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COMITE EXECUTIF
DU FONDS MULTILATERAL AUX FINS
D'APPLICATION DU PROTOCOLE DE MONTREAL
Soixante-quinzième réunion
Montréal, 16 – 20 novembre 2015

PROPOSITIONS DE PROJET : ÉGYPTE

Le présent document comporte les observations et la recommandation du Secrétariat du Fonds pour la proposition de projet suivante :

Mousses

- Démonstration d'options à faible coût pour la reconversion à des technologies sans SAO des mousses de polyuréthane chez les petits utilisateurs — PNUD

FICHE D'ÉVALUATION DE PROJET – PROJET NON PLURIANNUEL

ÉGYPTE

TITRE DU PROJET	AGENCE BILATÉRALE/D'EXÉCUTION
a) Démonstration d'options à faible coût pour la reconversion à des technologies sans SAO des mousses de polyuréthane chez les petits utilisateurs	PNUD

ORGANISME NATIONAL DE COORDINATION	Egyptian Environmental Affairs Agency, Unité nationale d'ozone

DONNÉES SUR LA CONSOMMATION LES PLUS RÉCENTES DÉCLARÉES SUR LES SAO PRISES EN COMPTE DANS LE PROJET

A : DONNÉES VISÉES À L'ARTICLE 7 (TONNES PAO, 2014 EN DATE D'OCTOBRE 2015)

HCFC	320,3

B : DONNÉES SECTORIELLES SUR LE PROGRAMME DE PAYS (TONNES PAO, 2014 EN DATE DE SEPTEMBRE 2015)

HCFC-22	174,5
HCFC-123	0
HCFC-141b	123,1
HCFC-142b	9,5
HCFC-141b dans le polyol prémélangé importé	13,2

Consommation de HCFC demeurant admissible au financement (tonnes PAO)	

CRÉDITS ALLOUÉS AU PLAN D'ACTIVITÉS DE L'EXERCICE EN COURS		**Financement SUS**	**Tonnes PAO à éliminer**
	a)	s.o.	s.o.

TITRE DU PROJET :	
Utilisation des SAO en entreprise (tonnes PAO) :	s.o.
SAO à éliminer (tonnes PAO) :	s.o.
SAO à introduire (tonnes PAO) :	s.o.
Durée du projet (mois) :	12
Montant initial demandé (SUS) :	340 000
Coûts finals du projet (SUS) :	340 000
Surcoûts d'investissement :	310 000
Imprévus (10 %) :	30 000
Surcoûts d'exploitation :	0
Coût total du projet :	340 000
Participation locale (%) :	s.o.
Composante des exportations (%) :	s.o.
Subvention sollicitée (SUS) :	340 000
Rapport coût-efficacité (SUS/kg) :	s.o.
Coûts d'appui de l'agence d'exécution (SUS) :	23 800
Coût total du projet imputé au Fonds multilatéral (SUS) :	363 800
État du financement de contrepartie (O/N) :	N
Objectifs de suivi du projet pris en compte (O/N) :	O

RECOMMANDATION DU SECRÉTARIAT	Pour examen individuel

DESCRIPTION DU PROJET

1. Au nom du gouvernement de l'Égypte, le PNUD, à titre d'agence d'exécution désignée, a présenté à la 75e réunion une demande de financement pour la démonstration d'options à faible coût pour la reconversion des mousses de polyuréthane (PU) à des technologies sans SAO chez les très petits utilisateurs, pour un montant de 340 000 SUS, plus des coûts d'appui d'agence de 23 800 SUS. Ce projet est préparé en réponse à la décision 72/40[1].

2. À la 74e réunion, le Comité exécutif a examiné les demandes de préparation de projets de démonstration de technologies à faible potentiel de réchauffement de la planète (GWP) et d'études de faisabilité du refroidissement urbain conformément à la décision 72/40. La proposition de l'Égypte était l'une des deux propositions entièrement élaborées présentées à cette réunion. Le Comité exécutif, dans les décisions 74/21 et 74/39, a recommandé que la proposition soit présentée de nouveau à la 75e réunion. La proposition de projet révisée est à l'annexe I du présent document.

Description du projet

3. Le secteur des mousses englobe un grand nombre de très petits utilisateurs qui mélangent les mousses à la main. Le mélange manuel entraîne des problèmes de santé et de sécurité professionnelle étant donné le manque de contrôle des émissions ou de la protection individuelle. En raison de leur très petite consommation de HCFC (100-200 kg par année), les très petits utilisateurs reçoivent, pour remplacer les agents de gonflage avec HCFC-141b utilisés, de l'aide du Fonds multilatéral uniquement en fonction de l'assistance technique d'un projet cadre ou de sociétés de formulation.

4. Dans le cas de l'Égypte, les sociétés de formulation ont reçu du financement dans le cadre de la phase I du plan de gestion de l'élimination des HCFC (PGEH), afin de mettre à l'essai et de développer des solutions de remplacement à base d'hydrocarbures prémélangés, méthylal et formiate de méthyle. L'assistance technique était incluse dans la reconversion des sociétés de formulation pour les très petits utilisateurs, et ces derniers pouvaient ainsi louer des équipements en fonction des leurs propres besoins. Toutefois, aucun financement n'était fourni pour la recherche et développement de nouvelles applications dans le secteur des mousses. Le présent projet pilote vise cet objectif.

