PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Full-sized Project

THE GEF TRUST FUND

Submission Date: 9/29/09

PART I: PROJECT IDENTIFICATION

GEF PROJECT ID[1]: **PROJECT DURATION:** 48 months
GEF AGENCY PROJECT ID:
COUNTRY(IES): Colombia and Kenya
PROJECT TITLE: Solar Chill: Commercialization and Transfer
GEF AGENCY(IES): World Bank
OTHER EXECUTING PARTNER(S): UNEP-DTIE, with Greenpeace, UNICEF, Vestfrost, Danfoss, WHO, Danish Technological Institute, PATH, GTZ Proklima.
GEF FOCAL AREA (S)[2]: Climate Change
GEF-4 STRATEGIC PROGRAM(s): Technology Transfer
NAME OF PARENT PROGRAM/UMBRELLA PROJECT (if applicable)**: NA**

INDICATIVE CALENDAR*

Milestones	**Expected Dates mm/dd/yyyy**
Work Program (for FSP)	11/2009
CEO Endorsement/Approval	9/15/2010
Agency Approval Date	10/15/2010
Implementation Start	11/1/2010
Mid-term Evaluation (if planned)	7/1/2012
Project Closing Date	9/1/2014

* See guidelines for definition of milestones.

A. PROJECT FRAMEWORK

Project Objective: To commercialize and transfer the Solar Chill vaccine refrigerator (Solar Chill A) and to begin the process of commercializing and transferring the Solar Chill household and light commercial refrigerator (Solar Chill B)

Project Components	**Indicate whether Investment, TA, or STA[b]**	**Expected Outcomes**	**Expected Outputs**	**Indicative GEF Financing[a]**		**Indicative Co-Financing[a]**		**Total ($)** c =a + b
				($) a	%	($) b	%	
1. Development, Evaluation and Testing of Solar Chill A	STA	Certification of Solar Chill A by WHO	Clear and favorable test results for Solar Chill A	NA		1,600,000 (to date) 100,000 (in-kind)		1,700,000
2. Procurement and Installation of 100 units of Solar Chill A in each country	TA-Investment	Field evaluation verifying technical performance and user acceptance of SolarChill A; , Increased interest in and demand for Solar Chill A	Demonstration experience of Solar Chill A under field conditions in representative health centers to ensure that safe vaccine storage conditions are met	1,073,000		250,000 (TBD)		1,323,000
3. Procurement and testing of Solar Chill B units in each country	TA-Investment	Increased experience of Solar Chill B	Prototype Testing results of Solar Chill B under field conditions	400,000		100,000		500,000
4. Marketing and Information	TA	Info re Solar Chill widely available,	Marketing campaign, business plans,	200,000				200,000

[1] Project ID number will be assigned by GEFSEC.
[2] Select only those focal areas from which GEF financing is requested.

Dissemination		increased production and orders for solar chill products	increased orders for solar chill					
5. Technology transfer, including development of Technology transfer packages and workshops, capacity building and training.	TA	Solar Chill A and B production capacity established in Latin America and Africa	Facilitation of partnerships and licensing agreements, including assessment of potential partner companies by an unbiased engineer and business specialist. Preparation of a tech transfer packet	680,000		$3,000,000		3,680,000
6. Subtotal				2,353,000		$5,050,000		7,403,000
8. Project management				$0.23m				230,000
Total project costs				$2.583m		$5.05m		$7.633m

[a] List the $ by project components. The percentage is the share of GEF and Co-financing respectively of the total amount for the component.
[b] TA = Technical Assistance; STA = Scientific & Technical Analysis.

B. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE and by NAME (in parenthesis) if available, ($)

Sources of Co-financing	Type of Co-financing	Project
Project Government Contribution	in-kind & cash (tbd)	$450,000
GEF Agency(ies)	(select)	
Bilateral Aid Agency(ies)	(select)	
Multilateral Agency(ies)	(select)	
Private Sector	Investment	$3,000,000
NGO	(select)	
Solar Chill Partners	(cumulative to date- cash)	1,600,000
Total Co-financing		$5,050,000

C. INDICATIVE FINANCING PLAN SUMMARY FOR THE PROJECT ($)

	Previous Project Preparation Amount (a)[3]	Project (b)	Total c = a + b	Agency Fee
GEF financing		2,583,000	2.583m	0.2583m
Co-financing	1,600,000	3,450,000	5.050m	
Total			7.633m	

PPG amount estimated at $145,000 not included in above.

[3] Include project preparation funds that were previously approved but exclude PPGs that are awaiting for approval.

