الأمم المتحدة

EP

برنامج الأمم المتحدة للبيئة

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اللجنة التنفيذية للصندوق المتعدد الأطراف لتنفيذ بروتوكول مونتريال
الاجتماع الخامس والسبعون
مونتريال، 16-20 تشرين الثاني/نوفمبر 2015

تعديلات برنامج عمل اليونيدو لعام 2015

تعليقات وتوصيات أمانة الصندوق

1- تطلب اليونيدو موافقة من اللجنة التنفيذية على مبلغ 742,024 دولار أمريكي، زائد تكاليف دعم الوكالة بقيمة 64,284 دولار أمريكي لتعديلات برنامج عملها لعام 2015 المدرجة في الجدول 1. ويرفق التقديم بهذه الوثيقة.

الجدول 1: تعديلات برنامج عمل اليونيدو لعام 2015

البلد	النشاط / المشروع	المبلغ المطلوب (دولار أمريكي)	المبلغ الموصي به (دولار أمريكي)
القسم ألف: الأنشطة الموصي لها بالموافقة الشمولية			
ألف 1: إعداد المشروع			
الكاميرون	إعداد خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية (الاستراتيجية الشاملة)	70,000	70,000
الأردن	إعداد الأنشطة الاستثمارية لإزالة المواد الهيدروكلوروفلوروكربونية (المرحلة الثانية) (قطاع الرغاوى)	55,000	55,000
	المجموع الفرعي لألف 1	125,000	125,000
تكاليف دعم الوكالة (7 في المائة للتعزيز المؤسسي):		8,750	8,750
	المجموع لألف 1	133,750	133,750
ألف2: المساعدة الفنية لإعداد تقارير التحقق			
البوسنة والهرسك	تقرير التحقق للمرحلة الأول من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية	30,000	30,000
جمهورية مقدونيا اليوغوسلافية سابقاً	تقرير التحقق للمرحلة الأول من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية	30,000	30,000
	المجموع الفرعي لألف 2	60,000	60,000
تكاليف دعم الوكالة (9 في المائة للمساعدة الفنية):		5,400	5,400
	المجموع لألف 2	65,400	65,400
ألف 3: المساعدة الفنية للدراسات الاستقصائية بشأن بدائل المواد المستنفدة للأوزون			
البحرين	دراسة استقصائية بشأن بدائل المواد المستنفدة للأوزون على المستوى الوطني	50,000	50,000
الكاميرون	دراسة استقصائية بشأن بدائل المواد المستنفدة للأوزون على المستوى الوطني	110,000	110,000
الكويت	دراسة استقصائية بشأن بدائل المواد المستنفدة للأوزون على المستوى الوطني	50,000	50,000
ليبيا	دراسة استقصائية بشأن بدائل المواد المستنفدة للأوزون على المستوى الوطني	110,000	110,000
السودان	دراسة استقصائية بشأن بدائل المواد المستنفدة للأوزون على المستوى الوطني	110,000	110,000
	المجموع الفرعي لألف 3	430,000	430,000
تكاليف دعم الوكالة (9 في المائة للمساعدة الفنية):		38,700	38,700
	المجموع لألف 3	468,700	468,700
القسم باء: الأنشطة الموصي بالنظر فيها بصفة فردية			
باء 1: المساعدة الفنية لدراسة جدوى			
مصر	دراسة جدوى للتبريد القطاعي	63,521	*
الكويت	دراسة جدوى تقارن ثلاثة تكنولوجيات من نوع آخر لاستخدامها في تكييف الهواء المركزي	63,521	*
	المجموع الفرعي لباء 1	127,024	
تكاليف دعم الوكالة (9 في المائة لإعداد المشروع):		11,434	*
	المجموع لباء 1	138,458	
المجموع الكلي (ألف1، وألف2، وألف3، وباء1):		806,308	667,850

* مشروع للنظر فيه بصفة فردية

القسم ألف: الأنشطة الموصي لها بالموافقة الشمولية

ألف1: إعداد المشروع

الكاميرون: إعداد المشروع للمرحلة الثانية من خطط إدارة إزالة المواد الهيدروكلوروفلوروكربونية (الاستراتيجية الشاملة): 70,000 دولار أمريكي

وصف المشروع

2- بالنيابة عن حكومة الكاميرون، قدّمت اليونيدو طلباً لإعداد مشروع للمرحلة الثانية من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية (الاستراتيجية الشاملة)، بقيمة 100,000 دولار أمريكي، زائد تكاليف الدعم للوكالة البالغة 7,000 دولار أمريكي، على النحو المطلوب في الأساس. وتضمن التقديم تحديث عن تنفيذ المرحلة الأولى من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية وتبرير للتمويل المطلوب والأنشطة التي سيتم تنفيذها والميزانيات المقابلة. وتسعى حكومة الكاميرون للحصول على مساعدة لتحقيق هدف التخفيض بنسبة 68 في المائة بموجب بروتوكول مونتريال.

تعليقات الأمانة

3- لاحظت الأمانة أيضاً أن الحدود التي وضعها المقرر 42/71 (د) و (و) و (ز) ستؤهل حكومة الكاميرون للحصول على مبلغ 70,000 دولار أمركي كحد أقصى للأنشطة الاستثمارية استناداً إلى استهلاكها المؤهل المتبقي للمواد الهيدروكلوروفلوروكربونية البالغ 57.06 طن من قدرات استناد الأوزون (فقط الهيدروكلوروفلوروكربون-22)، لإعداد الاستراتيجية الشاملة. والاستهلاك المؤهل المتبقي للبلد هو فقط للهيدروكلوروفلوروكربون-22).

توصية الأمانة

4- توصي الأمانة بالموافقة الشمولية على الطلب لإعداد المشروع للمرحلة الثانية من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية (الاستراتيجية الشاملة) للكاميرون بمستوى التمويل المبين في الجدول 1.

الأردن : إعداد الأنشطة الإستثمارية لإزالة المواد الهيدروكلوروفلوروكربونية (المرحلة الثانية) (قطاع الرغاوى) : 55,000 دولار أمريكي

وصف المشروع

5- قدّمت اليونيدو طلباً لأموال لإعداد مشروع لجزء من عنصر الاستثمار من المرحلة الثانية من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية للأردن بمبلغ 100,000 دولار أمريكي، زائد تكاليف الدعم للوكالة البالغة 7,000 دولار أمريكي، على النحو المقدّم في الأساس. وهذا الطلب هو بالإضافة إلى الأموال التي طلبها البنك الدولي (45,000 دولار أمريكي)، وهو الوكالة المنفذة الرئيسية، لإعداد المشروعات لجزء من قطاع الرغاوى.[1]

6- وتضمن التقديم تحديث عن تنفيذ المرحلة الأولة من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية وتبرير للتمويل المطلوب والأنشطة التي سيتم تنفيذها والميزانيات المقابلة.

[1] الوثيقة UNEP/OzL.Pro/ExCom/75/32.

تعليقات الأمانة

7- لاحظت الأمانة أن مهمة اليونيدو في خطة قطاع الرغاوى ستشمل تحويل الشركات الأكبر حجماً ؛ وتحديث معلومات البيانات لدار النظم فتحي أبرو عرجة وشركاه الصناعية (FAA)، التي تم اقتراحها في الأساس في إطار المرحلة الأولى من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية إنما تم تأجيلها من قبل اللجنة التنفيذية.

8- لاحظت الأمانة أيضاً أن الحدود التي وضعها المقرر 42/71 (د) و (و) و (ز) ستؤهل حكومة الأردن للحصول على مبلغ 100,000 دولار أمريكي كحد أقصى للأنشطة الاستثمارية استناداً إلى استنادا إلى استهلاكها المؤهل المتبقي للمواد الهيدروكلوروفلوروكربونية البالغ 68.8 طن من قدرات استناد الأوزون، ما يجعل حصة اليونيدو 55,000 دولار أمريكي.

توصية الأمانة

9- توصي أمانة الصندوق بالموافقة الشمولية على طلب إعداد مشروع للأنشطة الاستثمارية للمرحلة الثانية من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية (قطاع الرغاوى) للأردن بمستوى التمويل المبين في الجدول 1.

ألف 2: المساعدة الفنية لإعداد تقارير التحقق بشأن استهلاك المواد الهيدروكلوروفلوروكربونية

البوسنة والهرسك: المساعدة الفنية لإعداد تقرير التحقق للمرحلة الأولى من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية : 30,000 دولار أمريكي

جمهورية مقدونيا اليوغوسلافية سابقاً: المساعدة الفنية لإعداد تقرير التحقق للمرحلة الأولى من خطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية : 30,000 دولار أمريكي

وصف المشروع

10- طلبت اللجنة التنفيذية في المقرر 22/74 من الوكالات الثنائية والمنفذة ذات الصلة إدراج تعديلات برنامج عمل كل منها لتقديمها إلى الاجتماع الخامس والسبعين، وتمويل تقارير التحقق للمرحلة الأولى من خطط إدارة إزالة المواد الهيدروكلوروفلوروكربونية للبوسنة والهرسك وجمهورية مقدونيا اليوغوسلافية سابقاً، من بين غيرها، حيث أن اليونيدو هي الوكالة المنفذة الرئيسية.

تعليقات الأمانة

11- لاحظت الأمانة أن التمويل الذي طلبته اليونيدو لكل من البلدين كان متسقا مع الأموال التي وافقت عليها اللجنة التنفيذية لتقارير التحقق المماثلة في الاجتماعات السابقة. ولاحظت أيضا أنه ينبغي تقديم تقارير التحقق لهذين البلدين قبل 60 يوماً على الأقل من اجتماع اللجنة التنفيذية الذي يتم خلاله السعي للحصول على طلبات الشرائح المستقبلية لخطة إدارة إزالة المواد الهيدروكلوروفلوروكربونية الخاصة بهما.

توصية الأمانة

12- توصي الأمانة بالموافقة الشمولية على تقارير التحقق للمرحلة الأولى من خطط إدارة إزالة المواد الهيدروكلوروفلوروكربونية للبوسنة والهرسك وجمهورية مقدونيا اليوغوسلافية سابقاً بمستوى التمويل المبين في الجدول رقم 1 على أنه ينبغي تقديم تقارير التحقق قبل 60 يوماً على الأقل من اجتماعات اللجنة التنفيذية التي يتم

خلالها السعي للحصول على طلبات شرائح التمويل التالية لخطط إدارة إزالة المواد الهيدروكلوروفلوروكربونية الخاصة بهم.

ألف 3: المساعدة الفنية لإعداد دراسات استقصائية وطنية بشأن بدائل المواد المستنفدة للأوزون

وصف المشروع

13. قدّمت اليونيدو طلبات تمويل لإجراء دراسات استقصائية وطنية بشأن بدائل للمواد المستنفدة للأوزون للبحرين والكاميرون والكويت وليبيا والسودان بمستويات التمويل المبينة في الجدول 1 في معرض الاستجابة للفقرة 4 من المقرر 9/XXVI.[2] وسيكون هدف الدراسات الاستقصائية مساعدة هذه البلدان العاملة بمقتضى المادة 5 على فهم اتجاهات استهلاكهم للبدائل لغير المواد المستهلكة للأوزون وتوزيعها بحسب القطاع والقطاع الفرعي، بشكل أفضل.

تعليقات الأمانة

14- لاحظت الأمانة أن طلبات التمويل كانت متسقة مع المقرر 53/74(د). بالنسبة للكاميرون وليبيا والسودان، سيتم إجراء الدراسات الاستقصائية من اليونيدو وحدها. وبالنسبة للبحرين والكويت، تطلب اليونيدو، بوصفها الوكالة المنفذة المتعاونة، فقط جزء من التمويل المؤهل لهذين البلدين (أي 50,000 لكل منهما) ؛ واليونيب هو الوكالة المنفذة الرئيسية لتنفيذ هذه الدراسات الاستقصائية ويجري النظر في طلب التمويل المتبقي في تعديلات برنامج عمل اليونيب لعام 2015.[3]

توصية الأمانة

15- توصي أمانة الصندوق بالموافقة الشمولية على الطلبات لإعداد دراسات استقصائية بشأن بدائل المواد المستنفدة للأوزون في البحرين والكاميرون والكويت وليبيا والسودان، بمستوى التمويل المبين في الجدول 1.

