

**PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE**

Report No.: AB4732

Project Name	PH - Chiller Energy Efficiency Project
Region	EAST ASIA AND PACIFIC
Sector	General energy sector (50%); District heating and energy efficiency services (50%)
Project ID	P114119
GEF Focal Area	Ozone
Borrower(s)	GOVERNMENT OF THE PHILIPPINES
	Government of the Philippines Philippines
Implementing Agency	Department of Environment and Natural Resources
Environment Category	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> FI <input type="checkbox"/> TBD
Date PID Prepared	June 08, 2009
Date of Appraisal Authorization	June 24, 2009
Date of Board Approval	November 17, 2009

1. Country and Sector Background

Country Obligations under the Montreal Protocol and Clean Development Mechanism under Kyoto Protocol, with GEF support. The Project is developed within the context of the Medium-term Philippine Development Plan 2004-2010 (MTDB) which states that there is a need to manage natural resources and protect the environment to improve the quality of life of Filipinos and endorses systems conversion to ozone depleting substances (ODS) friendly technology, products and equipment. The Philippines has made great progress in phasing out the consumption of chlorofluorocarbons (CFCs) (used in refrigeration sectors as refrigerant and other sectors) over the last ten years since 1999 in accordance with its obligations to the Montreal Protocol (MP) on Substances that Deplete the Ozone Layer. The MP mandates a complete phase-out of production and consumption¹ of new ODS² in developing countries by January 1, 2010 and countries are requested to develop measures for the effective use of the ODS recovered from the chillers to meet servicing needs in the Refrigeration and Air-conditioning (RAC) sector³. The Philippines is neither a producer nor an exporter of CFCs. It has banned CFC-11 importation since 2005 and presently imports CFC-12. As of the end of 2007, the Philippines has phased out 2,847 MT of CFC, or 94% of its baseline consumption. It also intends to meet the MP total CFCs consumption phase-out deadline in January 2010.

In 1997, the international community adopted the Kyoto Protocol (KP), which requires developed countries to reduce emissions by an average of 5.2% between 2008 and 2012,

¹ The Montreal Protocol Article 1 defines "Consumption" as Production plus imports minus exports of controlled substances.

² Applicable to ODS belonging to Group I of Annex A of the MP

³ Sixteenth Meeting of the Parties Decision: UNEP/OzL.Pro.16/17, Decision XVI/13

compared to 1990 baseline. The KP has a number of flexibility mechanisms, including the Clean Development Mechanism (CDM), which enables developed countries to reduce the costs of compliance through the purchase of emissions reductions from projects in developing countries, provided that the emission reductions are real, measurable and long term, and that CDM projects meet sustainable development objectives in those countries. The Philippines ratified the UNFCCC in 1994 and subsequently ratified the KP in 2003.

The Philippines, as a Party to both MP and KP, is eligible for financial and technical assistance from the MLF, the GEF, and the CDM. The Project meets the objective of the KP by encouraging energy savings which in turn help in the reduction in emissions of GHGs. It also fits into the objective of the GEF4 by transforming the marketplace and introducing the concept of life-cycle based decision making in the chiller sector. The Project will also meet the objective of the MP by facilitating the replacement of old CFC-based chillers and reducing the burden of CFC usage in the servicing sector. The project will contribute to the Government of the Philippines' ongoing efforts to meet its obligations under the MP by reducing demand for new CFC. It complements the MLF-financed National CFC Phaseout Plan which deals with all consumption subsectors except for chillers. The additional chillers replaced with financing by CDM resources is equivalent to a replication strategy, which is consistent with the goal of ensuring consistency between the efforts of the GEF and CDM, while avoiding duplication of efforts and funding between the two. The Project will also support the Philippines to meet its ODS phaseout obligations under the MP, with minimum disruption to industry and economic development (and also meeting GEF's sound chemicals management objectives).