D. GEF RESOURCES REQUESTED BY AGENCY (IES), FOCAL AREA(S) AND COUNTRY(IES)[1]

GEF Agency	Focal Area	Country Name/ Global	(in $)		
			Project (a)	**Agency Fee (b)**[2]	**Total c=a+b**
IBRD	CC	Colombia Kenya	2,583,000	258,300 (Of which $48,000 will be used by UNEP-DTIE)	2,841,300
Total GEF Resources			2,583,000	258,300	2,841,300

PPG amount of $145k is not included in above.

.

PART II: PROJECT JUSTIFICATION

A. STATE THE ISSUE, HOW THE PROJECT SEEKS TO ADDRESS IT, AND THE EXPECTED GLOBAL ENVIRONMENTAL BENEFITS TO BE DELIVERED: Until recently, the market for vaccine refrigerators for remote rural areas has been dominated by refrigerators operating on kerosene and LPG . These refrigerators have presented a number of problems relating to their costs, effectiveness, and environmental implications. First, in truly remote areas, obtaining kerosene or LPG on a timely basis has proven to be quite challenging, as well as expensive. Second, existing kerosene or LPG vaccine refrigerators have been built with adjustable thermostats that can be set to a freezing temperature. It is the freezing temperature that results in the destruction of large quantities of live-virus vaccines. Worldwide, the value of these improperly stored vaccines runs to millions of dollars on an annual basis. Thirdly, current vaccine refrigerators primarily use hydrofluorocarbons (HFCs) for the refrigerant, and hydrochlorofluorocarbons (HCFCs) for the insulation foam blowing agent. Both HFCs and HCFCs are powerful Greenhouse Gases (GHGs), and HCFCs are also ozone depleting substance. Finally, kerosene and LPG vaccine coolers result in greenhouse gas emissions through normal operation, with the additional hazard that they can catch fire and they emit toxic fumes that are dangerous to human health in enclosed spaces. Solar vaccine refrigerators currently on the market rely on lead-acid batteries to store electricity, and also make use of HFCs and HCFCs. The batteries are typically the weakest link in solar systems in developing countries; they break down frequently in hot climates and thus impose risks and inefficiencies. They are also vulnerable to theft as they can be used in other applications, and they create disposal problems.

Solar Chill is an initiative designed to avoid these problems. It has been designed as an initiative to stimulate the development of vaccine refrigerators that is renewable and environmentally benign. The Solar Chill A model has spun out of this initiative: it is a vaccine refrigerator for remote rural areas that relies on direct current (DC) to run a hydrocarbon-based refrigerator compressor (i.e. using a non-ozone depleting and low GWP refrigerant), and makes no use of lead-acid batteries. Thus, it is a more efficient use of limited solar energy that has no emissions that threaten human health or the environment. It makes use not only of extremely efficient insulation, but also in water-pack lining to ensure that the vaccines are kept cold, but are never frozen.

SolarChill adapted mass produced freezer cabinets in order to reduce the cost of the units in comparison to other solar vaccine coolers currently on the market which are typically custom made.

The SolarChill initiative was started in 2000 by a consortium including Greenpeace International, Program for Appropriate Technology for Health (PATH); UNICEF, UNEP, WHO, GTZ Proklima, and the Danish Technological Institute. The first generation of SolarChill was built and demonstrated at the World Summit on Sustainable Development in Johannesburg in 2002. Since then, a second generation of prototypes were built and tested in Cuba, India, Indonesia and Senegal. Sufficient lessons were learned regarding the technology to allow a third generation of SolarChill vaccine refrigerators to be ready for testing on a larger scale. As these have been designed to meet the latest WHO standards for vaccine refrigerators, it is anticipated that they will present a unique opportunity for health ministries and clinics around the developing world to take advantage of the latest in solar energy technology and in refrigeration technology. The goal of this project is to provide meaningful scale of tests for this SolarChill vaccine refrigerator technology to allow it to proceed to the final stages of commercialization in two developing countries each with the potential to transfer the technology to private-sector producers. The annual demand for these vaccine refrigerators has been estimated at between 3,000 and 5,000 units annually.

In addition to the SolarChill vaccine refrigerator, referred to as 'Solar Chill A', there is also now an early prototype for household or light commercial refrigerators making use of the same technological innovations. This additional model, referred to as 'Solar Chill B', will be targeted at the household and light commercial sector, but will not have to undergo the same level of rigorous testing and certification standards as the vaccine refrigerators. Nevertheless, the potential market for Solar Chill B to help preserve food in the unelectrified rural areas in developing countries is immense. As the potential market demand for the Solar Chill B is more immense than the Solar Chill A, it may be seen as a more profitable product than the Solar Chill A for companies considering adopting the technology and production these new, direct-driven coolers. The partner companies identified through the PPG to produce the solar chill units will be expected to invest their own resources, estimated at about $1.5m per retrofit manufacturing line, to supply the solar chill markets and products.