القسم باء: الأنشطة الموصي بالنظر فيها بصفة فردية

باء1: المساعدة الفنية لدراسات الجدوى

مصر: دراسة جدوى للتبريد القطاعي في القاهرة الجديدة، مصر : 63,521 دولار أمريكي

الكويت: دراسة جدوى تقارن ثلاثة تكنولوجيات من نوع آخر لاستخدامها في تبريد الهواء المركز في الكويت : 63,521 دولار أمريكي

وصف المشروع

16- قدّمت اليونيدو طلبات لمقترحين لدراسات جدوى، تماشياً مع المقرر 40/72، لإعداد نموذج عمل للتبريد القطاعي في مصر والكويت. واليونيدو هي الوكالة المنفذة الرئيسية في حين أن اليونيب هي الوكالة المنسقة لكل من الدراستين.[4] وترد دراستي الجدوى للتبريد القطاعي في المرفقين الأول والثاني، على التوالي، من هذه الوثيقة.

[2] قررت الأطراف في بروتوكول مونتريال في جملة أمور "أن تطلب من اللجنة التنفيذية للصندوق المتعدد الأطراف أن تنظر في تقديم تمويل إضافي لإجراء جردات أو دراسات استقصائية بشأن البدائل للمواد المستنفدة للأوزون في الأطراف المهتمة العاملة بمقتضى الفقرة 1 من المادة 5 بناءً على طلبها.

[3] الوثيقة UNEP/OzL.Pro/ExCom/75/30.

[4] عنصر اليونيب موجود في التعديلات على برنامج عمل اليونيب لعام 2015 (الوثيقة UNEP/OzL.Pro/ExCom/75/30).

17- بالنسبة لمصر، ستركز دراسة الجدوى على ربط إمكانية استخدام التبريد القطاعي في القاهرة الجديدة التي يتم تصميمه حالياً. ومن المتوقع أن تشمل العاصمة الجديدة 663 مستشفى وعيادة وأكثر من مليون منزل لحوالى خمسة ملايين مقيم، بالإضافة إلى مطار دولي. وفي المستقبل، سيتم نقل مجلس النواب والوزارات الحكومية والسفارات الأجنبية إلى هذه المدينة. وستركز الدراسة على قطاع واحد للعاصمة الجديدة، على أن يتم اختياره قبل الدراسة، وستشمل حوالى 21 قطاع سكني وغير سكني.

18- وستحاكي الدراسة ملف حمل التبريد الديناميكي من خلال القطاع المختار. وسيجري النظر في تصميم ومحاكاة وتحسين مدخلات الطاقة المتعددة التي تعمل بالغاز الطبيعي ومصدر للطاقة الحرارية الشمسية ومسرب حراري للمياه العذبة.

19- وفي ما يلي النتائج المتوقعة من دراسة الجدوى في مصر :

(أ) تحديد تكنولوجيا قطاع التبريد الأكثر ملاءمة : وحدة تبريد تعمل بالغاز الطبيعي الهجين أو الحرارة الشمية ؛

(ب) تحديد مصادر الطاقة المتجددة وآليات توفير الطاقة والمنافع البيئية والحواجز القانونية لتنفيذها ؛

(ج) وضع هيكل مالي ونظام مالي لكل من آليات التمويل المشترك الخاصة بالحكومة (بما في ذلك إمكانية خفض دعم الطاقة) للشركات الخاصة التي تزود الطاقة من شأنهما التشجيع على اعتماد التبريد القطاعي في المنطقة المستهدفة ؛ و

(د) إكمال مقترح كامل لنظام تبريد قطاعي في القاهرة الجديدة، يسّلط الضوء على استراتيجية التنفيذية والحوافز المالية وعمليات التقييم.

20- وفي ما يخص الكويت، ستركّز دراسة الجدوى على إجراء تحليل مقارن كامل لثلاثة تكنولوجيات من غير نوعها : تبريد أخضر باستخدام مياه قاع البحار وامتصاص الحرارة المهدورة ونظم امتصاص الماء المبرد باستخدام الطاقة الشمسية، لتحديد الخيار الأفضل لنظم تكييف الهواء المركزي.

21- وسيتم تنفيذ الأنشطة التالية :

(أ) مراجعة مطبوعة بشأن الوضع الحالي للتبريد الأخضر باستخدام مياه قاع البحار وامتصاص الحرارة المهدورة ونظم امتصاص المياه المبردة باستخدام الطاقة الشمسية ؛

(ب) تحليل لمصادر الطاقة المتجددة والحواجز القانونية وآليات توفير الطاقة والمنافع البيئية ؛

(ج) وضع هيكل مالي ونظام مالي لكل من آليات التمويل المشترك الخاصة بالحكومة (بما في ذلك إمكانية خفض دعم الطاقة) ومزودي الطاقة من القطاع الخاص.

22- تبلغ التكلفة الإجمالية لكل من الدراستين 90,744 دولار أمريكي زائد تكاليف دعم الوكالة، التي تتألف من مبلغ 63,521 دولار أمريكي، زائد تكاليف دعم الوكالة بقيمة 5,717 لليونيدو، و 27,223 دولار أمريكي، زائد تكاليف دعم الوكالة بقيمة 3,539 دولار أمريكي لليونيب.

تعليقات الأمانة

23- أعادت اليونيدو تقديم دراستي الجدوى تماشياً مع المقرر 29/74. وبعد الاجتماع الرابع والسبعين، أثارت الأمانة عدداً من المسائل المتصلة بدراستي التبريد القطاعي[5] وقد تمت معالجة هذه المسائل بشكل كامل من قبل اليونيدو واليونيب في مقترح المشروع المعاد تقديمه.

توصية الأمانة

24- قد ترغب اللجنة التنفيذية في أن:

(أ) تنظر في دراستي الجدوى لإعداد نموذج عمل للتبريد القطاعي في مصر، والتحليل المقارن لثلاثة تكنولوجيات من غير نوعها لتكييف الهواء المركزي في الكويت، كما هو موضح أعلاه وفي الوثيقة بشأن لمحة عامة عن المسائل المحددة خلال مراجعة المشروع (الوثيقة UNEP/OzL.Pro/ExCom/75/27)، في سياق مناقشتها حول المقترحات لمشروعات تدليلية للبدائل ذات إمكانية الاحترار العالمي المنخفضة للمواد الهيدروكلوروفلوروكربونية ؛

(ب) إقرار عنصر اليونيدو لدراستي الجدوى المذكورتين في الفقرة الفرعية (أ) أعلاه، كل منهما بقيمة 63,521 دولار أمريكي، زائد تكاليف دعم الوكالة بقيمة 5,717 دولار أمريكي، في حال اختارت اللجنة التنفيذية هاتين الدراستين.

[5] المرفق الثاني للوثيقة UNEP/OzL.Pro/ExCom/74/13.

Annex I

PROJECT COVER SHEET

PROJECT TYPE TITLE	Feasibility Study District Cooling in Egypt - New Capital (Cairo)
COUNTRY NAME	The Arab Republic of Egypt
LEAD IMPLEMENTING AGENCY	UNIDO
COOPERATING IMPLEMENTING AGENCY	UNEP
NATIONAL COUNTERPART	National Ozone Unit / the Egyptian Environmental Affairs Agency
SECTOR	Air-Conditioning
SUB-SECTOR	Central Air-Conditioning (CAC)
PROJECT STAKEHOLDERS	- Ministry of Planning - General Authority for Investment - Housing & Building National Research Centre (HBNRC) - New & Renewable Energy Authority (NREA) - Energy Research Centre at Cairo University - Egyptian Organization For standardization & Quality - Egypt ASHRAE Chapter
PROJECT COSTS	$ 90,744
MLF REQUESTED FUNDING	$ 100,000
UNIDO FUNDING ALLOCATION	$ 63,521
UNIDO SUPPORT COSTS @ 9%	$ 5,717
UNEP FUNDING ALLOCATION	$ 27,223
UNEP SUPPORT COSTS @ 13%	$ 3,539
TOTAL PROJECT COSTS	$ 100,000
PROJECT DURATION	12 Months

PROJECT SUMMARY

The feasibility study objective is to provide a detailed technical, financial as well as environmental and energy assessment / road map for the government of Egypt, in the development of district cooling systems.
The focus of the feasibility study will be undertaken in connection to the establishment of the New Cairo Capital currently under design. The feasibility study will focus on one district of The new capital (to be selected), which in total will have a span of 700sq km and have 21 residential districts and 25 dedicated districts. Within the new capital there will be 663 hospitals and clinics, 1.1m homes hosting at least 5 million residents and 1 international airport. Furthermore, the new capital will foster the relocation of parliament, governmental ministries and foreign embassies.

The deliverables of the feasibility study are:

1. Assessment of the most suitable district cooling technology,
2. Assessment of renewable energy sources,
3. Assessment of legalization barriers,
4. Assessment of energy saving mechanisms,
5. Assessment of environmental benefits
6. Development a financial structure and financial scheme for both, governmental co-financing mechanisms, including the possibility of reducing energy subsidies and for private energy providing companies.
7. Develop a draft project proposal for district cooling system in the New Cairo Capital, highlighting implementation strategy, financial incentives and the direct assessments listed under points 1 to 6 shown above.

Contents

The Need of District Cooling in Egypt

Power consumption has been increasing in Egypt due to the increase in population, urbanization and industrialization. Power conservation and management have been investigated by many researchers in Egypt in order to meet the high and increasing demand of electricity. Different measures have been proposed in different sectors in order to conserve the energy consumption. In Egypt approximately 50 % of the total power consumption relates to air-conditioning and refrigeration during summer time. Hence, improving the performance of A/C units has been a subject for investigation; however due to lack of a centralized coordination the overall improvement has been hindered. Hence, Egypt needs urgently assistance and advice on energy conservation; and district cooling is one of the solutions especially for newly established cities or for large residential compounds.

Whereas district heating is very common, distributed energy (heating and/or cooling) is now being implemented with very good results in terms of energy savings. District cooling can provide a reduction in energy consumption as high as 40 %, compared to individual and stand-alone A/C installations. Also, district cooling gives the opportunity of thermal storages, which will allow for operation during low electricity demand periods (night). In addition, district cooling systems have a longer lifespan than stand-alone A/C units and are more reliable and easier to maintain.

Within the implementation of the High-Ambient testing project PRAHA, by UNEP and UNIDO, a specialized symposium for the potentialities of District Cooling systems to reduce dependency on HCFC and high-GWP alternatives was organized in Kuwait in May-2014. The event that gathered key-experts from the region and worldwide concluded and emphasized the important role of District Cooling industry in reducing domestic energy demand for A/C applications plus promoting long-term alternative technologies. The event also concluded that there are shortages of the specialized focused studies in this regards that can deeply investigate options, suggest solutions and recommend policy measures.

Egypt is also keen to maximize the benefit of using DC applications in different aspects of life due to the increasing demand on domestic energy demand as well as the great potentials to use natural resources, speciallyespecially natural gas, for deploying non-conventional A/C systems. Accordingly, Egypt is the first country in the region started drafting a National Code for District Cooling which is palmed to be enacted in 2016 and currently under development by local team of experts led by the Ministry of Housing. Similar efforts offered, lately, by the Egyptian Standardization Authority by introducing new MEPS (Minimum Energy Efficiency Standard) for A/C applications with a plan to update is every 3 years to ensure enhancing the performance of A/C systems with the increase of demand due to population increase plus the new ambitious development plans both residential and commercial sectors. The new Capital and the new Suez Canal will impose many new mega projects with huge potential for DC and invocative ideas to be introduced.

Project Impact

On behalf of The Government of Egypt, UNIDO and UNEP are requesting Project Funds to undertake a comprehensive feasibility study to assess potential for district cooling in the New Cairo Capital and provide technical and economical evidence to be disseminated to government officials as well as private investors; with the overall aim – in case of a positive outcome of the study – to include district cooling in the planning of the New Cairo Capital.

In line with the commitment of UNIDO and UNEP is to assist the Government Egypt in phasing-out ozone depleting substances while providing additional benefits both for the climate and energy sectors.