Inefficiency of Old CFC-based and non CFC-based Chillers. Because use of stockpiled or recycled CFCs in the refrigeration servicing sector is not controlled under the MP, stockpiled or recycled CFCs can be used in servicing old CFC based chillers beyond 2010. However, the average chiller manufactured today uses about 35% less electricity than chillers produced just two decades ago. With the best technology available, operated on HCFC-123 or HFC-134a, new chillers can use up to 50% less electricity than an average chiller from 1976.⁵ In addition, due to poor maintenance practice of chillers in the Philippines, younger non-CFC based chillers installed in late 1990s and early 2000s are also consuming high energy than expected. Energy efficiency savings is therefore a primary environmental consideration and potential economic incentive for conversion to non-CFC chillers.⁶ Replacing CFC based chillers contributes to reduced greenhouse gas (GHG) emissions both from an energy consumption perspective and from reduced emissions of CFCs which have high global warming potential⁷.

Barriers to Replacement of Inefficient Chillers. Despite the clear benefit to chiller owners of opting for non-CFC energy efficient (EE) chillers through dramatic savings in energy costs, early replacement is not taking place because of financial, technology, and information barriers. In an environment of competing investment opportunities and resource constraints, chiller replacement

⁴ Operational Program #5: Removal of Barriers to Energy Efficiency and Energy Conservation

⁵ Report of the TEAP Chiller Task Force, Technical and Economic Assessment Panel of the Montreal Protocol, May 2004.

⁶ Ibid. While some alternatives (HFCs) do possess Global Warming Potential (GWP), refrigerants on the whole do not contribute to global warming unless released into the atmosphere. Properly maintained chillers of modern design emit less than 1% of their refrigerant charge each year. The dominant global warming effect caused by chiller operation is therefore, the carbon dioxide emitted during combustion of fossil fuels used to generate the electricity required to drive them.

⁷ CFC-11 has a GWP of 5000, while CFC-12 has a GWP of 8500

which requires high upfront capital expenditures is not a priority of building owners. This situation is aggravated by other barriers including weak regulatory capacity, the longer-term achievement of the additional benefits of the investment compared with other less costly business upgrades with apparently better rates of return, access to capital, and perceived technology risks in operating new non-CFC chillers, and lack of awareness of the potential savings that could be rendered by the new technology. Results from demonstration projects funded by the MP's financial mechanism, the Multilateral Fund (MLF) and the Global Environment Facility (GEF) in Thailand and by the MLF in Mexico and Turkey, as well as a comprehensive MLF-World Bank Chiller Sector Study in India, confirm this finding. Therefore appropriate financial arrangements need to be put in place to accelerate the replacement of old centrifugal chillers to new non-CFC based energy efficient chillers.

Chiller Population in the Philippines. A national survey of chillers to update the baseline information for replacement was carried out in August 2008 which includes conduct of meetings and public consultations with chiller owners, suppliers, manufacturers, ESCOs and government institutions. Based on the baseline information to date covering only Metro Manila and neighboring cities, there are more than 330 inefficient chillers with a total of at least 123,000 Tons Refrigeration using R11, R12, R22, R123, and R134a. Using an emission rate of 0.6 tCO₂/Mwh which is applicable to the Luzon grid, the carbon emission reductions (CERs) that will be achieved in replacing these chillers will be more than 400,000 CERs.

2. Objectives

The Project development objective (PDO) is to reduce GHG emissions by replacing inefficient chillers including both old CFC-based chillers and non-CFC-based chillers.

3. Rationale for Bank Involvement

The Project is consistent with goals of the Philippines CAS which focuses on ensuring development with social equity through the protection of the environment and natural resource base. Since the effects of climate change range from erosion of beaches, inundation of coastal lands, additional costs to protect coastal communities and loss of habitats and species, this proposal fits within the World Bank's planned and on-going operations to improve governance and reduce poverty at the countryside by encouraging public-private partnerships.

The World Bank is uniquely positioned to mobilize funds from a number of sources to achieve the desired outcomes of this project. Firstly, it is the largest Implementing Agency (IA) of the GEF and MLF⁸, and is committed to implementation of activities toward achievement of GEF operational programs and MP goals. Secondly it is a significant player in the global carbon market and has extensive experience in the development of CDM methodologies, project design and implementation of CDM interventions. On their own, the GEF, MLF and CDM mechanisms are not able to overcome the significant barriers to the accelerated replacement of chillers. However, the Bank has a wealth of experience in managing potentially complex financing mechanisms that are required for the successful delivery of the Project. Finally, a comparative advantage of the Bank is its vast experience in dealing with both large scale energy saving

⁸ Other Implementing Agencies are UNDP, UNIDO and UNEP, along with bilateral donor agencies

projects as well as ODS reduction projects, including those relating to the replacement of CFC-based chillers in Mexico, Thailand and Turkey, as is detailed in Annex 2.

