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执行蒙特利尔议定书
多边基金执行委员会
第七十二次会议
2014 年 5 月 12 日至 16 日，蒙特利尔

项目提案：巴西

本文件包含基金秘书处对于以下项目提案的评论和建议：

销毁

- 关于消耗臭氧层物质废物管理和处置的试点示范项目 开发计划署

项目评价表——非多年期项目

巴西

项目名称	执行机构
关于消耗臭氧层物质废物管理和处置的试点示范项目	开发计划署

国家协调机构：巴西环境部

最新报告的项目所涉消耗臭氧层物质消费数据

A：**第 7 条数据**（ODP 吨，2012 年）

附件一，氟氯化碳	0		

B：**国家方案行业数据**（ODP 吨，2011 年）

消耗臭氧层物质	次级行业/数量	次级行业/数量	总计
氟氯化碳			0

现年业务计划：供资总额 672,253 美元　　共淘汰 75 ODP 吨

项目名称

企业使用的消耗臭氧层物质		不详
将淘汰的消耗臭氧层物质		不详
现业务计划内的项目		是
行业		销毁消耗臭氧层物质
次级行业		不详
项目影响		120 公吨
项目期限		36 个月
当地所有权		100%
出口部分		0%
原申请金额		1,578,000*
申请的多边基金赠款		
开发计划署	美元	1,490,600
执行机构支助费用		
开发计划署（7%）	美元	104,342
多边基金支付的项目费用总额	**美元**	1,594,942
成本效益	美元/公斤	12.42 公斤（公制）
项目监测进度指标		包括在内

*不包括机构支助费用

秘书处的建议：	单独审议

项目说明

1. 开发计划署代表巴西政府向第七十二次会议提交了关于消耗臭氧层物质废物管理和处置的试点示范项目提案，金额为 1,578,000 美元，外加机构支助费用 110,460 美元，与最初提交的提案一致。[1]

项目说明

2. 这个试点项目力图表明，在巴西全国范围内建立一个复杂的消耗臭氧层物质废物管理系统，对于消耗臭氧层物质的制冷剂废物，可以实现环境无害、有效、且具有成本效益的管理和处置。试点项目将创造机会，将消耗臭氧层物质的废物管理和销毁工作，与范围更加广阔的国家危险废物管理方案与能效举措结合起来。氟氯化碳国家淘汰计划（NPP）将促进建立国家机构，负责回收老旧设备使用的各类氟氯化碳，在计划执行期间开展的各项活动将对上述工作构成补充。国家淘汰计划设立了五处大型回收中心和 120 个分散在各地的再循环中心，同时向全国各地的公司和技师分发回收机器，为此提供支持。试点项目还将设法重点结合氟氯烃淘汰活动，争取产生协同增效作用，针对现有制冷设备的维修工作开展回收业务，通过这种方式有望得到不能再循环使用的消耗臭氧层物质废物。巴西在 2010 年通过的固体废物管理法将对这些工作提供进一步支持。这部法律将强制执行强化生产商责任（EPR）方案，可以从制冷和空调设备中获得包括消耗臭氧层物质在内的大量废物。提案的详细内容见本文件附件。

3. 项目包括以下四部分：

(a) 第 1 部分：建立综合性消耗臭氧层物质废物管理系统，包括消耗臭氧层物质废物的处理、运输和定性能力建设以及提高消耗臭氧层物质废物的存储能力；

(b) 第 2 部分：在两处焚化设施开展焚烧试验，根据国际标准从数量上确定国家处理消耗臭氧层物质废物的能力，分析物流和成本；

(c) 第 3 部分：技术援助，与消耗臭氧层物质废物管理和处置示范项目的评估和标准化工作有关的相关开发工作；以及

(d) 第 4 部分：与执行和监测有关的项目管理工作。

4. 将利用国内制冷维修行业建立综合性消耗臭氧层物质废物管理系统，由全国各地设备精良的技师和私营维修公司构成的网络付诸实施。由于收集来的消耗臭氧层物质废物分别储存在数家公司和回收中心，涉及国土面积超过 3,800 平方公里，在运输、整合和存储等方面给巴西构成严峻的挑战，这项方案对于示范项目至关重要。示范项目希望在回收中心、消耗臭氧层物质废物持有者、以及中心的废物整合者和管理者之间建立综合协调机制，确保正确地处理、运输和处置可能转入其他国家的消耗臭氧层物质废物。

[1] 执行委员会在第五十七次会议上为开发计划署提供资金，用于筹备在巴西开办消耗臭氧层物质处置试点示范项目。

5. 巴西现有七处危险废物和工业废物管理设施，将利用其中的两处在国内销毁巴西的消耗臭氧层物质废物。巴西已经具备了可以投入商业运行的危险化学废物管理能力，其中包括处理和销毁固体及液体氯化物。为达到国际标准，这两家设施将对国内现有废物流开展综合性焚烧实验。将按照巴西政府法规的要求，通过公开投标来确定两处焚化设施。

6. 将遵循涉及如下内容的监测程序：作业条件（即，焚烧炉温度、估计停留时间、烟道出口温度）；受控排放的标准要求，包括多氯二苯并二噁英和多氯二苯并呋喃（PCDD/PCFD）；物料平衡投入，包括所有残留释放途径（固体、液体和气体）；以及，重点污染物分析（包括固体底灰和洗涤器残留物中的多氯二苯并二噁英和多氯二苯并呋喃）和任何液体残留物分析。这样做的目的是确定销毁清除效率（DRE）和销毁效率（DE）。计划在三年内执行消耗臭氧层物质废物销毁示范项目。

将处理的消耗臭氧层物质估算量

7. 这个试点项目初期将处理 120 吨消耗臭氧层物质废物，以便销毁。这一数量来自现有的国家回收系统以及巴西国内回收和再循环中心，详见表 1。

表1：项目将处理的消耗臭氧层物质废物估算量

公司		类型	城市	消耗臭氧层物质	公斤
1	Capital Refrig	回收中心	阿雷格里港	CFC-11	11,250
				CFC-12 污染	4,900
2	Bandeirantes Refrig	回收中心	圣保罗	CFC-12 污染	4,419
3	Bom Clima Refrig	回收中心	累西腓	CFC-11	1,190
				CFC-12 污染	1,057
4	Revert Brasil	销毁厂	卡雷阿苏	CFC-12 污染	5,000
				CFC-12 污染	4,000
5	Frigelar	回收中心	圣保罗	CFC-12 污染	300
6	Tecnitest	终端用户	里约热内卢	CFC-12 污染	120
7	Ref. Marechal	回收公司	圣保罗	CFC-11	4,000
8	Carrier do Brasil	终端用户	卡诺阿斯	CFC-12 污染	11,500
9	ClimaSul	再循环中心	库里奇巴	CFC-12 污染	500
10	Recigases	再循环中心	里约热内卢	CFC-12 污染	13,540
有待整合的收集和集中的消耗臭氧层物质废物小计					**61,776**
北部 13 家公司	3 家公司	再循环中心	亚马孙州	CFC-12 污染	730
	1 家公司	再循环中心	阿克里州	CFC-12 污染	100
	1 家公司	再循环中心	罗赖马州	CFC-12 污染	150
	1 家公司	再循环中心	马卡帕州	CFC-12 污染	170
	2 家公司	再循环中心	朗多尼亚州	CFC-12 污染	200
	3 家公司	再循环中心	帕拉州	CFC-12 污染	290
	2 家公司	再循环中心	托坎廷斯州	CFC-12 污染	120
中部 16 家公司	3 家公司	再循环中心	马托格罗索州	CFC-12 污染	550
	4 家公司	再循环中心	南马托格罗索州	CFC-12 污染	1,100
	6 家公司	再循环中心	戈亚斯州	CFC-12 污染	2,500
	3 家公司	再循环中心	联邦区（DF）	CFC-12 污染	900
东北部 30 家	3 家公司	再循环中心	马拉尼昂州	CFC-12 污染	500
	2 家公司	再循环中心	皮奥伊州	CFC-12 污染	90

公司		类型	城市		消耗臭氧层物质	公斤
公司	5 家公司	再循环中心	塞阿拉州		CFC-12 污染	2,900
	3 家公司	再循环中心	北里奥格朗德州		CFC-12 污染	950
	3 家公司	再循环中心	帕拉伊巴州		CFC-12 污染	1,350
	2 家公司	再循环中心	阿拉戈斯州		CFC-12 污染	800
	2 家公司	再循环中心	伯南布哥州		CFC-12 污染	5,200
	2 家公司	再循环中心	塞尔希培州		CFC-12 污染	320
	8 家公司	再循环中心	巴伊亚州		CFC-12 污染	6,480
东南部 36 家公司	8 家公司	再循环中心	圣保罗州		CFC-12 污染	5,500
	3 家公司	再循环中心	里约热内卢州		CFC-12 污染	8,200
	19 家公司	再循环中心	米纳斯吉拉斯州		CFC-12 污染	7,034
	6 家公司	再循环中心	圣埃斯皮里图州		CFC-12 污染	1,780
南部 25 家公司	4 家公司	再循环中心	南里奥格朗德州		CFC-12 污染	2,320
	14 家公司	再循环中心	巴拉那州		CFC-12 污染	4,090
	7 家公司	再循环中心	圣卡塔琳娜州		CFC-12 污染	3,900
有待集中和整合的收集的消耗臭氧层物质废物小计						**58,224**
项目将销毁的消耗臭氧层物质废物总计						**120,000**
11	IBAMA	控制实体	圣保罗	SP	有待确定*	734,400
收集和集中的消耗臭氧层物质废物小计，有待确定						**734,400**
巴西消耗臭氧层物质废物库存总计						**854,400**

* 巴西环境和可再生自然资源研究所（IBAMA）没收了一个大型存储器和尚不明确的消耗臭氧层物质。核实工作目前正在进行。

项目的财务管理

8. 多边基金提供的资金将用于支付在某些焚化设施开展焚烧试验所需费用，以确定这些实验符合国际标准，能够销毁消耗臭氧层物质废物。多边基金提供的资金还将支付建立消耗臭氧层物质废物管理系统所需费用，这个系统将监测强化生产商责任方案/废物电力和电子设备方案，希望从老旧设备收集到的其他材料可以创造出充足的收益，支持今后持续开展消耗臭氧层物质废物的销毁工作。这个项目还将分析今后利用碳市场的可能性；但当前的项目规划没有涉及这一点。

选择销毁技术/方法

9. 为销毁消耗臭氧层物质废物，考虑了三种备选方案：（一）将消耗臭氧层物质废物出口至合格的危险废物管理设施；（二）引进技术，开发新的销毁设施；以及（三）利用能够提升至国际标准的现有的国家危险废物和工业废物管理设施。由于成本原因，以及国家对于此类交易缺乏经验，第一种选择不可行。由于巴西国内建设制冷器销毁厂、包括销毁设施的努力没有取得全面成功，对于开发销毁消耗臭氧层物质废物专用设施的选项，没有做进一步的考虑。

10. 最后一个选项要分析能否利用国内现有的焚化设施，条件是这些设施符合国际标准，特别是与《巴塞尔公约》[2]以及全球环境基金（GEF）科学和技术评估小组（STAP）

[2] http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/techguid/tg-POPs.pdf

