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执行蒙特利尔议定书
多边基金执行委员会
第五十七次会议
2009 年 3 月 30 日至 4 月 3 日，蒙特利尔

世界银行 2009 年工作方案

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 年工作方案核准 700,000 美元，外加 52,500 美元机构支助费用。

2. 世界银行 2009 年工作方案拟议的活动如下表 1 所示：

表 1：世界银行工作方案

国家	活动/项目	所需数额（美元）	建议数额（美元）
A 节：建议一揽子核准的活动			
A1. 氟氯烃淘汰管理计划项目编制			
印度尼西亚	减少泡沫塑料行业氟氯烃的行业计划编制	100,000	100,000
斯里兰卡	减少制冷和空调行业氟氯烃的行业计划编制	60,000	60,000
	A1 小计：	160,000	160,000
B 节：建议个别审议的活动			
B1. 氟氯烃示范项目的项目编制			
中国	喷射泡沫塑料次级行业氟氯烃化合物淘汰示范项目编制	30,000	*
中国	热水器泡沫隔温次级行业氟氯烃化合物淘汰示范项目编制	30,000	*
中国	泡沫塑料配方厂家示范项目编制	80,000	*
	B1 小计：	140,000	
B2. 消耗臭氧层物质废物管理试点项目			
印度尼西亚	消耗臭氧层物质处置试点项目编制	50,000	*
墨西哥	消耗臭氧层物质处置试点项目编制	50,000	*
菲律宾	消耗臭氧层物质处置试点项目编制	50,000	*
	B2 小计：	150,000	
B3. 技术援助			
全球	为淘汰氟氯烃调集资源和共同惠益	250,000	*
	B3 小计：	250,000	
A 节和 B 节小计：		700,000	160,000
机构支助费用（7.5%用于项目编制和体制建设和 250,000 美元以上的其他活动，9%用于 250,000 美元以下的活动）：		52,500	12,000
总计：		752,500	172,000

* 单独审议或未决的项目。

A 节：建议一揽子核准的活动

A1. 氟氯烃淘汰管理计划项目编制

印度尼西亚：减少氟氯烃在泡沫塑料行业中使用的行业计划编制（100,000 美元）

项目说明

3. 世界银行提出供资申请，用以编制其被印度尼西亚指定为主管机构的泡沫塑料行业的行业计划。

4. 为了支持这一申请，世界银行说明所申请费用包含对泡沫塑料行业进行调查，研究大约 200-250 家（占该行业公司的 30%）中小型企业的情况。申请的资金还包含确定该计划的行业协调讲习班以及其他所需协调会议的费用。该预算还涵盖协助编制行业计划的专家费用。该文件指出，该计划如能执行，估计能淘汰 100-200 ODP 吨氟氯烃，并且极其有助于履行印度尼西亚对 2013 和 2015 年的氟氯烃承诺。

秘书处的评论

5. 执行委员会第 56/16 号决定，2007 年消费了 101-300 ODP 吨氟氯烃的国家有资格获得最高 200,000 美元供资，用于投资项目的附加项目编制工作，作为其氟氯烃淘汰管理计划的一部分。根据第 7 条报告，印度尼西亚的氟氯烃消费量为 286.8 ODP 吨。

6. 在审查此项申请时，秘书处指出，世界银行已将秘书处要求得到的基本信息包含在内，以便能够更好地评价该申请。信息在上文第 4 段中已经总结。秘书处与世界银行讨论了该申请，特别讨论了该项目编制申请书是否涵盖整个泡沫塑料行业，并能使该国履行其第一阶段的氟氯烃淘汰管理计划承诺。秘书处还要求澄清该行业计划是如何全面纳入提交印度尼西亚的氟氯烃最终淘汰管理计划，其供资申请已在第五十五次会议上获得核准。世界银行确认此项活动将完全针对泡沫塑料行业的第一阶段，所拟订的项目最后将纳入氟氯烃最终淘汰管理计划。

7. 秘书处还指出，该供资申请加上开发计划署为制冷行业申请 90,000 美元（第 57/18 号文件），使得印度尼西亚申请的供资总额在 200,000 美元中占到 190,000 美元，根据第 56/16 号决定，这成为该国有资格在氟氯烃淘汰管理计划投资部分获得的最大金额。其余的 10,000 美元将在将来的会议上由工发组织为溶剂行业申请。

秘书处的建议

8. 谨建议执行委员会考虑核准作为印度尼西亚氟氯烃淘汰管理计划一部分世界银行为投资项目的项目编制申请的 100,000 美元另加支助费用 7,500 美元，但条件是执行委员会不再为泡沫塑料行业执行 2013 和 2015 年氟氯烃控制措施的项目编制另行核准供资。