5. Le projet proposé vise à optimiser les technologies dans le secteur des mousses de polyuréthane et l'on s'attend à ce qu'il devienne plus rentable grâce à une plus grande disponibilité et à des options d'élimination plus économiques pour ces très petits utilisateurs, sans coût supplémentaire pour le Fonds multilatéral. Ce projet tiendra aussi compte de la production et de l'assemblage local des équipements sélectionnés.

Objectifs

6. Les objectifs du projet sont les suivants :

   (a) Développer un distributeur de mousse à faible coût pour des applications de remplissage qui comprennent un compresseur d'air mais qui ne dépendent pas de l'énergie électrique, ou encore évaluer des options visant à réduire le coût des distributeurs de mousses Évaluer l'option de systèmes scellés de préemballage de mousses de polyuréthane, qui ont une longue durée de vie, et qui peuvent être utilisés sur demande (on les utilise actuellement en Colombie, au Mexique, et aux États-Unis d'Amérique pour certaines applications).

[1] Le Comité exécutif a décidé notamment de tenir compte à ses 75e et 76e réunions des propositions pour des projets de démonstration à faible potentiel de réchauffement de la planète en remplacement des HCFC, selon le cadre établi, et des critères fournis pour ces projets.

Méthodologie

7. La mise en oeuvre du projet de démonstration comporte deux parties :

(a) Optimisation d'équipements à faible coût, y compris la sélection d'un importateur / assembleur / fournisseur de service de distributeurs de mousses; révision des équipements existants et proposition de modifications visant à réduire les coûts; émission d'une demande de propositions pour la fabrication d'un nouveau distributeur de mousse à faible coût; validation des équipements; et atelier pour présenter les résultats; et

(b) Développement de systèmes existants de polyols préemballés et entièrement développés par l'identification de sources existantes; sélection d'une société de formulation désirant participer au projet; évaluation de ces systèmes en Égypte, suivie à d'autres pays de l'Article 5 avec des sociétés de formulation de mousses de polyuréthane; installation d'une usine de production locale avec une société de formulation; essais à une ou deux entreprises de mousses sélectionnées; et atelier pour présenter les résultats.

8. Plusieurs fournisseurs d'équipements et sociétés de formulation qui peuvent répondre aux exigences du projet ont été identifiés comme soumissionnaires éventuels pour ces services. La sélection est sous réserve des procédures d'approvisionnement des Nations Unies.

Budget du projet

9. Le tableau 1 résume les coûts du projet.

Tableau 1. Coûts du projet proposé

Activité	Description	Budget (SUS)
Gestion de projet	Spécialiste local Spécialiste international	30 000 30 000
Identification de la capacité locale	Tournée d'étude technique des équipements Tournée d'étude chimique de la chimie	10 000 10 000
Développement et établissement des prototypes des équipements de production	Optimisation des équipements existants Développement de nouveaux équipements Développement de systèmes pré-emballés	50 000 50 000 25 000
Validation/évaluation sur place	Optimisation des équipements existants Nouveaux équipements Systèmes pré-emballés	20 000 20 000 10 000
Atelier de dissémination de la technologie	Les trois approches combinées	25 000
Évaluation par les pairs et préparation et révision de la sécurité	Comprend la vérification de la sécurité, l'évaluation par les pairs, et les coûts de préparation	30 000
Imprévus	10 % du total partiel (arrondi)	30 000
Total		**340 000**

OBSERVATIONS ET RECOMMANDATION DU SECRÉTARIAT

OBSERVATIONS

10. À sa 74e réunion, le Comité exécutif a pris note que le Secrétariat n'a examiné que la conformité du projet aux lignes directrices de la décision 72/40. Les aspects techniques et les coûts du projet n'ont pas fait l'objet d'un examen à ce moment.

11. Le Secrétariat a pris note avec satisfaction des efforts du PNUD à concevoir un projet qui aiderait à la mise en oeuvre des activités des très petits utilisateurs.

12. Le Secrétariat a aussi demandé des explications pour des questions en rapport avec les exigences de la décision 72/40. En ce qui a trait à la technologie particulière en matière de faible potentiel de réchauffement de la planète dont le projet ferait la démonstration, le PNUD a expliqué que le projet contribuerait à une utilisation plus efficiente des systèmes utilisant des produits de remplacement à faible potentiel de réchauffement de la planète (comme le formiate de méthyle et le méthylal) pour les très petits utilisateurs, grâce à l'optimisation des systèmes et des équipements. En ciblant les très petits utilisateurs qui souvent ne reçoivent aucune assistance directe du Fonds multilatéral, le PNUD est d'avis que cela représente une occasion de les aider et d'encourager l'utilisation de technologies à faible potentiel de réchauffement de la planète. S'il réussit, le projet peut rendre disponible des équipements à faible coût qui seront utilisés dans bon nombre de pays par de très petits utilisateurs.