The proposed feasibility study supports the efforts of the Government of Egypt and complements its activities under the HPMP. Further, it provides crucial technical assistance and capacity building measures assuring the country's compliance with obligations under the MP. At the same time it makes an important contribution to the ongoing efforts towards:

- Mitigation of climate change by reducing greenhouse gas (GHG) emission into the atmosphere; and
- Achieving energy efficiency and reduce dependency on A/C applications that consumes high energy.

Project Objective

The focus of the feasibility study will be undertaken in connection to the establishment of the New Cairo Capital currently under design. The feasibility study will focus on one district of the new capital (to be selected).

The new capital will have a span of 700sq km and have 21 residential districts and 25 "dedicated districts. Within the new capital there will be 663 hospitals and clinics, 1.1m homes hosting at least 5 million residents and 1 international airport. Furthermore, the new capital will foster the relocation of parliament, governmental ministries and foreign embassies.

The main objective of the feasibility study will be to module and simulate centralized district cooling system with a hybrid solar and gas thermal driven absorption chiller. The hybrid system is considered very suitable for Egypt. The study will produce a detailed technical, financial as well as environmental and energy assessment / road map for the government of Egypt, in the development of district cooling systems and aims at – in case of a positive outcome – to be included in the planning of the New Cairo Capital.

Project Deliverables

The deliverables of the feasibility study are summarized below:

1. Conduct a literature review to identify the current status of district cooling technologies with hybrid natural gas and solar assisted heat driven chiller,
2. To approximate and simulate the detail dynamic cooling loads profile of one district of the New Capital Cairo area,
3. Conceptualize, design, simulate and optimize multiple energy inputs integrated centralized district cooling system powered by natural gas, solar thermal as energy source and fresh water as heat sink,
4. Assessment of renewable energy sources,
5. Assessment of legalization barriers,
6. Assessment of energy saving mechanisms,
7. Assessment of environmental benefits,

8. Development of a financial structure and financial scheme for both, governmental co-financing mechanisms, including the possibility of reducing energy subsidies and for private energy providing companies,
9. Develop a draft project proposal for district cooling system in the New Cairo Capital, highlighting implementation strategy and financial incentives.

Feasibility Study Methodology

District cooling is an essential utility for sustainable economic and urban development. District cooling has been a commercial alternative to traditional A/C and refrigeration technologies since the mid-90s. Various definitions, classifications and applications of district cooling and heating are discussed and implemented including elements of a district energy system, which are widely available in Europe. District cooling is a superior alternative to conventional air conditioning as it helps reduce energy consumption and costs to both customers and governments alike, while also protecting the environment by cutting carbon dioxide emissions. Some of the advantages district cooling has over traditional air conditioning include:

- 40% less energy consumption
- Decreases energy costs, whilst it is noted that initial capital investment is higher, however, in the long run the investment costs are covered and financial gains are made.
- Annual maintenance costs are substantially lower
- Can store up to 30% of potential output by holding chilled water in reserve, therefore easily meeting demands in seasonal variations
- Equipment needs to be replaced only every 30 years – as compared to 15 years for traditional air conditioning
- Greater reliability due to the high standard, industrial equipment utilized and back-up chillers on stand-by
- Protects the environment by reducing CO2 emissions due to lower energy consumption
- District cooling systems are remotely located and therefore enhance real estate value by freeing up space for other uses
- Phase-out of refrigerants HCFC, less refrigerant is needed for the same end-user demand for cooling comfort.

Solar Renewable Energy

The primary source of all renewable energies except geothermal energy is solar radiation. Solar energy is mainly harvested in two ways. It can be converted into either heat or electricity. Converting solar energy into heat is possible by using solar thermal energy technologies. Converting solar energy directly to electivity is achievable by using photovoltaic cells.

In solar thermal systems there are several advantages (European Solar Thermal Industry Federation, ESTIF, 2006)

- Reduces the dependency on imported fuels
- Saves natural resources
- Save CO2 emission

- Curbs urban air pollution
- Is immediately available
- Creates local jobs
- Inexhaustible

The feasibility study will emphasize district cooling by using hybrid solar and gas thermal driven absorption chiller, as will be illustrated in the study's literature review.

Refrigeration System

Refrigeration systems can be categorized into two types to the energy type that are used as energy inputs.

- Electrically driven refrigeration systems
- Thermally driven refrigeration system

Due to the electricity constrains on Egypt, as described in Annex 2 the feasibility study will focus hybrid solar and gas thermal driven absorption chiller.

Solar Thermally Driven Refrigeration Cycle

Thermal driven cooling systems are usually feasible when a low temperature and / or cost efficient heat sources are available. In general, solar energy is the most widely available heat source for solar driven cooling applications. There are four major solar thermal driven cooling systems, these are absorption, adsorption, desiccant and ejector cooling system. Analysis's indicates that absorption systems have a comparatively higher COP than other technologies. The feasibility study will undertake that analyses and conclude on the most suitable solar driven cooling system to be recommended for this site.

Absorption Cooling System

Absorption cooling system dates back to the 1700s, and the first ammonia-water refrigeration system was patented by Fredinand Carre in 1859.

The main difference of the absorption refrigeration cycle from the vapour compression cycle is the replacement of the compressor with a thermally driven absorption mechanism. The absorption cooling system consists of an absorber, pump, regenerator, generator, expansion valve, condenser and evaporator. The working fluid of the absorption refrigeration cycle is a solution of two or more fluids. Usually lithium bromide – water or ammonia – water is used.

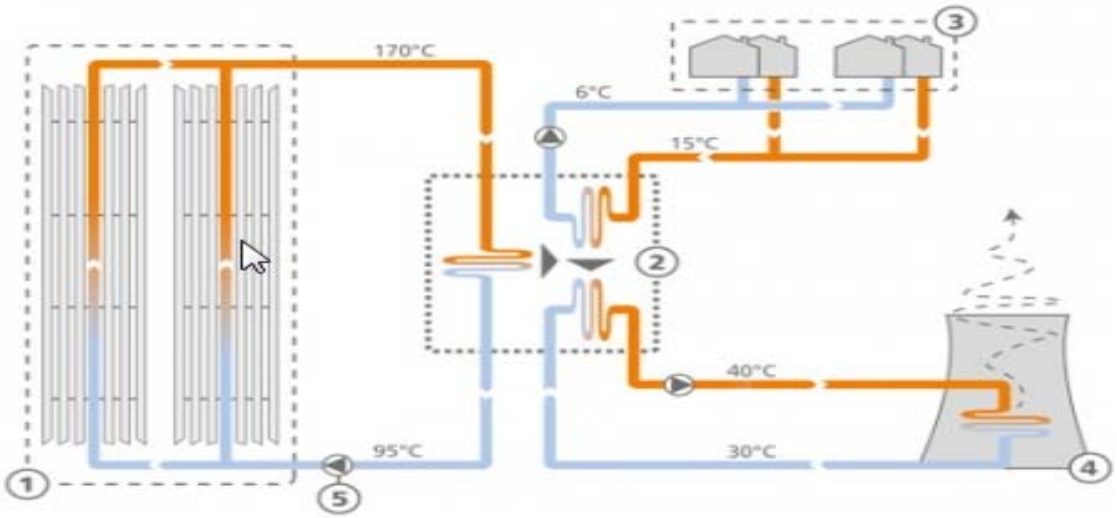
In ammonia – water system water is the absorbent and ammonia is the refrigerant. Since the freezing point of ammonia is -77c the system is possible to use for the low temperature applications. In the case of lithium bromide – water, the absorbent is lithium bromide and water is the refrigerant. The lithium bromide – water cycle are widely used in air conditioning applications since it has a freezing point of 0c.

There are three types of lithium bromide – water absorption refrigeration cycles available namely single effect, double effect and triple effect. Single and double effect refrigeration cycles are commercially available whilst triple effect is currently under research and is not available commercially available.

The feasibility study will analyze the most suitable fluid. Furthermore and detailed analyzes is to be provided in the case if lithium bromide – water is to be recommended, between single and double effect absorption refrigeration cycles.

Designing of Solar Assisted District Cooling System

The feasibility study will develop a draft modeling of the solar assisted district cooling system. The design should include both single and double effect if lithium bromide – water system is recommended in order to analyze separately and to identify most suitable configuration. In each case consideration have to be in cooperated include option of hybrid solar and gas thermal driven absorption chiller. Fresh water condensers heat rejection technology options are considered for the configuration.



1. Solar Field
2. Absorption Chiller
3. District Cooling
4. Cooling Tower
5. Circulation Pump

The increasing requirement for cooling can be produced most economically by district cooling systems with a correspondingly large solar field. The cooling energy is carried to the respective consumers in transmission line networks. District cooling systems are becoming the popular choice in high temperature locations including the Middle East. Novatec Solar's system provides the sustainable solution to the district cooling and refrigeration demands of these regions.

Assessment of Financial impact

The feasibility study will undertake a financial assessment on the total costs related to the development of a solar district cooling system, to cover the area of one district in the New Capital Cairo area. The assessment should include but not be limited to:

- All Capital costs, excluding land
- Labor costs
- Investment / Returns
- Energy Saving
- Maintenance and repair costs
- Distribution Costs
- Revenue Scenarios

- Possible Investors

Assessment of the Infrastructure and Regulatory Framework

The feasibility study will cover a full analysis on Infrastructure and Regulatory Framework, which will include:

- Current and future energy labelling programs or building codes that likely to be enforced within the country strategic development plan and its implication to the selection of technologies.
- Applicability to market specific needs:

a. Types of buildings/establishments i.e. residential, government, public, commercial, etc.
b. Infrastructure required to promote particular options (e.g. district cooling, absorption systems, others)

- National relevant institutional framework needed promote new technologies including policies, regulations and standards/codes.
- Potential incentives and disincentives measures that can be adopted for promoting the outcomes of the study
- Relevant standards and guidelines that need to be considered to each type of alternative technology(s) that will be offered by the study.
- Technical capacities needed to introduce new technologies including educational, training, specialized awareness.

Partners and Stake Holders

The studies intend to involve key governmental, research and industry partners Egypt. In order to ensure that inputs from all relevant stakeholders are incorporated and that the outcomes will be acceptable/implementable.

For Egypt, the following stakeholders are considered for direct and indirect involvement in the project:

- Ministry of Planning
- General Authority for Investment
- Housing & Building National Research Centre (HBNRC)
- New & Renewable Energy Authority (NREA)
- Energy Research Centre at Cairo University
- Egyptian Organization For standardization & Quality
- Egypt ASHRAE Chapter

Dissemination of Results

The results of the final assessment of the feasibility study will be presented in a three-way approach:

- A high level coordination meeting with the ministries of Urban Planning, Environment, Energy, Trade and Finance.

- A stakeholder coordination meeting, with project developers, main energy suppliers companies, and appropriate associations, and development banks.
- A publication of the assessment will be developed and circulated through the ministries of energy, environment and urban planning.

Feasibility Study Budget

Description	Activities	Responsible agency	Costs in (USD)
International Expert	1. Conduct a literature review to identify the current status of district cooling technologies with hybrid natural gas and solar assisted heat driven chiller. 2. To approximate and simulate the detail dynamic cooling loads profile of one district of the New Capital Cairo area. 3. Conceptualize, design, simulate and optimize multiple energy inputs integrated centralized district cooling system powered by natural gas, solar thermal as energy source and fresh water as heat sink. 4. Develop a financial structure and financial scheme for both, Governmental Co-financing mechanisms, including the possibility of reducing energy subsidies and for private energy providing companies, 5. Develop a draft project proposal for district cooling system in the "New capital, Cairo", highlighting implementation strategy, financial incentives.	UNIDO	30,000
National Consultation Meetings and a consultancy service by a regional expert	Legalization Barriers	UNEP	27,223
	Development terms of reference for comprehensively assessing the governmental Co-financing mechanism, including the possibility of reducing energy subsidies		
Preparation and Dissemination of final Feasibility Study	Develop through lesson learned a check-list	UNDIO	10,000
	Dissemination of final feasibility study		

Technical Assistance	Technical Assistance Through expert group meeting/workshop, to present feasibility study and its results and recommendation	UNIDO	23,521
Total			**90,744**

Feasibility Study Time Table

Description	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Hiring International Expert for the project	X											
Initial Consultation to: - Set the work-plan - Agree of criteria for technology assessment - Formulate working teams	X	X										
Conduct a literature review to identify the current status of district cooling technologies with hybrid natural gas and solar assisted heat driven chiller		X	X	X	X							
Conceptualize, design, simulate and optimize multiple energy inputs integrated centralized district cooling system powered by natural gas, solar thermal as energy source and fresh water as heat sink,					X	X	X					
Assessment of Financial impact of the suitable Technologies					X	X	X					
Assessment of the Infrastructure and Regulatory Framework						X	X	X				
Designing of Solar Assisted District Cooling System							X	X	X			
Development of the Draft Report									X	X		
Final Consultation Meetings										X	X	
Final Report development										X	X	
Dessimination of results to governmental partners and different stakeholders											X	X

Annex 1. Background

The Montreal Protocol on Substances that Deplete the Ozone Layer (MP) was adopted in 1987 to phase-out Ozone Depleting Substances (ODSs) as a result of the agreement established under the Vienna Convention for the protection of the environment from adverse effects of ozone depletion. To date, the MP has been effective and successful in reducing the impact of human activities on the global environment and therefore described as one of the most successful environmental treaty.