[3]有关的标准。这两个实体都曾经就如何选择持久性有机污染物（POP）的销毁技术发布指导文件，鉴于含氯化学废物的环境无害销毁标准具有某些相似性，可以参见这些文件中的相关资料。同时还考虑到了环境规划署技术和经济评估小组（TEAP）对于销毁标准的要求。对于已经确定有能力销毁消耗臭氧层物质废物的七处设施，将通过测试程序开展技术验证。巴西政府认为，利用国内销毁设施的成本效益将高于其他任何拟议选项。为此，围绕这个选项制订了提案。

监测与核实销毁

11. 为确保所有消耗臭氧层物质废物无一遗漏，将密切监测销毁过程，并通过专用电子数据库系统记录数据。由于现有原料由原始来源掌握，通过精密活动收集而来（即，海关截获、制冷维修活动和淘汰工作），很容易确定回收用于销毁的所有消耗臭氧层物质废物的来源。在这两种情况下，项目对于在后续整合、定性、存储、运输和销毁过程中跟踪这些物质做出了明确的规定，包括详细记录和利用电子数据库监测系统，这个系统是项目成果的一部分。

项目费用

12. 与初次提案一样，项目费用总额估计为 2,153,000 美元，其中要求多边基金提供 1,578,000 美元，详见下表 2。

表 2：拟议的项目费用

组成部分和活动		多边基金资金（美元）	共同融资（美元）	总计（美元）
第 1 部分：管理系统试点项目	各类氟氯化碳和使用氟氯化碳的消耗臭氧层物质的收集监督	25,000	-	25,000
	各类氟氯化碳的整合和定性	95,000	55,000	150,000
	各类氟氯化碳的临时存储	30,000	15,000	45,000
	运至销毁设施	20,000	10,000	30,000
	综合管理系统试点结构	400,000	120,000	520,000
	记录和报告	10,000	-	10,000
	第 1 部分小计	**580,000**	**200,000**	**780,000**
第 2 部分：焚烧试验/销毁示范	详细设计焚烧试验和选择设施	25,000	37,000	62,000
	调整相关设施的焚化基础设施	35,000	20,000	55,000
	确定程序和基准原料	10,000	10,000	20,000
	基准焚烧实验的原料组合	55,000	25,000	80,000
	示范焚烧试验原料 CFC-11（5 公吨）	75,000	45,000	120,000
	示范焚烧试验原料 CFC-12（5 公吨）	75,000	45,000	120,000
	销毁 CFC-11 和 CFC-12（110 公吨）*	418,000	-	418,000
	焚烧试验监督	10,000	5,000	15,000
	第 2 部分小计	**703,000**	**187,000**	**890,000**
第 3 部分：技术援助	支持技术能力建设活动	50,000	35,000	85,000
	支持利益攸关方和公共宣传	50,000	25,000	75,000
	第 3 部分小计	**100,000**	**60,000**	**160,000**

[3] http://www.unep.org/stap/Portals/61/pubs/POPs_Disposal_Final_low.pdf

第 4 部分：监测和评估	国际专家	80,000	-	80,000
	国内顾问	60,000	60,000	120,000
	差旅费/访问团费用	45,000	45,000	90,000
	管理办公室	-	15,000	15,000
	杂费	10,000	8,000	18,000
	第 4 部分小计	**195,000**	**128,000**	**323,000**
	总计（美元）	**1,578,000**	**575,000**	**2,153,000**

秘书处的评论和建议

评论

13. 秘书处根据第 58/19 号决定提出的各项标准进行审查，并向开发计划署提出了多项评论和建议。秘书处注意到，巴西设有机制完善、并且得到国家法律支持的消耗臭氧层物质废物收集系统，看来将产生可用的废物流，可以确保项目的可持续性。

14. 表 1 概述了巴西国内现有的消耗臭氧层物质废物数量，特别是与巴西环境和可再生自然资源研究所有关的数量，开发计划署在解释这些数字时说明，巴西政府刚刚截获了一大批不明化学品，可以肯定其中含有非法的消耗臭氧层物质（即，各类氟氯化碳）。目前正在努力确定这批货物中包含哪些物质。将这一数量纳入库存，是为了说明可能会出现更多废物需要销毁。

15. 秘书处希望澄清巴西国内两家私营制冷剂销毁实体的情况，这两家机构由于废物原料不足，没有投入全力运行。开发计划署收集到的资料显示，调查表明，巴西国内存有大量使用氟氯化碳的废弃设备；但这些两处设施所在地点不便及其相关运营成本过高，导致其没有获得完全成功。此外，机械化和自动化销毁过程需要收取服务费，而手工操作人员（与回收中心和再循环中心有关）可以出售从设备中提取的可以再循环使用的其他材料，用于支付回收消耗臭氧层物质废物的成本。

16. 关于选择两处焚化设施，并经过焚烧试验给予认证，秘书处得知开发计划署开展了广泛的工作，努力为销毁消耗臭氧层物质废物，制订技术和环境业绩要求。为此，开发计划署最初确定了采用液体注射和/或回转炉技术的十处高温焚化设施，其中一处采用等离子弧燃烧技术。开发计划署对于这些设施进行深入审查，并将范围缩小到符合开发计划署标准的七处设施，其中特别包括关于如下几个方面的标准：能力；改造设施以处理液化气体的能力；废物跟踪和销毁认证程序；环境业绩，特别是销毁效率和销毁清除效率；以及，多氯二苯并二噁英和多氯二苯并呋喃排放量。这七处设施均表示有意参与项目。将按照巴西政府和开发计划署双方的要求，通过公开招标，从中选出两处设施。开发计划署还强调指出，试点项目中的这些设施均不需要多边基金提供任何资本投资。技术改造成本将由各处设施自行承担，作为共同融资的一部分。

17. 在深入讨论过程中，秘书处建议修改项目的某些组成部分，以便将类似活动组合起来，合理规划费用。秘书处还就整合消耗臭氧层物质废物存量的必要且昂贵的回收器提供出了备选方案，用以减少数量和成本。秘书处还向开发计划署确认，项目成果之一是提交报告，记录实验程序的步骤和成果，说明焚烧试验过程、技术核证方法、设施升级过程以

及相关成本。此后，这份报告可用于巴西国内以及其他第 5 条国家类似焚化设施开展的类似实验程序，这将是示范项目的一项重要成果。开发计划署同意，并进一步表明项目的总体成果和回报分析（即，今后与此有关的碳贸易）将为激励巴西的其他设施决定是否为这项活动投资。开发计划署同意上述修改意见，并对项目提案进行必要的调整。

18. 项目的最终费用商定为 1,490,600 美元，外加机构支助费用，每公斤 12.42 美元，低于第 58/19 号决定规定的阈值（每公斤 13.2 美元）。修改了项目产出和费用，以便纳入秘书处的建议，相关概述见下文表 3。

表 3：商定的项目费用

组成部分和活动		多边基金资金（美元）	共同融资（美元）	总计（美元）
第 1 部分：管理系统试点项目	各类氟氯化碳和使用氟氯化碳的消耗臭氧层物质的收集监督	25,000	-	25,000
	各类氟氯化碳的整合和定性	95,000	55,000	150,000
	各类氟氯化碳的临时存储	150,000	67,000	217,000
	运至销毁设施	20,000	10,000	30,000
	综合管理系统试点结构	182,600	68,000	250,600
	记录和报告	10,000	-	10,000
	第 1 部分小计	**482,600**	**200,000**	**682,600**
第 2 部分：焚烧试验/销毁示范	详细设计焚烧试验和选择设施	25,000	37,000	62,000
	调整相关设施的焚化基础设施	35,000	20,000	55,000
	确定程序和基准原料	10,000	10,000	20,000
	基准焚烧实验的原料组合	55,000	25,000	80,000
	示范焚烧试验原料 CFC-11（5 公吨）	75,000	45,000	120,000
	示范焚烧试验原料 CFC-12（5 公吨）	75,000	45,000	120,000
	销毁 CFC-11 和 CFC-12（110 公吨）*	418,000	-	418,000
	焚烧试验监督	10,000	5,000	15,000
	第 2 部分小计	**703,000**	**187,000**	**890,000**
第 3 部分：技术援助	支持技术能力建设活动	50,000	35,000	85,000
	支持利益攸关方和公共宣传	50,000	25,000	75,000
	第 3 部分小计	**100,000**	**60,000**	**160,000**
第 4 部分：监测和评估	国际专家	80,000	-	80,000
	国内顾问	60,000	60,000	120,000
	差旅费/访问团费用	45,000	45,000	90,000
	管理办公室	-	15,000	15,000
	杂费	20,000	8,000	28,000
	第 4 部分小计	**205,000**	**128,000**	**333,000**
	总计（美元）	**1,490,600**	**575,000**	**2,065,600**

建议

19. 谨建议执行委员会考虑：

(a) 赞赏地注意到巴西政府提交的消耗臭氧层物质废物管理和处置试点示范项目提案，总共将销毁消耗臭氧层物质废物 120 公吨；以及

(b) 批准在巴西执行消耗臭氧层物质废物管理和处置试点示范项目，金额为 1,490,600 美元，外加给开发计划署机构支助费用 104,342 美元，但有一项谅解，即今后不再为巴西的任何消耗臭氧层物质处置项目提供资金。

Project Document

PILOT DEMONSTRATION PROJECT ON ODS-WASTE MANAGEMENT AND DISPOSAL

FEDERATIVE REPUBLIC OF BRAZIL

Prepared by

MINISTRY OF ENVIRONMENT - MMA
National Coordinator

In Cooperation with

UNITED NATIONS DEVELOPMENT PROGRAMME - UNDP
Implementing Agency

Brasília - DF. Brazil. March, 2014

COUNTRY: Brazil **IMPLEMENTING AGENCY:** UNDP
PROJECT TITLE: Pilot Demonstration Project on ODS-Waste Management and Disposal

PROJECT IN CURRENT BUSINESS PLAN: Yes
SECTOR: ODS-Waste
Sub-Sector: Refrigeration Servicing Sector

PROJECT IMPACT (ODP targeted): 120 Metric Tons of CFC-11 and CFC-12

PROJECT DURATION: 24 months
PROJECT COSTS: US$ 1,490,600

LOCAL OWNERSHIP: 100 %
EXPORT COMPONENT: 0 %

REQUESTED MLF GRANT: US$ 1,490,600
IMPLEMENTING AGENCY SUPPORT COST: US$ 104,342 (7.0 %)
TOTAL COST OF PROJECT TO MLF: US$ 1,594,942

COST-EFFECTIVENESS: US$ **12.42** /kg ODS (metric) based on complete destruction of recovered ODS Waste in Brazil.

PROJECT MONITORING MILESTONES: Included
NATIONAL COORDINATING AGENCY: Ministry of Environment of Brazil

Brief Description.

The Ministry of Environment of Brazil, in collaboration with UNDP, has developed a project to demonstrate the environmentally sound, efficient and cost effective management and disposal of ODS waste refrigerants through the establishment of a complex nationwide ODS Waste Management System with MLF investment, as part of broader national programs related to energy efficiency and the sustainable management of hazardous wastes and WEEE.