13. En présentant des explications sur la quantité de SAO à éliminer dans le cadre de ce projet, le PNUD a indiqué que cela n'aurait aucun résultat direct sur la réduction des SAO, parce que ce projet est présenté comme un projet pilote global visant à déterminer la faisabilité d'équipements à faible coût et la stabilité de systèmes de mousses pré-emballées. Toutefois, le PNUD a indiqué que, pour l'Égypte, les micro-utilisateurs représentent 22,7 tm de HCFC-141b qui pourraient être éliminées ce faisant. Le Secrétariat a pris note que la consommation des micro-utilisateurs est déjà incluse pour élimination à la phase I du PGEH de l'Égypte. Le PNUD a aussi indiqué que les effets potentiels du projet pourraient être de plus de 600 tm de HCFC-141b, s'ils étaient répétés dans des pays avec de très petits utilisateurs.

14. En réponse à la demande du Secrétariat d'exiger d'une entreprise ou d'un fabricant un engagement manifeste à mettre le projet en oeuvre, le PNUD a expliqué qu'une entreprise ou un fabricant d'équipements ne peut être identifié pour le moment, parce que la sélection du fabricant fera l'objet d'un processus d'appel d'offres. Toutefois, certains d'entre eux ont déjà initialement exprimé leur intérêt dans le développement des équipements.

15. Le PNUD a expliqué que la modification des équipements peut comprendre de l'électronique, un concept avec des têtes de mélange simplifiées et des tuyaux plus courts, un compresseur intégré, et des réservoirs chimiques attachés, ce qui réduirait le coût des éléments. Les équipements actuels de remplissage sont basés sur ceux qui sont utilisés pour les mousses en vaporisateur, et comprend des accessoires non requis pour le remplissage. Les fabricants des équipements décideront de ces modifications à la conception et à d'autres éléments au cours du développement. Ces modifications ne peuvent être effectuées par les fabricants d'équipements sans l'assistance du Fonds multilatéral, parce qu'ils n'ont aucun incitatif à le faire. Selon le PNUD, les équipements obtenus peuvent coûter moins de 10 000 SUS.

16. Le PNUD a justifié l'inclusion de l'optimisation des systèmes actuellement disponibles en expliquant que cette situation est particulière aux très petits utilisateurs (petites usines qui n'utilisent des produits chimiques que très peu souvent, opérations irrégulières de fabrication de mousse) qui exigent peu de petits systèmes prédéterminés faciles à utiliser. Le projet prévoit donc la fabrication de petits emballages scellés convenablement qui, au besoin, seront simplement perforés pour l'usage, et qui pourraient avoir une vie utile de jusqu'à deux ans. L'assistance actuelle offerte aux sociétés de formulation en Égypte ne comprend pas la possibilité d'actualisation de ces innovations.

17. Selon le Secrétariat, bien que l'objectif du projet profiterait aux petits utilisateurs de mousses et améliorerait leurs opérations, la proposition actuelle ne démontre pas strictement le remplacement des HCFC par un produit à faible potentiel de réchauffement de la planète, mais plutôt le développement d'équipements qui pourraient aider ces utilisateurs. Étant donné que ce projet est lié au secteur des mousses, la justification fournie n'est pas en relation avec la consommation restante à éliminer en Égypte,

et la façon dont le projet contribuerait à augmenter de façon importante le savoir-faire actuel en termes de technologie de remplacement à faible potentiel de réchauffement de la planète n'est pas claire.

RECOMMANDATION

18. Le Comité exécutif pourrait souhaiter prendre en considération :

(a) le projet de démonstration d'options à faible coût pour la reconversion à des technologies de mousses de polyuréthane sans SAO chez les très petits utilisateurs en Égypte, dans le contexte de sa discussion sur les propositions de projets de démonstration pour des solutions de remplacement des HCFC à faible potentiel de réchauffement de la planète, tel que le décrit le document sur la revue des questions identifiées pendant la revue du projet (UNEP/OzL.Pro/ExCom/75/27); et

(b) l'approbation du projet de démonstration d'options à faible coût pour la reconversion à des technologies de mousses de polyuréthane sans SAO chez les très petits utilisateurs en Égypte, au montant de 340 000 $US, plus des coûts d'appui d'agence de 23 800 $US pour le PNUD, conformément à la décision 72/40.

Annex I

COUNTRY:	**International (to be implemented in Egypt)** **IMPLEMENTING AGENCY: UNDP**
PROJECT TITLE:	**Demonstration of Low Cost Options for the Conversion to non-ODS Technologies in PU Foams at Very Small Users (VSUs)**

PROJECT IN CURRENT BUSINESS PLAN:	**Based on ExCom Decision 72/40**
SECTOR:	**Foams**
Sub-Sector:	**Rigid and Integral Skin PU Foams**
ODS USE IN SECTOR:	**n/a**
BASELINE ODS USE:	**n/a (demonstration project)**
PROJECT IMPACT (ODP targeted):	**n/a (demonstration project)**
PROJECT DURATION:	**12 months**
PROJECT COSTS:	**US$ 340,000**
LOCAL OWNERSHIP:	**n/a**
EXPORT COMPONENT:	**n/a**
REQUESTED MLF GRANT:	**US$ 340,000**
IMPLEMENTING AGENCY SUPPORT COST:	**US$ 23,800**
TOTAL COST OF PROJECT TO MLF:	**US$ 363,800**
COST-EFFECTIVENESS:	**n/a**
PROJECT MONITORING MILESTONES:	**Included**
NTL. COORDINATING AGENCY:	**Egypt Environmental Affairs Agency (EEAA), National Ozone Unit**

