



Report Number : ICRR0020838

1. Project Data

Project ID

P084874

Project Name

CN- Energy Efficiency Financing

Country

China

Practice Area(Lead)

Energy & Extractives

Additional Financing

P123239

L/C/TF Number(s)

IBRD-75290,IBRD-75300,IBRD-80920

Closing Date (Original)

31-Dec-2013

Total Project Cost (USD)

964,600,000.00

Bank Approval Date

27-May-2008

Closing Date (Actual)

31-Dec-2016

IBRD/IDA (USD)
Grants (USD)

Original Commitment

200,000,000.00

0.00

Revised Commitment

300,000,000.00

0.00

Actual

300,000,000.00

0.00

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Project ID

P098916

Project Name
CN-GEF Energy Efficiency Financing
(P098916)
L/C/TF Number(s)

TF-90719

Closing Date (Original)

31-Dec-2013

Total Project Cost (USD)

393,600,000.00



Bank Approval Date	Closing Date (Actual)	
27-May-2008	31-Dec-2016	
	IBRD/IDA (USD)	Grants (USD)
Original Commitment	0.00	13,500,000.00
Revised Commitment	0.00	13,402,650.27
Actual	0.00	13,402,650.27

2. Project Objectives and Components

a. Objectives

Original Objective

The project development objective was “to improve energy efficiency of selected medium and large industrial enterprises in China, and to reduce their adverse environmental impacts on climate” (Loan Agreement dated July 11, 2008, page 5).

The statement of the project development objective is the same in the Project Appraisal Document (PAD, page 4).

The Global Environment Facility grant objective is identical (GEF Grant Agreement, page 6).

Revised Objective

The revised objective in the IBRD loan agreements and the GEF grant agreement was “to improve energy efficiency of selected energy end-users in key energy-consuming sectors, thereby reducing their adverse environmental impacts on climate” (Amendment to the IBRD Loan Agreements and the GEF Grant Agreement dated June 5, 2013).

b. Were the project objectives/key associated outcome targets revised during implementation?

Yes

Did the Board approve the revised objectives/key associated outcome targets?

Yes

Date of Board Approval

12-Mar-2013

c. Will a split evaluation be undertaken?

Yes

d. Components



Original components

1. **Promotion of Energy Efficiency Financing** (appraisal US\$18.7 million; actual US\$15.5 million). The proposed activities were to address key barriers to developing energy conservation financing businesses in the domestic banking sector, primarily for medium- and large-size industrial energy conservation investments. The activities comprised: (a) *Strengthening the capacity of Project Implementing Entities* in energy efficiency business development, evaluating and assessing the eligibility of sub-projects; developing energy conservation sub-project pipeline and marketing energy efficiency financial products; and developing energy conservation-related financing instruments and risk management tools; (b) *Strengthening the capacity of selected financial institutions* in energy efficiency business startup; energy efficiency business development; appraisal of energy efficiency projects; training of their staff in regulatory frameworks governing energy efficiency business; development of risk management tools, financing instruments, and hedging instruments related to energy efficiency business; (c) *Promoting energy efficiency financing in the banking sector*; and (d) *technical assistance*.

2. **Energy Conservation Investment Lending** (appraisal US\$571.0 million; additional financing of US\$428million; actual US\$1,417.9 million). This component was to consist of an energy conservation lending program of US\$571 million over five years, including US\$400 million in debt financing and US\$171 of equity financing by beneficiary enterprises. A US\$200 million IBRD loan was to be onlent by the Government of China (GoC) to two Participating Financial Intermediaries (PFIs): US\$100 million to the Export-Import Bank of China (EXIM) and US\$100 million to Huaxia. The PFIs were in turn to lend the funds to industrial enterprises and/or energy service companies (ESCOs) for energy conservation investment subprojects. The staff of the PFIs' energy conservation business team/unit were to be trained to identify potential carbon financing candidates from their subproject pipelines. However, no GEF assistance was provided to support the preparation of subprojects that would benefit from the sale of CO2 emissions reduction credits. For eligible subprojects that applied for carbon financing from carbon funds managed by the World Bank, the World Bank was to review the due diligence documentation to ensure conformity with the agreed procedures detailed in the OMs before the completion of the transaction. In the end, this was not done due to lack of demand.