斯里兰卡：减少制冷行业氟氯烃消费量的行业计划编制 行业：60,000 美元

项目说明

9. 世界银行提交了一份供资申请，用于编制其被斯里兰卡指定为主管机构的制冷和空调行业的行业计划。

10. 为了支持该申请，世界银行说明所申请的费用包含对制冷和空调行业进行调查，研究该行业的大型和小型企业的活动情况。申请的资金还确定该计划的协商讲习班以及其他所需协调会议的费用。预算还将涵盖协助编制行业计划的专家费用。该文件指出，此项计划如能执行，估计能淘汰 3 ODP 吨氟氯烃（约 50-55 公吨 HCFC-22），并将极大地有助于履行斯里兰卡对 2013 和 2015 年的氟氯烃承诺。

秘书处的评论

11. 执行委员会在第 56/16 号决定中决定，2007 年氟氯烃消费量达到 100 ODP 吨的国家有资格获得最高 100,000 美元供资，用于投资项目的附加项目编制工作，作为其氟氯烃淘汰管理计划的一部分。据第 7 条报告，斯里兰卡的氟氯烃消费量为 15.4 ODP 吨。

12. 在审查此项申请时，秘书处指出，开发计划署是斯里兰卡编制氟氯烃淘汰管理计划的牵头机构，世界银行必须与其密切合作，共同撰写一份氟氯烃淘汰管理综合计划，以使所有行业都能够执行 2013 和 2015 年氟氯烃控制措施。他还指出，世界银行已按照秘书处的要求，提供了关于该行业的信息以保证对该提案给予更好的评价。世界银行还确认此项活动将完全针对制冷和空调行业的第一阶段，所编制的项目将纳入氟氯烃最终淘汰管理计划。

13. 秘书处还指出，该供资申请加上开发计划署为不同行业申请的 40,000 美元（第 57/18 号文件），使得斯里兰卡申请的供资额达到 100,000 美元，这是该国有资格在氟氯烃淘汰管理计划投资部分项下获得的最大金额。斯里兰卡氟氯烃淘汰管理计划第一阶段的编制工作将不再为其他消费氟氯烃行业提供资金。

秘书处的建议

14. 谨建议执行委员会考虑作为斯里兰卡氟氯烃淘汰管理计划的一部分核准世界银行为投资项目的项目编制所申请的 60,000 美元另加支助费用 4,500 美元，但条件是执行委员会不再为制冷和空调行业执行 2013 和 2015 年氟氯烃控制措施的项目编制另行核准供资。这还构成斯里兰卡编制氟氯烃淘汰管理计划以完成氟氯烃淘汰第一阶段的最终供资。

B 部分：建议个别审议的活动

B1. 氟氯烃示范项目的项目编制

(a) 中国：喷射泡沫塑料次级行业氟氯烃淘汰示范项目编制：30,000 美元

(b) 中国：热水器泡沫隔温次级行业氟氯烃淘汰示范项目编制：30,000 美元

(c) 中国：泡沫配方厂家氟氯烃淘汰示范项目编制：80,000 美元

项目说明

15. 世界银行为中国泡沫塑料行业示范项目编制提出了四项申请。为上述提案提供的信息归纳如下：

(a) 在过去六年里喷射泡沫塑料次级行业对氟氯烃的使用大大增加。据估计，2007 年有约 15%的 HCFC-141b 在该行业中使用。拟议的示范项目将评估在该行业使用 HFC-245fa 或液态二氧化碳作为氟氯烃替代品的技术和商业可行性。该项目将在哈尔滨天硕建材工业有限公司实施，该公司是一家制造公司，1993 年在黑龙江省哈尔滨市建立。

(b) 在中国，聚胺脂泡沫塑料用于热水器和太阳能热水系统水箱的隔温。近年来太阳能装置的使用有所增加，据估计，中国有 500 多家企业生产这类设备。单独一家公司对于该设备专用的聚胺脂泡沫塑料所需的 HCFC-141b 消费量估计为 40-60 ODP 吨。该项目将展示碳氢化合物作为该次级行业的替代品是如何使用的。我们将在位于江苏淮阴的江苏淮阴辉煌太阳能有限公司进行示范。该企业组建于 1993 年。

(c) 尽管在许多国家使用多元醇配方厂已证明是在泡沫塑料制造中淘汰 CFC-11 的具有成本效益的方法，但中国并未经过试验。该示范项目将通过一个配方厂和 8-10 个下属的泡沫塑料企业测试拟议的办法，以确定使用事先混合的多元醇和碳氢化合物的可行性。预计该项目将在 1991 年在广东省建立的广东万华容威聚氨酯有限公司中进行示范。