The Bank has initiated a similar project in India. The Bank has pioneered the carbon market in many sectors, by developing benchmark baseline and monitoring methodologies that can be replicated in other projects or countries. It has developed more than 25 % of all methodologies approved by the CDM Executive Board so far, and has developed a methodology for the accelerated replacement of chillers in India which was approved in late 2007 and will be used for the Philippines.

The Bank has already mobilized strategic bilateral cooperation and private sector interest to support the successful implementation of the Project. Possible involvement of commercial lending institutions would demonstrate to the Philippines banking industry that energy conservation is a good business opportunity for future lending portfolios. Partnership with the financial industry is essential to future energy efficiency activities in the Philippines and the Project will complement other efforts in the Philippines to promote energy efficiency in the private sector such as the IFC-funded Sustainable Energy Finance Program. In addition, the US Environmental Protection Agency has promised its in-kind financial support for the development of a marketing tool that would outline the advantages of the Project to chiller owners as it did for the similar project in India.

4. Description

The Project has four key components, as defined below:

Component 1: Investment to Chiller Replacement

This component will provide financial incentives (20% subsidy, 15% of cost of new chiller and 5% import tax exemption) to accelerate the replacement of old centrifugal chillers to non-CFC energy efficient ones, in advance of the natural attrition rate of the existing equipment. Following the full implementation, the Project will consider expanding the scope of work to include CDM-eligible and non-centrifugal chillers, provided that significant gains in energy efficiency can be achieved.

Sub-component 1.1: Incentive to Chiller Owners

The grant funds from GEF and MLF will be used to provide incentives for inefficient chillers, in the initial phase of project implementation (until grant funds are exhausted). Additional units will be replaced through revenues generated by carbon credits. In the initial phase, chiller owners will have the following two choices of incentives which they must decide upon as soon as they join the program:

- (a) Up-front grant subsidy of 20% (15% normative cost of new non-CFC based energy efficient centrifugal chillers + 5% import tax exemption); or
- (b) Future carbon finance revenues to be generated by energy savings from replacing old chillers with new non-CFC based energy efficient centrifugal chillers.

For the first option, chiller owners would have to agree to relinquish future carbon finance revenues that would be generated from their subprojects to the program. These revenues would then be used to replace additional chillers.

For the second option, chiller owners would receive annual payments of about 75-80%⁹, of carbon credits earned over the previous twelve-month period until 2017 (the validity of the ERPA). The 20 to 25 % of CDM revenues will be used for covering DENR's costs for administration, financial management, sub-project processing, reporting, marketing and other CDM related costs. This option will also support the special circumstances of public sector institutions who are constrained by procedural and legal implications in accepting up-front incentives from the private sector, but which are encouraged by the GOP to participate in the carbon market.

Chiller owners interested in joining the program will need to fulfill the following conditions¹⁰:

- (a) The inefficient chiller identified for replacement should have a residual technical life of more than 5 years. In order to simplify the demonstration of this criterion, the CDM Methodology indicated that the eligibility would be restricted to those chillers that have been installed after 1995;
- (b) The identified new centrifugal chillers must be non-CFC-based with specific energy consumption being equal or lower than 0.63 kW /TR at current ARI condition or at the site condition confirmed during commissioning.
- (c) The rated capacity of new chillers must be within 5% of the baseline capacity.

The Project will encourage the signing of service contracts between chiller owners and suppliers/manufacturers or ESCOs to ensure continued energy-efficient operations of the new chillers. Procurement of new centrifugal chillers will be carried out by project participants, based on prevailing commercial practice. Since financial incentives will only be a certain percentage of the total investment cost, chiller owners will seek the remaining funds from other sources including their own cash resources; arrangements with leasing companies, special financing plans that may be offered by chiller manufacturers, commercial loans, ESCOs, and etc.

