GEF EO Terminal Evaluation Review Form

1. PROJECT DATA				
			Review date:	October 26, 2007
GEF Project ID:	445		at endorsement (Million US$)	at completion (Million US$)
IA/EA Project ID:		**GEF financing:**	9.86	NA
Project Name:	Barrier Removal for the Widespread Commercialization of Energy-Efficient CFC-Free Refrigerators in China	IA/EA own:		
Country:	CHINA	Government:	1.37	NA
		Other*:	29.92	NA
		Total Cofinancing	31.29	NA
Operational Program:	OP-5: Energy Conservation and Efficiency	**Total Project Cost:**	41.15	NA
IA	UNDP	Dates		
Partners involved:	UNOPS, China State Environmental Protection Agency (SEPA), National Council for Light Industry (NCLI)	Work Program date		March 1997
		CEO Endorsement		March 1998
		Effectiveness/ Prodoc Signature (i.e. date project began)		01/July/1999
		Closing Date	Proposed: Dec 2004	Actual: UA
Prepared by: Alejandro Imbach	Reviewed by: Neeraj Negi	Duration between effectiveness date and original closing: 65 months	Duration between effectiveness date and actual closing: UA	Difference between original and actual closing: UA
Author of TE: Dr. David Von Hippel		TE completion date: Nov 17, 2006	TE submission date to GEF OME: July 12, 2007	Difference between TE completion and submission date: 8 months

* Other is referred to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

2. SUMMARY OF PROJECT RATINGS

Please refer to document "GEF Office of Evaluation Guidelines for the verification and review of terminal evaluations" for further definitions of the ratings.

	Last PIR	IA Terminal Evaluation	Other IA evaluations if applicable (e.g. IEG)	GEF EO
2.1 Project outcomes	**HS**	**N/A**	**N/A**	**HS**
2.2 Project sustainability	**N/A**	**N/A**	**N/A**	**ML**
2.3 Monitoring and evaluation	**N/A**	**N/A**	**N/A**	**UA**
2.4 Quality of the evaluation report	**N/A**	**N/A**	**N/A**	**MS**

Should this terminal evaluation report be considered a good practice? Why?
No. There is a good analysis of outcomes and impacts. However, analysis of other components is missing.

Is there follow up issue mentioned in the TE such as corruption, reallocation of GEF funds, etc?

NO

3. PROJECT OBJECTIVES AND ACTUAL OUTCOMES

3.1 Project Objectives

- **What were the Global Environmental Objectives of the project? Were there any changes during implementation?**

According to the project documents the goal of the project was to reduce China's future GHG emissions through the transformation of the refrigerator market in China to the production and utilization of more energy-efficient models.

There was no change in the project objectives during implementation.

- **What were the Development Objectives of the project? Were there any changes during implementation?**

There were changes in Development Objectives but the spirit and sense of the Project was maintained. The changes are probably due to GEF Phase changes, but there is neither record nor explanation about this change in available documentation from the Project. These changes happened during the long time elapsed between the Project document preparation (estimated 1997-1998) and the first available PIR (2005). As no UNDP Annual Project Reports (APR) are available besides the PIR 2006, this source could not be used to find out the reasons for those changes. The mentioned changes are shown below:

1. Development Objective as in Project Document: *The goal of the project is to reduce China's future GHG emissions through the transformation of the refrigerator market in China to the production and utilization of more energy-efficient models*
2. Development Objective as in PIR and TE: *To reduce CO2 and other greenhouse gas emissions in China by removing barriers to wide spread commercialization of energy-efficient refrigerators in China*

There was also a significant change in Specific Objective (later Outcome) 5, that was shifted from "Project Management, Monitoring, and Evaluation" in the Project Document to "Establish national capacity to promote and manage energy efficiency in the refrigeration sector" in both PIR 2006 and TE. No justification of this change is provided in the mentioned documents.

3.2 Outcomes and Impacts

- **What major project outcomes and impacts are described in the TE?**

Outputs of Project—Attainment of Objectives and Milestones

- Compressor Efficiency Improvement.
- Sales of energy-efficient compressors
- Refrigerator efficiency improvement
- Sales of energy-efficient refrigerators
- Standards and label development
- Raising of public awareness of link between energy efficiency and environmental impacts

In all these areas the Project has exceeded the established goals, according to the TE. The average energy intensity of new refrigerators sold dropped by nearly 29 percent between the Project's inception in 1999 and the end of 2005.

Development Objectives

- Impact on government policies. The direct impact of getting standards and labels implemented, as well as indirect impact of setting up pathways and connections for more effective energy-efficiency policy development in the future.
- Gender Issues.