The project utilizes an existing stocks of "end of life" ODS to qualify two domestic, modern, high temperature hazardous waste temperature incineration facilities to international standards. The project covers both the destruction of CFC-12 and CFC-11 refrigerants. Under the project, these facilities, as qualified, will destroy a more substantial quantity of ODS already generated as seized cargo resulted from illicit trade. The option of demonstrating destruction capability on such domestic facilities has been selected on the basis of it being the most cost effective route for Brazil relative other options available.

In terms of overall global demonstration value, the project offers an effective demonstration of what a middle income, industrializing Article 5 country can practically achieve in relation to EOL ODS waste management and destruction as integrating it into broader hazardous waste management programs and energy efficiency initiatives while capitalizing on emerging domestic environmental management capability.

It will also serves to demonstrate synergy with national stakeholders for the management of ODS stocks and wastes, and contributes to the knowledge base on current issues under discussion by TEAP. As result, it is expected that the lessons learnt under this project may be beneficial to other A5 countries.

Table of Contents

LIST OF ANNEXES

LIST OF ABBREVIATIONS

ABNT	National Association for Technical Standards
Alice-Web	System for Foreign Trade Data Analysis
CFC	Chlorofluorocarbon
CONAMA	National Council on Environment
CO_2 eq	Carbon Dioxide Equivalent
CTF	Federal Technical Registry
EE	Energy Efficiency
EPR	Extended Producer Responsibility
EOL	End of Life
ExCom	Executive Committee
GHG	Greenhouse Gas
GWP	Global Warming Potential
HCFC	Hydrochlorofluorocarbon
HC	Hydrocarbon
HFC	Hydrofluorocarbon
HPMP	HCFCs Phase Out Management Plan
HVAC-R	Refrigeration, Air Conditioners, Ventilation and Heating Sectors
IBAMA	National Institute of Environment and Natural Renewable Resources
MLF	Multilateral Fund for the Implementation of the Montreal Protocol
MMA	Ministry of Environment
MOP	Meeting of the Parties to the Montreal Protocol
N.A.	not available
NPP	National Phase-Out Management Plan
ODP	Ozone-Depletion Potential
ODS	Ozone-Depletion Substance
PBCO	National Program for the Protection of the Ozone Layer
PROZON	Inter-Ministries Executive Committee for Ozone Layer Protection
PU	Polyurethane Foam
RAC	Refrigerating and Air Conditioning
R&R	Recovery and Recycle
SMEs	Small and Medium Enterprises
UNDP	United Nations Development Programme
WEEE	Waste Electrical and Electronic Equipment

EXECUTIVE SUMMARY

1. UNDP, on behalf of The Government of Brazil, is submitting to the 72nd ExCom this request for funding for a pilot project that will evaluate and demonstrate the management and environmentally sound disposal and destruction of ODS waste, at a cost, as originally submitted, of US $1,490,600. This project is submitted in line with decision 58/19 and will address the destruction of 120 metric tonnes (mt) of waste ODS in the country.

2. At the 57th meeting, the Executive Committee approved the preparation project BRA/DES/57/PRP/288 for UNDP to prepare a pilot ODS demonstration project for Brazil. At that meeting, the decision was taken to look at pilot ODS disposal projects that would respond to decision XX/7 of the Twentieth Meeting of the Parties, which provided that pilot projects could cover the collection, transportation, storage and destruction of ODS, with a focus on assembled stocks with high net global warming potential (GWP), and in a representative sample of regionally diverse Article 5 countries. Members also stressed that ODS disposal demonstration projects should be feasible, and should include methods of leveraging co-funding. Brazil was one of the countries selected based on this criteria.

3. Brazil has already advanced significantly as regards of some aspects included in Decision 58/19, namely recollection and de-manufacturing of ODS. Transport and storage, and this final component of management of collected stocks, transport (logistics) and destruction would ensure that the full circle is completed. The project complies with the criteria established by Decision 58/19 including focus on specific aspects not addressed by other pilot projects.

4. The National CFC Phase-out Plan (NPP) promoted the creation a national structure for the recollection of CFCs from old equipment. Also, the national Council on Environment (CONAMA) has enacted the Resolution 267/2000 prohibiting the emissions of CFCs in the country. The Government of Brazil has approved, in 2010, the Law 12.305/10, that established the National Law on Solid Waste, which will enforce an Extender Producer Responsibility (EPR) programme, fact that will generate large quantities of waste of RAC equipment, including ODS.

5. In one hand, the establishment of regional energy-efficiency programmes promoted the early retirement of more than 500,000 units of domestic refrigerators. In the other hand, the country is implementing a project which seeks to transform the market by promoting the replacement of old and inefficient chillers, mainly CFC-based ones, through a complex nationwide finance-warranty scheme.

6. The above developments have resulted in the collection of ODS in an amount of 61,776 kg pure and contaminated CFCs (CFC-12, CFC-11), that has been accumulated mostly in the Reclaim Centers. Larger quantities might also been held in small scale de-centralized recycling centers that will needed to be inventoried and inserted in the ODS Waste Management System. Additionally, an estimated 734,400 kg of ODS materials is anticipated to become available from June, 2014 due to a large cargo seized by IBAMA.

7. It is anticipated that transportation, consolidation and storage will pose great challenges to the project, since the CFCs collected are located in several companies and reclamation centers, in tanks and cylinders of different sizes and shapes, are spread over a large territory that comprises more than 3,800 km. Besides the large distances to be covered in this ODS Waste Management System proposal, there is a need to strengthen the entities and transportation companies involved in such process.

8. The various strategic and technology options for destruction of waste ODS have been reviewed as a basis for developing the project design Overall the strategic options considered were: i) *export to qualified facilities in countries party to the Basel Convention*; ii) *the development of new national facilities using imported technologies*; and iii) *utilization of existing national hazardous and industrial waste management capacity that could potentially be qualified to international standards*. After careful evaluation the Government of Brazil has decided to pursue the path (iii).

9. In this sense, this project is design around 4 Components, as follows:

a. Component 1: Establish a comprehensive ODS Waste Management System including the ccapacity building on handling, transportation and characterization of ODS waste, as well as improve the ODS waste storage capacity;
b. Component 2: Undertake test burns at the two incineration facilities in order to qualify national capacities for ODS waste disposal as per international standards, analyzing its logistics and cost;
c. Component 3: Technical assistance and related development work associated with evaluation and standardization of the ODS waste Management & Disposal Demonstration Project;
d. Component 4: Project management associated with implementation and oversight of project

10. In order to ensure that all ODS waste is properly accounted for, the process will be closely monitored and data will be recorded through an electronic database system to be set up for this purpose. The origin of all EOL ODS recovered for destruction is easily determined given that the currently available stocks are held by the original sources and are collected from well-defined activities.

11. The total cost of the project, as originally submitted and including co-finance, has been estimated at US $2,065,600, the amount requested from the Multilateral Fund Secretariat is US $1,490,600.

12. As result, it is expected that this project will demonstrate the management and safe and environmentally sound management and disposal of “end of life” (EOL) ODS waste through an innovative approach that could be replied to other A5 countries.

A. Introduction and Background

13. In recent years it has become generally recognized that a significant bank of ODS remains in use, mainly as refrigerant fluids and as blowing agent for PU foams, and it is likely that this ODS will be subject to atmospheric release at some point at the end of its useful life. As a consequence, the Parties to the Montreal Protocol have directed attention to the issue, particularly in developing countries where the major remaining banks of high ODP ODS (i.e. CFCs) remain. Under Decision XX/7[1], the Parties requested ExCom to consider supporting demonstration initiatives in Article 5 countries as well as requesting TEAP to update its earlier guidance on ODS destruction[2] as adopted by the Parties[3].

14. In recognition of this, ExCom Decision 58/19[4] approved a set of interim guidelines for the funding of demonstration projects for the disposal of ODS and agreed that the Multi-lateral Fund (MLF) will fund demonstration projects. Preparation funding for a number of such projects, including the current project proposed in Brazil were subsequently approved at ExCom 59. TEAP has also updated its guidance on destruction requirements and approved technologies for ODS destruction with inclusion of a current Task Force Report in its most recent Progress Report[5].

15. In this sense, a number of ODS Waste & Disposal demonstration projects funded by the Multilateral Fund are being implemented worldwide based on the most varied premises. Overall it is apparent that experience gathered through those projects with a variety of ODS destruction technologies, programs and business models will be accumulated over the next years that can serve as a basis for future decision making and action on the issue by both countries and collectively by the Parties.

16. In the national context, although the production and consumption of CFCs in Brazil have been successfully phased-out under the Montreal Protocol, there is a significant residual amount of CFCs still found in equipment currently in operation, such as domestic refrigerators and Chillers. Due to their high Global Warming Potential, the CFCs contained in such equipment threaten to leak into the atmosphere if appropriate management and disposal measures are not taken into consideration.

17. Also, there is an evident need for an environmentally sound management and disposal of ODS that are being accumulated in the country originated at its operational recovery, recycling and reclaim system, also due to regional programmes on early retirement of Chillers and Domestic Refrigerators under the energy efficiency targeted initiatives and expected to be expanded to national levels due to the approval of the National Law on Solid Waste (Política Nacional de Resíduos Sólidos).

[1] Montreal Protocol Handbook (8th Edition, 2009), Page 90 - http://ozone.unep.org/Publications/MP_Handbook/MP-Handbook-2009.pdf
[2] TEAP Task Force on Destruction Technologies Report – 2002 (Volume 3b of 2002 TEAP Report) - http://ozone.unep.org/Assessment_Panels/TEAP/Reports/Other_Task_Force/TEAP02V3b.pdf
[3] Montreal Protocol Handbook (8th Edition, 2009), Page 457-464 - http://ozone.unep.org/Publications/MP_Handbook/MP-Handbook-2009.pdf
[4] http://www.multilateralfund.org/sites/58th/Document%20Library2/1/5853.pdf
[5] May 2011 TEAP Progress Report – P65, http://ozone.unep.org/Assessment_Panels/TEAP/Reports/TEAP_Reports/TEAP_Progress_Report_May_2011.pdf

B. Objective

18. In this proposal, the Government of Brazil is requesting funding for a project to demonstrate and evaluate the management and safe and environmentally sound disposal of "end of life" (EOL) ODS. The country's aggressive legislation and efforts to prevent the release of this material resulted in the accumulation of stocks of CFCs and CFCs-contaminated materials. Such stocks are also in significant risk of dramatic growth due the anticipation - in the mid to long term - of the impacts of national programs related to energy efficiency and the Extended Producer´s Responsibility under the National Law on Solid Waste. The absence of cost effective demonstrated destruction scheme represents a significant gap in that process and a barrier to its implementation.

19. From the perspective of the MLF, ExCom and the Parties generally, the proposed project provides an opportunity within the overall global ODS destruction demonstration program to support the practical implementation of ODS destruction using existing domestic capacity as an integrated part of broader national environmental and sustainable development programs utilizing various instruments such as energy efficiency incentives and potentially carbon financing. The project will also serve to address several technical issues that have been raised in recent TEAP discussions and add to the technical knowledge base related to environmental performance requirements applied to ODS destruction.

C. Project Context and Justification

20. Brazil has ratified and implemented the Vienna Convention and Montreal Protocol by Decree no. 99.280 of June the 6th in 1990. All amendments of the Protocol were ratified and implemented by Brazil, according to the following table, and since 1988 Brazil has been implementing activities addressed to comply with the targets set by the Montreal Protocol through legislative measures, public policies and through investment and non-investment projects.