Sub-component 1.2: Incentive to Chiller manufacturers and suppliers

Non-CFC-based centrifugal chillers are being offered by national and international manufacturers. These include inter alia: Carrier, McQuay, Trane and York from the U.S., Hitachi, Mitsubishi Heavy Industry, and Ebara from Japan among others.

In order to promote their participation in the program, eligible manufacturers and suppliers will be eligible to a success fee of US\$ 0.5 per ton of Certified Emission Reductions per year provided they undertake the following steps:

⁹ depending on actual costs

¹⁰ These conditions are based on the approved CDM methodology. The program is requesting the CDM methodology panel and executive board for clarification regarding eligibility of chillers installed prior to 1993.

- (a) provide up-front a list or database of existing clients or chiller owners; For confidentiality reasons, this list will be subject to non-disclosure for 18 months from the date of the submission.
- (b) Secure the participation to the program from clients identified in the list submitted to the project (as detailed in (i) above).

The involvement of chiller manufacturers and ESCOs is critical to the successful implementation of this Project in particular to target owners of inefficient chillers from the private sector. The Project has access to an inventory of chiller owners from 2001, but chiller manufacturers and ESCOs would have a more extensive list and recent contact information. To date, the majority of manufacturers and important ESCOs have indicated their interest to actively participate in marketing efforts and are ready to sign memoranda of understanding with DENR to formalize their involvement and arrangements on the success fee described above.

Sub-component 1.3: Management of CFCs Collected from Replaced Chillers:

The Project also requires that CFCs extracted from retired units must be inventoried, stored and managed properly and can be used only for servicing other RAC equipment in-site or destroyed, as per specified guidelines. These requirements and monitoring arrangements are detailed in the Environment Management Plan of the Project, and will be included in the agreements to be signed with chiller owners.

Component 2: Measurement, Monitoring and Verification (MM&V)

As per the methodology approved by the CDM EB, the program is required to monitor data related to the power-output function of the old chiller to be replaced, electrical consumption of the new chiller, and cooling output. It necessitates a database to be established to keep track of all the data generated from the individual replacement activities and to be used to generate the reports that would support the CER claims.

A monitoring body will be contracted by the Project to establish a system for

- (a) measuring energy consumption of baseline and new equipment;
- (b) monitoring performance of new chillers by collecting performance parameters of new chillers on an on-line basis; and
- (c) analyzing the data collected during the lifetime of the project.

The monitoring body will develop specifications for data loggers and data transmitters and will be responsible to ensure that all new chillers are equipped with them. The project will finance the acquisition of these data loggers and transmitters for up to 100% of the chillers, in accordance with the CDM methodology. Data loggers and transmitters could be provided and installed directly by chiller suppliers or could be procured and installed by the MM consultant, provided that it meets the specifications as identified by the MM&V consulting company. The data will be collected and processed by an MIS, which will be developed by the consultant. The MIS will be used, among others, as the tool for generating all technical reports required by the Project, and

for estimating the emission reductions to be verified by a third party prior to submission to the CDM EB for certification. The verification of emission reductions will be carried out by a Designated Operating Entity (DOE) to be appointed by the project, which must be selected from the pool of firms accredited by the CDM EB.

Component 3: Technical Assistance

The objectives of this project component are to increase awareness the general public of the upcoming ban of CFC consumption and production, and to remove chiller owners' perceived technology risks by demonstrating significant rate-of-return on investment of chiller replacement and other potential low-cost and/or no-cost energy conservation measures in large buildings. To achieve these objectives, the Project proposes to include the following activities.

Sub-component 3.1: Policy Review and Revision

Policies, regulations and technical standards to support replacement of new efficient chillers will be reviewed, revised and issued.

Sub-component 3.2: Training and Workshops on Project Awareness and Energy Efficiency Opportunity for Large Buildings

The primary goal of this sub-component is to raise awareness of decision makers, service technicians, and other stakeholders of the opportunity for energy efficiency improvement from chiller replacement. This sub-component will also aim at increasing awareness of the stakeholders of other energy efficiency improvement opportunities in large buildings.