One of the reasons for this success is the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) that, since 1991, provides financial assistance to Article 5 countries, or developing countries, to help achieve their phase-out obligations under the MP. Since 1992, UNIDO, as one of the implementing agencies of the Montreal Protocol, assists countries in developing and implementing projects with the aim to phase-out ODSs. So far, UNIDO has implemented over 1217 projects, which contributed to the phase out of 70,287 Ozone Depleting Potential tones (ODPt) of the world's total consumption of ODSs.

In September 2007, the Parties to the MP took a historical decision to accelerate the phase-out of Hydrofluorochlorocarbons (HCFCs)[1], ODSs used as interim substitutes to Chlorofluorocarbons (CFCs). While phasing-out HCFCs, the Parties agreed to promote the selection and adoption of alternatives that have low impact on the environment, in particular, on climate, and that meet other health, safety and economic standards. Therefore, the Executive Committee of the MLF (ExCom), when developing and applying funding criteria for the HCFC phase-out strategy, gives priority to alternatives that have low Global Warming Potential (GWP) and that are able to ensure energy efficiency.

Since 1993, UNIDO has been assisting the Government of Egypt, through the Egyptian Environmental Affairs Agency (EEAA), to comply with its commitments as signatory party of the Montreal Protocol carrying out projects that aim to phase-out ODSs in various industrial sectors and, at the same time, to improve their economic and environmental performance. UNIDO is currently engaged with the Government of Egypt in the implementation of the 1st Stage of the HCFC Phase-out Management Plan (HPMP) and in the preparation of the strategy for its 2nd Stage.

Meanwhile, given the importance of inclusive and sustainable industrial development, UNIDO seeks opportunities to go beyond the MLF funded activities and create linkages to expand the scope of Montreal Protocol projects in Egypt. Despite the Egypt's on-going efforts and success in phasing-out ozone depleting substances, there are other challenges and environmental issues that could be tackled at the same time.

[1] Decision XIX/6

Annex 2. Energy Sector Overview

Egypt has been depending on oil imports since 2008 to meet its domestic energy demand: Egypt's total oil production averaged 660,000 (bbl/d), of which approximately, 540,000 bbl/d was crude oil. Crude oil production continues to decline. At the same time, new natural gas field production came on stream. Egypt oil consumption is estimated to be 710,000 bbl/d.

Egypt had a total installed electricity generating capacity of 23.4 GW in 2008, according to EIA data. 20.3 GW was conventional thermal generation capacity, 2.8 hydroelectric and 0.3 GW of almost 88% of the total generated electricity in Egypt still origins from fossil sources, a rate which is set to increase in the future due to continuing high rates of demand growth.

The Egyptian electrification rate is 99.4%, according to the International Energy Agency (IEA); this rate is among the highest in Africa. However, ageing infrastructure and rising demand have led to intermittent blackouts mainly associated with the high cooling demands during the summer months.

According to the African Development Bank (AfDB), Egypt's total primary energy demand has grown at an average annual rate of 4.6% during the last two decades. In order to meet the increasing energy needs, mainly thermal power plants have been built. As a result, Egypt ranks among the 11 countries in the world showing fastest growing GHG emissions according to the AfDB.

Industry is the most significant energy-consuming sector in Egypt. The sector is expected to further grow due to high demand and rapid expansion of industrial production. The energy productivity in Egyptian industry is way below the international average, where the energy consumption per unit of output in Egyptian industries is 10 to 50% higher in Egypt compared to the international average. Other users including commercial sector (hotels, offices, shopping malls, etc.) and residential buildings are also excessively growing and consuming more and more energy particularly for air conditioning and water heating, etc. Industrial process, large buildings and tourism facilities are typical major users of electricity for air conditioning and heating purposes.

According to the Minister of Electricity and Energy, air conditioning consumers around 50% of the maximum productive capacity of power stations and that the number of air conditioning units have risen from 700,000 in 2006 to over 3 million in 2010. In winter a comparable percentage is used for heating purposes especially in the commercial sector. Therefore rational use of energy and deployment of renewable energy technologies for cooling and heating purposes in these two sectors would contribute to moderate the growing demand for energy in Egypt and reduce the GHG emissions resulting from these activities.

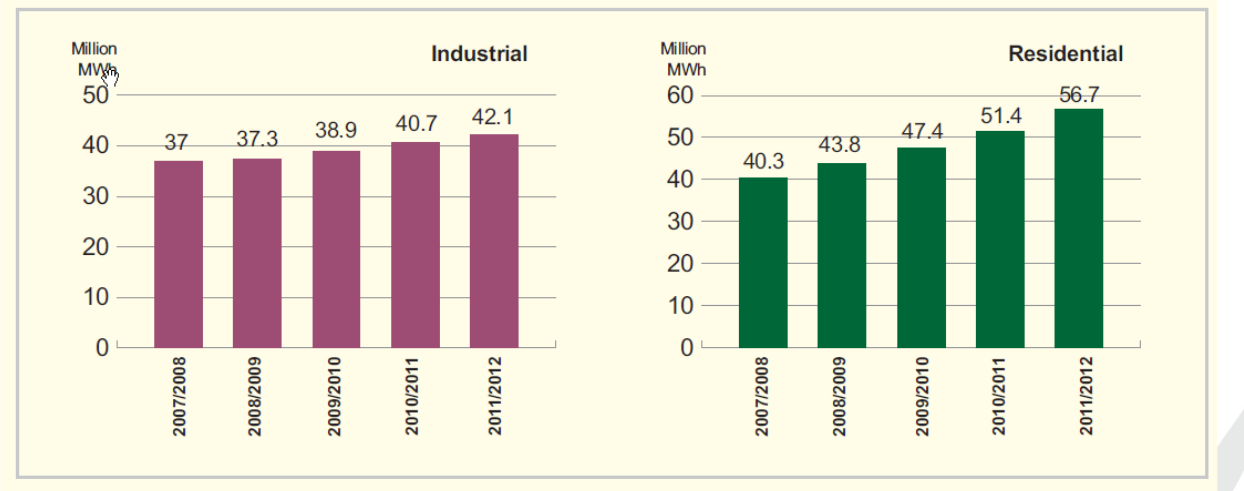
Egypt is a rich country with renewable sources. These sources include; wind, solar and biomass. Atlases for both wind and solar energies have been developed. Two thirds of the country's area has a solar energy intensity more than 6.4 kWh/m2 day, between 2000 kWh/m2/y at the north and 3200 kWh/m2/y at the south with an economic potential 73656 TWh/Y. Duration of sun shine ranges between 9-11 h/day from north to south, with very few cloudy days. Wind speed approaches 10 m/sec and higher in some areas especially around the Red sea coast with 8 to 10 m/s in average in the Suez Gulf Zone. So far mainly hydropower facilities have been developed and it is believed that the most cost effective hydro sites have already been exploited. Consequently, solar and wind energy have to be used as clean and indigenously available energy in order to support Egypt's economic growth and increasing energy demand. Otherwise

these energy needs will be met by building conventional energy based- facilities. The tables below highlight the distribution of sold electric energy by purpose of use covering the period of (04/05-11/12).

"Unit: G.W/H"

Item	12/11	11/10	10/09	09/08	08/07	07/06	06/05	05/04
Total	**135 592**	**126 654**	**119 916**	**112 617**	**107 226**	**98 812**	**92 859**	**85 781**
Industry	42 098	40 702	38 916	37 273	37 045	34 569	32 701	30 284
Agriculture	5 560	4 927	4 834	4 617	4 209	3 789	3 719	3 460
Utilities &Public Lighting	12 547	11 945	12 605	11 696	11 139	10 881	10 695	9 930
Governmental authorities	6 385	5 977	5 443	5 563	5 691	5 562	5 054	4 710
Houses &Housing Companies	56 664	51 370	47 431	43 811	40 271	36 596	33 900	31 311
Shops and others	10 715	10 238	9 674	8 754	8 240	7 046	6 016	5 393
Total	**133 969**	**125 159**	**118 903**	**111 714**	**106 595**	**98 443**	**92 085**	**85 088**
Percentage distribution								
Industry	31.4	32.5	32.7	33.4	34.8	35.1	35.5	35.6
Agriculture	4.2	3.9	4.1	4.1	3.9	3.8	4.0	4.1
Utilities &Public Lighting	9.4	9.5	10.6	10.5	10.4	11.1	11.6	11.7
Governmental authorities	4.8	4.8	4.6	5.0	5.3	5.6	5.5	5.5
Houses & Housing Companies	42.3	41.0	39.9	39.2	37.8	37.2	36.8	36.8
Shops and others	8.0	8.2	8.1	7.8	7.7	7.2	6.5	6.3
%	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Sales of linking countries[1] and BOOT	**1 623**	**1 495**	**1 013**	**903**	**631**	**369**	**774**	**693**
%	**1.2**	**1.2**	**0.8**	**0.8**	**0.6**	**0.4**	**0.8**	**0.8**

The considerable growth in the housing loads in comparison with industry is due to the expansion of residential compounds and new communities in addition to widespread use of domestic appliance especially air conditioners. It is further estimated that within the housing sector 50% of the energy consumption is directly linking to Air conditioning.



Electricity Is Heavily Subsided

Subsidies have been enabled most people in Egypt to be able to afford electricity. The country's electrification rate is 99%. Electricity tariffs in Egypt are subsidised both at the end-user level and for fuel input to power production. In the fiscal year 2009/10, subsidies for electricity were 7.5 Billion Egyptian Pounds (EGP) not including the underlying fuel subsidy, and EGP 16.5 with the fuel subsidy. Tariffs were unchanged from the early 1990's to 2003 and actually decreased due to inflation during these periods averaging around 6.9% per year. However, demand has grown and costs have increased, and Egypt needs to address different options to provide the required level of power with a reduction to their subsidies.

Annex II

PROJECT COVER SHEET

PROJECT TYPE TITLE	Comparative analysis of 3 not-in-kind technologies for use in central AC in Kuwait
COUNTRY NAME	State of Kuwait
LEAD IMPLEMENTING AGENCY	UNIDO
COOPERATING IMPLEMENTING AGENCY	UNEP
NATIONAL COUNTERPART	National Ozone Unit at Environment Public Authority of Kuwait
SECTOR	Air-Conditioning
SUB-SECTOR	Central Air-Conditioning (CAC)
PROJECT STAKEHOLDERS	• General Secretariat of the Supreme council for Planning and Development • Kuwait Institute for Scientific Research (KISR) • Kuwait Foundation for the Advancement of Science (KFAS) • Kuwait University • Ministry of Electricity & Water • Local Consulting firms and companies
PROJECT COSTS	$ 90,744
MLF REQUESTED FUNDING	$ 100,000
UNIDO FUNDING ALLOCATION	$ 63,521
UNIDO SUPPORT COSTS @ 9%	$ 5,717
UNEP FUNDING ALLOCATION	$ 27,223
UNEP SUPPORT COSTS @ 13%	$ 3,539
TOTAL PROJECT COSTS	$ 100,000
PROJECT DURATION	12 Months

PROJECT SUMMARY

The feasibility study objective is to provide a detailed technical, financial as well as environmental and energy assessment / road map for the government of Kuwait, in the development of Central A/C systems.

The focus of the feasibility study will be a full comparative analysis of three not-in-kind technologies namely Deep Sea Water free cooling, Waste heat absorption and Solar assisted chilled water absorption systems; being considered the most promising for Kuwait

.