3. **National Policy Support and Capacity Building** (appraisal US\$2.8 million; actual US\$5.9 million): This component will strengthen the government's capabilities to implement industrial energy efficiency policies and programs, through: (1) Assistance to ensure that the National Energy Conservation Center (NECC) is operational and fully functional, through support for organizational start-up and strategic planning. The main responsibility of NECC, approved for establishment by the State Council in August 2006, is to support the implementation of national energy conservation policies and programs; and (2) Support to the implementation of priority national energy conservation programs under the 11th Five-Year Plan. This will mainly include a midterm review (2008) of implementation activities to identify problems, make recommendations and assist in implementing remedial measures.

4. **Project Implementation Support, Monitoring and Reporting** (appraisal US\$1.1 million; actual US\$1.1 million). The component included (1) Assistance in the coordination of technical assistance activities to the banks and the government, as well as organizing project monitoring, evaluation, and reporting activities; and (2) Assistance to support the independent verification of energy conservation lending for the allocation of the performance-based GEF grant and to monitor energy savings



performance of subprojects financed by the PFIs.

Revised components.

The additional financing (AF) in 2011 introduced the following three modifications: (a) piloting lending to ESCOs, which would provide EE services to end-users under performance-based contracts, and broadening the range of sub-borrowers from large and medium-sized industrial enterprises to energy end-users of all sizes and to ESCOs; (b) expanding the target market segments from the industrial to the building sector; and (c) increasing the leverage ratio of the IBRD loan to EXIM Bank contribution from 1:1 in CHEEF to 1:2 in the AF.

e. Comments on Project Cost, Financing, Borrower Contribution, and Dates

Project Cost: The total project cost was US\$1,440 million, which increased from its appraisal estimate of US\$593.6 million due to the expanded scope following additional financing. The total project cost estimate was updated to US\$1,021.6 million at AF.

Financing: The project was financed through two IBRD Loans of US\$100 million each on-lent to the Export-Import Bank of China (EXIM) and the Huaxia Bank, and a GEF Grant of US\$13.5 million for technical assistance to the government and two participating financial intermediaries (PFIs). An additional financing loan in the amount of US\$100 million was approved on October 27, 2011 to on-lend to EXIM Bank. The IBRD loans were fully disbursed to total US\$300 million, and the GEF grant was disbursed at US\$13.4 million.

Borrower contribution: The Government of China contributed US\$6.3 million as planned. The PFIs agreed to lend, from their own resources, an additional amount equivalent to their respective IBRD loan allocation for energy efficiency investments- an estimated total of US\$202.8 million. The subproject beneficiary enterprises (industrial enterprises) were expected to contribute about 30 percent of project costs (matching equity investments), a requirement by EXIM and Huaxia, amounting to US\$171 million. At the time of additional financing in 2011, the contribution from the PFIs was estimated at US\$200 million, and from sub-borrowers US\$128 million. At closure, the PFIs contributed a total of US\$416.8 million, and sub-borrowers contributed US\$703.9 million.

Dates: The project closing date was extended by three years from December 31, 2013 to December 31, 2016 in conjunction with additional financing (AF). The AF was approved on October 27, 2011 to expand activities by broadening the market segment target through both EXIM Bank and Huaxia Bank (AF Project Paper, 2011). The project development objective and the project outcome indicators were revised to reflect these changes. The project was restructured to reflect these changes only in March 2013.

3. Relevance of Objectives & Design

a. Relevance of Objectives



Original Objective

At project appraisal, China was the second largest energy user and emitter of greenhouse gases (GHGs) in the world and its energy demand was continuing to grow. Its energy-intensive manufacturing industries accounted for about 50 percent of total final energy consumption, operated at significantly higher levels of energy intensity (energy use per unit of physical output) than international best practices. Improvement in industrial energy efficiency were expected to contribute to reduction of GHG emissions and help mitigate global climate change impacts.