PROJECT SUMMARY

The objective of this project is to optimize, validate and disseminate easy to use low cost PU metering equipment and pre-packaged systems for the use at very small users (VSUs) in the manufacture of PU rigid insulation and integral skin foams. Chemically, the use of long term stable, prepackaged two component systems is envisioned. The country selected for implementation is Egypt. Egypt is a Party to the Vienna Convention and the Montreal Protocol and ratified the London, Copenhagen and Montreal amendments. The country is fully committed to the phaseout of HCFCs and willing to take the lead in assessing and implementing new HCFC phaseout technologies, particularly in the foam sector—as it did for CFCs in 1992 when it submitted and completed the first foam sector investment projects ever under the MLF. Egypt has local PU system houses that frequently combine importations and distributions for major international chemical and equipment manufacturers with local blending for SMEs. In addition, most international PU chemicals suppliers are represented with offices or their own system houses. Its existing HCFC phaseout program has a section dedicated to VSU that is in need to the outcome of this demonstration project but will not require additional investment funding. Similar projects in Brazil, Mexico and Nigeria are also in need to address its VSU customers.

IMPACT OF PROJECT MONTREAL PROTOCOL OBLIGATIONS RELATED TO VSUs

This project is a pilot project aimed to optimize PU sector technologies and will contribute indirectly to the fulfillment of Montreal Protocol obligations in any country with a VSU subsector. In Egypt, Mexico and Nigeria this will facilitate existing, approved programs and NOT lead to additional funding—just better implementation because, if successfully validated, the optimized technology will contribute to availability of better and cost-effective phaseout options.

Prepared by: Bert Veenendaal **Date: October, 2015**

PROJECT OF THE GOVERNMENT OF EGYPT
DEMONSTRATION OF LOW COST OPTIONS FOR THE CONVERSION TO NON-ODS TECHNOLOGIES IN PU FOAMS AT VERY SMALL USERS (VSUs)

1. PROJECT OBJECTIVES AND RATIONALE

The objectives of this project are to:

- Optimize and validate low cost chemical and equipment options for ODS phaseout at VSUs;
- Demonstrate these in downstream operations;
- Transfer the technology to interested system houses and other users around the world, and
- Use the outcome in existing projects thus, at no additional costs, improving the success of these projects.

2. CONTEXT

2.1 MARKETS/APPLICATIONS

While VSUs are not limited in applications—rather in size—there are typical applications. They are:

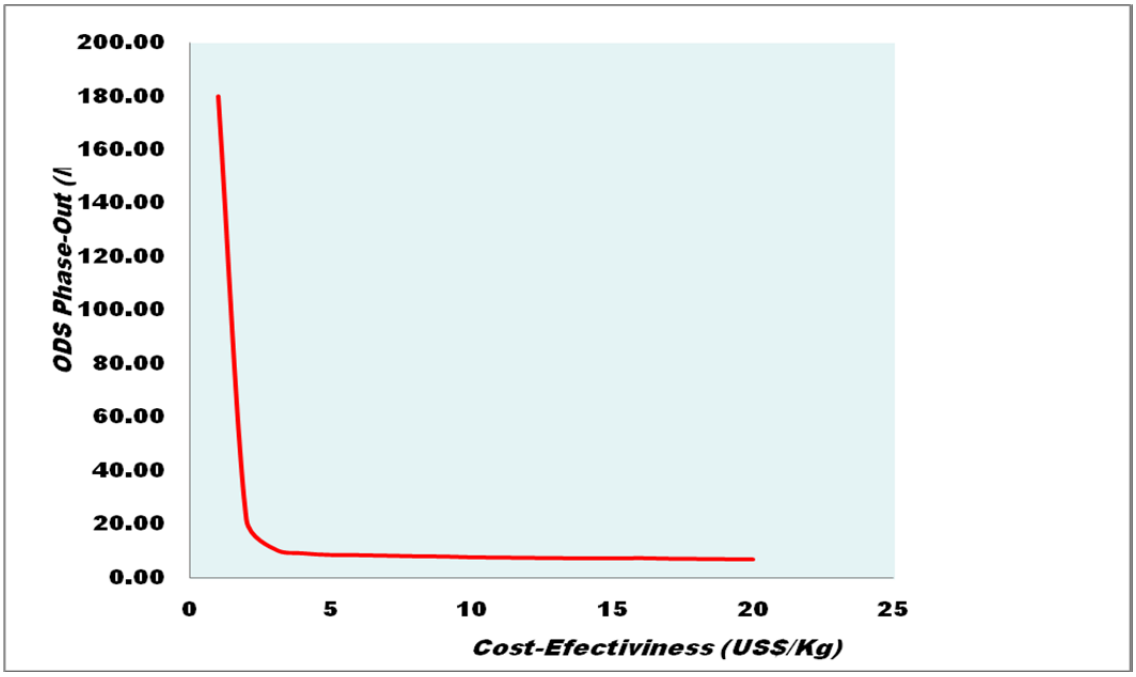
For Rigid PU Foam	- boat insulation
	- repair of existing insulation
	- home insulation improvement
	- making disposable molds (mostly in ceramic applications)
	- marine fenders
	- concrete replacement
For Integral Skin Foam	- bicycle saddles
	- safety coatings in exercise equipment
	- fenders
	- furniture parts

