GEFM&E Terminal Evaluation Review Form

1. PROJECT DATA				
			Review date:	October 2005
GEF ID:	PMIS 97		at endorsement (Million US$)	at completion (Million US$)
Project Name:	Efficient Industrial Boilers	GEF financing:	$32.8	$31.9
Country:	China	Co-financing:	$68.6	$89.2
Operational Program:	OP5	Total Project Cost:	$101.4	$121.1
IA	World Bank	Dates		
Partners involved:		Work Program date		04/01/1996
		CEO Endorsement		11/20/1996
		Effectiveness/ Prodoc Signature (i.e. date project began)		02/14/1997
		Closing Date	Proposed: 06/30/2001	Actual: 06/30/2004
Prepared by: Anna Viggh	Reviewed by: Siv Tokle	Duration between effectiveness date and original closing: 4 years and 4 months	Duration between effectiveness date and actual closing: 7 years and 4 months	Difference between original and actual closing: 3 years
Author of TE: Robert P. Taylor, Feng Liu		TE completion date: 12/10/04	TE submission date to GEF OME: 03/22/05	Difference between TE completion and submission date: 3 months

2. SUMMARY OF PROJECT RATINGS

GEFME Ratings for project impacts (if applicable), outcomes, project monitoring and evaluation, and quality of the terminal evaluation: Highly Satisfactory (HS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U), Highly Unsatisfactory (HU), not applicable (N/A) and unable to assess (U/A). GEFME Ratings for the project sustainability: Highly likely (HL), likely (L), moderately likely (ML), moderately unlikely (MU), unlikely (U), highly unlikely (HU), not applicable (N/A), and unable to assess (U/A).
Please refer to document “Ratings for the achievement of objectives, sustainability of outcomes and impacts, quality of terminal evaluation reports and project M&E systems” for further definitions of the ratings.

	Last PIR	IA Terminal Evaluation	Other IA evaluations if applicable (e.g. OED)	GEFME
2.1 Project impacts	**N/A**	N/A	N/A	S
2.2 Project outcomes	S	S	S	S
2.3 Project sustainability	**N/A**	L	L	L
2.4 Monitoring and evaluation	**N/A**	S	S	U/A
2.5 Quality of the evaluation report	**N/A**	**N/A**	S	S

Should this terminal evaluation report be considered a good practice? No Why? Although the overall quality of the ICR is high it has some shortfalls. It is cryptic when addressing safeguard issues. Evaluation of technical assistance, institutional development, and monitoring and evaluation is a bit vague. Section 10 could have been used to discuss issues of interest to GEF, but these were well presented elsewhere.

3. PROJECT OBJECTIVES, EXPECTED AND ACTUAL OUTCOMES

3.1 Project Objectives

- **What are the Global Environmental Objectives? Any changes during implementation?** No.

To reduce Greenhouse Gas (GHG) emissions, as well as emissions of total suspended particulates, sulfur dioxide and nitrogen oxides

- **What are the Development Objectives? Any changes during implementation?**

Reduce GHG emissions through:
a) development of affordable energy-efficient and cleaner industrial boiler designs;
b) mass production and marketing of the improved boiler models that have successfully met performance criteria; and
c) broad dissemination of more energy-efficient and cleaner industrial boiler technologies throughout China through institutional strengthening, improved information exchange, and energy efficiency and environmental policy reform.

The original components were not changed, but two additional TA subprojects were included during implementation. One was the Sub-licensing Promotion Program to assist the planning and organization of technology dissemination. The second was the National Sales and Marketing Promotion for GEF-supported Industrial Boilers designed to raise the general market awareness of the specific benefits or acquiring GEF-supported boilers.

3.2 Outcomes and Impacts

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

Impact

Regarding the overall objective of reducing GHG emissions, the ICR estimates that the project will reduce carbon dioxide (CO2) emissions by a cumulative amount of 160 millions tons by 2019, compared to 180 million tons by 2016 estimated at appraisal. Given the uncertainties inherent in such estimates and the rapid rate of change in China's energy market, this evaluation considers that the project objective was essentially achieved.