The Sub-component 3.2 will include a series of following training and workshops:

- (a) Launch workshop to inform the public of the commencement of the Project and to invite interest parties to participate in the Project;
- (b) Project cycle workshops to inform interest parties of all the project requirements, eligibility and funding criteria;
- (c) Technical workshops on raise awareness of chiller owners of the importance of proper chiller maintenance;
- (d) Technical workshops on measurement, monitoring, and verification of power consumption and energy savings in line with the Project's requirements; and
- (e) Training and workshops to disseminate lessons learned and success attained by the Project.

Sub-component 3.3: Recognition Program

In this regard, annual recognition awards will be presented to those chiller owners that are able to sustain high performance of their chillers through proper operations and maintenance. These awards will also encourage project participants to closely monitor performance of their chillers, which will maximize CDM revenues for the project in a sustainable manner.

Sub-component 3.4: USEPA Technical Assistance on a marketing tool to demonstrate cost

effectiveness of chiller replacement. (to talk to US EPA on its support)

To create awareness of chiller owners of energy saving opportunities from chiller replacement, USEPA would like to provide a simple computer software with a user-friendly interface to demonstrate significant rate-of-return on investment of chiller replacement for decision makers to use. USEPA's experience from its Energy Star Program particularly with regard to low cost and/or no cost measures would be introduced through reproduction of US EPA materials. Both the computerized marketing tool and printed materials will be made available to chiller owners, suppliers, ESCOs, and other stakeholders through direct mails and at workshops financed by the Project.

USEPA's TA is covered by funding support provided by US EPA as co-financing for this Project. It is anticipated that further refinement of these tools (computer software and printed materials) will be required during project implementation for the Philippines. Practical experiences gained during implementation will be incorporated. Costs of refinement of these tools during the project implementation phase will be financed by the MLF and GEF resources.

Component 4: Project Management

FASPO/DENR will oversee the coordinating entity of this Project. It will hire a Coordinating entity (CE) to support project management. A CE will be responsible for preparation and implementation of all activities under the Project. The Project will finance the CE and all Project related activities to be undertaken (except direct procurement of chillers which will be done by project beneficiaries).

The procedures of project implementation, requisite institutional framework for implementation and monitoring of project activities and the formats for monitoring and reporting are delineated in the Project Implementation Manual. A grievance handling mechanism will be set up by the Environmental Management Bureau (EMB) to allow feedback from the project beneficiaries and potential stakeholders.

5. Financing

Source:	(\$m.)
BORROWER/RECIPIENT	0
Global Environment Facility (GEF)	2.6
Carbon Fund	7.77
Montreal Protocol Investment Fund	1.02
Foreign Private Commercial Sources (unidentified)	42.5
Total	53.89

6. Implementation

Partnership Arrangements

The Project is designed on the financial partnership which includes the three international financial instruments (GEF, MLF and CDM), and the Bank as an implementing agency of the

GEF and MLF and KfW as the Carbon Fund buyer. This financial partnership model is consistent with the GEF-4 Strategy for Climate Change, as well as decision made by the Parties at the 20th Anniversary of the Montreal Protocol, and could serve as an innovative financial arrangement models for future climate related projects.

The Project is innovative in its approach involving the use of a CE to reduce the per unit transaction costs involved in a carbon finance operation, thereby allowing many small individual entities to access the carbon market which otherwise would not be possible.

Institutional and Implementation Arrangements

DENR. DENR will oversee implementation of the Project, especially support implementation of Component 3.