The deliverables of the feasibility study will be:

1. Assessment of the most suitable not-in-kind technology for Central AC systems
2. Assessment of available renewable energy sources,
3. Assessment of legalization barriers,
4. Assessment of energy saving mechanisms,
5. Assessment of environmental benefits
6. Development of a financial structure and financial scheme for both, governmental co-financing mechanisms, including the possibility of providing incentives for private companies.

Contents

The Need of Central A/C in Kuwait

Electricity sector

Kuwait's electric sector capacity has been slow to expand despite rapidly rising consumption rates over the past decade and persistent power shortages during peak demand periods. In this respect, the Gulf Cooperation Council is developing an interconnected power grid to meet the increasing electricity demand.

Kuwait relies on fossil fuels, namely oil and natural gas, to generate its electricity. The country struggles to produce and import sufficient natural gas to meet peak electricity demand in the summer months, and as a result, depends on more expensive and heavy fuel oil and crude oil. In 2011, oil accounted for more than 70% of Kuwait's power generation in 2011, while natural gas made up about 28.

Power-plants with capacity of 15.7 gigawatts (GW) have been installed with a 44% efficiency factor, resulting in an average output of nearly 7 GW. Peak demand in 2013 was 12.1 GW and has been increasing each year since 2004. The rate of growth of power generation capacity is not keeping pace with the rate of growth in demand which has averaged around 5% annually over the past decade.

Kuwait's increasing population and gross domestic product levels and low electricity tariffs over the past decade have led to higher demand in the residential sector. According to the World Bank, Kuwait was the world's fourth-largest electricity consumer on a per capita basis in 2011. In the past decade, the development of Kuwait's electricity sector has stalled because of political factors and a lack of investment. The country is perpetually in a state of electricity shortage and experiences frequent blackouts and brownouts each summer.

Electricity subsidies

The government of Kuwait provides these basic utilities at a very low cost. Historically, the price of electricity had some links with the cost of production, but this link has been broken, and rather than raising electricity prices, the government has reduced them over time. Since 1966 the government set the price at 2 fils/kWh (0.7 US cents) for ordinary consumers and 1 fils/kWh (0.35 US cents) for industrial companies, very low even by regional standards. This tariff structure is still in force today, though for chalets/villas, the price of electricity has been raised to 10 fils/kwh (3.5 US cents).

Due to these low prices, there is a wide gap between production costs and the selling prices of electricity. In the early 1980s, the average cost of electricity production was estimated at 26 fils/kWh, while the price, as above mentioned was administratively set at 1–2 fils/kWh (Al-Qudsi and Al-Shatti, 1987). However, the government over the last few years started to study new policies and measures that can free, even partially, the cost of energy and start applying smart plans that can motivate the different consuming sectors to use best energy saving practices and equipment.

Project Impact

On behalf of The Government of Kuwait, UNIDO and UNEP are requesting Project Funds to undertake a comprehensive feasibility study to do a comparative analysis of three not-in-kind technologies; considered most promising for Kuwait, to be applied in central AC, and potential DC technical and economical evidence to be disseminated to government officials as well as private investors; with the aim of facilitating employment of one or more of the studied technologies in future investment programs in Kuwait.

The overall objective of UNIDO and UNEP with this initiative is to assist the Government of Kuwait in phasing-out ozone depleting substances while providing additional benefits both for the climate and energy sectors by leapfrogging the use of high GWP-options and/or conventional technologies.

The proposed methodology supports the efforts of the Government of Kuwait and complements the activities under their HPMP's. Further, it provides crucial technical assistance and capacity building measures assuring the countries compliance with obligations under the MP. At the same time it makes an important contribution to the on-going efforts towards Mitigation of climate change by reducing greenhouse gas (GHG) emission into the atmosphere and Achieving energy efficiency.

Project Objective

The focus of the feasibility Study is to comparatively assess three not-in-kind technologies for central AC and DC; and provide technical and economical evidence to be disseminated to government officials as well as private investors. This feasibility study will address:

- Use of not-in-kind technologies
- Central A/C technology options;
- Legalization Barriers;
- Energy saving mechanisms;
- Governmental co-financing mechanisms, including the possibility of .

Project Deliverables

The deliverables of the feasibility study are summarized below:

1. Conduct a literature review to identify the current status of not-in-kind technologies for central A/C, and potential DC plants, considered to be most promising for Kuwait; namely
    I. Deep Sea Water free cooling,
    II. Waste heat absorption, and
    III. Solar assisted chilled water absorption systems

2. Assessment of available renewable energy sources,
3. Assessment of legalization barriers,
4. Assessment of energy saving mechanisms and governmental incentive tools,
5. Assessment of environmental benefits,

6. Development of a financial structure and financial scheme for both, governmental co-financing mechanisms, including the possibility of introducing incentive programs for the private companies, with the aim of employing one or more of the studied technologies in future projects.

Feasibility Study Methodology

Central A/C and DC systems are an essential utility for sustainable economic and urban development. Central A/C has been a commercial alternative to traditional A/C and refrigeration technologies since the mid-90s. Various definitions, classifications and applications of Central A/C and DC and heating are discussed and implemented including elements of a district energy system, which are widely available in Europe. Central A/C and DC are superior alternatives to conventional individual air conditioning units as it helps reduce energy consumption and costs to both customers and governments alike, while also protecting the environment by cutting carbon dioxide emissions. Some of the advantages Central A/C and DC has over traditional air conditioning include:

- 40% less energy consumption
- Decreases energy costs, whilst it is noted that initial capital investment is higher, however, in the long run the investment costs are covered and financial gains are made.
- Annual maintenance costs are substantially lower
- Can store up to 30% of potential output by holding chilled water in reserve, therefore easily meeting demands in seasonal variations, or utilizing electricity during low demand periods
- Equipment needs to be replaced only every 30 years – as compared to 15 years for traditional air conditioning
- Greater reliability due to the high standard, industrial equipment utilized and back-up chillers on stand-by
- Protects the environment by reducing CO2 emissions due to lower energy consumption
- Central A/C systems are remotely located and therefore enhance real estate value by freeing up space for other uses
- Phase-out of refrigerants HCFC, less refrigerant is needed for the same end-user demand for cooling comfort.

Central A/C and DC technologies

Distributed energy (heating and/or cooling) has proven to be an effective mean to reduce the overall energy consumption and, despite the fact that the energy distribution systems typically use vapour compression technologies for generating cold water, there are also several non-vapour compression technologies introduced over years in many locations around the world.

The adoption of any technology to widely contribute to the respective sectors relies on many factors:

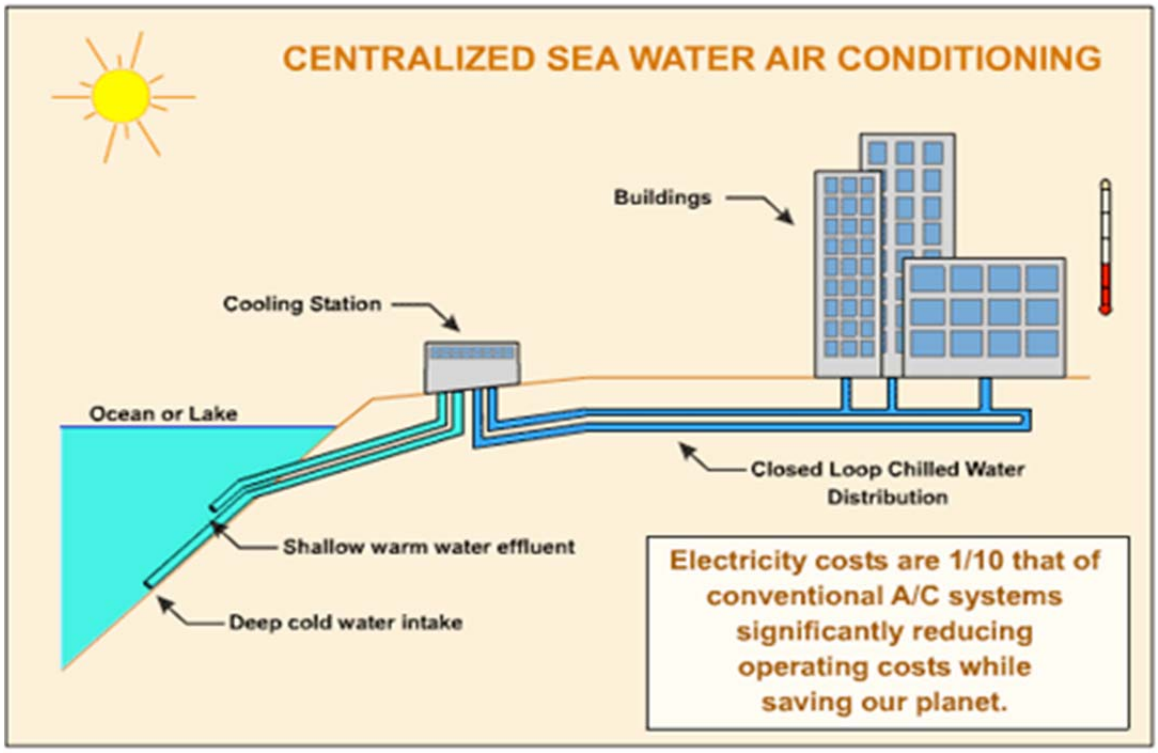
- Economics of the technology (initial and operation) compared to conventional ones;
- Energy Saving;
- Availability of natural and/or renewable resources i.e. Solar, Natural gas, etc.;

- Availability of local/regional technical support and competent service providers;
- Availability of national relevant supporting policies, standards, norms;

Therefore, the feasibility study will seek answers to above elements aiming at making the outcomes of the project feasible and appealing to governments and decision makers of the buildings sector and related energy distribution systems. Accordingly, the project will basically examine the deployment of such technologies and their applicability in Kuwait. Below technologies are considered most promising for Kuwait; and hence will be the focus of the study but others can be also examined during the preparation; if found suitable.

Deep Sea Water Free cooling

Cold seawater air-conditioning is a process in which seawater from the ocean's depths is pumped up to a heat exchanger to handle the cooling load of a large building. Cold seawater air-conditioning can be competitive with more conventional forms of meeting large air conditioning loads such as the use of vapour-compression chiller units. The use of cold seawater air conditioning is most competitive in tropical island areas, where air-conditioning demands are high and the physical distance to cold seawater is at a minimum. This technology is suitable to projects near the sea in locations where the continental reef is relatively steep. In those locations reasonable depths are achievable at distances not too far from shore. The technique uses directional drilling techniques to pump sea water from depths near the sea bottom and use this water to cool a secondary chilled water loop. This technology can achieve saving in operating expenses in excess of 50% when compared to mechanical vapour compression.



Waste heat and absorption technology

One of the primary advantages of distributed electricity generation is the possibility of waste heat recovery, which will lead to the reduction of energy costs and the emissions of greenhouse gases (CO2).

Waste heat obtained from an industrial process can be used to generate steam or hot water. This is achieved by using heat recovery boilers and heat exchangers. Absorption chillers use heat energy instead of mechanical energy to provide refrigeration, so they can be powered by lower cost fuel or waste heat. Heat required for the chiller is typically provided by steam or water from a boiler or combustion turbine, but can also be provided by an integral, direct gas-fired heater. Other energy use occurs in pumping fluids around the process, pumping condenser water, and driving cooling tower fans. Cooling towers are larger with absorption chillers than with electrical chillers because they have to reject the cooling load plus the input heat to drive the process.

Absorption chillers involve a complex cycle of absorbing heat from a driving source to create chilled water. Steam or hot water from a boiler or from a heat recovery unit is used to boil a solution of refrigerant/absorbent, with most systems using water/lithium bromide for chilling and ammonia/water for refrigeration as the working solutions. The absorption chiller then captures the refrigerant vapor from the boiling process, and uses the energy in this fluid to chill water after a series of condensing; evaporating, absorbing steps are performed. This process is essentially a thermal compressor, which replaces the electrical compressor in a conventional vapor compression chiller. In doing so, the electrical requirements are significantly reduced, requiring electricity only to drive the pumps that circulate the solution.

Annual cooling costs are heavily dependent on fuel and electrical costs. Facilities with 1,500 hours per year or more of air conditioning loads, low fuel costs, high peak demand costs, and waste heat sources should consider installing an absorption chiller.