Table 1. Vienna Convention, Montreal Protocol and respective Amendments

Convention, Protocol &Amendments	Ratification	Date
Vienna Convention – 1985	19 March 1990	Decree 99.280 – 06 June 1990
Montreal Protocol – 1987	19 March 1990	Decree 99.280 – 06 June 1990
London Amendment – 1990	1 October 1992	Decree 181 – 24 July 1991
Copenhagen Amendment – 1992	25 June 1997	Decree 2.679 – 17 July 1998
Montreal Amendment – 1997	30 June 2004	Decree 5.280 – 22 November 2004
Beijing Amendment – 1999	30 June 2004	Decree 5.280 – 22 November 2004

21. To support the coordination of activities and to mainframe the actions under the Montreal Protocol, the Ozone Layer Protection Coordination (CPCO) was created, which is subordinated to the Climate Change Department of the Ministry of Environment. The CPCO works on policies related to the phase out of the Ozone-Depleting Substances and acts as National Ozone Unit for the MP, also coordinating the formulation and implementation of all projects funded by the MLF, and acts as executive secretariat for the Inter-Ministries Executive Committee for Ozone Layer Protection (Prozon).

22. In 2002, the MLF approved for Brazil the National CFC Phase out Plan (NPP) aiming to phase out the consumption of 9,276 ODP tonnes of ODS from the Annex A, Group I (CFCs), during the period of 2002-2010. In this sense several investment, non-investment, technical assistance and training activities have been carried out, specifically the ones related to Recovery & Recycling structure.

23. The NPP promoted the creation of 5 large scale Reclaim Centers and 120 de-centralized Recycling Centers, supported by the distribution of 5,000 recovery bags and machines to companies and technicians in the country, which created a unique environment for the recovery of CFCs from old equipment in the country through operations of maintenance and/or disposal. Also, CONAMA has enacted the Resolution 267/2000 prohibiting the emissions of CFCs in the country.

24. The Government of Brazil has approved, in 2010, the Law 12.305/10, that established the National Law on Solid Waste. This regulation has come to establish national and subnational Directives on solid waste matters (including WEEE). Between such Directives, there is the creation of a sector Extender Producer Responsibility (EPR) programmes, setting obligations for the establishment of a wide reverse manufacturing system to recover, dismantle, recycle and disposal equipment, including RAC ones.

25. In this sense, the subsector regulation of National Law on Solid Waste is being discussed and is expected to be enforced in the next couple of years, fact that will generate large quantities of waste of RAC equipment, including ODS, that will need to be recovered and disposed properly, in line with the CONAMA Resolution.

26. In one hand, as advanced programme, public and private sectors in Brazil joined forces through the establishment of regional energy-efficiency programmes that promoted the early retirement of more than 500,000 units of domestic refrigerators.

27. In the other hand, the country is implementing the project BRA/REF/47/DEM/275 - co-funded by the MLF, the GEF and the IADB – which seeks to transform the market by promoting the replacement of old and inefficient chillers, mainly CFC-based ones, through a complex nationwide finance-warranty scheme.

28. The above developments have resulted in the collection of ODS in an amount of 61,776 kg pure and contaminated CFCs (CFC-12, CFC-11), that has been accumulated mostly in the Reclaim Centers, and was verified as being available for destruction as listed in Table 2 below. Larger quantities might also been held in small scale de-centralized recycling centers that will need to be inventoried and inserted in the ODS Waste Management System. Additionally, estimated 734,400 kg of ODS materials is anticipated to become available from June, 2014 due to a large cargo seized by IBAMA.

29. Finally, larger quantities of CFC-contained waste will be generated in the mid to long term, result of the enforcement of the National Law on Solid Waste and its related EPR programme. The universe of those stocks must still need to be inventoried.

Table 2. ODS Inventory Brazil, as of 28th February 2013

Company		Profile	City	Prov.	ODS	Kg
1	Capital Refrig	Reclaim Center	Porto Alegre	RS	CFC-11	11,250
					CFC-12 Contaminated	4,900
2	Bandeirantes Refrig	Reclaim Center	Sao Paulo	SP	CFC-12 Contaminated	4,419
3	Bom Clima Refrig	Reclaim Center	Recife	PE	CFC-11	1,190
					CFC-12 Contaminated	1,057
4	Revert Brasil	De-manufacturer	Careaçu	MG	CFC-12 Contaminated	5,000
					CFC-12 Contaminated	4,000
5	Frigelar	Reclaim Center	Sao Paulo	SP	CFC-12 Contaminated	300
6	Tecnitest	End-user	Rio de Janeiro	RJ	CFC-12 Contaminated	120
7	Ref. Marechal	Recovery company	Sao Paulo	SP	CFC-11	4,000
8	Carrier do Brasil	End-user	Canoas	RS	CFC-12 Contaminated	11,500
9	ClimaSul	Recycle Center	Curitiba	PR	CFC-12 Contaminated	500
10	Recigases	Recycle Center	Rio de Janeiro	RJ	CFC-12 Contaminated	13,540
SUBTOTAL ODS WASTE COLLETED AND AGGREGATED, to be consolidated						**61,776**
North Reg. 13	3 companies	Recycle Center	Amazonas Province		CFC-12 Contaminated	730
	1 company	Recycle Center	Acre Province		CFC-12 Contaminated	100
	1 company	Recycle Center	Roraima Province		CFC-12 Contaminated	150
	1 company	Recycle Center	Macapá Province		CFC-12 Contaminated	170
	2 companies	Recycle Center	Rondônia Province		CFC-12 Contaminated	200
	3 companies	Recycle Center	Pará Province		CFC-12 Contaminated	290
	2 companies	Recycle Center	Tocantins Province		CFC-12 Contaminated	120
Center Rg. 16	3 companies	Recycle Center	Mato Grosso Province		CFC-12 Contaminated	550
	4 companies	Recycle Center	Mato Gr. do Sul Province		CFC-12 Contaminated	1,100
	6 companies	Recycle Center	Goiás Province		CFC-12 Contaminated	2,500
	3 companies	Recycle Center	Federal District (DF)		CFC-12 Contaminated	900
North East Reg. 30	3 companies	Recycle Center	Maranhão Province		CFC-12 Contaminated	500
	2 companies	Recycle Center	Piauí Province		CFC-12 Contaminated	90
	5 companies	Recycle Center	Ceará Province		CFC-12 Contaminated	2,900
	3 companies	Recycle Center	Rio Grande Nor. Province		CFC-12 Contaminated	950
	3 companies	Recycle Center	Paraíba Province		CFC-12 Contaminated	1,350
	2 companies	Recycle Center	Alagoas Province		CFC-12 Contaminated	800
	2 companies	Recycle Center	Pernambuco Province		CFC-12 Contaminated	5,200
	2 companies	Recycle Center	Sergipe Province		CFC-12 Contaminated	320
	8 companies	Recycle Center	Bahia Province		CFC-12 Contaminated	6,480
South East Reg. 36	8 companies	Recycle Center	São Paulo Province		CFC-12 Contaminated	5,500
	3 companies	Recycle Center	Rio de Janeiro Province		CFC-12 Contaminated	8,200
	19 companies	Recycle Center	Minas Gerais Province		CFC-12 Contaminated	7,034
	6 companies	Recycle Center	Espirito Santo Province		CFC-12 Contaminated	1,780
South Reg. 25	4 companies	Recycle Center	Rio Grande Sul Province		CFC-12 Contaminated	2,320
	14 companies	Recycle Center	Paraná Province		CFC-12 Contaminated	4,090
	7 companies	Recycle Center	Sta Catarina Province		CFC-12 Contaminated	3,900
SUBTOTAL ODS WASTE COLLETED, TO BE AGGREGATED and to be consolidate**						**58,224**
TOTAL ODS WASTE TO BE ELIMINATED UNDER THE PROJECT						**120,000**
11	IBAMA	Controlling Entity	São Paulo	SP	to be identified*	734,400
SUBTOTAL ODS WASTE COLLETED AND AGGREGATED, to be characterized						**734,400**
TOTAL UNVERSE OF ODS WASTE inventoried in Brazil						**854,400**

**ODS originated from a large cargo seized by IBAMA*
***indicative inventory.*

C.1. ODS Waste Management System

30. As can be seen in the above, the quantities of CFCs recollected are located in several companies and reclamation centers in tanks and cylinders of diverse sizes and shapes and spread over a large territory that comprises the states of São Paulo (SP), Rio de Janeiro (RJ), Minas Gerais (MG), Pernambuco (PE), Rio Grande do Sul (RS) and Paraná (PR).

31. Due to the large distances of Brazil, it is foreseen that a major administrative/operational challenge in a sustainable solution to accumulating ODS will lay in the logistics of management system, mainly those related to the consolidation, transport and storage capacity in the country.

32. In this sense, to meet the requirements of the interim guidelines for the funding of demonstration projects for the disposal of ODS , as approved by Executive Committee, at its 58th Meeting, in accordance with paragraph 2 of decision XX/7 of the Meeting of the Parties. This project proposes to comply with all of the requirements as set out by the above mentioned Decision 58/19, as follows:

C.1.1. Collection

33. In recent years, through a series of activities driven by the MLF funded projects, Brazil has established a nationwide Recovery, Recycling and Reclaiming (RRR) System composed by 5 (five) Reclaim Centers and 120 (one hundred and twenty) de-centralized Recycling Centers, backed up by the distribution of 5,000 (five thousand) tools, recovery bags and recovery machines, reaching all states in the country.

34. Also, Brazil has successfully created a stable energy efficiency program, driven by the Law 9991/00, that by working in close cooperation with Utilities, have promoted a wide equipment replacement programme. Since 2005, this programme successfully retired and replaced more than 500,000 inefficient domestic refrigerators, mostly owned by low income families.

35. In the same spirit, Brazil is implementing the project BRA/REF/47/DEM/275, which is co-funded by the MLF, the GEF and the IADB. This project overlooks the chillers owners and tries to create a new market, mostly driven by ESCOs and Utilities energy efficient programmes, by creating technical and financial mechanisms which companies can accede to accelerate the replacement of old and inefficient chillers. Indeed, replacement of high impact CFC-based chillers is a priority under the programme that, directly or indirectly, is promoting such replacements.

36. Supported by the National Resolution CONAMA 267/2000 – that prohibited CFC emissions in the country – great efforts were made to strengthen the collection system in the country, grouping all these sources of ODS contained equipment. As owners of state-of-

art recovery equipment, Reclaim and Recycling Centers had become the priority consolidation centers for these ODS, generating a real demand for the environmentally sound disposal.

37. However, selecting and consolidating such ODS (at the end-user level) is not a straightforward activity, since those Centers deal with a large and diverse source of equipment (and ODS), this situation generated a large quantity of CFC-based contaminated ODS collected. Also, it was identified that pure CFC-11 has virtually no commercial value due to the extreme low demand of this refrigerant for Chillers (that are being replaced), resulting in the inventory collected and surveyed in the Table 2 of this document that has no market value or technical condition to be recycled and reused.

38. In this sense, a major objective of this project is monitor the source of the collected ODS held by those Centers and strength their capacities in receiving, separating transferring and temporarily store it (in small quantities) with proper equipment to accomplish the further steps of the logistic process, avoiding, in this ways, the risk of venting and the loss of materials.