Coordinating Entity. At the project implementation level, a CE will be hired and overseen by DENR. The CE will be responsible for its day-to-day operations. The CE will be responsible for preparation and management of all activities under the Project. The CE, which will assist DENR, will carry out the following responsibilities:

- (a) Program Preparation – Prepare required documents, interact with government and other regulatory agencies for approval of the program, if required.
- (b) CPA Preparation – Prepare required documents for the above project
- (c) Seeking approval from the Republic of the Philippines DNA – presenting the project to DNA.
- (d) Environmental Clearance – define which environmental clearances are required and how they can be obtained, either by the Program or at the sub-project level
- (e) Stakeholder Consultation – define how stakeholders are to be consulted. Either at program level or at the sub-project level. Should prescribe a common consultation method to be followed by the sub-project.
- (f) Facilitate the replacement of 210 chillers by 2012 plus additional 40 units until 2017. Market and coordinate the project activities among the various stakeholders and beneficiaries. Provide guidance on baseline and operational data collection and management, monitoring requirements per methodology and establish a system for data transfer from sub-project.
- (g) Prepare project implementation manual.
- (h) Financial and Legal Arrangement (Grant/subsidy/Loan/other relationship) - Prepare legal sub-agreements, defining the roles of the stakeholders, revenue sources included and sharing arrangements.
- (i) Validation and Registration of PoA and first CPA – Coordinate with DOE to organized validation and enable registration
- (j) Validation and Registration of all subsequent CPAs – Verify and cross-check information in the sub-project documents, through discussion and site visit.
- (k) Contracting with the MMV consultant.
- (l) Information management and data archiving. Develop an infrastructure (hardware and software) to collect and transmit data from all chillers to a central facility for further processing. Collect project information from sub-projects, verify data quality, calculate and prepare monitoring report. In case of data incongruence, cross-check

- data with sub-project. Maintain record of project data up to two years after the project activity
- (m) Assist DOE's verification of the sub-projects
 - (n) Administration of a revolving fund from Carbon Emission Reduction revenues- Receive ER payments from World Bank and distribute ER revenue to sub-projects
 - (o) Liase with buyers and sign ERPA on behalf of the sub-project (to be specified in the sub-agreement)
 - (p) Marketing and Networking with chiller owners and other stakeholders
 - (q) Administration of Grant funds from GEF and MLF
 - (r) Facilitating implementation of the technical assistance component under the Program
 - (s) In exchange for its services, the CE will receive a management fee to cover its administrative and management costs. It will collaborate with relevant stakeholders and authorities, including other divisions (see next Para.) and DOE. The CE will maintain separate special accounts for the three fund streams and will institute a Financial Management Information System (FMIS) to track project expenditures and disbursements made from these respective accounts.

Other Divisions under DENR

- (a) The Philippine Ozone Desk (POD), which is housed in the DENR, has the operational and administrative responsibility for the Philippines' MP program and reports to the Secretary, DENR. It is responsible for the day-to-day operations of the MP program, including promulgation of relevant policies and implementation and monitoring of investment and non-investment activities. POD will participate in marketing the project with the project to the public sector, by helping update the inventory of chillers in the public sector over the next few months, supporting the project launch workshop by sending special invitations to the public sector agencies and direct interventions as required. The POD will be the primary responsible authority for the final destruction/disposal of old, contaminated CFCs.
- (b) The GEF Focal Point, chaired by the DENR Assistant Secretary for Foreign-assisted projects (FASPO), functions as an empowered body to establish national priorities, approves and endorses project proposals before submission to GEF and facilitates implementation. It coordinates the review of proposals and monitoring of projects among various line agencies and NGO representatives.
- (c) The Designated National Authority (DNA), which is housed in the DENR, is mandated to provide approval for all CDM projects in the Philippines. According to the modalities of the KP, the DNA ensures that project entities participate in the CDM on a voluntary basis and that projects are consistent with sustainable development objectives. It will have to issue a Letter of Approval (LoA) as part of the validation of the Project.

The World Bank will enter into Grant Agreements with the DOF to channel funds from the MLF and GEF to the Philippines. The Coordinating Entity will also enter into an Emission Reduction Purchase Agreement (ERPA) with the KfW which has provided some financing to prepare the CDM project and already indicated the intent to purchase one million tones of certified emission reductions from the project.

The Project will rely on chiller manufacturers/suppliers and ESCOs as its major marketing force to promote chiller replacement. DENR will enter into agreements in the form of a Memorandum of Understanding (MOU) with them. Sub-grant agreements (SGAs) or Emission Reduction Transfer Agreements (ERTA) will be signed between chiller owners and DENR to describe terms and conditions including the level of funding, disbursement schedules, transfer of certified emission reduction rights, and obligations of chiller owners pertaining to this project. To meet the measurement and monitoring requirements, DENR will contract a technical consulting firm to undertake project monitoring at the chiller level. This monitoring approach will rely on remote technology which will allow real-time monitoring of chiller performance and also on annual physical verifications.