16. 世界银行指出，项目编制资金将用来编制个别的投资提案，审查以精选的工艺、技术援助和公司培训对现有泡的沫塑料设备进行改型的可行性、进行试生产以及计算采用替代技术产生运营成本/节余。在配方厂家示范项目中，还将设计和验证流程，以及探讨如何使泡沫塑料化学配方最优化以符合地方市场和条件要求。

秘书处的评论

17. 秘书处指出，世界银行提供的用来支持上述中国示范项目编制申请的信息，与第 56/16（i）号决定的要求一致，该决定特别提到项目编制资金的申请应包含以下内容：国家和行业的详细说明、项目简述、将淘汰约多少 ODP 吨、涉及的企业（如果有）以及开始业务活动的日期，并提供执行委员会为何选择该项目的确凿理由。在配方厂家项目编制的申请中，并未指明由于本项目可以淘汰多少氟氯烃。而且，所提交的提案并未根据上述决定包含执行委员会选择该项目作为示范项目的确凿理由。

18. 世界银行解释说，这些申请是为了根据第 55/43（e）号决定提出的，在该决定中，执行委员会特别邀请各机构提交数量有限、具有时效性项目提案，其中涉及非氟氯烃发泡剂使用的化学配方的开发、优化和验证所需的相关配方厂家和/或化学品供应商。他们还对中国政府就项目需求提出的请求做出回应，以展示所述的每种应用技术，其结果就是协助中国政府和泡沫塑料行业就使用哪种替代方法来淘汰这些行业中的氟氯烃做出决定。

19. 秘书处还指出所确定的三家公司全部在 1995 年 7 月之前开始经营，因而符合第 17/7 号决定中有关 1995 年 7 月 25 日之后确定的企业资格。

秘书处的建议

20. 谨提议执行委员会根据第 55/43（e）号和第 56/16（i）号决定考虑核准中国三个示范项目的项目编制的申请额，金额如下文所示：

(a) 喷射泡沫塑料次级行业氟氯烃淘汰示范项目编制：30,000 美元，加上机构支助费用 2,250 美元。

(b) 热水器泡沫隔温次级行业氟氯烃淘汰示范项目编制：30,000 美元，加上机构支助费用 2,250 美元。

(c) 泡沫塑料配方厂家氟氯烃淘汰示范项目编制：80,000 美元，加上机构支助费用 6,000 美元。

B2. 消耗臭氧层物质废物管理试点项目的项目编制

背景

21. 世界银行提交了编制三个消耗臭氧层物质处置试点项目的申请。这些试点项目拟议在印度尼西亚、菲律宾和墨西哥进行。项目设计将记录三个国家里无用消耗臭氧层物质的不同情况（例如：无用的消耗臭氧层物质来源、收集、运输、包装、储存和最后处置）。

22. 根据该申请，这三个试点项目还包含一项财务分析，以决定在不同流量和不同当地条件的情况下处置消耗臭氧层物质的可行性。完成消耗臭氧层物质处置的实际费用预计由将由有待确定的供资资源的碳信用额来承担。处置消耗臭氧层物质将在销毁效率至少达到99.99%的现有处置设施中完成。

23. 各国预期处置的消耗臭氧层物质数量列于下表。世界银行并未具体说明其申请中的实际物质。

国家	ODP 吨				
	2009 年	2010 年	2011 年	2012-2015 年	总计
印度尼西亚		60			60
菲律宾		12			12
墨西哥		100	135	540	775

印度尼西亚：消耗臭氧层物质处置试点项目的编制：50,000 美元

项目说明

24. 世界银行的申请指出，在印度尼西亚，该项目将针对非法进口的消耗臭氧层物质处置，还将探讨以当地处置设施来销毁消耗臭氧层物质的可行性。该项目的设计将以早先由日本政府作为其多边基金双边出资方之一所资助的消耗臭氧层物质处置项目的经验为根据。

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

25. 墨西哥的拟议活动将示范如何应用世界银行在墨西哥能效装置方案下通过从制冷机和空调中收集无用的消耗臭氧层物质完成的消耗臭氧层物质处置研究所制定的（同样也是由世界银行制定的）消耗臭氧层物质处置方法和标准。将收集和处置老设备的 CFC-12 和 CFC-11。

菲律宾：消耗臭氧层物质处置试点项目的编制：50,000 美元

项目说明

26. 菲律宾试点研究不仅仅针对批量氟氯化碳的处置，还涉及受污染的氟氯化碳（CFC-12、HFC-134a 和其他物质的混合物）的处置。该项目还将探讨氟氯化碳从维修车间到由多边基金资助的国家氟氯化碳淘汰计划下设立的回收和再循环中心的运输，其中还包括包装和最终处置。