39. Private companies (Reclaim and Recycle Centers) will finance the cost of personnel and daily operational costs involved in the collection process. Therefore, no funds are being requested to collection of ODS waste.

C.1.2. Transport, Consolidation and Storage

40. It is anticipated that transportation and consolidation will pose great challenges to the project, since the CFCs collected are located in several companies and reclamation centers, in tanks and cylinders of different sizes and shapes, are spread over a large territory that comprises the states of São Paulo (SP), Rio de Janeiro (RJ), Minas Gerais (MG), Pernambuco (PE), Rio Grande do Sul (RS) and Paraná (PR), needing to overcome distances of more than 3,800 km (From Porto Alegre to Recife). The Figure 1, below, indicate the map of distribution of the ODS collected through the partial inventory.

41. The inventory in Table 2 is based on collected ODS originated from a limited number of Recycling Centers and from all Reclaim Centers, including additional independent owners of CFCs. Due to the large basis of the country it is expected that more quantities of CFCs and contaminated CFCs collected may be inventoried during the implementation of the project.

42. Besides the large distances to be covered in this ODS Waste Management System proposal, there is a need to strengthen the entities and transportation companies involved in such process. It was identified that transportation of virgin/new ODS is quite a simple process due to the large normative basis and due to the fact that great part of consumption is through labelled non-refillable cylinders. However, managing the transport of collected (included recycled/reclaimed) ODS is still a challenge for these actors.

Fig. 1 – Map of the partial inventory of ODS Collected

43. In this sense, transport of ODS waste in Brazil has been done in an *ad hoc* manner and with no structured approach so far. The gaps already identified are:

a. Lack of a hegemonic understanding (voluntary standardization) on how to treat and categorize ODS waste (subnational permit systems and documentation), it means: which class of waste/hazardous waste ODS should be marked and labelled, as well its issued documents at state environmental agencies. Such categorization is being done *ad hoc* by state governments. Different interpretation of class of the materials is given, meaning that each time that a ODS waste cargo cross a state border new regulations must be obeyed, resulting in more time and cost in the process.

b. Lack of proper vehicles for transport of ODS waste, and lack of refillable cylinders for transport of collected ODS waste, since great part of the refrigerant market in Brazil is supplied by non-refillable cylinders;

c. Lack of expertize on handling and labelling refillable cylinders/tanks containing ODS waste;

d. Lack of technical standards for handling, labelling and transporting ODS waste; and

e. Lack of consolidation of ODS waste coming from different owners and recycling centers that could allow economies of scale, improve efficiency and minimize venting.

44. This proposal includes a component that will create a tangible and coordinated structure for transport of collected ODS waste at all levels in Brazil. This includes capacity building activities for state governments and private companies involved in the licensing and transport operations of ODS waste from the recollection centers to storage and destruction facilities. Private companies (Reclaim Centers) will co-finance the cost of personnel involved in transport of ODS waste in the country.

45. Brazil is also using its Reclaim and Recycle centers as advanced locals for consolidation and storage facilities, taking advantage of the very limited capacity storage with proper tanks and cylinders.

46. Since the main area of business of such centers is recovering, recycling/reclaiming and re-using ODS, it was also identified that there is a certain lack of expertize of handling, transferring and lack proper storage equipment at the Centers.

47. It was identified the current system has its limitations, since ODS waste use the same tanks and cylinders that are to be used for tradable recycled/reclaimed ODS. It is urgent the need to undertake improvements in order to have a fully operational system that would complement the general ODS Waste Management System.

48. The proposal includes that recycle centers become advanced points of receipt of ODS waste and that the Reclaim Centers become also Regional Storage Centers to facilitate the consolidation and the transport of the waste to the destruction facility, taking advantage of the physical structure and capacities already in place.

49. In this sense, as part of the collection process, Recycling Centers placed at 120 cities in Brazil will be responsible to act as advanced collections centers for ODS waste and will be able to support ODS waste owners on how to collect and direct their waste. As determined by ExCom decision, this **collection** activity **will not** be funded by this proposed project.

50. As further step, Reclaim Centers placed at the 4 main cities of Brazil (*Refrigeração Bandeirantes and Sudeste Refrigeracao, in São Paulo; Frigorio Climatizacão, in Rio de Janeiro; Bom Clima Refrigeracão, in Recife; and Refrigeracão Capital, in Porto Alegre*) will be the main responsible (and co-funders) partners in the consolidations of ODS Waste . Their activities will include: receipt collected ODS waste; identification and characterization of the ODS waste streams and tonnage; transfer to high capacity cylinders and tanks and labeling of the consolidated ODS waste cargo.

51. Ultimately, this proposal intends to create a coordination mechanism between the Reclaim Centers, ODS waste holders, consolidators and managers to assure proper handling, transportation and disposal of ODS waste through an integrated Management System that could be replicated to other countries.

52. Therefore, the government of Brazil is requesting funds to cover the costs of procuring recovery equipment and associated multi-refrigerant ODS identifiers, materials/large

capacity storage cylinders and ancillary equipment that would allow transfer of ODS waste from smaller to larger cylinders in a higher rate.

53. The proposal includes the procurement of 5 high rate recovery machines that can be moved in the units at the advanced receipt points. It would be important to note that the recovery machines would need to have a high capacity in order to be able to transfer ODS waste between cylinders of different sizes.

54. It is also foreseen the procurement of 15 large capacity tanks (1,000kg each) to each Reclaim & Storage Center, increasing the storage capacity of the country from current from 4.4 metric tonnes to 20 metric tonnes, facilitating the handling and disposal of waste (since current inventory is being stored in private owned cylinders, and the centers are being demanded to return the empty cylinders to end users, creating a negative incentive for the system).

55. This also includes capacity building activities for the private companies involved in the handling and storing operations of ODS waste from the recollection centers to storage and destruction facilities, as well as further quantification of stocks (associated costs for gas-chromatographic analysis, labelling, issuance of documents and certificates for final disposal, supervision and monitoring).

56. This proposal will co-finance a consolidation pilot project in each Reclaim Center. These Storage Centers will co-finance the cost of personnel and day-to-day operational costs involved in consolidation, transfer and storage of ODS waste in the country.

C.2. ODS Disposal Strategy

57. The various strategic and technology options for destruction of waste ODS have been reviewed as a basis for developing the project design and its detailed scope. In general, the menu of available technological options that would meet the destruction performance requirements set out by the Montreal Protocol is well known.

58. These have been reviewed in the previous referenced TEAP documentation adopted by the Parties, including the most recent update in 2010 where a number of new innovative but as yet fully commercialized technologies were considered. Similarly, both the Basel Convention[6] and the GEF Scientific and Technical Assessment Panel (STAP)[7] have issued guidance documents on the selection of destruction technology for POPs which also provide relevant information given the similarities in requirements for environmentally sound destruction of chlorinated chemical wastes, including differential between so-called combustion and non-combustion technologies.

59. Overall the strategic options considered were: i) export to qualified facilities in countries party to the Basel Convention; ii) the development of new national facilities

[6] http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/techguid/tg-POPs.pdf
[7] http://www.unep.org/stap/Portals/61/pubs/POPs_Disposal_Final_low.pdf

using imported technologies; and iii) utilization of existing national hazardous and industrial waste management capacity that could potentially be qualified to international standards. Each of these is discussed below:

60. *Export to qualified hazardous waste management facilities:* This option would essentially be applicable to the actual chemicals under the assumption that the cost of bulk export of any significant quantities of CFC-11 and contaminated CFC. The export options considered available to Brazil are North America and Europe, noting that the United States status as a non-party to the Basel convention limits consideration of that destination directly. Facilities qualified and experienced in destroying EOL ODS exist in Mexico, the United States and Canada. These primarily employ high temperature incineration (HTI) although commercial plasma arc facilities employing PLASCON technology were to start operation in Mexico and the United States. In Europe, to date HTI is the main available commercial option with a number of facilities existing that have destroyed EOL ODS. In general, facility gate market prices for EOL ODS destruction with HTI in North America range from approximately US$1.5/kg to US$3.0/kg and essentially mirror the market pricing for non-flammable halogenated waste. Destruction with plasma arc technology is reported to be somewhat higher, An overall unit cost range of US$10.3-18.5/kg is estimated for this technology, noting that a cost of US$6.5/kg in Australia would apply at an operating commercial facility there. The European market has recently become similar in pricing to that in North America for chlorinated waste streams. Current pricing for POPs shipped from Eastern Europe is in the range of US$1.5-2.0/kg. It should be noted that all of these costs exclude Basel Convention transaction, local administration/supervision, local handling and sea container transportation. Based on quotations from the UNDP demonstration project in Ghana (overall destruction cost of US$12.3/kg) , reasonable estimates of these would be US$6/kg including US$3/kg for transportation and US$1/kg transaction costs for Basel documentation into the EU. There is no recent previous experience for export of ODS from Brazil that could be used as reference to calculate such costs.

61. *Development of new national facilities using imported technologies:* The option of developing specialized facilities for destruction of EOL ODS has not been further considered noting that two attempts to establish refrigerator de-manufacturing facilities inclusive of destruction facilities have not been completely successful. In any event it was determined through a preliminary qualification process that permit national commercial HTI incineration facilities have the required capability subject to demonstration. Additionally, a pilot Plasma Arc facility exists in the country and could be considered subject to economic viability.. In general it is felt that development of any new technology in Brazil exclusively for EOL ODS destruction would not be viable due to the relatively high initial cost and oversized for the national requirement. This generally mirrors the experience of other more advanced MLF projects, notably that approved and now being implemented in Colombia[8]

[8] http://www.multilateralfund.org/66/English/1/6633.pdf

62. *Utilization of existing national hazardous and industrial waste management capacity:* This option involved examining the potential for existing domestic incineration facilities to be qualified to international standards, specifically those that could potentially be qualified to international standards as reference to both the Basel Convention[9] and the GEF Scientific and Technical Assessment Panel (STAP)[10] have issued guidance documents on the selection of destruction technology for POPs which also provide relevant information given the similarities in requirements for environmentally sound destruction of chlorinated chemical wastes, including differential between so-called combustion and non-combustion technologies. This involved review of the present permitting and qualification protocols and standards in force in Brazil as applied to hazardous waste thermal treatment/incineration facilities as well as identify these facilities subject to this legislation and permitting process, as can be found in the Annex III.

63. In summary, Brazil has a well-established mature legal and regulatory system for the management of hazardous waste. The requirements and procedures in place and enforced by institutions and technical capability are generally aligned with those in developed countries. Similarly, the country has a rapidly developing and capable waste management service provider base that is investing in modern capability, both in the collection and handling of hazardous waste and in its environmental sound processing, treatment and disposal. In particular, it now has several thermal treatment and destruction facilities that should be capable of undertaking the destruction of waste ODS. Subject to demonstration of this capability in accordance with international standards, utilization of domestic destruction capability should be more cost effective than alternatives of export to qualified facilities elsewhere, or developing new purpose built facilities with alternative technologies.