2.2 PREVIOUS WORK WITH VSUs

MLF projects are since 1993 subject to Cost-Effectiveness (C/E) Thresholds. These thresholds are not taking consumption volumes into account and therefore are frequently difficult to meet by very small users (VSUs). Many VSUs practice hand-mix, an operation deemed an industrial hygienic concern as no emission control or personal protection is used. These companies need low cost/easy to use equipment that meets applicable limits on cost-effectiveness. Others use infrequently PU foams and have problems with inventories in view of the relatively short life time of existing systems (3-6 months).

A first attempt to deal fairly and effectively with small users (SMEs) was a 1995 study by UNDP called *"Determination of Cost-Effective Phaseout Approaches for Enterprises with relatively Small ODS Use"*. The Multilateral Fund Secretariat (MFS) prepared, based on this study, Document 17/55 (June 30, 1995) called "Strategy Paper for Small Foam producing Enterprises". It recommended dividing projects by size and foam category; to assign to large and medium sized enterprises specific C/E thresholds and to make the approval of small projects subject to specific cost containment procedures. This would have addressed the issue. However, the study was not accepted at that time and was never transformed into a formal policy. Nevertheless, anybody who reads the document and is familiar with approval procedures will recognize later use of many of the proposed elements.

The cost effectiveness increases exponentially when the consumption decreases as following graph shows:



Following approaches have been tried by UNDP to obtain cost containment when dealing with SMEs:

- Management : Use local experts; work with group projects
- Technology : Evaluate and validate new technologies
- Equipment : Use more retrofit; develop low-cost equipment
- Trials/Tests : Get suppliers involved
- IOCs : Regardless of the technology applied, calculate IOCs based on the lowest cost (validated) technology

The largest success has been creating ODS projects using PU System Houses as project managers. This approach provided not only local project management but also larger economy of scale and supplier-arranged trials/tests.

The validation of new technologies was almost equally successful. UNDP conducted in the foam sector ten (10) demonstration projects to evaluate new—or to modify existing—technologies. Through this program, methyl formate (MF) and methylal (ML)—both oxygenated hydrocarbons or HCOs—are already approved in over 10 countries -- Brazil, Cameroon, Dominican Republic, Egypt, El Salvador, Nigeria, Russia, South Africa and Trinidad-Tobago and in several of these countries by now successfully completed. One system house in Mexico offers successfully preblended hydrocarbons, including smaller users in sprayfoam. While some of the demonstrated technologies suffer under economic constraints, such as high license fees (supercritical CO_2) or high operating costs (HFOs) the program in general has saved the MLF millions of dollars in project costs.

Attempts to decrease equipment costs had mixed results. UNDP has, as part of CFC as well as HCFC phaseout plans, consistently searched for lower cost equipment as described in detail above. Such attempts had mixed results:

- Retrofit of equipment has significantly decreased costs when using water, MF or ML technologies (Mexico, Dominican Republic, El Salvador);
- Renting out equipment to very small users (VSUs) failed because of frequent mishandling of equipment as well as chemicals (Egypt, Mexico);
- An attempt to import low cost equipment in one country (Colombia) failed because of lack of training and local equipment service;
- An attempt to lower costs of ISF equipment in Mexico was very successful but still is off UNDP's goal and requires further fine-tuning;
- Infrequent use leads to aging issues with chemicals.

2.3 PROPOSED EFFORTS RELATED TO THIS DEMONSTRATION PROJECT

A. One issue identified by UNDP was that all Pour-in-Place (PIP) equipment is based on sprayfoam equipment—being relatively low cost equipment and easily fitted for PIP operations. However, such spray-foam equipment has features that are not needed for PIP operations such as:

- High pressure pumps
- Long supply hoses, and misses features such as:
- Built-in compressor
- Two phase electrical hook-up
- Chemical tanks

UNDP therefore looked in the market for equipment that would fit better the purpose of PIP applications. It foundsuitable—albeit not ideal—equipment from Pumer/Brazil (see picture below):

Pumer-1000 DT medium pressure injector

While this dispenser cuts the current price of a PIP dispenser considerably, it still does not meet several of UNDP's criteria:

- It is still too expensive
- It has medium injection pressure rather than the desired low pressure
- It has no built-in compressor

UNDP has had discussions with the manufacturer and believes that further economizing and adaptation will be possible. Other companies have offered to prepare bids based on UNDP's design criteria which are

- Better efficiency in the use of chemicals;
- Economizing (cost reduction) of existent equipment or
- Developing new, low cost equipment;
- Easy in operation and maintenance
- Ready to use with just a two phase electrical connection.

B. For integral skin equipment a similar program will be based on a previous attempt to economize equipment in Mexico for that particular purpose:

Low cost ISF Foam Dispenser, developed by Zadro/Mexico

For this application, different properties are required:

- Variable r chemical ratios
- Gear pumps allowing high viscosity
- Heating for chemicals

In addition, in both cases, the issue of local maintenance needs to be addressed. Emphasis will be put on local, sustainable capacity for training and equipment service to ensure the required level of sustainability of results.