秘书处的评论

27. 在第 XX/7 号决定第 2 段中，缔约国会议请执行委员会立即作为紧急事项考虑开始执行那些涉及收集、运输、储存和销毁消费臭氧物质的试点项目。尽管执行委员会在第五十一次会议上同意将消耗臭氧层物质销毁项目纳入各机构的业务计划中，但委员会仍未阐明评估其影响的方法，当前也没有制定该项目的指导方针。此外，此次会议将是委员会申请第 XX/7 号决定第 2 段对于其供资业务的影响的第一次机会。

28. 尽管没有指导方针，秘书处仍就要求世界银行对上述申请进行澄清，并询问试点项目将展示的活动类型以及所申请资金将涵盖哪些资金。世界银行介绍了试点项目的活动，作为附件二随附在该申请之后。

29. 有关印度尼西亚，世界银行认为，日本的消耗臭氧层物质处置项目已导致消耗臭氧层物质销毁所需的水泥窑得到了测试和验收。该申请将以从先前项目中获得的知识为根据，反过来将在决定如何销毁被没收的各类非法氟氯化碳时研究政府能够探索的其他方法。由于政府无法通过当地设施销毁这些氟氯化碳，因而需要审查其他一些方法，如将这类消耗臭氧层物质用于碳交易。世界银行指出，将在编制期间确定可能提供碳信用额的实体。秘书处还询问没收的批量氟氯化碳是否会被视为“废物”，是否会审查其他可替代的处置方法。似乎当前的海关管理条例禁止这类产品再出口。

30. 有关墨西哥，世界银行指出，该提案将以世界银行开发的、通过贷款融资的墨西哥能效装置项目的经验为基础，并通过清洁发展机制。由于该项目设计并不包含装置产生的泡沫塑料和制冷剂中的氟氯化碳的萃取和最终处置，因而要求提供项目编制资金，以确定将旧装置运至中央设施的相关费用、消耗臭氧层物质的萃取费用、在达到蒙特利尔议定书第五次缔约方会议按照第 V/26 号决定所定义的销毁和清除率标准的现有设施中测试、包装和最终处置消耗臭氧层物质的费用。他们还说明建造销毁设施不属于试点项目的一部分。

31. 菲律宾申请的资金将用来研究根据国家氟氯化碳淘汰计划建立并由多边基金资助的国家回收和再循环中心是如何从维修车间收集各类氟氯化碳的。世界银行指出，目前还未进行收集工作，因为维修车间收集的大多数制冷剂都被污染了，无法再生利用。在该试点项目中，受污染的制冷剂将送到中央设施进行测试、包装，可能根据符合《巴塞尔公约》的国家法规出口到有证的设施进行最后处置。之后，该项目还将通过有证的设施探索那些无法再循环再利用的物质的处置方法。对于焚化、等离子弧等不同的选择也将进行探讨，但实际选择哪种处置方法将取决于其成本。

32. 在答复为何这三个试点项目都在其工作方案中提出申请的询问时，世界银行指出，这三个消耗臭氧层物质销毁示范项目将展示无用的消耗臭氧层物质来源性质上的不同，由于其所处地点的不同，所产生的收集、测试、储存、销毁和包装费用也各不相同。

33. 秘书处指出，世界银行这三个项目编制申请的一个共性就是，这些项目都力图产生管理和融资模式的实用数据和实际经验，并审查利用可能的共同融资的机会。它还指出，尽管墨西哥和菲律宾项目着眼于消耗臭氧层物质废物的处置，但印度尼西亚的申请则是考虑销毁无用的消耗臭氧层物质的选择办法。

34. 在审查世界银行为各国申请的费用时，秘书处认为，它们完全在这类项目的项目编制史水平之内。世界银行确认这些费用还将承担项目编制通常所需的专家费和差旅费。

35. 在上述讨论之后，秘书处还指出，由编制资金而资助的所有项目不一定非得通过多边基金供资，但更可能从销毁消耗臭氧层物质为那些国家产生碳信用额来资助。尽管项目编制资金可能被视为增量成本，但谨建议执行委员会考虑一下是否愿意资助那些根据《蒙特利尔议定书》处置消耗臭氧层物质可能产生的项目编制工作，但在项目全面执行阶段则由其他资源资助。另外谨建议它考虑这些提案是否构成探索多边基金以外的供资来源的申请。

秘书处的建议

36. 谨建议执行委员会考虑以上信息，其中包括缺乏消耗臭氧层物质销毁/处置项目指导方针，并考虑是否资助世界银行提交的印度尼西亚、墨西哥和菲律宾项目编制申请。

B3. 技术援助

<u>全球：为淘汰氟氯烃调集资源和气候共同惠益 250,000 美元</u>

项目说明

37. 世界银行提交了调集资源技术援助项目的申请，以使氟氯烃淘汰的气候惠益最大化，其供资额为 250,000 美元。该申请还随附一份概念说明，阐述目标、活动和对于该项目的预期成果。