Table 3 – Summary table of surveyed hazardous and industrial waste management facilities

Company	City	State	Technology	Remarks
Cetrel	Salvador	BA	Liquid Injection	Solid waste
HazTec-Tribel	Belford Roxo	RJ	Rotary and Static Kilns	Hazardous waste
Essencis	Taboão da Serra	SP	Rotary Kiln	De-manufacturing ref.
BASF	Guaratinguetá	SP	Rotary Kiln	Chemicals waste
ABL	Cosmópolis	SP	Rotary Kiln	Pharmaceutical waste
Ecochamas	Rezende	RJ	Plasma Arc	Industrial waste class II
Fox Reciclagem	Cabreúva	SP	Chemical-Thermal Treat.	Refrigerator de-manufacturer

64. In this sense, Brazil has decided to implement its disposal project based on the destruction strategy described in the paragraph 43 above, namely to "*Use the existing national hazardous and industrial waste management capacity".*

65. The rationale behind qualifying destruction capability for both for CFC-11 and contaminated CFC-12 is so that options are covered given the overall incremental approach adopted for developing waste ODS destruction capability. The pre-qualification of CFCserves to remove a possible barrier to the eventual investment in such high efficiency capability when economies of scale and financing mechanisms are

[9] http://www.basel.int/Portals/4/Basel%20Convention/docs/pub/techguid/tg-POPs.pdf
[10] http://www.unep.org/stap/Portals/61/pubs/POPs_Disposal_Final_low.pdf

in place. This incremental project design strategy should serve as useful and practical demonstration for broader replication elsewhere.

66. The qualification of the existing domestic incineration facilities will be accomplished through undertaking test burns of these waste streams at least in one facility (preferred two due to the geographic distribution of Storage Centers in the country, to be determined during the implementation). This will involve the destruction of an estimated 120 metric tonnes of CFC contaminated refrigerant, being 61,776 kg of collected CFC-11 and 12 and additional 58,224 kg to be consolidated from diverse sources at Recycling Centers and from the seized stock from IBAMA . The project will also support the incremental development of key institutional and technical capacity through technical assistance related to regulatory measures and appropriate economies of scale.

67. The project complies with the criteria established by Decision 58/19 and involves aspects that are not necessarily addressed by other pilot projects approved by ExCom.

D. Project Description

68. The proposed project described below has been structured into four components: *Component 1* (ODS Waste Management System through Transport, Consolidation and Storage coordination and structure enhancement); *Component 2* (Test Burn/Destruction Demonstration); *Component 3* (Technical Assistance); and *Component 4* (Monitoring and Evaluation). The activities to be undertaken in each component are summarized in the Table 4. The following provides a detailed project description by Component:

Component 1:

69. The activities in this component cover the oversight/monitoring of collected CFC and the proper consolidating the material into larger containers (for compatibility with onward transport and incineration feed infrastructure) at the Regional Storage Centers, and transportation to the destruction facility, its characterization as to CFC content and contaminants, secure storage, and ultimately transportation to the test burn sites. **The initial collection stage up** to the consolidation and storage sites **will not be MLF funded**, but paid for by the current holders.

70. MLF grant funding is proposed for 5 sets of high speed refrigerant recover equipment (inclusive of tools, accessories and portable analyzers) and a quantity of larger multiple use cylinders with appropriate vapour locks and purging capability. Capacity building on handling, transportation and characterization is also envisaged with MLF funds. Finally, a specific activity is identified to document and report on the origin, tracking, and verification of all the waste ODS in accordance with procedures suitable for use under an international carbon crediting system if that were to apply and to enhance the coordination system through the creation of an Integrated Management System as pilot activity. The detailed activities include:

- Consolidate collected ODS waste into centralized storage sites, consolidating the material into larger containers (sizing anticipated to be at least 500 kg containers, preferably 1,000kg ones, selected for compatibility with onward transport and incineration feed infrastructure);
- Proper characterization (identification) of large containers as to CFC content and contaminants though gas chromatograph analysis;
- Establish a secure storage at 5 strategically located places (cities São Paulo, Osasco, Rio de Janeiro, Porto Alegre and Recife), with proper stocks control;
- Transportation to the test burn sites and the transport documentation/licensing.
- A specific activity is to document and report on the origin (collection sites, profile of equipment, etc), tracking (labelling), and verification of all the EOL ODS in accordance with procedures suitable for use under an international carbon crediting system if that were to apply;
- Review of Licensing demands for all operations;

Component 2:

71. It is proposed to undertake test burns at the two incineration facilities that will be further selected under a public process – taking as reference the short list provided in Table 3 above. The test burn process will be utilize the national regulatory requirements and protocols described above, supplemented by an international standard, likely as issued by USEPA[11, 12].
72. The initial activity will be technical assessment work undertaken jointly by an MLF funded consultant and the incinerator operator that will include a base line environmental audit of the facilities and current environmental management plan required under national regulations, development of a detailed test burn protocol and specification, and design for any modifications required for the test burn. A key part of this will be determination of an appropriate ODS feed rate (allowable chlorine content) and the waste stream to be co-disposed with ODS along with its compositional characterization.

73. In terms of modifications required, these are anticipated to be relatively minor. It will involve installation of a new feed port in the front end of the kiln and setting up the feeding cylinder system with appropriate metering and automated record tabulation as well as a switching and purging capability for cylinders. For CFC-11, modifications may involve either a dedicated feed system but more likely simply a connection into the existing liquid feed system and burner nozzle, although for purposes of the test burn and integrity of input measurement a dedicated feed tank, pump, metering system and flow controls will likely be required.

74. On each facility/ODS chemical combination, there will be a baseline test burn with the normal waste stream to be co-disposed, and then a test burn with the ODS. In each case, the monitoring protocol will be followed covering operating conditions (i.e. combustion chamber temperatures, estimated resident times, stack outlet temperatures),

[11] http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/chap13.pdf
[12] http://www.epa.gov/osw/hazard/tsd/td/combust/pdfs/burn.pdf

the standard menu of regulated emissions including PCDD/F as well as mass balance inputs covering all residual release paths (solid, liquid and gaseous), analysis for key contaminants (including PCDD/F) in solid bottom ash, scrubber residuals) and any liquid residual streams. The intention is to determine both Destruction Removal Efficiency (DRE) and Destruction Efficiency (DE). This would serve to inform current discussions reflected in the most recent TEAP ODS Destruction Task Force report referenced above regarding the equivalency of these two parameters used in assessing environmental performance of organic waste destruction facilities generally. DE is generally considered more comprehensive since it covers all releases though DRE which only assesses releases to air is more generally used including in the TEAP guidelines. It is generally felt that gaseous or high vapor pressure CFCs would only be subject to air release but this should be validated. Likewise, analysis for PCDD/F and any recombinant CFC residuals in all release medium would likewise be useful contributions to the technical knowledge base.

Component 3:

75. This component covers technical assistance and related development work associated with evaluation, regulation and implementation of the ODS disposal demonstration project and in ensuring the legal, regulatory, technical and public acceptance tools are in place to sustain capacity so qualified. This sub-component provides limited MLF support, co-financed by the MMA for regulatory enabling measures. This would include:

    i) legislation/regulation guidance in support of collection, storage, analysis, tracking, certified destruction and reporting requirements applicable to the management of waste ODS;

    ii) Standardization of the technical criteria and specifications for the facilities managing waste ODS; and

    ii) legislation/regulation guidance for the ODS waste management under the EPR system regulation under the National Policy on Solid Waste.

Component 4:

76. This component covers the project management costs associated with this kind of project. MLF funding would be associated with partial funding of incremental staffing costs in the form of a full time project manager, project documentation printing/translation costs and local project related travel. This component also provides for normal M&E costs also on a cost shared basis between the MLF and the Government.

77. Formal Monitoring and Evaluation activities responsible to gather all documents at all level, establishment of digital archives, tables and controls. Systematization of storage data (quantity of cylinders, composition of ODS contained in it and labelling). Transportation system related to profile of transport company and insurance. Systematization of transport and handling Licensing protocols with the various state agencies involved in the process. Monitoring and evaluation of test Burn protocols.

D.1. Synergies with other Chemical related Conventions

75. In principle, there are no direct synergies related to this project proposal that can be implemented *vis-à-vis* with other chemicals projects. However, it was identified that the destruction qualification for ODS waste (particularly the upgrade of incineration facilities and the establishment of protocols and verification of efficiency of destruction) that can be beneficial for the disposal of other types of hazardous waste like PCBs, since Brazil is implemented, under the GEF-V, a "Integrated Project on PCBs Management". In this sense, some institutional cooperation might the promoted between the Ozone National Unit and other Chemicals Directories, in order to exchange good practices on the overall waste management principles (although the stakeholders involved in each project are different, but general lessons learned can be exchanged).

D.2. Financial Sustainability and expected Business Model

78. Initially, the project will analyze the possibility of using carbon finance scheme for the short term; In the medium to long term, the Extended Producer´s Responsibility (EPR) programme will fund the ODS waste system through the establishment of a financial mechanism (or fund), funded by RAC equipment producers, that will be responsible for the disposal of ODS contained equipment (cradle-to-grave / life cycle approach).

D.3. Budget & Related Costs

Component and Activities			MLF Funding USD	Co-funding USD	TOTAL USD
1.1	**Component 1: Management System Pilot Project:** Transport, Consolidation and Storage	Collection oversight of CFCs and CFC-based ODS	25,000	-	25,000
1.2		Consolidation and Characterization of CFCs	95,000	55,000	150,000
1.3		Temporary storage of CFCs	150,000	67,000	217,000
1.4		Transportation to destruction facility	20,000	10,000	30,000
1.5		Integrated Management System Pilot Structure	182,600	68,000	199,600
1.6		Documentation and Reporting	10,000	-	10,000
1		**Subtotal Component 1**	**482,600**	**200,000**	**682,600**
2.1	**Component 2: Test Burn / Destruction Demonstration**	Detailed test burn design and selection of facilities	25,000	37,000	62,000
2.2		Incineration infrastructure adaptation of facilities	35,000	20,000	55,000
2.3		Settlement of procedures and baseline feed	10,000	10,000	20,000
2.4		Baseline test burn feed mix	55,000	25,000	80,000
2.5		Demonstration test burn feed CFC-11 (5mt)	75,000	45,000	120,000
2.6		Demonstration test burn feed CFC-12 (5mt)	75,000	45,000	120,000
2.7		Destruction of CFCs 11&12 (110mt)*	418,000	-	418,000
2.8		Test burn supervisión	10,000	5,000	15,000
2		**Subtotal Component 2**	**703,000**	**187,000**	**890,000**
3.1	**Component 3: Technical Assistance**	Support for technical enabling activities	50,000	35,000	85,000
3.2		Support for stakeholder and public awareness	50,000	25,000	75,000
3		**Subtotal Component 3**	**100,000**	**60,000**	**160,000**
4.1	**Component 4: Monitoring and Evaluation**	International Expert	80,000	-	80,000
4.2		National Consultant	60,000	60,000	120,000
4.3		Travel / Mission Costs	45,000	45,000	90,000
4.4		Administrative Office	-	15,000	30,000
4.5		Sundry	20,000	8,000	22,000
4		**Subtotal Component 4**	**205,000**	**128,000**	**333,000**
		Total USD	**1,490,600**	**575,000**	**2,065,600**

**remaining 676,176 kg of ODS contaminated materials seized by IBAMA shall be destructed by own costs, as co-financed provided by the Government/fined company responsible for the illegal trade. Destruction is dependent on positive results of the burns undertaken under this demonstration project.*

D.4. Monitoring, Implementation & Dissemination

76. A national team of experts will be set up to implement and monitor project implementation and progress under the direct coordination of MMA and UNDP. This includes the monitoring of transport, storage and final disposal of ODS, as per ExCom Guidelines 58/19 and other national/international legislation.