C. Another issue is infrequent use of chemicals such as for setting poles for fences, electricity, etc. This application requires small, pre-determined amounts of chemical to set a pole—much like cement but much faster in solidifying. Because of irregular, in field use, users in this application have problems with chemical life time—now typically 3-6 months. A life time of at least one year is desired. UNDP located a US company that manufactures prepackaged chemicals for pole setting applications with a life time of up to 2 years and intends to bring this technology to existing system house in, initially, Egypt but later in any country that has system houses and is interested.

2.4. Estimated Potential Project Impact

Depending of the stage of development and the size of a country, VSUs' market share in foam applications can range from 5%--such as Egypt—to more than 30%-- such as Nigeria.

Indeed, the Egyptian HPMP mentions that "from available information it has been determined that "Micro Users" (=VSUs) account for 22.3 t HCFC-141b and, assuming an average use of 250 kg/y per company, include up to 100 companies." Other countries such as Brazil, India, Mexico and Nigeria will have much larger VSU sub-sectors and many more VSUs and the outcomes of this demonstration program are essential to ensure smooth HPMP implementation in VSU sector.

The amount of HCFC-141b phase-out that may benefit from this project, or the number if VSUs that would apply the solutions proposed in sections A, B and C of the previous section 2.3 would be very hard to estimate, but may very well amount to over 600 metric tons of HCFC-141b and thousands of VSU enterprises.

3. PROJECT DESCRIPTION

The concept of this project is to develop:

- Easy to use and maintain low-cost foam dispensing units for PIP Rigid Foam applications that include air compressors and is relying on two phase electrical power;
- Low cost variable ration foam dispensers for integral skin applications Alternatively, look into lowering the costs of existing low-cost equipment already on the market; and
- For infrequent PU users, make available the option of prepackaging PU systems that are sealed, have a long lifetime and can be used upon demand.

The implementation of the equipment part of the project will be staged as follows:

1. The selection of an importer/installer/service provider – based on an open call bidding via requests for proposals (latter giving better flexibilities with previously untried approaches);
2. Review of existing offerings of low-cost equipment followed by negotiations with selected providers on required modifications and potential cost savings – on modifications it currently roughly estimated to be below US$ 10,000 per PIP simplified machine (below US$ 10,000 for ISF and US$ 5,000 for RPF machine with modifications in electronics, removal of spray function and less hosing, gun cleansing mechanisms with simplified mixing heads and better local service for sustained operations), but yet to be tested on the actual costs below this target threshold;
3. Selection of equipment to be validated;
4. Purchase and validate the most promising equipment (1-2 different dispensers);
5. Workshop to present the outcome(s).

Interested equipment suppliers that can potentially meet requirements from the project are listed below as prospective bidders to provide such services (selection is subject to universal UN procurement procedures which apply to projects under implementation):

- Pumer	Belo Horizonte	Brazil	RPF only
- Cannon	Milano	Italy	ISF and RPF
- Zadro	Guadalajara	Mexico	ISF only
- Tec Mac	Milano	Italy	ISF and RPF
- FSI	St. Louis	USA	RPF only

The implementation of the chemical part of the project is envisioned as follows:

1. Selection of a system house willing to cooperate on this approach;
2. Identification of existing prepackaged systems (there are reportedly such systems in the USA) with stable storage life-time/easy component perforation when in need for field application;
3. Evaluate this technology at the selected system house;
4. If successful, install a local component facility and/or assembly facility;
5. Conduct trials/tests to assure that the equipment is suitable for the earmarked ODS phaseout technologies;
6. Include the outcome in the mentioned workshop in technology section.

VSUs currently use the — unprotected — hand-mix approach, opening and blending from containers delivered by system houses and mixing these with a stick or electrical mixer. The main issue is, of course, the unprotected use of PU chemicals, but also the issue of lifetime of the chemicals is important. Systems normally have a lifetime of 3-6 months and VSUs frequently exceed this. In addition, they do not properly protect chemicals from humidity, thus further lowering life time.

System houses in Egypt do receive assistance from HPMP Stage I on HCFC-free conversions to tested technologies which are HC, ML and MF, but do not receive any funding for further research and development on newer type of applications in the foam sector, which is the purpose of the current pilot project.
The project foresees the manufacture of small, properly sealed packages that, when needed, are punctured and used. This avoids exposure to emission and skin. That is not the case with current smaller system houses' deliveries in, 200 l drums.

Previous experience taught that local, knowledgeable service and availability of spare parts are essential to success. Therefore, the consideration for local production/assembly of selected equipment is essential.

Likewise, prepackaged systems have only a chance in the market when produced and marketed —or at least backed-up—by a local system house.

While the project includes trials/tests, these will be conducted to the extent possible at system house development facilities and with one or two selected customers. Industrialization should take place through National Phaseout Plans. It should be noted that these plans for Egypt and Mexico have already funds dedicated to VSUs. More specifically, it should be emphasized that the results of this pilot project will be immediately applicable in already approved VSU projects in Mexico, Brazil, Egypt and Nigeria without rising costs to MLF (currently designed approach of renting equipment to VSUs does not work), as well as in future such programmes in other countries, as such optimized equipment can be then purchased from ready developer at lower cost.