38. 据世界银行介绍，该项目旨在探索各种选择办法，以预报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的增长情况。该研究将审查和探讨为向全球升温潜能值较低的方法过渡进行融资的潜在的融资机制，包括氢氟碳化物计划在发展中国家以及经济转型国家减少。该项目还将针对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，使整体能源收益实现最大化。

39. 研究将探讨：（一）氟氯烃技术向全球升温潜能值较低的方法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氢氟碳化物数量和其他替代品的 CO_2 约当量，其中包括其他化学流程的副产品；（三）可能用来支助采用更好的氟氯烃遏制做法和无害气候技术的供资来源（如：多边基金，联合国气候变化框架公约、碳交易市场、碳伙伴关系基金、清洁技术基金等），以及（四）有关各种供资方法的建议，如评估和设

定氢氟碳化物的基准消费量和产量以及计划减缓量等。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那些可能由其他供资来源资助的活动之间的协同增效作用。

40. 世界银行指出，该申请将首次提出在 2009 年 7 月提交执行委员会第五十八次会议审查的研究的详细调查范围。研究需要 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。

41. 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
相当于减排量的二氧化碳可能数量	审查当前的氟氯烃装置和现有的无氟氯烃替代办法；对于各种替代办法的渗透性（全球升温潜能值高/低）进行市场分析并评估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用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方法的相关障碍	对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	侧重于第5条国家和非第5条国家中的化学品生产商的行业调查；项目趋势的市场分析。	10,000
潜在的供资来源	审查由各种供资机制供资的现有活动或项目；审查现有的清洁发展机制和非清洁发展机制方法；与第 5 条国家的预期受益人进行会谈；确定可能的融资来源；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
利益攸关方协商会议	三次协商会议	30,000
总计		**250,000**

秘书处的评论

42. 缔约方第十九次会议第 XIX/6 号决定第 11（b）段向执行委员会提供了指导，其中特别要求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）最小化的替代办法以优先考虑，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指导方针，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。

43. 第 54/39 号决定商定的氟氯烃编制指导方针包括，要求第 5 条国家考虑财务激励措施以及在其氟氯烃最终淘汰管理计划中共同融资的机会，这可能关系到确保淘汰氟氯烃产生上述第 XIX/6 号决定第 11（b）段所述的惠益。

44. 秘书处指出，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。

45. 秘书处还指出，执行机构提交这类性质的提案还是第一次，因而这类申请既没有先例可遵循，也没有指导方针可供考虑。它还指出，该项目不可能清晰地构成第 10 条下所载的、由第四次蒙特利尔议定书缔约方会议所商定的增量成本提示性清单中所界定的增量成本，因而可能不符合获得资金的条件。然而，谨建议执行委员会审查世界银行提交的详细提案，并审议该提案是否值得在其为执行氟氯烃淘汰管理计划第一阶段和第二阶段编制工作可能所做的积极贡献的基础上进行讨论。

秘书处的建议

46. 谨建议执行委员会根据上述信息并根据议程项目 14，贷款和其他资源的附加收益工具，来审议本提案。

2009 WORK PROGRAM

PRESENTED TO THE 57th MEETING OF THE EXECUTIVE COMMITTEE

WORLD BANK IMPLEMENTED MONTREAL PROTOCOL OPERATIONS

February 12, 2009

WORK PROGRAM FOR WORLD BANK-IMPLEMENTED MONTREAL PROTOCOL OPERATIONS

1. This proposed work program for Bank-Implemented Montreal Protocol Operations is prepared on the basis of the World Bank 2009 business plan also being submitted to the 57th meeting of the Executive Committee. The proposed 2009 business plan consists of investment and non-investment activities to assist Article 5 countries in adhering to their freeze obligations, and meeting their 85% and 100% reduction targets for Annex A and B chemicals. The proposed 2009 business plan also include activities that are necessary to assist Article 5 countries to meet their first two HCFC reduction targets (i.e., freeze in 2013 and 10% reduction in 2015).

2. **The total amount of deliverables in the proposed 2009 World Bank business plan, including investment and non investment activities amounts to US$32.78 million, including agency support costs**. Funds will be used towards new and previously approved activities, which combined will capture an estimated 2,886 ODP tonnes in 2009.

3. **The proposed 2009 business plan includes deliverables of 16 investment activities in 8 countries, totaling roughly US$29.44 million.** These include annual work programs for 12 previously approved multi-year projects and four new HCFC phaseout demonstration projects in the foam sector.

4. The proposed 2009 business plan allocates US$23.8 million (roughly 81% of the total investment deliverables for the year) to support annual work programs of the Argentina, China, and India CFC production closure projects, and the China and India CTC production closure activities.