77. Lessons learned will be documented and shared nationally as well as internationally. The project will generate valuable information about how to develop a full system of ODS Disposal Management System covering collection, transport, storage and destruction in place. A Closure Seminar is intended to be promoted to share the experiences learned.

E. Implementation Schedule & Milestones

Activity	2014			2015				2016				2017	
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Project Start-up													
Excom Project Approval													
Receipt of Funds													
Project/Grant Signature													
Management activities													
Progress Reports to Excom													
Project Implementation													
Component 1: Collection/Transport/Consolidation/Storage													
Component 2: ODS Destruction Demonstration													
Selection Process of Incineration Facility													
Test burn design													
Adaptation of feeding mechanism, baseline feed mix pre-determination process, settlement of test burn evaluation													
Test burn of 10mt of CFC													
Effective incineration of 110mt of ODS waste recollected													
Supervisory/audit and data analysis													
Component 3: Technical Assistance													
Component 4: Management/Monitoring/Evaluation													
Project Closure													
Final Report													
Certificate of Technical Completion													
Operational and Financial Closure													

ANNEX I

Transmittal Letter

MINISTÉRIO DO MEIO AMBIENTE
SECRETARIA DE MUDANÇAS CLIMÁTICAS E QUALIDADE AMBIENTAL
DEPARTAMENTO DE MUDANÇAS CLIMÁTICAS
SEPN 505 - Lote 02 - Bloco B - Edifício Marie Prendi Cruz - Sala 307. CEP: 70.730-542. Brasília DF
Tel.: (61) 2028-2272 -e Fax.: (61) 2028-2272

Ofício nº 16/2014/SMCQ/DEMC

Brasília, March 18 2014.

Mr. JACQUES VAN ENGELS
Officer-in-Charge, Montreal Protocol Unit/Chemicals
UNDP
New York, NY
USA

Subject: Pilot Demonstration Project on ODS-Waste Management and Disposal.

Dear Mr. Jacques Van Engels,

Please find enclosed original copy of the Pilot Demonstration Project on ODS-Waste Management and Disposal to be submitted for the consideration of the 72nd Executive Committee Meeting of the Multilateral Fund.

Yours sincerely,

ADRIANO SANTHIAGO DE OLIVEIRA
Director of the Department of Climate Change

ANNEX II

Reference Incinerator Environmental Performance Limit Standards for Relevant Air Emissions[13]

Performance Parameter	Brazil CONAMA 316 de 2002[14]	TEAP Task Force Report (2002)[15] Decision XV/9[16]	Basel Convention G/L (POPs)[17]	EC Incineration Directive[18]	EC IPPC BREF[19]
Particulates (mg/Nm^3)	70	50	NR	10	0.1 – 2
SO_x (mg/Nm^3)	280	n/a	NR	50	0.1 – 50
HCl (mg/Nm^3)	80	100	NR	60	0.1 – 10
HF (mg/Nm^3)	5	5	NR	1	0.04 – 1
HBr/Br_2 (mg/Nm^3)	n/a	5	NR	n/a	n/a
NO_x (mg/Nm^3)	560	n/a	NR	200	40 – 200
CO (mg/Nm^3)	100	100	NR	n/a	5 -50
Dioxin/Furan ($ng\text{-}ITEQ/Nm^3$)	0.5	0.2 0.5 (Foam)	0.1	0.1	0.002 – 0.1
Total Organic Carbon	n/a	n/a	NR	10	0.1 – 10
DE (%)	n/a	n/a	99.99	n/a	n/a
DRE (%)	99.99 (POPs) 99.9999(PCB)	99.99	99.9999	99.9999	n/a

NR – National Regulations
n/a – not applied

[13] Limits are also applied to other pollutants, particularly heavy metals but are not listed.
[14] CONAMA Resolution no. 316 from 2002 - http://www.mma.gov.br/port/conama/legiabre.cfm?codlegi=338
[15] TEAP Task Force Report on ODS Destruction Technologies (2002) - http://ozone.unep.org/Assessment_Panels/TEAP/Reports/Other_Task_Force/TEAP02V3b.pdf
[16] Handbook of the Montreal Protocol, 8th Edition (2009), Section 3.1,Page 457, http://www.unep.ch/ozone/Publications/MP_Handbook/MP-Handbook-2009.pdf
[17] http://www.basel.int/pub/techguid/tg-POPs.pdf
[18] Directive 2000/76/EC on Incineration of Waste – Hazardous waste incineration daily averages: http://www.central2013.eu/fileadmin/user_upload/Downloads/Document_Centre/OP_Resources/Incineration_Directive_2000_76.pdf
[19] EC IPPC BREF, August 2006- – Hazardous waste incineration daily averages:, ftp://ftp.jrc.es/pub/eippcb/doc/wi_bref_0806.pdf

ANNEX III

Destruction Facilities Surveyed under the Preparation Project

Comparative Factors	Cetrel	HazTec-Tribel	Essencis	BASF	Serviatis	ABL	Ecochamas
Location	Salvador, BA	Belford Roxo, R.J.	Taboao da Serra, SP	Guaratinqueta, SP	Resende/RJ	Cosmopolis, SP	Resende, RJ
General Business Scope	Operating environmental services – Waste Mgt., WWT, monitoring	Hazardous/ Industrial WM. services	Waste Mgt. Reverse manufacturing Consulting	Major international chemicals producer	Formulating agrochemicals and waste management	Pharmaceutical manufacture	Industrial waste destruction
Ownership/Financial Depth	100% national. State (20%) and large industrial firm (80%)	100% national ownership involving two banks. Recent merger with larger firm.	100% national ownership.	10% foreign (German)	100% national ownership (workers and ex-workers)	100% foreign (Italian, US)	100% national, local entrenpeneur, state research institute technical support
Waste Management Business Scope	Incineration, landfill, land farm, biological treatment	Integrated Organic/Inorganic Hazardous/ Industrial waste	Solid, industrial and Haz. Waste, plus resource recovery	Accepts third party hazardous waste for incineration in captive facility	Liquid industrial and Haz. Waste	High temperature incineration	Galvanic waste, with plan to process domestic, agrochemicals and pharmaceutical waste
Destruction Technology Proposed	Liquid injection & rotary kiln incineration	Rotary kiln Static kiln	Rotary kiln	Rotary kiln	Vertical static kiln	Rotary Kiln	Plasma Arc combustion
Age/History of Facility	Liquid injection - 1992, Rotary kiln- 1998	Initially 1992 WWTP/Phys-Chem - 2000 Upgrade, capacity increase, add static kiln – 2001 Relocating – 2010	Operation since 1993 Operational upgrades 2003-2010 including bag filters in 2009	Constructed 1994 Upgraded 2007.2008	Constructed 1977	Constructed 1996	Funded in 1999. Licence from 2006. Upgrade operation in process
Nominal Annual Capacity (t/year unless noted)	Liquid injection - 10,000 t/year (5.6 Gcal/hr) Rotary kiln- 5,000 t/year (4.4 Gcal/hr)	7,000 t/year (2.2 Gcal/hr)	7,000 t/year (6.5 Gcal/hr)	3,600 t/yr	20,000 t/year (6.0 Gcal/hr)	8,000 t/year	300 kg/hour

Comparative Factors	Cetrel	HazTec-Tribel	Essencis	BASF	Serviatis	ABL	Ecochamas
Capacity Availability (t/year)	Operating at 85% capacity	Operating at full capacity	Operating at full capacity	N/A	N/A	Approximately 4,000 t/yr	N/A - full capacity not in use
Waste Currently Processed	Wide range of chlorinated wastes	Wide range of industrial wastes (solids liquids gasses)	Limited chlorinated wastes but wide range of other HW, primarily pesticide containers and solids	Wide range of chlorinated by products, principally from agro-chemical production	Organic solvents, waste water	Wide range of chlorinated and non-chlorinated solids and liquids.	Galvanic residues, with Fe, Zn, Cr, Cd, Ni
Other Waste Qualified For	PCBs	PCBs	No PCBs	No PCBs	No PCBs	No PCBs	No PCBs, due to rules of the condominium
Technical/ Environmental Waste Type Limitations	800 kg/hr. Chlorinated waste	Not Significant	Potential limitations on Cl and F feed. Fluorine impact monitored. Not qualified for PCBs	Potential limitations on Cl and F feed.	No chlorinated/ fluorinated waste	Subject to feed rate restrictions on chlorinated solid and liquids generally, as well as chlorine and fluorine content	None declared except PCBs and declared that are able to process waste with Cl and F
Combustion Chamber Temperature Range	Liquid Injection - >1,000^{o}C(1,200 +/- ^{o}C 100 ^{o}C) Rotary Kiln –>800 ^{o}C Secondary - >900 ^{o}C 1,100 +/- ^{o}C 100 ^{o}C)	Rotary Kiln –800 to 1100 ^{o}C Secondary – 1100-1250 ^{o}C	Rotary Kiln – 900 ^{o}C Secondary –1,160 ^{o}C	Rotary Kiln – 686 ^{o}C Secondary –1,200 ^{o}C	950-1,100 ^{o}C	Kiln temperature 1,100 ^{o}C	Average temperature: 1500°C Temperature inside the torch: 5000 to15 000°C Combustion chamber 1000 to 1800°C
Residence Time (liquid)	Liquid Injection – 2.5 sec. Rotary Kiln - 2 Sec.	Rotary kiln 2-3 sec Secondary 2-3 sec	Rotary kiln N/A Secondary >2 sec	N/A	N/A	45-60 min. for solids 2-3 sec for liquids	N/A