Absorption chillers can be used to reshape the thermal and electric profile of a facility by shifting cooling from an electric load to a thermal load. The shift can be very important for facilities with time-of-day electrical rates or high cooling season rates.

The operating saving obtained by this technique is between 60 and 70 % when compared to a similar capacity mechanical vapour compression system.

Solar assisted chilled water absorption systems

Solar cooling technologies use solar thermal energy provided through solar collectors to power absorption cooling machines. As many cooling applications, such as air conditioning, have a high coincidence with the availability of solar irradiation, the combination of solar thermal and absorption cooling obviously has a high potential to replace conventional cooling machines based on electricity. Larger solar cooling systems have been successfully demonstrated and smaller machines, which could be used in (small) residential and office buildings, are entering the market.

In this system part of the refrigeration capacity of a system is obtained by the use of a hot water or steam fired absorption chillers. Solar collectors are used to produce this hot water or steam. The system can utilize single, double or triple effect absorption chillers, according to the firing temperatures obtained

by the solar collectors. The system is one of the most proven and can achieve operating saving in the range of 25 to 40 % when compared to traditional mechanical vapour compression systems[1].

Solar Renewable Energy

The primary source of all renewable energies except geothermal energy is solar radiation. Solar energy is mainly harvested in two ways. It can be converted into either heat or electricity. Converting solar energy into heat is possible by using solar thermal energy technologies. Converting solar energy directly to electivity is achievable by using photovoltaic cells.

In solar thermal systems there are several advantages (European Solar Thermal Industry Federation, ESTIF, 2006)

- Reduces the dependency on imported fuels
- Saves natural resources
- Save CO2 emission
- Curbs urban air pollution
- Is immediately available
- Creates local jobs
- Inexhaustible

The feasibility study will assess the three technologies with the view to provide the most suitable technologies to assist the government of Kuwait in meeting its environmental and energy obligation whilst insure the reduction of the reliance of HCFC's

Assessment of Financial impact

The feasibility study will undertake a financial assessment on the total costs:

- All Capital costs, excluding land
- Labor costs
- Investment / Returns
- Energy Saving
- Maintenance and repair costs
- Distribution Costs
- Revenue Scenarios
- Possible Investors

Assessment of the Infrastructure and Regulatory Framework

The feasibility study will cover a full analysis on Infrastructure and Regulatory Framework, which will include:

[1] Regarding renewable energies, Kuwait plans to generate 5% of its electricity from renewable sources by 2020 and 15% by 2030, primarily by using the country's solar and wind potential. To achieve the goals, Kuwait is employing more private capital through public-private projects (PPP), as well as independent water and power projects (IWPP).

- Current and future energy labelling programs or building codes that likely to be enforced within the country strategic development plan and its implication to the selection of technologies.
- Applicability to market specific needs:

a. Types of buildings/establishments i.e. residential, government, public, commercial, etc.
b. Infrastructure required to promote particular options (e.g. district cooling, absorption systems, others)

- National relevant institutional framework needed promote new technologies including policies, regulations and standards/codes.
- Potential incentives and disincentives measures that can be adopted for promoting the outcomes of the study
- Relevant standards and guidelines that need to be considered to each type of alternative technology(s) that will be offered by the study.
- Technical capacities needed to introduce new technologies including educational, training, specialized awareness.

Partners and Stake Holders

The studies intend to involve key governmental, research and industry partners, in order to ensure that inputs from all relevant stakeholders are incorporated and that the outcomes will be acceptable and implementable.

For Kuwait, the following stakeholders are considered for direct and indirect involvement in the project:

- General Secretariat of the Supreme council for Planning and Development
- Kuwait Institute for Scientific Research (KISR)
- Kuwait Foundation for the Advancement of Science (KFAS)
- Kuwait University
- Ministry of Electricity & Water
- Local Consulting firms and companies

Dissemination of Results

The results of the final assessment of the feasibility study will be presented in a three-way approach:

- A high level coordination meeting with the ministries of Urban Planning, Environment, Energy, Trade and Finance.
- A stakeholder coordination meeting, with project developers, main energy suppliers companies, and appropriate associations, and development banks.
- A publication of the assessment will be developed and circulated through the ministries of energy, environment and urban planning.

Feasibility Study Budget

Description	Activity Type	Responsible agency	Costs in (USD)
International Expert	Assessment of suitable technologies Energy saving mechanisms	UNIDO	30,000
National Consultation Meetings and a consultancy service by a regional expert	Legalization Barriers Development terms of reference for comprehensively assessing the governmental Co-financing mechanism,	UNEP	27,223
Preparation and Dissemination of final Feasibility Study	Develop through lesson learned a check-list Dissemination of final feasibility study	UNDIO	10,000
Technical Assistance	Technical Assistance Through expert group meeting/workshop, to present feasibility study and its results and recommendation	UNIDO	23,511
Total			**90,744**

Feasibility Study Time Table

Description	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Hiring International Expert for the project	X											
Initial Consultation to: - Set the work-plan - Agree of criteria for technology assessment - Formulate working teams	X	X										
Assessment of suitability of various technologies to Kuwait		X	X	X	X							
Evaluate the assessed technologies as per the agreed criteria					X							
Assessment of Financial impact of the suitable Technologies					X	X	X					
Assessment of the Infrastructure and Regulatory Framework						X	X	X				
Development of the Draft Report								X	X			
Final Consultation Meetings									X	X		
Final Report development										X	X	
Dessimination of results to governmental partners and different stakeholders											X	X

Annex 1. Background

The Montreal Protocol on Substances that Deplete the Ozone Layer (MP) was adopted in 1987 to phase-out Ozone Depleting Substances (ODSs) as a result of the agreement established under the Vienna Convention for the protection of the environment from adverse effects of ozone depletion. To date, the MP has been effective and successful in reducing the impact of human activities on the global environment and therefore described as one of the most successful environmental treaty.

One of the reasons for this success is the Multilateral Fund for the Implementation of the Montreal Protocol (MLF) that, since 1991, provides financial assistance to Article 5 countries, or developing countries, to help achieve their phase-out obligations under the MP. Since 1992, UNIDO, as one of the implementing agencies of the Montreal Protocol, assists countries in developing and implementing projects with the aim to phase-out ODSs. So far, UNIDO has implemented over 1,217 projects, which contributed to the phase-out of 70,287 Ozone Depleting Potential tones (ODPt) of the world's total consumption of ODSs.

In September 2007, the Parties to the MP took a historical decision to accelerate the phase-out of Hydrofluorochlorocarbons (HCFCs)[2], ODSs used as interim substitutes to Chlorofluorocarbons (CFCs). While phasing-out HCFCs, the Parties agreed to promote the selection and adoption of alternatives that have low impact on the environment, in particular, on climate, and that meet other health, safety and economic standards. Therefore, the Executive Committee of the MLF (ExCom), when developing and applying funding criteria for the HCFC phase-out strategy, gives priority to alternatives that have low Global Warming Potential (GWP) and that are able to ensure energy efficiency.

Annex 2. Energy Sector Overview

Kuwait is one of the world's top producers and net exporters of petroleum and other fossil fuels. The country holds the world's sixth-largest oil reserves (104.5 billion barrels) and is one of the top 10 global producers and exporters of total petroleum liquids.

Kuwait's domestic consumption has been increasing, but a majority of its oil production is exported to Asia, being South Korea and India the largest importers. This country maintains refining and marketing interests in Europe and looks to expand into Asia, particularly China, Vietnam, and Indonesia.

According to OPEC, Kuwait exported 805,000 bbl/d of petroleum products in 2013, the highest level among OPEC members. However, domestic oil consumption has been steadily increasing, partially as a result of increased petroleum-fired electricity generation.

Regarding natural gas, Kuwait recently became a net importer of this energy source, leading the country to focus more on natural gas exploration and development for domestic consumption.

Kuwait's natural gas sector, like the petroleum and other fossil fuels sector, is managed by Kuwait Petroleum Corporation.

[2] Decision XIX/6.

The country plans to increase dry natural gas production to 3 billion cubic feet per day by 2030 to satisfy increasing domestic consumption and reduce dependence on natural gas imports during peak summer months.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

75th Executive Committee of the
Multilateral Fund for the Implementation of the Montreal Protocol

UNIDO Work Programme

75th Executive Committee

Introduction

The UNIDO Work Programme for the consideration of the 75th Ex.Com. of the Multilateral Fund has been prepared following the Government requests as well as based on ongoing and planned activities. The Work Programme will support the implementation of UNIDO's three year Rolling Business Plan 2014-2016.

As a follow up of the UNEP/OzL.Pro./Ex.Com./Decision 71/42 that approved Guidelines for the preparation of Stage II HPMPs and based on country requests, the UNIDO 75th Work Programme Amendment included preparatory funding for the stage II of HPMP for Cameroon and Jordan.

In the light of the Decision 72/40 and upon approval of the preparatory funding for specific demonstration activities by the 74th Ex.Com., the 75th UNIDO WPA included several demonstration projects for low-GWP alternatives in the refrigeration and air-conditioning and foams subsectors, respectively addressing the district cooling subsector and PU foam applications in high ambient temperature and in SMEs.

In the light of the Meeting of the Parties Decision XXVI/9 requesting the Executive Committee of the Multilateral Fund to consider financial support to conduct surveys on alternatives to ODS in Article 5 parties and upon Governments requests, the 75th UNIDO WPA included several such activities, respectively for Bahrein, Cameroon, Kuwait, Libya and Sudan.

Verification Reports for Bosnia and Herzegovina and for Macedonia, FYR are requested in line with the Decision UNEP/OzL.Pro./Ex.Com./72/22.

The 75th UNIDO WPA is also addressing the approval request for the UNIDO core unit funding, with the notification that the concept was submitted individually to the MLF Secretariat.

The UNIDO Work Programme Amendment for the consideration of the 75th Ex.Com. Meeting comprises the following sections:

Section 1
Gives in a tabulated form by project types and country the consolidated list of activities foreseen for the above requests

Funding is requested as follows:

- preparatory assistance proposals addressing HPMP stage II, amounting $US 288,900 (including $US 18,900 representing 7.0 % A.S.C.)
- demonstration activities in Egypt, Kuwait, Morocco, Saudi Arabia and South Africa totally amounting $US 1,147,895 (including $US 77,471 representing 9%, respectively 7.0 % ASC)
- technical assistance addressing surveys of ODS alternatives, amounting $US 468,700 (including $US 38,700 representing 9.0 % A.S.C.)
- verification reports amounting $US 64,200 (including $US 4,200 representing 7.0 % ASC)
- UNIDO core unit funding, amounting $US 2,040,715

Total: 3,855,260 $US (including $US 129,121 A.S.C.)

Project concepts indicating details and funding requirements are provided in Section 2.
The demonstration activities and the core unit funding support concepts were submitted individually.