5. In 2009, requests to support implementation of previously approved phaseout and sector plans will include subsequent funds for: i) approved CFC phaseout plans in Antigua and Barbuda, Malaysia, Tunisia, and Thailand; ii) a commercial refrigeration sector plan for Turkey; iii) CTC phaseout plans for India, Malaysia and Thailand; iv) two process agent phaseout plans for China; and v) two methyl bromide phaseout plans in Thailand and Vietnam.

6. Other than deliverables for ongoing multi-year agreements, the proposed 2009 Business Plan includes four HCFC phaseout demonstration projects in the foam sector for China.

7. The proposed 2009 business plan includes requests to extend support for implementation of four existing institutional strengthening projects in Ecuador, Jordan, and Thailand, totalling US$0.72 million.

8. The proposed 2009 business plan also includes a request to carry out a comprehensive study on resource mobilization to maximize climate benefits from HCFC phaseout. The concept note of this proposed activity along with cost breakdown for

conducting this proposed study is included in Annex I. Detailed terms of reference for this proposed study will be submitted at the 58th Meeting of the ExCom.

9. The proposed 2009 work program, which is being submitted for consideration at the 57th Meeting of the ExCom, includes nine project preparation funding requests: four are for development of demonstration projects, two for preparation of HCFC phaseout sector plans, and the remaining three for development of pilot ODS disposal projects.

10. Descriptions of nine project preparation funding requests are included in Table 1. Justifications for four demonstration projects in the foam sector for China are summarized in Table 2.

Table 1: Project Preparation Funding Requests Submitted for Consideration of the 57th Meeting of the Executive Committee

Country	Request (US$)	Duration	Description
China	30,000	April – December 2009	Preparation of demonstration project for phaseout of HCFC in spray foam
China	30,000	April – December 2009	Preparation of demonstration project for phaseout of HCFC in foam insulation for water heaters
China	80,000	April – December 2009	Preparation of demonstration project for foam system house
Indonesia	100,000	April 2009 – December 2010	Preparation of the foam sector plan
Indonesia*	50,000	April 2009 – December 2010	Preparation of pilot ODS disposal project
Mexico*	50,000	April 2009 – December 2010	Preparation of pilot ODS disposal project
The Philippines*	50,000	April 2009 – December 2010	Preparation of pilot ODS disposal project
Sri Lanka	60,000	April 2009 – December 2010	Preparation of a refrigeration and a/c sector plan
Global	250,000	April 2009 – December 2010	Resource Mobilization for HCFC Phaseout Co-benefits (Concept Note and cost breakdown included in Annex I)
Support Cost	52,500		
Total	**752,500**		

**Refer to Annex II.*

Table 2: Detailed Descriptions and Justifications for HCFC Phaseout Demonstration Projects

Project title	Description/reason for demonstration	Prep. Funds (USD)	Estimated Project Cost (USD)	Substitute Technology	HCFC-141b (ODS tons)	Time Schedule (months)
1. Demon-stration project for development of a foam system house with non-HCFC blowing agents	Using polyol system houses as project implementers has been proven as a cost effective implementation modality for phasing out of CFC-11 in many countries. This modality has not yet been used in China; China therefore wants to test the modality through a demonstration project involving one existing system house and 8-10 smaller foam enterprises. The majority of the foam enterprises in China are smaller foam enterprises. We would also like to test the feasibility of using preblended polyols and hydrocarbons. The project activities/costs consist of the following: a. development, validation process, and provision of technology transfer; b. Setup of a facility for premixing hydrocarbon and polyol. c. Modification of foam equipment and facilities for using preblended polyol at each of the participating foam companies. Level of safety measures should be identified and evaluated. d. Technical assistance/training to each of the participating foam enterprises; e. Trial production; and f. Operating costs/savings will be requested for a two year period consistent with existing ExCom guidelines for the foam sector.	80,000	1,200,000 (estimated based on existing ExCom guidelines and policies)	Hydro-carbon	80-100 T	18

Project title	**Description/reason for demonstration**	**Prep. Funds (USD)**	**Estimated Project Cost (USD)**	**Substitute Technology**	**HCFC-141b (ODS tons)**	**Time Schedule (months)**
2. Demon-stration project for hydrocarbon blowing agent application in the sub-sector of solar energy appliances	PU foam is used for insulation of water heaters and tanks in solar heating systems. Use of solar energy appliances has been growing quickly in recent years. It is estimated that over 500 enterprises are involved in this sub-sector in China. The project is proposed to demonstrate the use of hydrocarbon as a substitute to HCFC-141b in solar energy appliances. An existing solar heater company with a solar panel production facility will be selected to implement this project. As a company with HCFC-141b consumption level of 40-60 ODS tons should replace HCFC-141b with hydrocarbon, it is important to demonstrate and evaluate the technology and cost. The project activities/costs will consist of the following: a. Retrofitting or replacing existing foam equipment for the use of hydrocarbon; b. Modification of the foaming facility for the use of hydrocarbon and installation of necessary safety measures; c. Installation of hydrocarbon storage tank and a premixing unit; d. Technical assistance/training; e. Trial production; f. Operating costs/savings will be requested for a two year period consistent with existing ExCom guidelines for the foam sector.	30,000	780,000 (estimated based on existing ExCom guidelines and policies)	Hydro-carbon	40-60T	18