Outcome

As a result of the project, western technology for greater boiler efficiency and lower emissions of pollutants is now well understood by the principal boiler manufacturers in China and the new models developed with GEF support are beginning to penetrate the market. These models are also able to meet China's increasingly stringent standards for emission of pollutants. The project also financed the revision of national and sector standards for boiler and boiler house designs and competency standards for boiler operators, thus expanding the influence of the project to many additional installations. While the GEF boiler designs have a higher initial cost than older models, by 10 to 20%, this is more than offset by improved thermal efficiency and reduced installation costs, resulting in a payback period of about three years.

4. GEF OFFICE OF M&E ASSESSMENT

4.1 Outcomes and impacts — Rating: S

A Relevance

- **In retrospect, were the project's outcomes consistent with the focal areas/operational program strategies? Explain**

The project's outcomes were consistent with OP5 strategies. It developed clean boiler technologies and reared up the capacity of companies that are responsible for the promotion and widespread sales of this technology. Coal-fired industrial boilers account for about 30 percent of carbon dioxide emissions in China, making them a major target in China's effort to mitigate GHG emissions.

B Effectiveness

• **Are the project outcomes as described in the TE commensurable with the expected outcomes (as described in the project document) and the problems the project was intended to address (i.e. original or modified project objectives)?**
As China expects to be largely dependent on coal as an industrial fuel for the foreseeable future, the project objective of accessing western technology for greater boiler efficiency and lower emissions of pollutants, remains of critical importance both for national development reasons and for minimizing GHG emissions. As a result of the project, this technology is now well understood by the principal boiler manufacturers in China and the new models developed with GEF support are beginning to penetrate the market.
C Efficiency (cost-effectiveness)
• **Include an assessment of outcomes and impacts in relation to inputs, costs, and implementation times based on the following questions: Was the project cost – effective? How does the cost-time Vs. outcomes compare to other similar projects? Was the project implementation delayed due to any bureaucratic, administrative or political problems?**
Given the project's achievements it can be seen as cost-effective. It reduced GHG at a GEF cost of only $0.21/ton, which compares very favorably with the current value of traded carbon credits of $3 to 5/ton-CO2 equivalent. However, reported local costs exceeded appraisal estimates by 30 percent, partly because of difficulties in cost assignment within the enterprises. The project was extended twice for a total of three years. The main reason for the time overrun of three years was procurement delays in the first phase. Use of standard Bank procedures for industrial equipment proved to be cumbersome, due to a limited number of qualified suppliers and other issues. A prolonged installation and testing period accounted for the remaining year's delay. Several changes in project management were also a factor.

4.2 Likelihood of sustainability. Using the following sustainability criteria, include an assessment of project sustainability based on the information presented in the TE.

A Financial resources	**Rating: ML**
The project worked with boiler manufactures that had become joint-stock companies or privately owned companies. Financing for clean boiler technology and production was available during the project. The actual reported local cost financed by enterprises (equities ore bank loans), exceeded the appraisal estimate by 30 percent. Many investments made by the boiler manufacturers were for production equipment which is used for both GEF-supported boiler models, as well as other models. It is difficult to assess from the ICR weather financing continues to be available for replication activities.	
B Socio political	**Rating: L**
It is important for the government to continue to help raise awareness in the market concerning the advantages of GEF-supported boilers and design technologies through special promotion channels and events.	
C Institutional framework and governance	**Rating: HL**
The institutional development impact was most significant in the project's activities supporting the formulation, revision and upgrading of national and sector technical standards for industrial boiler and boiler house designs, and the strengthening of the training curriculum and certification procedures for boiler operations. The promulgation of key new or revised standards raised the bar for design and engineering for the entire industrial boiler sect in China.	
D Ecological (for example, for coffee production projects, reforestation for carbon sequestration under OP12, etc.)	**Rating: L**
Most of the technologies introduced by the project have proved to be practical, easily adopted and cost-effective. Coal will remain a primary fuel for industrial boilers in China for a long time. Coal prices have been rising sharply due to stricter government regulation of the coal mining sector for quality and safety as well as general energy demand.	
E Examples of replication and catalytic outcomes suggesting increased likelihood of sustainability	**Rating: ML**

There are no examples of replication at this stage. The replication and dissemination process is likely to take place in the absence of formal licensing procedures as many of the new boiler designs features are not complicated and can be studied in the open and replicated without resorting to special instruction and training.