In summary, a successful cost reduction program requires following features:

- An effective local commercial operation providing importation, sales as well as after sales support;
- Inclusion of auxiliaries such as an air compressor and a set of pour guns;
- Standard, two phase electrical requirement;
- A simple, built-in gun cleaning systems;
- A set of small chemical tanks with protection against humidity, to the extent possible consisting of commodity parts;
- A cost goal of US$ 5,000 for RPF and US$ 10,000 for ISF equipment;

4. PROJECT COSTS

Cost forecasts for demonstration projects are problematic as these projects are by nature unpredictable. UNDP has used to the extent possible guidance provided by the Secretariat in Document 55/47 Annex III, Appendix II. Applying this guidance leads to the following summarized cost expectations:

DEVELOPMENT/OPTIMIZATION/VALIDATION/DISSEMINATION				
#	**ACTIVITY**	**BUDGET (US$)**	**Description of sub-activities**	
1	Project Management	30,000 30,000	Local expert International expert	Local coordination, sourcing of service capacities International development coordination
2	Identifying local capacity	10,000 10,000	Study tour Study tour	For equipment development For prepackaged systems
3	Production eqt development	50,000 50,000 25,000	Optimize existing equipment Develop new equipment Develop prepackaged systems	
4	Validation/Field evaluation	20,000 20,000 10,000	Optimize existing equipment New equipment Prepackaged systems	
5	Workshop	25,000		To disseminate the project outcomes
7	Safety review	30,000	Operational safety Design safety	At manufacturer as well as enduser At manufacturer

8	Contingencies	30,000	10% of sub-total/rounded	
TOTAL		**340,000**		

5. IMPLEMENTATION FRAMEWORK AND MONITORING

Following tentative implementation schedule applies:

TASKS	2015				2016			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Project Start-up								
MF Project Approval				X				
Receipt of Funds				X				
Grant Signature				X				
Monitoring/oversight activities in place					X	X	X	
Implementation								
Selection of partner					X			
Identification, evaluation and optimization of existing and new approaches						X	X	
Industrialization, trials/tests							X	X
Dissemination Workshop								X

MILESTONES FOR PROJECT MONITORING

TASK	MONTH*
(a) Receipt of funds	2
(b) Project document signatures	3
(c) Bids prepared and requested	5
(d) Contracts Awarded	6
(e) Equipment Delivered	8
(f) Training Testing and Trial Runs	10
(g) Completion	11
(h) Dissemination/reporting	12

* As measured from project approval

The project document includes the customary implementation and milestones achievement plant and meets decision 72/40 requirement to be completed in one year. The project will be backed by two missions from assigned international expert during its lifetime of 12 months, and from UNDP MPU office to ensure progress is achieved in accordance with plan of actions.

With the team present on the ground (HPMP team) the daily supervision will be ensured. With respect to the equipment development process, since it being simpler than the three-way injection machine with SAIP in the previous project, it is not seen as a major barrier in delaying the project's outcomes.

6. PROJECT JUSTIFICATION

6.1 CONFORMACE WITH APPLICABLE POLICIES

The project is submitted in response to ExCom Decision 72/40. The relevant part of this decision states as follows, and the way UNDP has addressed them are added in **bold**.

(i) The following criteria would be applied when selecting projects:

a. The project offered a significant increase in current know-how in terms of a low-GWP alternative technology, concept or approach or its application and practice in an Article 5 country, representing a significant technological step forward;

While the first part of the condition recommends that the demonstration should relate to a low-GWP alternative, the second part of the sentence also allows for "applications and practices representing a significant technological step forward". This demonstration clearly falls under the latter category as described in paragraphs 2 and 3 above. As mentioned, it will save a significant amount of funds to the MLF by addressing very small users (VSUs).

That said, the project will also result in a conversion of HCFCs to low-GWP solutions in VSUs. While in theory, they may shift to HFCs, these alternatives would typically be more expensive than if they were to go to solutions involving low-GWP. It is anticipated in fact that a vast majority of the VSUs – if given the proposed technology solutions of this demonstration – would select water-blown technology, while others may use methyl formate, methylal, HFOs, etc. There would therefore be a positive climate impact, albeit hard to quantify. Having said that, the use of HCs for foams in VSUs is very unlikely due to safety concerns.

b. The technology, concept or approach had to be concretely described, linked to other activities in a country and have the potential to be replicated in the medium future in a significant amount of activities in the same sub-sector;

Paragraphs 2 and 3 above provide a detailed description of the context and the proposed approach, and linkages to the replication of VSUs in other article-5 countries are provided, albeit hard to quantify.

c. For conversion projects, an eligible company willing to undertake conversion of the manufacturing process to the new technology had been identified and had indicated whether it was in a position to cease using HCFCs after the conversion;

This is not a conversion project, but a <u>true</u> demonstration project in the strictest sense of the word. Indeed, rather than converting an ODP-consuming enterprise, new equipment and systems will be developed with equipment suppliers, to be then used in a system house in Egypt, to ensure proper implementation of the VSU component which otherwise is likely to fail in other similar VSU programmes. This was exactly the case with the previous true demonstrations carried out by UNDP, such as for methyl formate, methylal and the low-cost HC programme in Egypt.