Capacity Building

- Capacity building in government and quasi-governmental institutions
- Capacity building in commercial enterprises

Impacts

- Quantitative impact on electricity consumption and generation in China. TE quote "*Based on the assumptions described in the box below, and with refrigerator improvement trends*

as shown in Figure 5-9, the Evaluation Mission estimates that by 2005, the Project has resulted in the savings of 9.4 TWh of annual electricity generation (measured at the power plant) annually from the improvement in efficiency of new refrigerators produced in China. By 2010, projected cumulative annual savings from refrigerators purchased through that year are estimated at 36 TWh, meaning that the Project will have replaced, by that time, the need for approximately 10 600 MW coal-fired power plants". These figures result from the application of a model, not actual measurements.

- Quantitative impact on greenhouse gas and other pollutant emissions in China. TE quote: "*The Evaluation Mission estimates that the Project has resulted in the savings of about 11 million tonnes of CO2 emissions by 2005, and will result in a total of 42 million tonnes of CO2 emission savings by 2010.*" The CO2 tonnage is cumulative (not annual average) and the estimates are the results of application of a model.
- Uncertainties in the estimation of project results. The TE rightly includes a detailed list of factors that could affect the results mentioned above.

4. GEF EVALUATION OFFICE ASSESSMENT

4.1.1 Outcomes (use a six point scale 6= HS to 1 = HU)

A Relevance **Rating: HS**

Were the project's outcomes consistent with the focal areas/operational program strategies and country priorities?

In terms of "Removal of barriers to energy efficiency and energy conservation, (OP5)" this Project is very relevant because it is focused on removing technical, market and regulation barriers to the adoption of higher energy-efficient refrigerators. The Project achieved results are relevant to this purpose.

B Effectiveness **Rating: HS**

Are the project outcomes commensurate with the expected outcomes (as described in the project document) and the problems the project was intended to address?

As presented in the TE "The Project has been highly effective in reaching its main goals—namely, getting much higher-efficiency refrigerators into the hands of Chinese consumers".
While the TER does not present aggregated evidence, the data from individual industries are significant:

- Efficiency of compressors improved and reached international standards
- Dongbei Inc. doubled their goal from 745,000 to 1,746,000 efficient compressor units sold between 2003 and 2006, and the proportion of this type of compressors in this factory grew from 19% to 32% of the production.
- Refrigerators efficiency improved by 30%
- Kelon produced 750,000 efficient refrigerators in 12 months between 2004 ands 2005
- Heier tripled up their refrigerators production from 2 to 6 millions units a year between 2000 and 2006, while the proportion of energy-efficient models evolved from 35 to 91% of the production.
- An energy-labeling system for refrigerators was developed, adopted and generalized throughout the industry, allowing both domestic and international consumers to clearly identify the level of energy efficiency of the different models.

There are some constraints in achieving the M&E Objective and in launching a complementary project on recycling old refrigerators, but these complementing initiatives are not central to the project Development objective.

C Efficiency (cost-effectiveness) **Rating: S**

Was the project cost – effective? How does project's cost/time versus outcomes equation compare to that of similar projects? Was the project implementation delayed due to any bureaucratic, administrative or political problems and did that affect cost-effectiveness?

Although the TE does not make a tentative judgment on the overall cost effectiveness of the project, the data on energy savings, reduction in CO2 emissions, significant growing sales of energy efficient refrigerators and the strong involvement of Government in setting incentives and regulations to promote energy-efficient refrigerators; shows that the direct benefits of the project were substantial. Based on this and the information that the project was able to achieve most of its expected results, it could be inferred that the project was very cost effective, particularly in terms of GEF investment.

The Project implementation seems to have been 2 years longer than expected, apparently in a cost-neutral way. This issue was not addressed in the TE (or in the PIR). Moreover, it was not possible to find the termination date of the Project. The TE was done in October 2006 and there is a paragraph stating that last project activities were planned to last until end of 2006.

4.1.2 Impacts

Has the project achieved impacts or is it likely that outcomes will lead to the expected impacts?
According to the TE, the Project has achieved relevant impacts in terms of both reduction of energy consumption and reduction on CO2 emissions (given the reliance of China on coal for energy generation) as evidenced by the following data estimated by the TER: • By 2005, there were savings of 9.4 TWh of annual electricity generation (measured at the power plant) from the improvement in efficiency of new refrigerators produced in China. By 2010, projected cumulative annual savings from refrigerators purchased through that year are estimated at 36 TWh, meaning that the Project will have replaced, by that time, the need for approximately 10 600 MW coal-fired power plants • There are also savings of about 11 million tonnes of CO2 emissions by 2005, and will result in a total of 42 million tonnes of CO2 emission savings by 2010

4.2 Likelihood of sustainability. Using the following sustainability criteria, include an assessment of **risks** to sustainability of project outcomes and impacts based on the information presented in the TE. Use a four point scale (4= no or negligible risk to 1= High risk)