As required by the CDM process, verification of emission reduction will be done on an annual basis. Verification of emission reduction is the requirement for the Project to claim for CDM payments. This task will be carried out by a Designated Operational Entity (DOE) to be appointed by the KfW. The DOE must be selected from the pool of firms approved by the CDM EB for energy efficiency. Verification will be conducted throughout the project implementation period, in this case until 2017 as per the terms of the Emission Reductions Purchase Agreement (ERPA).

7. Sustainability and Replicability

Project ownership, an underpinning factor of sustainability, and commitment at the country level is already evidenced in part by the country ratification of both the MP and the KP and the compliance with the scheduled obligations with regard to CFC phase-out. The Project provides fundamental support towards GoP's CFC phase-out strategy. The stringent national regulatory and fiscal framework on ODS, already established by GOP, provides the overarching environment for sustainable project implementation.

The Project design incorporates an incentive program to ensure the ongoing commitment of chiller manufacturers, suppliers and owners. Additionally, since the chiller owners will be responsible for about 85% of the capital cost, it is expected that such a significant financial stake will further ensure their commitment, in particular since the investment can be recovered relatively fast if the energy efficiency is realized. Although chiller manufacturers and ESCOs in a country experiencing high economic growth like the Philippines typically focus on the potential sale of chillers in new commercial and industrial buildings, the project envisages the provision of an incentive in the form of a payment of US\$ 0.5/tCO₂e per annum for eligible chillers for the period of validity of the ERPA, estimated to be until 2016. This incentive will ensure that manufacturers and ESCOs also focus on retrofitting existing buildings with more efficient chillers before end of technical life.

Sustainability in this project signifies no "backsliding" to the use of equipment which require CFCs and which are less energy efficient by design. The project will necessitate the removal and destruction of the main component of the old CFC-based chiller to ensure there is no re-use of the old equipment and thereby no re-emergence of demand for virgin CFCs. This destruction will be verified by GOP accredited chartered engineers. The combination of adequate institutional and regulatory capabilities, increased public awareness and understanding, and active and informed chiller owners will ensure project sustainability.

The project design requires that the new chillers which will be procured will meet energy efficiency specifications¹¹. In addition, they will be equipped with basic data loggers which will automatically monitor their performance, as this is a critical requirement for calculating the carbon emission reduction credits. Through MOUs, the project will also encourage all chiller manufacturers and ESCOs to grant service maintenance contracts with their clients during the project implementation period, all participants will be informed of the energy savings gained by new chillers, which, in fact, are much higher¹² than the subsidy or CDM revenues provided by the Project. Energy efficiency gains from the new chillers are therefore substantial and sustainable.

The project has an inherent replication modality, given that the CDM component replicates the GEF and MP components to encourage additional chiller replacements. The sustainability of the project and market transformation is highly dependent on carbon finance revenues, which can only be assured through registration of the project with the CDM EB. In the event that the project fails to attain registration, it will seek to sell verified emission reductions (VERs) in a number of emerging cap-and-trade systems in Australia, Canada, Japan and the United States. The sale of VERs would enable the project to implement the revolving fund concept and achieve Project Development Objectives.

8. Lessons Learned from Past Operations in the Country/Sector

The Project is closely in line with the Philippines' existing ODS phase-out program and builds on the lessons learnt after a decade of involvement in this program. This includes recognition of the advantages performance-based programmatic approach, importance of a supportive policy environment, need for sound institutional arrangements and for strengthening capabilities for implementation and monitoring. Similar findings have been documented in the World Bank GEF Energy Efficiency Portfolio Review, including need for comprehensive and holistic market assessments and simple and flexible program design.