Comparative Factors	Cetrel	HazTec-Tribel	Essencis	BASF	Serviatis	ABL	Ecochamas
Overall Environmental Performance Parameters	DRE >99.99 on general waste, >99.9999 on PCBs. PCDD/PCDF-<0.1 Ng/Nm^3 Generally meet international air emissions/significantly better than national standards.	DRE >99.99 on general waste, >99.9999 on PCBs. PCDD?PCDF <0.5 Ng/Nm^3 Air emissions to national regulations.	DRE >99.99 on PCDD?PCDF <0.5 Ng/Nm^3 Air emissions to national regulations.	DRE >99.99 on PCDD?PCDF <0.5 Ng/Nm^3 Actual 0.35-0.40 Ng/Nm^3 Air emissions to national regulations.	N/A	DRE.99,9999 DE>99.9999 PCDD/PCDF 0.06 NG/Nm^3 on test burns. Other air parameters substantially better than nation regulations and meet international	N/A
Residuals Handling/Disposal	No pre-treatment of solid residuals, sent to on-site landfill. Liquids residuals to on site WWTP	No pre-treatment of solid residuals. Liquids residuals to on site WWTP Solid residuals sent to off-site LF	No pre-treatment of solid residuals. Liquids residuals to on-site WWTP Solid residuals sent to on-site LF	No pre-treatment of solid residuals. Liquids residuals to on-site WWTP Solid residuals sent to off-site LF (SASSA landfill)	No pre-treatment of solid residuals. Liquids residuals to on-site WWTP Solid residuals sent to off-site LF	Solid residuals immobilized in cement production Liquid effluents to WWTP and reuse on- site	Residues sent to the condominium landfill
Waste Tracking/ Destruction Documentation	Reception analysis/formal tracking thru to destruction certificate	N/A	N/A	N/A	N/A	Reception analysis/formal tracking thru to destruction certificate	Reception analysis/formal tracking thru to destruction certificate
Facility Land Use Setting	Located adjacent to the ocean with main industrial complex providing buffer with other land uses.	Located in an industrial park, immediately adjacent to a small river. Residential development on river's opposite bank	Relatively good separation from other development but surround by urban development	Excellent location with substantial buffer under enterprise control.	Located in Dutra Via, in industrial area, without adjacent population	Location remote from residential or conflicting land use.	Inside Clariant's condominium, about 1 km from a urban center
Environmental Monitoring	Continious – O_2,CO,CO_2,SO_X, NO_X	Continuous stack monitoring of basic parameters – CO, O_2). Well equipped on-site lab Compliance stack monitoring quarterly. PCDD/PCDF – 2y.	Continuous stack monitoring of CO, NO_x, SO_x, MP and O_2 Ground water monitoring	Continuous stack monitoring of basic parameters - CO, NO_x, SO_x,O_2.	Continuous stack monitoring of CO, NO_x, SO_2, and O_2	Continuous stack monitoring of CO, NO_x and SO_2	CO and CO_2. New equipments, in instalation will monitor SO_X, NO_X

Comparative Factors	Cetrel	HazTec-Tribel	Essencis	BASF	Serviatis	ABL	Ecochamas
Public Consultation Program	N/A	N/A	No formal program. Publications	Active public consultation and information program	N/A	Active public consultation and information program	None
Laboratory/QA/ EMS Standards Certification	ISO 14.001:2004 ISO 9.001:2000 OHSAS 18.001:2007 SA 8.000:2001	ISO 14001	ISO17025 ISO14001	N/A	None	ISO14001	None
Required Facility Modifications for ODS	Minor if liquid injection unit used	Addition of kiln injection port.	$1 million upgrade investment planned (proposed)	Addition of kiln and/or secondary chamber injection port.	N/A	Minor Addition of kiln injection port or off gas return piping	Minor modifications anticipate by enterprise
Feasibility of Onsite ODS Bulk Storage	Yes	Yes	Yes	Yes	N/A	Yes	Area available to expand for storage
Feasibility of ODS Specific Tracking/ Monitoring Protocols	Yes	Yes	Yes	Yes	N/A	Yes	Yes upon evaluation
Provision of Collection/ Transportation Services	Yes, although capacity limited	Yes	Yes	No	No	No	No
Raw Estimate Pricing Range for ODS (FOB Site), not included collection, transport, consolidation and storage	R$5-16/kg	R$2 – 15/kg	R$9/kg	N/A	N/A	R$1-12/kg	R$3-13,50/kg
Confirmation of Interest in Pursuing ODS Destruction	Yes	Yes, subject to availability of facility after relocation	Yes, but may be constrained by 18 months to upgrade facility.	Yes	No	Yes	Yes

N/A – Information not provided

ANNEX IV

Project Framework

Activity		Product	Funding - USD			Remarks on Co-funders
			MLF	Co-finance	Total	
1	**Component 1: Collection oversight, Transport, Consolidation and Storage Management System**		**482,600**	**200,000**	**682,600**	
1.1	Technical assistance on collection oversight of CFCs and CFC-contaminated ODS	Bulk quantities of CFC/CFC-contaminated ODS already collectedt Storage Center / Incineration Facility level, are verified and monitored, in order to check if best available practices were undertaken to avoid leakages and environmental contamination.	25,000	0	**25,000**	No co-financing
1.2	Technical assistance on consolidation and characterization of CFCs	Bulk quantities of CFC/CFC-contaminated ODS screened, consolidated into optimized cylinders for destruction and monitored.	95,000	65,000	**150,000**	Co-funded by Recycling Centers and ODS Waster owners/holders as operational costs (staff, energy, cleaning of tanks, licensing costs)
1.3	Technical assistance on Temporary storage of CFCs	Bulk quantities of CFC/CFC-contaminated ODS securely storage at the project sites.	150,000	67,000	**217,000**	Co-funded by Reclaim Centers (staff, energy, licensing costs)
1.4	Technical assistance on transportation to destruction facility	Bulk quantities of CFC/CFC-contaminated ODS, transported from Storage Center to Incineration Facilities as required by test burn/burning schedules.	20,000	10,000	**30,000**	Co-funded by Reclaim Centers (staff, licensing costs, insurance)
1.5	Integrated Management System Pilot Structure	Integrated consolidation and ODS waste management system in place at each of the 5 Regional Storage Centers, included staff capacitated and logistic system developed	100,000	50,000	**150,000**	Co-funded by Reclaim Centers as operational costs (staff, energy, water, handling, inspection and cleaning of tanks, licensing costs)
1.5.1	5 (five) High capacity transfer machinery for recovered ODS waste	Bulk quantities of CFC/CFC-contaminated ODS collected by 120 companies transferred to larger size cylinders.	10,000	50,000	**60,000**	
1.5.2	15 (fifteen) High capacity storage cylinders	High capacity cylinders, that match incineration facilities feeding systems, made available to 5 Storage Centers for temporary storage of waste.	22,100	0	**22,100**	
1.5.3	5 (five) Multi-refrigerant identifiers	Refrigerant blends identifier delivered to Storage Centers and characterization costs minimized over the medium to long term.	22,500	0	**22,500**	

Activity		Product	Funding - USD			Remarks on Co-funders
			MLF	Co-finance	Total	
1.5.4	Revision of Processes, Documents and Lessons Learnt	Internal revision of ODS waste aggregation process and consolidation of lessons learnt focused on compliance with national regulations on waste.	10,000	0	**10,000**	
1.5.5	Integrate System Coordinator	Part time Coordinator financed for 6 months by the project in order to start-up the Integrated System hired.	18,000	18,000	**36,000**	6 additional months to be co-financed by the Storage Centers = total period 12 months
1.6	Documentation and Reporting	Auditable documentation on the origin, tracking and certified analysis of EOL ODS for test burns stocks assembled in suitable format for accreditation under an international carbon crediting mechanism model.	10,000	0	**10,000**	No co-financing
2	**Component 2: Test Burn / Destruction Demonstration**		**703,000**	**187,000**	**890,000**	
2.1	Detailed test burn design and selection of facilities	Detailed test burn design, specification and proposal documents delivered with baseline environmental audit for each test burn facility	25,000	37,000	**62,000**	Co-funded by Incineration Operator: staff, opportunity cost for not incineration other streams, internal auditing costs)
2.2	Incineration infrastructure adaptation of facilities	Material feed, control and measurement infrastructure at HW incineration facility improved, included but not limited to: - Primary combustion chamber port modifications for high vapor pressure liquid and/or compressed gas feed; - Dedicated liquid feed from barrels or containers inclusive of weight scale, pump, fugitive emission containment, flow controls and flow metering; - Dedicated gaseous feed from pressurized containers inclusive of weight scale, pump, fugitive emission containment, flow controls and flow metering; - Container purging capability.	35,000	20,000	**55,000**	Co-funded by Incineration Operator: staff, opportunity cost for not incineration other streams while civil and retrofit works are being done, equipment adaptation, licensing costs)
2.3	Settlement of procedures and baseline feed	Representative baseline feed to be co-disposed with ODS selected and implemented	10,000	10,000	**20,000**	Co-funded by Incineration Operator: staff, internal auditing costs)

Activity		Product	Funding - USD			Remarks on Co-funders
			MLF	Co-finance	Total	
2.4	Baseline test burn feed mix	General baseline test burn on representative normal feed mix established: - Incineration facility operating conditions; - Stack analysis for regulated emissions including HF and PCCD/F; - Bottom ash analysis; - Scrubber waste water (as applicable) analysis.	55,000	25,000	**80,000**	Co-funded by Incineration Operator: staff, equipment review protocols, licensing costs)
2.5	Demonstration test burn feed CFC-11 (5 metric tonnes)	Continuous metered injection of 5 metric tonnes of CFC-11, at pre determined rates, with monitoring and documentation of items 2.3 and 2.4 above	75,000	45,000	**120,000**	Co-funded by Incineration Operator: staff, opportunity cost for not incineration other streams while test burns are running).
2.6	Demonstration test burn feed CFC-12 (5 metric tonnes)	Continuous metered injection of 5metric tonnes of CFC-12, at pre determined rates, with monitoring and documentation of items 2.3 and 2.4 above.	75,000	45,000	**120,000**	
2.7	Destruction of of CFC (11&12) (110 metric tonnes)	110 mt of CFC-11 and CFC-12 destructed at commercial rate of USD 3.80/kg, established after the test burns.	418,000	0	**418,000**	No co-financing
2.9	Test burn supervision	Independent supervisory/audit consultant(s) undertaken for the test burn oversight, data analysis and reporting	10,000	5,000	**15,000**	Co-funded by Incineration Operator: staff, internal auditing and Env. Licensing costs)
3	**Technical Assistance**		**100,000**	**60,000**	**160,000**	
3.1	Support for technical enabling activities	Support for enabling measures delivered for the facilitation development and implementation of the ODS Management System - Verification/Update of Environmental Performance Limit Standards for Relevant Air Emissions. - Technical guidance in support of collection, storage, analysis, tracking, certified destruction and reporting requirements applicable to the management of EOL ODS. - Regulation of the technical criteria and specifications for the selection of facilities to incinerate ODS. - Technical guidance for the regulamentation of EPR system	50,000	35,000	**85,000**	Co-funded by Ministry of Environment of Brazil: staff, legal advisory of the Ministry, mission and day to day operational costs.

Activity		Product	Funding - USD			Remarks on Co-funders
			MLF	Co-finance	Total	
3.2	Support for stakeholder and public awareness	Stakeholder and public consultations effective support and awareness developed and delivered related to the national ODS Waste Management System: - Information products/public promotion; - Stakeholder workshops; - Consultation meetings; - Capacitation/Information Materials.	50,000	25,000	**75,000**	Co-funded by Ministry of Environment of Brazil: staff, legal advisory of the Ministry, mission and day to day operational costs.
4	**Monitoring and Evaluation**		**205,000**	**128,000**	**333,000**	
4.1	International Expert	International expert (part-time) on hazardous waste management/incineration that delivered high level advisory, guidance and oversight to National Expert, to NOU and UNDP on the project implementation cycle	80,000	0	**80,000**	Co-funded by Ministry of Environment of Brazil: staff, mission and day to day operational costs.
4.2	National Consultant	National expert on ODS, hazardous waste and WEEE management (full time) delivered overall project coordination, reporting to NOU/UNDP, and provided close cooperation with private sector	60,000	60,000	**120,000**	
4.3	Travel / Mission Costs	Projected related travel/mission costs.	45,000	45,000	**90,000**	
4.4	Administrative Office	Projected related day-to-day operational issues.	0	15,000	**15,000**	
4.5	Sundry	Not foreseen extraordinary costs contingences.	20,000	8,000	**28,000**	
GRAND TOTAL			**1,490,600**	**575,000**	**2,065,600**	