The global environmental benefits of this technology will be reduced GHG emissions, both from direct emissions from the refrigerant charge, a reduction in the kerosene currently burned to cool current off-grid vaccine refrigerators, a reduction in emissions attributable to delivering the kerosene to the clinics, and a reduction in the use of ozone-depleting substances. In addition, benefits to both the local and global environment will be gained from the avoidance of the use of lead-acid batteries. The economic and health benefits in terms of improved vaccine storage and reduced food spoilage are potentially immense.

DESCRIBE THE CONSISTENCY OF THE PROJECT WITH NATIONAL/REGIONAL PRIORITIES/PLANS: In both participating countries, the Government (both Ministry of Health and Ministry of Environment) have expressed an interest in obtaining greater experience with Solar Chill A vaccine refrigerators. Kenya has clearly expressed an interest in them. Colombia was involved in earlier demonstration of the solar chill refrigerators, and the Colombian Ministry of Health has already provided an order for 25 Solar Chill A units. Both countries see it as posing an environmentally friendly solution to the challenges of their health sector. However, in terms of the capability of producing the solar chill units in country, the two countries provide a different story. In Colombia's case, earlier solar chill consortium work has identified eight companies currently producing refrigerators locally: HACEB; Challenger SA; Industrias Haceb SA; Landers & Cia SA; Mabe de Colombia SA; Oster De Colombia Ltd; Seb Colombia SA, Groupe; and Whirlpool Colombia. In the past, Vestfrost has collaborated with several of these companies. The PPG being undertaken will assess the the capabilities of these companies will be assessed by project partners as the project moves forward. In Kenya, most refrigerators are imported from abroad. The activities undertaken in this PPG will require that both the demand and potential supply to Kenya and neighboring countries (which form potentially a huge market for solar chill products) be assessed and directed.

B. DESCRIBE THE CONSISTENCY OF THE PROJECT WITH GEF STRATEGIES AND STRATEGIC PROGRAMS: This program is designed to provide exposure to and experience of working with a new, environmentally friendly technology that will reduce GHG emissions, ODS emissions, and emissions from burning kerosene in clinics and homes. It will also reduce the need for lead-acid batteries (deep-cycle or otherwise) in the vaccine cold-chain, removing another potential sources of environmental damage. Once transferred and mass-produced, the technology itself looks to be cheaper and more reliable over its life-cycle than the current fossil-fuel based alternatives.

C. JUSTIFY THE TYPE OF FINANCING SUPPORT PROVIDED WITH THE GEF RESOURCES: The support from the GEF's technology transfer window will accelerate the provision of information about and the dissemination of the new Solar Chill A vaccine refrigerator. Once this device is certified by WHO, it will be purchased for use in participating developing countries, and activites to commercialize and transfer the technology can begin. The Solar Chill B domestic and light domestic refrigerator is at an earlier stage of commercialization and still requires prototype testing and demonstration. But commercially, it may have a broader market—with a less demanding certification—at farms, households, tuck shops, bars, restaurants and groceries all in remote rural areas. This potential profitability of the Solar Chill B may provide an incentive for companies to get involved in the technology transfer to provide Solar Chill A. This strategy of using the cool-boxes to reach potential manufacturers will be considered as part of the program.

The project will focus on three sets of activities. The first will involve the procurement of 100 Solar Chill A vaccine refrigerators for each partner country. These will be placed in solar clinic and will be carefully monitored to ensure that adequate data are available to verify the reliability of the product (1/3 of the products will have detailed monitoring and 2/3 will be more lightly sampled). UNEP, in consultation with Solar Chill international and local partners will ensure the scientific credibility of the data. These data will be critical to advertise the vaccine refrigerator around the world and stimulate the demand for the technology. Second, a smaller number of Solar Chill B units will be procured for each country. This will be demonstrated in industry shows and placed in businesses and places where they can be monitored for reliability, but also marketed. Given the magnitude of the potential market for cold drink and fresh food refrigeration in the target countries, it is likely that the Solar Chill B may stimulate more commercial interest than Solar Chill A. The third major activity under the project will be a marketing and awareness raising campaign, again to be undertaken by UNEP in collaboration with local and international partners. The purpose of this is to raise awareness of solar Chill products, stimulate market demand and pave the way for accelerated commercialization, production and technology transfer in the program countries. This budget will be evenly split between the two participating countries, and will include the process of prospecting for commercial partners for the technology. Funding is also made available for the actual development and provision of a technology transfer package, including legal agreements and licensing arrangements. However, in order to be successful, participating partner companies will be expected to invest in a retrofitted manufacturing line to be able to produce sufficient solar chill units to meet demand. The required resources are estimated on a preliminary basis at $1.5m per installation, bringing the expected investment requirement to $3m.