The original objectives were relevant to the Government priorities set in the 11th Five-Year Plan (FYP) (2006–2010) for Economic and Social Development, where the GoC pledged to reduce the energy intensity of gross domestic product (GDP) by 20 percent from 2005 to 2010. The National Development and Reform Commission (NDRC) launched the 1000 Large Industrial Enterprises Energy Conservation Action Plan in April 2006, targeting the top 1,008 largest industrial energy consumers, which accounted for approximately 30 percent of China's total primary energy consumption.

The original objectives were aligned with the Bank's Country Partnership Strategy at appraisal (2006-2010), which aimed at helping to manage environmental challenges through demonstrating more efficient energy supply systems.

Following the global 2008 financial crisis, the economic slowdown and structural shifts in the economy of China led to shutting down much of the capacity in energy intensive industries, significantly affecting deal origination of the PFIs. The focus on medium and large-sized industrial enterprises in the project development objective was expanded to incorporate all energy-end users in key energy consuming sectors.

Revised Objective

The revised objectives were consistent with the Government's priorities set out in the 12th and 13th FYPs, which set targets for improving EE by sector and region and emphasized the need to develop market mechanisms to promote EE investment. The objectives also contribute to China's Intended Nationally Determined Contributions as submitted to the Conference of the Parties, which include goals to lower carbon intensity of GDP by 60–65 percent below the 2005 level by 2030, and reduce CO2 emissions per unit of GDP by 40–45 percent below the 2005 level by 2020.

The objectives remained consistent with the World Bank's CPS (FY13–FY16), which supported greener growth and aimed at accelerating energy conservation and investment in energy efficiency, in particular encouraging greater reliance on the market to deliver energy efficiency.

Rating
Substantial

Revised Rating
Substantial

b. Relevance of Design

Original Objective

The statement of the original objective was clear; it aimed at improving the energy efficiency of medium and large-sized industrial enterprises in China, thereby reducing their adverse environmental impacts on climate. Per the China State Statistical Bureau (2003 guideline), enterprises were defined as medium-sized if their



annual revenues are in the range of RMB30 to 300 million yuan (about US\$3.9 to 39 million), and large-sized if more than RMB300 million (over US\$39 million) (PAD, page 4). Energy intensive industrial sectors included iron and steel, chemicals and petrochemicals, and construction materials (mainly cement).

The project consisted of two integrated components: an IBRD loan to be on-lent by PFIs to finance energy efficiency investment sub-projects in medium and large scale industrial enterprises, and GEF-funded technical assistance which would assist in building institutions and institutional capacities to support the promotion of an active energy efficiency financing market. The linkages between the project activities, outputs, expected outcomes and the objective were logical. The energy conservation and efficiency investments financed and leveraged by the project were expected to save energy and reduce associated carbon dioxide (CO₂) emissions of medium and large-sized enterprises in energy-intensive industries, thus reducing their adverse climate impacts. These efforts were supported by technical assistance activities to address institutional and capacity building needs of the banking sector and strengthen governmental supervision of industrial energy conservation.

Revised objective

The objective remained broadly the same, while the market segment shifted from 'medium and large-sized industrial enterprises' to 'energy-end users in key energy consuming sectors'. Originally, the PFIs focused narrowly on a few main heavy industries (iron & steel, cement, and chemical) and a few EE technologies (predominantly waste heat recovery). They were facing increasing difficulties in finding projects, in particular following the economic slowdown and decelerating demand for industrial goods. The project design was revised to expand lending to a wider range of energy user sectors and EE technologies. The objective was revised to reflect this change and the linkages were aligned in the results framework.

Rating
Substantial

Revised Rating
Substantial

4. Achievement of Objectives (Efficacy)

Objective 1

Objective

To improve energy efficiency of selected medium and large industrial enterprises in China, and to reduce their adverse environmental impacts on climate.

Rationale

Outputs

- 41 subprojects were financed by the two PFIs (17 by EXIM Bank and 24 by Huaxia Bank). Investments ranged from US\$5 million to US\$134 million. Under Huaxia's subprojects, the largest amount of investments were in power and heat sector subprojects, such as utilization of waste heat and



construction of heating networks, followed by chemicals and cement. For EXIM, the financing of projects was heavily weighted toward the nonferrous metals industry (iron and steel).