Section 1

Consolidated table giving project preparation and non-investment projects in all countries and sectors

Country	Type	Subs-tance	Title of Project	Requested amount USD	A.S.C. USD	Total (incl ASC) USD	A.S.C. %	P.D.	Remarks
Preparatory assistance									
Cameroon	PRP	HCFC	Preparation of HPMP Stage II -Refrigeration Servicing	70,000	4,900	74,900	7	12	
Jordan	PRP	HCFC	Preparation of HPMP Stage II -Rigid PU foam component	55,000	3,850	58,850	7	12	IBRD Lead Agency, UNIDO Co-IA
Subtotal				**125,000**	**8,750**	**133,750**			
Demonstration activities									
Egypt	DEM	HCFCs	Feasibility Study addressing District Cooling	63,521	5,717	69,238	9	12	UNEP Co-IA, individually submitted
Kuwait	DEM	HCFCs	Feasibility study on district cooling systems in Kuwait	63,521	5,717	69,238	9	12	UNEP Co-IA, individually submitted
Morocco	DEM	HCFCs	Demonstration of the use of low cost Pentane foaming technology for the Conversion to non-ODS Technologies in PU Foams at Small and Medium Enterprises (SMEs).	297,000	20,790	317,790	7	12	individually submitted
Saudi Arabia	DEM	HCFC-141b	Demonstration Project for the Phase-out of HCFCs by Using HFO as Foam Blowing Agent in the Spray Foam Applications in High Ambient Temperatures	274,016	19,181	293,197	7	12	individually submitted
South Africa	DEM	HCFC 141b	Technical and economic advantages of the Vacuum Assisted Injection in discontinuous panel's plant retrofitted from 141b to pentane	372,366	26,066	398,432	7	12	individually submitted
Subtotal				**1,070,424**	**77,471**	**1,147,895**			
Surveys on ODS alternatives									
Bahrein	TAS	All	Survey on ODS alternatives	50,000	4,500	54,500	9	12	concept submitted by UNEP, the lead agency

Cameroon	TAS	All	Survey on ODS alternatives	110,000	9,900	119,900	9	12	
Kuwait	TAS	All	Survey on ODS alternatives	50,000	4,500	54,500	9	12	concept submitted by UNEP, the lead agency
Libya	TAS	All	Survey on ODS alternatives	110,000	9,900	119,900	9	12	
Sudan	TAS	All	Survey on ODS alternatives	110,000	9,900	119,900	9	12	
Subtotal				430,000	38,700	468,700			
Verification reports									
Bosnia Herzegovina	Verification report	All	Verification report	30,000	2,100	32,100	7	24	
Macedonia, FYR	Verification report	All	Verification report	30,000	2,100	32,100	7	24	
Subtotal				60,000	4,200	64,200			
Administrative support cost									
UNIDO	ASC	ALl	Core Unit funding	2,040,715	0	2,040,715	0	12	individually submitted
Subtotal				**2,040,715**	**0**	**2,040,715**			
Grand Total				**3,726,139**	**129,121**	**3,855,260**			

Section 2
PROJECT CONCEPT

Country:	Cameroon
Title:	Preparatory funding request Second Stage of HPMP – Servicing sector
Project Duration:	12 months
Project Budget:	US$ 70,000 (excl. 7% Agency Support Costs)
Implementing Agency:	UNIDO
Coordinating Agency:	Ministry of Environment, Protection of Nature and Sustainable Development (National Ozone Unit)

Project Summary

The Implementing Agency has received an official request from the Government of Cameroon for preparatory funding for the stage II of HPMP. In response to the decision 71/42(b) UNIDO is submitting a request for funds for the preparation of stage II of HPMP.

Cameroon's base line consumption of HCFCs amounted to 88.8 ODP tonnes**.** During the implementation of the first phase, 9.7 ODP tonnes HCFC 22 and 16 ODP tonnes HCFC 141b, including polyol consumption, are planned to be eliminated by 2017, while remaining eligible consumption amounts 57 ODP tonnes HCFC 22.

In the Second Stage of HPMP, Cameroon will further address with priority the servicing sector aiming to reach a 68% reduction in HCFCs consumption by the year 2025. The Stage II strategy will also include include pilot demonstration activities in two sub-sectors:

- Phase-out of HCFC 141b as solvent in the refrigeration applications
- Pilot demonstration project in the fisheries sector

Phase-Out of HCFCs in Refrigeration Assembly – Background sector information

The assembly sector, extensively described under the HPMP Stage I, will be tackled under the servicing sector related activities. In addition, pilot demonstration addressing the use of HCFCs as solvent as well as pilot demonstration in fisheries will enhance the awareness in the sector and substantially contribute to the achievement of the phase-out reduction targets.

The refrigeration and air-conditioning assembly manufacturing sector in Cameroon is limited to a relatively small number of small and medium scale enterprises, the majority of which also operate as refrigeration and air-conditioning servicing and installation contractors.
A range of display cases, condensing units, spilt air conditioning systems, cold rooms and bespoke systems are manufactured to the enterprise's own design on an order by order basis, often with individual modifications to suite the customer's requirements. Most equipment is produced using a mixture of imported and locally made components, some of which are recycled from redundant equipment and systems.

HCFC-22 is used in assembling of condensing units, commercial refrigeration display cases, split air-conditioners, cold store refrigeration circuits and bespoke industrial refrigeration systems. Due to the relatively basic production facilities available, large volumes of HCFC-22 are used for purging and cleaning components during the manufacturing process.

Twelve enterprises, potential demonstration sites have been identified as detailed below, all are small or medium sized enterprises located in the principal cities of Cameroon. Doula, Yaounde, Bafousam, Nagaoundere, Garoua and Maroua.

Assembly is done in multipurpose workshops with basic fabrication tools and equipment. Some of the larger workshops own charging equipment whilst others use vacuum pumps, pressure gauges and weighing scales to achieve the correct charge levels.

All (12 enterprises identified) workshops have leak detectors and circuit pressure test equipment. The table below lists the enterprises identified as HCFC-22 in the manufacture and installation of refrigeration and air-conditioning

None of the enterprises listed have been converted to an HCFC technology and none export to non-article 5 countries. Breakdown of HCFC-22 consumption in Refrigeration Manufacturing 2010

Company Baseline Data (as per the HPMP Stage I)

Company	Start date	No. of employees	Type of Production	Kits used compressors, evaporators, condensers, thermostat, dehydrator etc	Use of condensing units?	Charging at premises or customer site?	Non-ODS refrigerants
Equatorial Froid, S/c M. NDJIWA David, B.P 57 D'LA Tél: (237)33420116	1984	100	Assembly only	Yes	Yes	Both	Yes, HFC-134a
COFIC, S/c M. ITOTODE Leopold, B.P 740 D'LA Tél: (237)33434304	2001	94	Assembly only	Yes	Yes	Both	Yes, HFC-134a
MCE, B.P 3799 D'LA, S/c M.BOLLA Tél: (237)22231334	1999	32	Assembly only	Yes	Yes	Both	Yes, HFC-134a
FROIDCAM S/c M.BENTEO B.P 795 D'LA Tél: (237)334225740	1960	85	Assembly only	Yes	Yes	Both	Yes, HFC-134a
SOCEM, S/c M. MBOUYOM, B.P 9091 D'LA Tél: (237)3390019	1986	80	Assembly only	Yes	Yes	Both	Yes, HFC-134a
LIFROIDCAM S/c M. ASSALA Gabriel, BP 795 D'LA Tél: (237)77730542	1981	07	Assembly at site only.	Yes	Yes	At site only	Yes, HFC-134a
MCI, S/c M. , B.P 4439 D'LA Tél: (237)33028342	1998	34	Assembly only	Yes	Yes	Both	Yes, HFC-134a
FROID-EMI S/c M.BOPDA B.P 740 D'LA Tél: (237)334225740	2000	63	Assembly only	Yes	Yes	Both	Yes, HFC-134a
COFRELEC, S/c M.DOFANG, B.P2063 D'LA Tél: (237)22228232	2002	11	Assembly only	Yes	Yes	At site	Yes, HFC-134a
ETS ZE EBOUDENA, S/c M. EBOUDENA BP 1727 D'LA Tél: (23722132335	1985	06	Assembly at site	Yes	Yes	At site	Yes, HFC-134a
TECHNOCLIM, BP D'LA Tél: (237)77761612	1991	03	Assembly at site only	Yes	Yes	At site only	Yes, HFC-134a
PICTET, S/c M. VIALLET, B.P 858 D'LA Tél: (237)33439794	1980	87	Assembly at site	Yes	Yes	At site only	Yes, HFC-134a

Phase-out of HCFCs in the fisheries sub-sector

The fisheries sub-sector had not been signaled out in the preparation of the HPMP since the use of refrigerants for that sector is mostly for land-based cold stores and hence was considered under refrigeration servicing sector.
The second stage of the HPMP will address a demonstration project in the fisheries subsector for two reasons:

1) the sub-sector is well defined and organized; a demonstration project in one cold store can be effectively copied and implemented in other cold stores,

2) the refrigerant consumption of a cold store is high due to high leakage resulting from the age of the equipment installed and the mode of operation that requires units to run constantly all year round with little time for maintenance.

The lack of maintenance and the ensuing high leakage affect also the efficiency of the units and require a high consumption of power.
The demonstration project will aim at converting the refrigeration equipment at one typical cold store to efficient units running with low-GWP refrigerant alternatives. The project will not only reduce the consumption of ozone depleting substances, but will also have a high positive environmental impact from the reduction of direct emissions from refrigerant leakage and indirect emission from the operation of inefficient units.

Phase-out of HCFCs used as solvent

HCFC-22 is widely used as solvent for purging and flushing refrigerator and freezer circuits in the service and manufacturing processes. Moreover, HCFC-141b is also commonly used as a solvent for degreasing refrigeration and air-conditioning circuits after fabrication and for cleaning of electronic and mechanical parts in various sectors. Refrigerants used as solvents contribute 100% to ozone depletion and global warming since all the used quantities end up vented into the atmosphere.

The project will ensure the sustainability of the use of non-HCFCs as solvents. It will also contribute to the complete phase-out of HCFC-141b after the successful phase-out of its use in the foam sector. In 2014 Cameroon consumed around 9 metric tons, equivalent to 1 ODPt, of HCFC-141b used as solvent.

There are viable alternative solvents that can be recycled and used several times without venting them in the atmosphere. These solvents, and the tools for applying them, have been successful and effectively applied in other countries and require only basic training for their use. The project aims at supplying a number of the equipment and quantities of the alternative solvents to a number of workshops and to train the technicians at these workshops on the proper use of these tools.
The selection of the demonstration sites for the pilot projects will be done based on the background information and the inventory records of the companies' active in the assembly sector.

In accordance with the guideline 71/55 the preparatory funds are requested for UNIDO, as follows:

	Activities	Total
1	**Preparation of Refrigeration Servicing (including assembly)**	**55,000**
	Survey to update consumption all over the country	15,000
	Stakeholders meetings	10,000
	Consultation meeting	15,000
	Consultancy (international consultant)	8,000
	National consultants and data validation process	7,000
2.	**Preparation of pilot activities in fisheries sector and for**	**15,000**

	elimination of the use of HCFCs as solvents	
	Site-visits and sites selection criteria setting-up	8,000
	Stakeholders consultation meetings	3,000
	Preparing pilot project concepts	4,000
	Grand total	**70,000**

Project Concept

Country: **Jordan**

Title: Project preparation for HPMP Stage II (Rigid PU foam)
Project Duration: 12 months

Project Budget: US$ 55,000 for foam sector (excluding. 7% Agency Support Costs)

Implementing Agency: UNIDO

Coordinating Agency: National Ozone Unit

Project Summary

The Implementing Agency has received an official request from the Government of Jordan for project preparation in the stage II of HPMP, respectively addressing the foam sector. In response to the decision 71/42(b) UNIDO is submitting a request for funds for the preparation of stage II of HPMP – Foam sector as co-implementing agency, noting that Lead Agency for Jordan for HPMP Stage II strategy is IBRD.

Jordan's base line consumption of HCFCs amounted to 83 ODP tonnes. After the approval of the HPMP Stage I, Jordan committed to reduce 8.1 by 2015, once completed the remaining consumption in the HPMP will be 70.16 ODP.

All HCFCs used in Jordan are imported as the country does not produce these substances. A survey showed that imports of HCFC-22, HCFC-141b and HCFC-142b take place in bulk, and HCFC-141b is also imported in pre-blended polyol systems.

The baseline is 83 ODP tons. The reduction and compliance targets are as follows:

Year	Consumption (ODP Tons)	Reduction (ODP Tons)	Consumption allowed (ODP Tons)
2009	70.9	N/A	N/A
2010	95	N/A	N/A
Base line	**83.0**	N/A	N/A
2011	101.31		
2012	124.85		
2013 (freeze)	59.4	65.45	83
2014	72.03		83
Year	**Control measure**		
2015	10% reduction	8.3	74
2020	35% reduction	29.05	53.95
2025	67.50% reduction	56.025	26.975
2030	97.50% reduction	80.925	2.075
2040	100% reduction	83	0

The activities contained in the HPMP are focusing on air conditioner manufacturing and partially on the foam sector, which are the main sectors using HCFCs

The HPMP Stage I has the following strategy and consists of the following three components:

1. Investments in the air conditioning sector to achieve HCFC consumption reductions. Investments were made in enterprises manufacturing residential air conditioners in addition to the already approved Petra project. The project includes the conversion of at least six enterprises:

Petra Engineering Industries Com., (Implemented by UNIDO)

- Middle East Electrical Industries Com. Ltd (MEC), (HPMP) (this component of the project has been cancelled)
- Abu Haltam Group for Investments, (HPMP)
- National Refrigeration Com. (NRC), (HPMP)
- National Integrated Industrial Complex (NIIC), (Not eligible)
- Al-Seden for electronics. (Not eligible)

2. The second component is the technical assistance, policy and air conditioning sector plan management, which supports the implementation of investment interventions under the HPMP.
3. Finally, there is a component of strengthening national capacity for the introduction of policies, regulations, and general awareness (HPMP).