The results of a World Bank commissioned India Chiller Sector Study undertaken in 2002 and a similar project in India were used as a reference in preparing the initial design of the project. The market barriers were quantified and employed as a basis for establishing the level of funding requirement for this project, whereas the chiller manufacturers' database of existing installations of CFC-based centrifugal chillers supported project design with regard to chiller population and market assessment. Project design flexibility is achieved through national-level implementation arrangement that takes into account prevailing business and commercial practices to make it as market-oriented as possible.

¹¹ (i) Existing chillers (all refrigerants except HCFC-123) with cooling capacity of 100 TR and above to be replaced with new non-CFC or non-HCFC22 chillers with energy consumption of not more than 0.63 kW/TR at the manufacturer's rated capacity are eligible (ii) chillers to be replaced must be currently be in use and located in the Philippines (iii) chillers must have been installed after 1995 and (iv) rated capacity of new chillers must be within 5% of baseline capacity

¹² The simple payback period for an individual chiller owner comes to 2.7 years without the inclusion of carbon revenues.

A series of meetings with stakeholders and chiller owners at the national and global levels were conducted to obtain relevant inputs for the project design. The key messages from these meetings were that, for the project to be successful, the design had to be kept simple, and any transactions or actions required by building owners, chiller suppliers, and financiers should approximate existing commercial practices and/or existing business models as much as possible. The project design has also benefited from experience and lessons learned from demonstration projects in Mexico, Thailand and Turkey (Annex 2).

9. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (OP/BP 4.01)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Natural Habitats (OP/BP 4.04)	<input type="checkbox"/>	<input type="checkbox"/>
Pest Management (OP 4.09)	<input type="checkbox"/>	<input type="checkbox"/>
Physical Cultural Resources (OP/BP 4.11)	<input type="checkbox"/>	<input type="checkbox"/>
Involuntary Resettlement (OP/BP 4.12)	<input type="checkbox"/>	<input type="checkbox"/>
Indigenous Peoples (OP/BP 4.10)	<input type="checkbox"/>	<input type="checkbox"/>
Forests (OP/BP 4.36)	<input type="checkbox"/>	<input type="checkbox"/>
Safety of Dams (OP/BP 4.37)	<input type="checkbox"/>	<input type="checkbox"/>
Projects in Disputed Areas (OP/BP 7.60)*	<input type="checkbox"/>	<input type="checkbox"/>
Projects on International Waterways (OP/BP 7.50)	<input type="checkbox"/>	<input type="checkbox"/>

10. List of Factual Technical Documents

Project Background Documents:

- Minutes of the First Global Chiller Workshop, Washington, DC, September 10, 2005;
- Minutes of the Second Global Chiller Workshop, Washington, DC, January 10, 2006;
- Multilateral Fund Project Document: Global Chiller Replacement Project, November 2005;
- Project Appraisal Document for a Thailand Building Chiller Replacement Project, Environment and Social Development Unit, East Asia and Pacific Region, World Bank, May 2001;
- Philippine Chiller Energy Efficiency Project Identification Note for Carbon Finance;
- Philippine Chiller Energy Efficiency CDM Program of Activities for Carbon Finance;
- Philippine Chiller Energy Efficiency Project Identification Form for GEF Work Program Entry, January 22, 2008;
- East Asia Energy Sector Assessment (Philippines, Vietnam, Indonesia), March 2009
- Aide Memoire: Philippines Chiller Energy Efficiency Preparation Mission

Sector Background:

- India Chiller Sector Study, July 2002;

* By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas

- International Chiller Study, prepared for ENVMP of the World Bank, ICF Consultants, 2005
- Philippine Chillers Inventory, September 2008.

UNFCCC

- AM0060 – Baseline and monitoring methodology for power savings through replacement by energy efficient chillers;

11. Contact point

Contact: Maya Gabriela Q. Villaluz

Title: Senior Operations Officer

Tel: 632-9173074

Fax: 632-6375870

Email: mvillaluz@worldbank.org

Location: Manila, Philippines (IBRD)

12. For more information contact:

The InfoShop

The World Bank

1818 H Street, NW

Washington, D.C. 20433

Telephone: (202) 458-4500

Fax: (202) 522-1500

Email: pic@worldbank.org

Web: <http://www.worldbank.org/infoshop>