That said, section 2.4 above tries to estimate the potential impact that this project may have worldwide, if it succeeds to address the VSU problematic being tackled in this demonstration.

d. The project proposals should prioritize the refrigeration and air-conditioning sector, not excluding other sectors;

This demonstration falls into the latter category (VSUs in foams).

e. They should aim for a relatively short implementation period in order to maximize opportunities for the results to be utilized for activities funded by the Multilateral Fund as part of their stage II HCFC phase-out UNEP/OzL.Pro/ExCom/72/47 36 management plans (HPMPs);

Implementation time for this project is considered 12 months as required by the decision 72/40.

f. The project proposals should promote energy efficiency improvements, where relevant, and address other environmental impacts;

The fact that the use of high-pressure spray foam equipment would be replaced by low-pressure simplified machines may result in some energy savings, but these would be minor and hard to quantify. The use of

small-packaged systems of chemicals would result in a decrease of chemical waste and unwanted chemical emissions as well.

While the current window for these projects prefers demonstration projects for the HVAC sector, it does clearly not exclude other sectors. Therefore UNDP requests to consider this project in the foam sector based on:

- UNDP's success rate in demonstration projects for this sector that has led to
  - Lower project costs (MF, ML, pre-blended/direct injected HCs with low GWPs)
  - New or modified ODS phaseout technologies that decrease cost thresholds
- Despite of past successes, there is still need to find solutions for very small users (VSUs);
- There is a need to redirect funds already approved and earmarked for VSUs that were based on approaches that proved untenable such as the provision of rental of equipment through system houses – this will help spread the existing low GWP technologies in this sector to a wider clientele to ensure more comprehensive uptake of these on national levels.

The projects includes some elements that could be seen as project preparation but most of that preparation—i.e. the basic outline of requirements for systems as well as equipment—has been finalized and the submittal of just a project preparation request would delay the eventual outcome unnecessary.

The project further cannot be seen as resulting in HCFC reduction targets being not associated with direct phase-out at any recipient system house, but is more geared towards optimization of general costs of equipment and preparing easy-to-use formulations for VSUs to assist in implementation of already approved VSUs sub-projects in the mentioned countries, as well as in future programmes of this type elsewhere.

6.2 SELECTION OF IMPLEMENTATION LOCATION

Egypt has been selected for this project because it has in its HPMP a sub-project for VSUs using rental equipment for very small users. After this approach has shown in Mexico to be untenable (rental equipment is damaged by inappropriate use, despite provision of application instructions; chemical are not cleaned out, causing clogging….), UNDP plans to redirect the funds to a low equipment cost approach. However, such an approach needs a proper and comprehensive study.

Several potential importers/service providers have already been located—which will speed up the implementation. For the systems, a system house that is willing to cooperate has also been identified.

Finally, overall, provided accumulated experience with the low cost HC technology optimization via three-way injection and preparation of pre-blended HC polyols in Egypt, the main technology report was submitted expediently (decision 66/15 approved it) for consideration of the Executive Committee where this technology further recommended for replication. Follow-on political changes in the country did not allow to make a complementary investigation study on density optimization at UNDP's initiative; which is now complete. Nonetheless, with the restoration of stable situation end of 2014, UNDP is confident that the current demonstration project is implementable, aided by the fact that less complex equipment, compared to the low cost HCs, is in focus of the current project.

7. RISKS AND BARRIERS

There have already been several successful attempts to address the needs of SMEs. This has led to adjustment in approaches (group projects around system houses, alternative, more affordable technologies). No approach, however, has been successful with VSUs. While this approach addresses past shortcomings such as local service, it is an uncharted way and therefore success is not secure. However, UNDP has shown in other demonstration projects that by and large, success of its approaches in more likely than not.

A potential barrier is the attitude of VSUs. For these companies, PU foam is often a very small part of their production—even a necessary evil—and changes do not always get the required attention and dedication. Working with local system house of distributors—very small users frequently do not buy directly—can reduce this barrier. Users are always considered a barrier for any project's successful implementation—in terms of not inclined to change, lacking financial means, not looking for additional work, etc. VSUs are not different. MLF-financed projects are designed to counter that attitude with a mixture of Government regulations, technical support and financial assistance. This is the case with MF, ML and low-cost HCs programmes.

VSUs are included in foam sector plans in programmes such as Mexico, Egypt, Nigeria and other countries, and the outcomes of this proposed project will help address HCFC consumption in such approved and future funded foam sector plans here in the former group there are now challenges discovered with the rental of equipment to VSUs as described in the current project document. This sector was accepted as eligible by the MLF Secretariat and then by the Executive Committee in approving such sector plans, and it needs, based on current HPMP implementation experience, a better approach from the chemical and equipment side, as proposed in this project.

If no remedies are obtained such as being proposed in this project, the situation in current sector plans will be left unaddressed with resulting non-compliance prospects.

8. REPORTING

A final report can be expected 12 months after project approval. Interim reporting will follow existing reporting guidelines.