Implementation progress

The HPMP Stage I addressed to the extent possible conversion at large enterprises:

a. Phase-out of HCFC-22 and HCFC-141b in the manufacture of unitary air conditioning equipment at Petra Engineering Industries Co. Completed

b. Conversion of two eligible unitary air conditioning manufacturing Abu Haltam Group for Investments, National Refrigeration Com). Ongoing

c. Technical assistance for the elimination of HCFC 141b for the foam sector (system houses). Ongoing

d. Support to the project coordination, monitoring policy regulation. Ongoing

Demand

The calculated levels of consumption of Annex C substances, determined in accordance with the Montreal Protocol definition (production + import – export), in the years 2013 and 2014 are reported in the table below. Jordan is not a producing country, consquently, the consumption is as follows

Year	ODS	Uses				Total
		Manufacturing	Foam	Services	Fire Fighting	
2013	R22	450.00	-	310.00	2.00	762.00
	R-144b	40.00	120.00	-	-	160.00
	R-141(polyol)	-	80.00	-	-	80.00
	Total	**490.00**	**200.00**	**310.00**	**2.00**	**1002.00**
2014	R22	420.00	-	325.31	2.00	747.31
	R-144b	50.00	119.1	-	-	169.1
	R-141(polyol)	-	150.00	-	-	150
	Total	**470.00**	**269.1**	**325.31**	**2.00**	**1066.41**

The total HCFCs consumption in Jordan is summarized in the table below, where figures of HCFC-141b include the bulk (pure) substance, not the pre-blended substance in polyols.

Total HCFC consumption during 2012-2014 in ODP tons

Consumption	Baseline	2012	2013	2014
HCFC–metric tons	--	1746	922.00	916.41
HCFC–ODP tons	83	124.85	59.51	59.70

HPMP financial aspect
The implementation progress can be summarized as follows. At present one investment project (Petra, Co) and one tranche have been approved. The investment component is completed. The first tranche is about to be completed. Second tranche is being requesting to the 74th Executive Committee, and the last one is expected to be requested in 2016.

The remaining eligible consumption of HCFCs in foam and servicing sector to reach 2020 is 29. ODP Tons. It is expected that addressing the foam sector and servicing (in parallel) the country will comply with 2020 target.

Funding Requirement
The preparatory funds are requested for UNIDO, as follows:

Activities	Total
Preparation of PU Foam Rigid PU Sector	
Survey to update consumption all over the country	10,000
Stake holders meetings	8,000
Consultation meeting	2,000
Preparing and update FAA System house document	10,000
Preparing up ten investment projects document	15,000
Preparing documents and final	10,000
TOTAL PRP Foam sector	**55,000**

Activities to be undertaken to develop Stage-II document
The following activities shall be undertaken for the preparation of stage-II HPMP to be prepared from the proposed funding:

- Data Collection and Surveys
  - Collection, verification and validation of HCFC consumption in both sectors (Refrigeration and Foams) through survey of Government departments, traders, distributors, importers and manufacturers to assess the distribution of HCFC consumption (update previous data collection)
- Develop a plan for implementation of the PU rigid foam sector related activities, to be integrated in the overall strategy (at least one system house and 10 small enterprises would be addressed)
- Evaluate the climate co-benefits
- Prepare project documents

Surveys on ODS alternatives

Project Concept

Country:	**Cameroon**
Title:	**Preparation of National Survey on Alternatives to ODSs**
Project Duration:	**12 months**
Budget:	**USD 110,000 (excluding ASC)**
Implementing Agency:	**UNIDO**

I. Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

II. Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

III. Project objectives

The objective of this proposal is to conduct a detailed national survey on Argentina's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

IV. Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Argentina.

OUTPUTS		ACTIVITIES
Data Collection	Establish current consumption of HFCs and low-GWP alternatives by substance	• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed; • Collect import (and export as applicable) data for the substances for the previous years; • Correlate the substances with possible end-use in various sectors; • Establish estimated alternatives use by sector.
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	• Review the historical use data of the substances; • Review and forecast growth for various applications; • Establish growth patterns in use by substance/sector.
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	• Compile data on available low-GWP alternatives for various applications; • Identify opportunities and challenges for applying low-GWP alternatives for various applications; • Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO_2 emission reduction targets by 2020; • Make use of the available linkage to Argentina's HPMP. • Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.

V. Institutional arrangements

a. Brief information on legal and regulatory support for the demonstration project

The proposal is supported by the National Ozone Unit of Argentina and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

b. Description of implementation approach

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings

- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

Table 1. Tentative budget allocation per activity

	Description		**Costs [USD]**
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (5 w/m)	20,000
		International Expert (2 w/m)	20,000
		Local Travel	20,000
Data Assessment	- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance - Identify challenges and opportunities for transition to low-GWP alternatives for various applications	National Expert (3.8 w/m)	15,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	10,000
TOTAL			**110,000**

Project Concept

Country:	**Libya**
Title:	**Preparation of National Survey on Alternatives to ODSs**
Project Duration:	**12 months**
Budget:	**USD 110,000 (excluding ASC)**
Implementing Agency:	**UNIDO**

VI. Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

VII. Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

VIII. Project objectives

The objective of this proposal is to conduct a detailed national survey on Argentina's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

IX. Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Argentina.

OUTPUTS		ACTIVITIES
Data Collection	Establish current consumption of HFCs and low-GWP alternatives by substance	• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed; • Collect import (and export as applicable) data for the substances for the previous years; • Correlate the substances with possible end-use in various sectors; • Establish estimated alternatives use by sector.
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	• Review the historical use data of the substances; • Review and forecast growth for various applications; • Establish growth patterns in use by substance/sector.
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	• Compile data on available low-GWP alternatives for various applications; • Identify opportunities and challenges for applying low-GWP alternatives for various applications; • Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO_2 emission reduction targets by 2020; • Make use of the available linkage to Argentina's HPMP. • Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.

X. Institutional arrangements

a. Brief information on legal and regulatory support for the demonstration project

The proposal is supported by the National Ozone Unit of Argentina and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

b. Description of implementation approach

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data

- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.
- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

Table 1. Tentative budget allocation per activity

	Description		**Costs [USD]**
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (5 w/m)	20,000
		International Expert (2 w/m)	20,000
		Local Travel	20,000
Data Assessment	- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance - Identify challenges and opportunities for transition to low-GWP alternatives for various applications	National Expert (3.8 w/m)	15,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	10,000
TOTAL			**110,000**

Project Concept

Country:	**Sudan**
Title:	**Preparation of National Survey on Alternatives to ODSs**
Project Duration:	**12 months**
Budget:	**USD 110,000 (excluding ASC)**
Implementing Agency:	**UNIDO**

XI. Introduction

At the 26th Meeting of the Parties to the Montreal Protocol a key decision was taken on assessing alternatives to ozone-depleting substances (Decision XXVI/9). Under this framework, Parties have been encouraged to continue providing the Ozone Secretariat, on a voluntary basis, with information on data, policies and initiatives pertaining to the promotion of technologies that minimize environmental impact wherever available. The same MOP decision requested the Executive Committee of the Multilateral Fund to consider financial support to conduct inventories or surveys on alternatives to ODS in Article 5 parties who request so.

It is important for Article 5 countries to conduct detailed national surveys on their industrial sectors relying on HFCs as well as market trends of those substances and substitutes. Not only it will give a full picture of the various enterprises/contacts related to HFCs and the possibility to collect data on these, but it will also consider whether the alternatives are available, proven, environmentally sound, safe to use and economically viable.

Moreover, it will enable countries to engage in any discussions on the HFC and its potential inclusion in the Montreal Protocol with a clear picture of what any amendment to the Montreal Protocol would entail.

XII. Project summary

The survey would tap into the extensive stakeholder network established for the HCFC survey and ongoing implementation of the HPMP. This network includes all major importers, manufacturers, service companies and distributors of chemicals and equipment as well as industry and trade associations. Data would be collected top down through trade and customs statistics and bottom up from users, distributors and importers. It will also take advantage of the planned HPMP activities to engage with its wider community and to gain sector insights and qualitative data. The survey will take into consideration various factors, such as energy efficiency, regional differences and high ambient temperature, potential limitations of alternatives and their implications on the different sectors, servicing and maintenance requirements, international design and safety standards.

XIII. Project objectives

The objective of this proposal is to conduct a detailed national survey on Argentina's industrial sectors relying on HFCs (HFC consumption, distribution and uses). It will analyze historical and predicted consumption trends and correlate data with the ongoing monitoring of HCFC consumption while taking into account the uptake of various existing technologies, revise the scenarios for current and future demand elaborated in the report to MOP Decision XXV/5, and improve information related to costs and benefits with regard to the criteria listed above.

XIV. Expected demonstration results

The summary scope of the survey would be in line with similar recent surveys, taking advantage of UNIDO's established stakeholder network in Argentina.

OUTPUTS		ACTIVITIES
Data Collection	Establish current consumption of HFCs and low-GWP alternatives by substance	• Interact with upstream chemical and equipment suppliers/importers and/or their local representatives, relevant industry associations and government departments as needed; • Collect import (and export as applicable) data for the substances for the previous years; • Correlate the substances with possible end-use in various sectors; • Establish estimated alternatives use by sector.
Data Assessment	Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance	• Review the historical use data of the substances; • Review and forecast growth for various applications; • Establish growth patterns in use by substance/sector.
	Identify challenges and opportunities for transition to low-GWP alternatives for various applications	• Compile data on available low-GWP alternatives for various applications; • Identify opportunities and challenges for applying low-GWP alternatives for various applications; • Estimate the potential impact of transition to low-GWP alternatives, where feasible, in terms of contributing to the country's voluntary CO_2 emission reduction targets by 2020; • Make use of the available linkage to Argentina's HPMP. • Review national regulations and standards related to the import and use of the various alternatives to HCFCs and identify barriers to their application.

XV. Institutional arrangements

a. Brief information on legal and regulatory support for the demonstration project

The proposal is supported by the National Ozone Unit of Argentina and is consistent with the long-term strategies of the beneficiary Government and will be implemented in full synchrony with the ongoing HPMP. Relevant national authorities will also be involved in the project implementation.

b. Description of implementation approach

The project activities as defined above will be carried out through engagement of suitable national and international industry experts, who will be identified with the close involvement of the National Ozone Unit.

The ODS alternatives' survey will be coordinated through the established HPMP stakeholder meeting infrastructure which includes regular meetings and workshops and has an established attendance, providing an ideal vehicle for general stakeholder engagement. Other activities will include:

- Desk based data collection and analysis from institutional sources including NOU, end users, importers, distributors and associations
- Site visits
- Consultative workshops and meetings
- Compilation of data and analysis, including comparative analysis with HCFC data
- Assessment of the institutional, regulatory and policy framework controlling ODS, GHGs and other air pollutants.

- Industry consultation on feasibility and potential methodology for estimating HFC bank and emissions

On the assumption that funds will be approved by May 2015, UNIDO aims to provide the NOU with the preliminary information at least on HFC consumption, market share and consumption trend, before the 27th Meeting of the Parties (latest by end October 2015). The complete survey and data analysis is expected to be concluded within 12 months.

Tentative budget

Table 1 below presents the budget allocation per activity for the implementation of the demonstration project.

Table 1. Tentative budget allocation per activity

	Description		**Costs [USD]**
Data Collection	Establish current consumption of high-GWP HFCs and low-GWP alternatives by substance	National Expert (5 w/m)	20,000
		International Expert (2 w/m)	20,000
		Local Travel	20,000
Data Assessment	- Establish estimated growth patterns in consumption of high-GWP HFCs and low-GWP alternatives by substance - Identify challenges and opportunities for transition to low-GWP alternatives for various applications	National Expert (3.8 w/m)	15,000
		International Expert (1 w/m)	15,000
		Technical Meetings	10,000
		Outreach Activities & Miscellaneous	10,000
TOTAL			**110,000**