Project title	**Description/reason for demonstration**	**Prep. Funds (USD)**	**Estimated Project Cost (USD)**	**Substitute Technology**	**HCFC-141b (ODS tons)**	**Time Schedule (months)**
3. Demon-stration project for HCFC-141b phaseout in spray foam sub-sector	Based on available data, the use of HCFCs has grown significantly during the past 6 years. It is estimated that approximately 15 percent of HCFC-141b in 2007 was used in the spray foam sub-sector. The project is proposed to demonstrate the use of a suitable substitute to HCFC-141b in this sub-sector. Substitute technology is to be selected. The following estimated cost is based on the use of HFC-245fa as substitute. An existing foam enterprise will be selected to implement this project. The project activities/costs consist of the following: a. Retrofitting of an existing foam equipment for the use of e.g. HFC substitute; b. Technical assistance/training; c. Trial production; and d. Operating costs/savings will be requested for a two year period consistent with existing ExCom guidelines for the foam sector.	30,000	300,000 (estimated based on existing ExCom guidelines and policies)	HFC-245fa or liquid CO_2	20-30T	12

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 usages.

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 equivalent in comparison with 2 billion tons of CO2 equivalent to be achieved under the firs the commitment period of the Kyoto Protocol[2].

However, phasing out of these potent ODS has resulted in an increasing demand for high global warming gases including gases regulated under the Kyoto Protocol[3]. For example, the demand for HFC-134a, which is 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 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 recognized that selection of alternative technologies for HCFCs should take into consideration climate impact and benefits. However, the accelerated phase-out of

[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.

HCFCs could result in an unintentional growth of HFC demand as it 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 systematical 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 is primarily replacing 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 instrument to leverage funding for technology transfer in developing countries[8]. Elements from both conventions can therefore be analyze and compared to preempt the increase in the demand of HFCs or high GWP gases.

OBJECTIVES

The objective of this study is to explore options for preempting an increase in the demand of HFCs or any other high global warming gases in the consumption sector as a result of HCFC phase-out in developing countries. The study will review and examine potential financing 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 chemical; however, it recognized that actions to reduced indirect emissions indirect emissions, such as energy efficiency improvement, can have a significantly higher impact that focusing strictly on chemical used[9]. Therefore, the proposed study will also addressed technologies limitations and 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, mainly HCFC-141b, HCFC-142b, and HCFC-22, of all developing country Parties in 2006 is approximately 352,000 ODP? MT. Consumption of other HCFCs (for example, HCFC-123) represents only a small fraction in the HCFC 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

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

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 the previous years, a growth rate of 9 - 10% per annum could be expected. By applying a 9% growth rate to the demand of each type of HCFCs, the total demand of HCFCs in developing countries could reach up-to 2.78 million tons level in 2030. The breakdown of HCFC demand in 2030 is shown in Table 1.

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

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

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

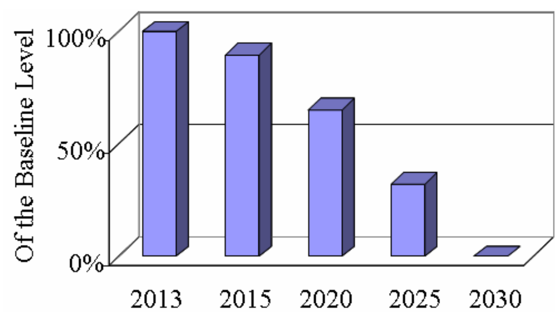

Fig. 1. HCFC Allowance Production and Consumption Schedule in Developing Countries

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

[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.

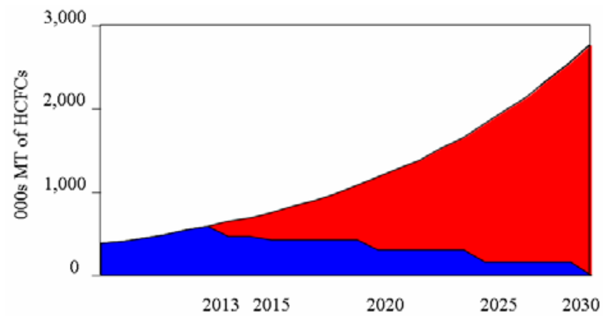

Fig. 2 Estimated consumption of HCFCs and alternatives for 2013 – 2030

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.