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

A. Effective M&E systems in place: What were the accomplishments and shortcomings of the project's M&E system in terms of the tools used such as: indicators, baselines, benchmarks, data collection and analysis systems, special studies and reports, etc.? **Rating: U/A**

It is difficult to assess the M&E system based on the ICR due to lack of detailed information, although the IRC rated M&E satisfactory.

Since the project included over a dozen beneficiaries across China, and each one had a unique set of issues, the support for project M&E was important. The component also supported the testing and evaluation of the energy efficiency and environmental performance of the verification boiler models, which was critical to assure the design quality prior to commercial production. The main quantitative outcome/impact indicator in the PAD is the annual sale of GEF-supported boilers, targeted at annual sales of a total boiler capacity of 17,940 tph at project completion, and 3,000 tph for each beneficiary project boiler works within two years after project completion (a total of 27,000 tph of annual sales). Based on sales contracts completed by the end of October 2004, sales of GEF-supported boilers from the eight beneficiary boiler manufacturers which have completed Phase two will be about 9,230 tph in 2004. The boiler works expected substantial increased sales in the coming years, but attainment of the 27,000 tph target for 2006 is uncertain. The ICR team found the tph annual sales outcome too simplistic as the main measure of the overall outcome of the project. Energy efficiency gains from components such as grates and blowers also developed and sold by the project should be considered.

Furthermore, the government's oversight of the project activities was affected by four major organizational changes at the ministerial level. The executive director position of the Project Management Office was changed three times, causing some disruption to the continuity and consistency of project management.

B. Information used for adaptive management: What is the experience of the project with adaptive management? **Rating: MS**

The project was implemented in two phases. A mid-course evaluation between phases proved to be a successful project design feature, as it resulted in intensive dialogue with each boiler manufacturer on technical results and how best to proceed with commercial production and marketing plans. It also provided for necessary corrective actions: one of the nine boiler manufacturers was not granted Phase 2 GEF financing because its operation was found financially unsustainable. One auxiliary equipment maker was granted with additional GEF investment financing because its GEF-supported product was gaining market share rapidly.

Can the project M&E system be considered a good practice? Perhaps, but more details on the M&E system than what is provided in the ICR would be needed to judge.

4.4 Quality of lessons

Weaknesses and strengths of the project lessons as described in the TE (i.e. lessons follow from the evidence presented, or lessons are general in nature and of limited applicability, lessons are comprehensive, etc.)

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?

1. Standard procurement processes may not be appropriate for non-standard items, for which the market in industrialized countries is disappearing.

2. GEF support can make a critical difference for the introduction of energy-efficient technology, especially when it is sustained through all stages of the product introduction cycle - design, demonstration, manufacture and marketing. 3. Consistent government support is also critical, especially during a period of rapid economic change, including privatization of manufacturing enterprises.

4.5 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 the "Criteria for the assessment of the quality of terminal evaluation reports" in the document "Ratings for the achievement of objectives, sustainability of outcomes and impacts, quality of terminal evaluation reports and project M&E systems" for further definitions of the ratings.

4.5.1 Comments on the summary of project ratings and terminal evaluation findings
In some cases the GEF Office of M&E may have independent information collected for example, through a field visit or independent evaluators working for the Office of M&E. If substantial independent information has been collected, then complete this section with any comments about the project.
N/A

4.5.2 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? Yes.	6
B. Is the report internally consistent, is the evidence complete/convincing and are the IA ratings substantiated? Yes.	5
C. Does the report properly assess project sustainability and /or a project exit strategy? Yes.	5
D. Are the lessons learned supported by the evidence presented and are they comprehensive? Yes.	5
E. Does the report include the actual project costs (total and per activity) and actual co-financing used? No, not by activity.	3
F. Does the report present an assessment of project M&E systems? M&E is discussed and partly assess in several sections of the ICR.	3

4.6 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:** X	**No:**
Explain: The ICR recommends that a follow-up assessment of the project impact be conducted in 2006. It should evaluate the market uptake of GEF-supported boilers and technologies, measured by actual sales of GEF-supported boilers from beneficiary boiler works and other boiler works and their share of the industrial boiler market, as well as the market success of auxiliary equipment makers supported by the project. The overall impact should be assessed based on coal savings capacity resulting from the project.		
Is there a follow up issue mentioned in the TE such as corruption, reallocation of GEF funds, etc.? No.		

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

OED ICR Review, ICR, PIR03.