A Financial resources **Rating: 4** What is the likelihood that the financial resources will be available to continue the activities that results in the continuation of benefits?
The likelihood is very high because the companies who are manufacturing refrigerators and their parts are getting benefits from the change, as energy-efficient products. In TE terms: *"The fact that efficient units apparently are also reportedly high-profit units further increases manufacturer's already strong incentives to continue to pursue energy-efficiency, as does Chinese producers increasing presence in and goals for participation in the appliance export market"*
B Socio political **Rating: 3** Are there any social or political risks that can undermine the longevity of project outcomes?
There is no mention of this issue in the TE. Probably because the TE was focused on the production side and not on the demand side where most of the social risks may take place. In any case, the global trend towards higher energy prices makes unlikely to expect rejection of energy-efficient products. In terms of outcomes the TE mentions the possibility of a market shift towards larger refrigerators requiring more energy.
C Institutional framework and governance **Rating: 4** Do the legal frameworks, policies and governance structures and processes pose any threat to the continuation of project benefits?
Not at all, in contrast all mentioned aspects are well aligned to promote the production of higher energy-efficient refrigerators, including standards, incentives, official engagement in the process, etc.
D Environmental **Rating: 4** Are there any environmental risks that can undermine the future flow of project environmental benefits?
Not obvious.

4.3 Catalytic role

a. Production of a public good
This level was clearly achieved through the reported reduction in energy consumption and CO2 emissions.
b. Demonstration
In demonstration terms, the Project has also had a demonstration role, as it started working with selected companies in designing, producing and marketing both components and appliances that demonstrated the environmental and economic benefits of the new technology.
c. Replication
This level was also achieved as other manufacturers adopted the new technologies in their own processes at their own initiative and cost, replicating the demonstration efforts.
d. Scaling up
The scaling up has started. Energy-efficient refrigerators do not constitute yet the highest part of the total production of refrigerators but, according to the TE, they represented almost 30% of them at the end of 2005 and their proportion was growing. Therefore, the scaling up started and continues vigorously.

4.4 Assessment of the project's monitoring and evaluation system based on the TE information

A. M&E design at Entry	**Rating (six point scale): U**
The M&E design at the entry point was weak and mixed with a communications center. There are indicators, but they are too generic and quantitative goals were not defined for those indicators. The M&E system is not presented in detail; just 6 M&E generic activities are listed and not further developed in the proposal.	
B. M&E plan Implementation	**Rating (six point scale): UA**
There is no available information about implementation, as the only available PIR is dated in 2006, a few months before the TE. In this PIR the M&E Objective has been completely converted into communications (Information Center). It also speaks about a Testing Center for the refrigerators industry (which seems to have been an excellent initiative) but the Project M&E seems to be missing. The TE follows the path traced by the PIR in this regard, and it is focused on the Information Center. It also speaks about audits performed by the national institutions, but the Project M&E remains unaddressed. Moreover, the reasons justifying the change in the name of Objective 5, and its shift from M&E to communications are not presented.	
C.1 Was sufficient funding provided for M&E in the budget included in the project document? No. The M&E and Project Management budget is 2% of the overall Project budget and 5.2% of the GEF contribution (that was approximately 25% of the overall Project cost). But, within this Objective 5, between 40 and 50% of the budget is allocated to Project Management, and the remaining funds are allocated to M&E, reducing the effective M&E funding to 1% of the overall cost (2.6% of the GEF contribution).	
C.2 Was sufficient and timely funding provided for M&E during project implementation? There is no information available to assess this issue, but it was not mentioned as a problem neither in the 2006 PIR nor in the TE	
C.3 Can the project M&E system be considered a good practice? No. Poor design, insufficient funding and lack of evidence on Project progress during implementation (just no late PIR, no other PIR or APR available) are reasons not to consider this M&E system as good practice. The TE was able to put a convincing case for good impacts and results based on information provided by the manufacturers and models developed by the evaluators based on manufacturers' information. In the case of industry achievements, standards set by Government and other characteristics very specific to this case, the evidence, even if not independently obtained, can be accepted, but this is hardly good practice to be recommended.	

4.5 Lessons and Recommendations

Project lessons and recommendations as described in the TE

What lessons mentioned in the TE that can be considered a good practice or approaches to avoid and could have application for other GEF projects?
Most of the lessons and recommendations are specific for this type of Projects. One lesson that can be taken by other projects is the following one, quoted from the TE: *"An integrated approach to problem has been crucial to Project success. This includes the excellent "technology push/market pull" concept"*

List (or if detailed summarize) the recommendations given in the terminal evaluation

Recommendations Related to Project Processes

- Continue to build capacity to manage programs in China.
- Attempt to minimize management staff turnover in project management.
- Continue to insist on transparency in processes and communications.
- Deepen the role of the Project Information Office, and make sure that project materials persist (on the website) after Project is Complete.
- Continue to involve stakeholders at an early stage of Project planning.

