need for HFCs equipment or products (e.g., air-conditioning and insulation foam products) will continue to grow in spite of the HCFC phase-out schedule under the Montreal Protocol. Hence, to minimize the growth of HFCs the choice of technologies to be made by existing manufacturing facilities of those products currently produced with or containing HCFCs not only has to be considered, but also the choice of technologies for facilities to be established in the future in order to meet the demand of these products.

OBJECTIVES OF THE STUDY

While HCFC phase-out renders two climate benefit opportunities: (i) improved energy efficiency; and (ii) use of lower GWP chemicals, the proposed study will focus on resource mobilization to support the latter, but will addressed technologies limitations and tradeoff between energy efficiency gains and low GWP gases.

The study will focus on resource mobilization to support projects aiming at reducing use of HFCs[13] as a result of HCFCs phase-out and reducing HFCs as a byproduct from HCFC production.

SCOPE OF THE STUDY

The study will investigate: (i) review of tradeoff between energy efficiency gains and low GWP gases; (ii) costs and barriers associated with conversion of HCFC technology with to low GWP alternatives; (iii) volume of HFCs and equivalent in carbon dioxide equivalent associated with the consumption and production in developing countries and transition economies including those produced as byproducts of other chemical processes; and (iiv) potential funding resources (e.g., Multilateral Fund, Carbon Market, Carbon Partnership Funds, Clean Technology Fund, and etc.) to support adoption of better HCFC containment practice, and climate friendly technologies (v) recommendations (or development of a) for a funding methodologies such as approaches to evaluate and setting the baseline consumption and production of HFCs, etc. In addition, the study will investigate effective modalities for implementing these activities in order to ensure seamless synergy between the MLF funded activities and activities funded by resources outside the MLF.

Based on experience from CFC phase-out, it is anticipated that HCFC phase-out will involve a large number of beneficiaries. Moreover, HCFC phase-out strategies and HFC strategies may require not only investment and technical assistance activities but also a combination of policy and timely investment interventions to ensure cost-effective means of achieving the targets. Experiences from implementation of CFC phase-out activities in the last two decades clearly demonstrate effectiveness of sectoral or national approaches whereby policy and investment activities are carried out in chronology. Similarly, the climate community also recognizes the need to scale up its CDM activities. Recently, a program of activity approach has been adopted by the CDM Board.

There are some similarities between the sectoral or national approaches under the Multilateral Fund and the CDM program of activity approach. The study will review these different approaches and offer recommendations to synchronize implementation

[13] It includes HFCs used as a result of CFC phaseout and possibly HCFC phase-out. For example, the study will explore financing opportunities for replacing HFC-134a MACs with low GWP alternatives.

modalities as well as to synchronize, to the extent possible, monitoring and verification procedures that may be required by the MLF mechanism, CDM mechanism, and other potential funding mechanisms.

STUDY APPROACH

The study will entail a desk review of the on-going study on HCFC alternatives and their climate benefits being conducted by UNEP TEAP under the auspices of the Montreal Protocol, the cost study being carried out by the Multilateral Fund, all applicable CDM methodologies, proposed approaches under negociations by the climate community, funding mechanisms outside UNFCCC and MP such as the Clean Technology Carbon Partnership Funds, Clean Technology Fund and others. Findings of the desk review will lead to recommendations or development of a funding methodologies for potential funding sources. The study will also include workshops to inform developing countries of findings of the study, which will lead to identification of potential pilot projects in a few developing countries.

TIMEFRAME

Detailed terms of reference for this study will be submitted for the consideration of the Executive Committee at its 58th Meeting in July 2009. The study will then take about 12 months to complete. The final report of the study will be submitted to the ExCom at its 62nd Meeting in November 2010.

Appendix 1: Non-HCFC Alternative Matrix

Sector	Sub-sector	HCFCs Currently Used	Alternative Options
Foam	XPS	HCFC 22/HCFC 142b (blends), HCFC 22, HCFC 142b	CO_2, CO_2/Ethanol, CO_2/HCs; HFC 134a
	Polyurethane Spray	HCFC 141b, minor use of HCFC 141b/HCFC 22	HFC, CO_2 (CO_2 not preferred option if superior thermal insulation performance is required.)
	Domestic refrigerators/freezers	HCFC 141b, minor use of HCFC 141b/HCFC 22	HFC, HC (Small enterprises use HFCs)
	Commercial refrigerators/freezers	HCFC 141b	HFC, HC, CO_2 (Adhesion problem with CO_2)
	Sandwitch panels - continuous	HCFC 141b	HFC, HC
	Sandwitch panels - discontinuous	HCFC 141b	HFC, HC
	Insulated pipes	HCFC 141b	HFC, HC
	Integral skin foams	HCFC 141b	HFC 134a, CO_2, HC
Refrigeration	Supermarket refrigerators	HCFC 22	R-404A, CO_2, HCs and Ammonia (R-717)
	Industrial refrigeration	HCFC 22	R-717, CO_2
	Transport refrigeration	HCFC 22	HFC 134a, R-404A, R-410A
Air-conditioning	Air-conditioning	HCFC 22	R-410A, HCs, CO_2
	Water -heating heat pumps	HCFC 22	HFC 134a, R-410A, CO_2
	Chillers	HCFC 22	HFC 134a

Source: OORG Presentations, OORG Meeting, October 2008, Washington DC
Note: R-404A and R-410A are HFC blends.