A PPG proposal for $145,000 will be submitted. The activities to be undertaken will include a detailed assessment of the market for solar chill products in the participating countries and their neighbors; an assessment of the local capabilities to produce solar chill in industry; and the formulation of a program to grow the market for solar chill technology and transfer the technology in order to meet that increasing demand.

D. OUTLINE THE COORDINATION WITH OTHER RELATED INITIATIVES: This project is placed within the context of the evolution of thinking of the Montreal Protocol, which has moved from phasing out CFCs (which will be complete by the end of 2009) to phasing out HCFCs. HFCs are in the Kyoto basket of greenhouse gases. The widespread adoption of hydrocarbons [in some/many countries] is seen as one viable alternative to HCFCs and HFCs. Used in refrigeration, hydrocarbons pose few risks to the environment, being both non- ozone depleting and low GWP. This project is also aligned with the WHO's adoption of new standards for vaccine refrigeration system, which will help drive this technology as well.

E. DISCUSS THE VALUE-ADDED OF GEF INVOLVEMENT IN THE PROJECT DEMONSTRATED THROUGH INCREMENTAL REASONING : GEF support is needed to take this technology that has been progressing slowly over the past decade and move it rapidly up the commercialization scale. This support will not only provide sufficient testing and demonstration of the technology to be able to stimulate the market, but it will also help facilitate technology transfer agreements relating to the technology. Without the GEF support, this technology would proceed at a very slow pace toward expanded commercialization and would not be gaining the sort of global exposure and market demonstrations that will be obtained with this project.

F. INDICATE RISKS, INCLUDING CLIMATE CHANGE RISKS, THAT MIGHT PREVENT THE PROJECT OBJECTIVE(S) FROM BEING ACHIEVED, AND IF POSSIBLE INCLUDING RISK MITIGATION MEASURES THAT WILL BE TAKEN: No climate change risks are identified. The major risk is that the market and potential technology adopters will not respond favorably to this product, and its commercialization and transfer will proceed very slowly. **T**here is also the risk that the manufacturing base in either Kenya or Colombia will be insufficient to the task of producing the solar chill project. In such a case, alternative plans will be made to increase the market for the solar chill units.

G. DESCRIBE, IF POSSIBLE, THE EXPECTED COST-EFFECTIVENESS OF THE PROJECT: The project is expected to be cost-effective in terms of providing the least-cost approach to take this technology to commercilization in a short period of time. While it will result in the reduction of both emissions of GHGs and ODS, these reductions are anticipated to be relatively small. However, the humanitarian (and dollar) value of the contribution is extremely high.

H. JUSTIFY THE COMPARATIVE ADVANTAGE OF GEF AGENCY: This project focuses on developing the commercial infrastructure for investment in the production and marketing of the solar chill technology. Although it is a late comer to the solar-chill consortium, the World Bank is the GEF agency best suited to help drive the investment of the solar chill initiative. UNEP has been a partner in the Solar Chill initiative from the beginning and continues to play a key role as an executing partner providing scientific and technical advice.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

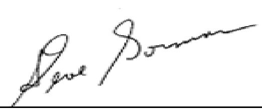
A. Record of Endorsement of GEF Operational Focal Point (S) on Behalf of the Government(s):

(Please attach the country endorsement letter(s) or regional endorsement letter(s) with this template).

Name	**Position**	**Ministry**	**Date** *(Month, day, year)*
Dr. A. Muusya Mwinzi	Director General	National Environment Management Authority	August 12, 2009
Ms. Claudia Mora Pineda	Vice Minister	Ministry of Environment, Housing and Territorial Development	September 29, 2009

B. GEF Agency(ies) Certification

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for project identification and preparation.

Agency Coordinator, Agency name	Signature	Date *(Month, day, year)*	Project Contact Person	Telephone	Email Address
Steve Gorman, World Bank Executive Coordinator		**9/30/09**	Richard Hosier	+1(202)458-0290	<rhosier@worldbank.org>