Overarching Recommendations for New Projects Building on Results of Project

- A key impediment to moving forward with programs similar to the Project (examples are provided in section 7.3, below) is lack of funding
- A major option for raising a significant amount of money for use in implementing energy efficiency and greenhouse gas emissions reduction projects is to implement a "Public Benefits Charge", collecting a fraction of electricity (and/or gas) revenues for use for energy efficiency, to help fund future market transformation initiatives of this type.

Specific Recommendations for Follow-up or New Projects Related to Project Elements

- In the future, when organizing training seminar involving engineers, technicians, or other staff from competing companies, be mindful of the fact that trainees may be unwilling to bring up more than the most general concerns in front of their colleagues from other companies.
- Consider going beyond the mass-purchase effort included in the project—the placement of energy-efficient refrigeration products on the government list of products approved for purchase—to actually organizing bulk purchases by government agencies, and by collaborating non-government entities, of the highest efficiency refrigerator products.
- Apply the concepts of the Project—the technology push/market pull— to other appliances, starting with window-mounted, split and possibly commercial air conditioners.
- Apply Project concepts to commercial refrigeration.
- Apply Project concepts to the goal of producing more efficient buildings.
- Apply Project concepts to the development and marketing of "next generation" automobiles, that is, electric and hybrid vehicles with efficiencies 2 to 3 times those of current vehicles on the Chinese market.
- When designing media ads, try to tie advertisements in more directly with standards/labels (for example, use a "Grade 1" logo in ads, show the China Energy Label), and include a website address where substantive information can be found such as sample calculations of annual household savings of money (and kWh and CO_2 emissions).
- Consider revising grade designations for freezers (as opposed to combination refrigerator/freezers) to better reflect the fact that freezers operate at similar temperatures to the freezer compartments of combination units, and as a consequence, at lower average temperatures than refrigerator/freezers.
- Consider modifying grade designations for refrigerators to allow for the separation of the very best refrigerators from those that are merely very good.
- Continue to seek funding for Appliance recycling programs.

4.6 Quality of the evaluation report Provide a number rating 1-6 to each criteria based on: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, and Highly Unsatisfactory = 1. Please refer to document "GEF Office of Evaluation Guidelines for the verification and review of terminal evaluations" for further definitions of the ratings.

4.6.1 Comments on the summary of project ratings and terminal evaluation findings from other sources such as GEF EO field visits, etc.
NA

4.6.2 Quality of terminal evaluation report	**Ratings**
A. Does the report contain an assessment of relevant outcomes and impacts of the project and the achievement of the objectives?	5
B. Is the report internally consistent, is the evidence complete/convincing and are the IA ratings substantiated?	4
C. Does the report properly assess project sustainability and /or a project exit strategy?	5
D. Are the lessons learned supported by the evidence presented and are they comprehensive?	4
E. Does the report include the actual project costs (total and per activity) and actual co-financing used? The report does not provide any information on actual project costs and cofinancing mobilized.	1
F. Does the report present an assessment of project M&E systems? The discussion on M&E systems is inadequate.	1

Comments to lowly rated issues

- The actual projects costs and co-financing information were not included in the Terminal Evaluation
- The Report does not include comments or assessment of the Project M&E systems

4.6.3 Assessment of processes affected attainment of project outcomes and sustainability.

Co-financing and Project Outcomes & Sustainability. If there was a difference in the level of expected co-financing and actual co-financing, then what were the reasons for it? Did the extent of materialization of co-financing affect project's outcomes and/or sustainability, and if it did affect outcomes and sustainability then in what ways and through what causal linkage did it affect it?
There is no information available about these issues neither in PIR 2006 nor in the TE. The PIR 2006 assigned the highest ratings to all issues addressed in this Project
Delays and Project Outcomes & Sustainability. If there were delays in project implementation and completion, then what were the reasons responsible for it? Did the delay affect the project's outcomes and/or sustainability, and if it did affect outcomes and sustainability then in what ways and through what causal linkage did it affect it?
There were approximately 2 years of delay in completing the Project. There is no justification, explanation or simple acknowledgement of this delay presented neither in the PIR 2006 nor in TE. According to what can be deducted from the TE information, this delay in implementation has not affected the achievement of outcomes.

4.7 Is a technical assessment of the project impacts described in the TE recommended? Please place an "X" in the appropriate box and explain below.	**Yes:**	**No:** **X**
Explain: The information presented in the TE is clear, non-controversial and supportive of its conclusions.		

4.8 Sources of information for the preparation of the TE review in addition to the TE (if any)

PIR 2006 / Project Document