Appendix 2: Selection of HCFC's Alternatives and Climate Considerations

In terms of climate benefits, it could be described that the available alternatives in the consumption sector can be categorized according to Figure 3. These four regions represent:

- Region I – Low GWP alternatives with improved energy and resource efficiency or thermal insulation property of the final products;
- Region II – High GWP alternatives with improved energy and resource efficiency or thermal insulation property of the final products;
- Region III – Low GWP alternatives with inferior energy and resource efficiency or thermal insulation property of the final products when compared with HCFC products;
- Region IV – High GWP alternatives with inferior energy and resource efficiency or thermal insulation property of the final products when compared with HCFC products.

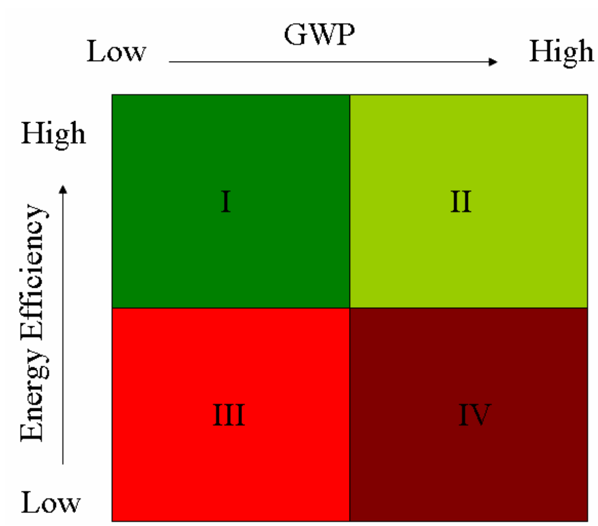


Fig. 3 Characteristics of Non-HCFC Alternatives

Foam products, air-conditioning and refrigeration equipment, are made with a small quantity of HCFCs. However, they have a long product lifetime. Therefore, any alternatives of HCFCs that fall in Regions III and IV are not desirable. For example, replacing HCFCs with low GWP alternatives (Region III) but resulting in low energy efficiency or insulation property, could result in higher energy consumption during the lifetime of these products. Emissions of carbon dioxide during the lifetime of the products normally are many times higher than the difference between the GWP values of HCFCs and alternatives used for manufacturing or maintaining these products. Alternatives in Region IV are even less desirable.

Appendix 3: GWP of HCFCs and HFC alternatives[14]

Substance	GWP
HCFC-22	1,700
HCFC-141b	630
HCFC-142b	2,000
HFC-134a	1,300
HFC-152a	140
HFC-245fa	820
HFC-365mc	840
HFC-227ea	2,900
HFC-23	14800
R-410A (HFC Blends)	2,100
R-404A (HFC Blends)	3,900
R-407C (HFC Blends)	1,800

Note: R-404A, R-407C, and R-410A are HFC blends

[14] 2006 UNEP Technical Options Committee Refrigeration, A/C and Heat Pump Assessment Report

Appendix 4: Preparation Cost Breakdown

Element	Description	US$
Potential Volume of Carbon Dioxide Equivalent Emission Reduction	Review of current HCFC applications and available non-HCFC alternatives; market analysis on penetration of various alternatives (high and low GWP) and estimates on benefits from improved energy and resource performance (taking into account ongoing work of TEAP and OORG)	35,000
Barriers Associated with Conversion of HCFC Technology with Baseline Energy and Resource Efficiency to Low GWP Alternatives with Improved Energy and Resource Efficiency	Industrial survey in a selected number of Article 5 countries and Article 2 countries that are major technology providers for each HCFC application	50,000
Consumption and Production of HCFCs	Industrial survey focusing on chemical producers in both Article 5 and non-Article 5 countries; market analysis to project trends	10,000
Potential Funidng Resources	Review of existing activities or projects funded by various funding mechanisms; review existing CDM and non-CDM methodologies; interview with prospective beneficiaries in Article 5 countries; identification of potential sources of financing; development of approaches and project model for securing such resources	55,000
Development of Funding Criteria/Standards/Methodologies	Development of tools for capturing co-financing resources outside the MLF	70,000
Stakeholder Consultation Meetings	3 consultation meetings	30,000
Total		**250,000**