Properties offered by HFCs in the air conditioning and refrigeration sectors …
can we say something explaining why these gases are in fact not so easy to replaced (this is for non MP expert) such as Thermodynamic and properties or insulation values etc…

[11] Based on an assumption that HCFCs will be replaced by low GWP alternatives. …

[12] Assuming 3% generation of 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 to ensure that manufacturing facilities, production and servicing personnel are trained and equipped with necessary safety equipment, making conversion costs 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 (e.g., hydrocarbons, ammonia, carbon dioxide, and etc.), 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 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)costs and barriers associated with conversion of HCFC technology with to low GWP alternatives; (ii) volume of HFCs and equivalent in carbon dioxide equivalent associated with the consumption and production, in developing countries including those produced as byproducts of other chemical processes; and (iii) potential funding resources (e.g., Multilateral Fund, UNFCCC, Tradable Carbon Market, Carbon Partnership Funds, Clean Technology Fund, and etc.) to support adoption of better HCFC containment practice, and climate friendly technologies (iv) recommendation for a funding methodologies such as approaches to evaluate and setting baseline consumption and production of HFCs and scheduled phase-down, 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 investment interventions, supporting by timely availability of funding sources, 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 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.

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

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 the climate convention negotiations, 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 development of funding recommendations and/or 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 58^{th} 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 62^{nd} 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 efficiency and/or thermal insulation property of the final products;
- Region II – High GWP alternatives with improved energy efficiency and/or thermal insulation property of the final products;
- Region III – Low GWP alternatives with inferior energy efficiency and/or thermal insulation property of the final products when compared with HCFC products;
- Region IV – High GWP alternatives with inferior energy efficiency and/or thermal insulation property of the final products when compared with HCFC products.

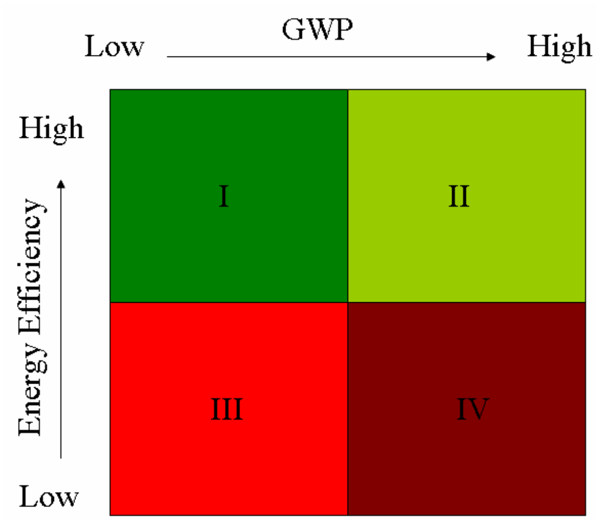

Fig. 3 Characteristics of Non-HCFC Alternatives

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 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 Funding 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**

Annex II
Description of Proposed Pilot ODS Disposal Projects

1. Three pilot ODS disposal projects are proposed in the 2009 World Bank Business Plan and its associated Work Program for the consideration of the 57th Meeting of the Executive Committee. These pilot projects are being proposed for Indonesia, the Philippines, and Mexico.

2. The three pilot ODS disposal projects will be designed to capture different circumstances of unwanted ODS (i.e., sources of unwanted ODS, collection, transportation, packaging, storage, and final disposal) in these three countries. 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.

3. For Indonesia, the project will address disposal of ODS from illegal imports. This project will explore feasibility of having ODS eliminated by the local disposal facility. The design of this project will be built on experience of the earlier ODS disposal project financed by the Government of Japan as part of its bilateral contribution to the Multilateral Fund.

4. For the Philippines, the project will address not only disposal of bulk CFCs but also contaminated CFCs (mix of CFC-12, HFC-134a and others). For the Philippines, the project will address transportation of CFCs from service shops to the recovery and recycling center financed by the NCPP, packaging, and final disposal.

5. The three pilot projects will also include a financial analysis to determine financial viability of ODS disposal for different streams and for different local conditions. Actual costs of carrying out of ODS disposal are expected to be covered by carbon credits generated by ODS disposal. Disposal of ODS will be carried out at existing disposal facilities that meet the destruction efficiency of at least 99.99%.

6. Expected amounts of ODS to be disposed of are included in the 2009 World Bank Business Plan. For easy reference, those figures are summarized below.

Country	ODP tons				
	2009	2010	2011	2012 - 2015	Total
Indonesia		60			60
Philippines		12			12
Mexico		100	135	540	775

Note: The quantity of ODP tons for Mexico is made on the assumption that 1.2 million refrigerators and a/c will be exchanged under the energy efficiency appliance program.