- A series of studies were carried out on how to use public funds to leverage commercial financing, preparation of green bond guidelines, design of financing platforms, and workshops to provide assistance to the banking sector. Technical assistance was provided to the China Banking Regulatory Commission (CBRC) to develop green financing policies that incentivize banks to mainstream EE financing.
- The National Energy Conservation Center (NECC) became fully operational, as planned, under the project; it is a leading center for technical support.
- Technical assistance and training were provided to build capacity in energy efficiency financing for EXIM, Huaxia, and another PFI- Minsheng Bank, which was involved in a parallel Bank-financed energy efficiency financing project II in China (P113766).
- Studies were carried out with GEF funding to support implementation of the 12th FYP and the design of the 13th FYP. The policy recommendations informed and in some cases led directly to national and local policies and regulations that were promulgated (a full list of activities is provided in the ICR's Annex 2).

Outcome

- The cumulative amount of incremental EE investments supported by the project was US\$1,427 million, exceeding the original target of US\$900 million, which was revised upward to reflect the additional financing.
- The cumulative annual energy savings were estimated at 2.67 million tons of coal equivalent (Mtce), exceeding the original target of 2.07 Mtce, which was revised upwards to reflect the additional EE investments.
- The associated total annual reductions of GHGs were estimated at 6.51 million tons of CO₂, exceeding the original target of US\$5.05 Mt of CO₂, which was revised upwards to reflect the additional EE investments.

Rating

Substantial

Objective 1 Revision 1

Revised Objective

To improve energy efficiency of selected energy end-users in key energy-consuming sectors, thereby reducing their adverse environmental impacts on climate.

Revised Rationale

Outputs

- The outputs are the same as above.
- All subprojects remained in the industrial sector after project restructuring. The intended expansion of



the scope of lending through the AF to include building EE did not materialize, and the anticipated investments in the building sector (assumed to be 20 percent of the AF portfolio) were not made. The average cost of EE investments rose, and the typically small size of building sector EE projects made it difficult to aggregate them into large lending packages to be handled by the PFIs.

Outcome

- The cumulative amount of incremental EE investments supported by the project was US\$1,427 million, exceeding the revised target of US\$1,328 million.
- The new target added at AF of US\$60 million for the cumulative amount of EE investments to ESCOs and building EE projects was exceeded and reached US\$105 million at project closure.
- The cumulative annual energy savings were estimated at 2.67 million tons of coal equivalent (Mtce), slightly above the revised target of 2.66 Mtce.
- The associated total annual reductions of GHGs were estimated at 6.51 million tons of CO₂, slightly exceeding the revised target of 6.49 Mt of CO₂.
- Through the project, EXIM developed EE lending as a major business line with its own funding in 2013, financing EE loans of CNY 19.3 billion (US\$2.8 billion) with its own funds. At the project's end, Huaxia was scaling up its green lending business through a dedicated Green Finance Center. Green credit business now accounts for 7 percent of its entire business at Huaxia, and its Blue Sky Clear Water Fund that finances green projects totals CNY 5 billion.

Revised Rating Substantial

5. Efficiency

Economic and financial analysis

The project was built on the premise that the expected type of EE subprojects would be economically justified if they were financially viable (PAD-Annex 9). Ex-ante economic and financial analyses were carried out for four representative subprojects, which were part of the first batch of subprojects envisaged for financing under the project. These included two subprojects to recover and utilize waste heat for power generation, one subproject to upgrade fans and pumps, and one to revamp a production line in a petrochemical complex. The financial impacts of the subprojects were analyzed based on the financial benefits, derived mainly from energy savings, and the investment costs and incremental operating costs. The analysis at appraisal, excluding income tax, showed that these four subprojects would have an aggregate financial internal rate of return (FIRR) of 28 (ranging from 11 to 48) percent and corresponding payback period of 2.9 (1.6 to 7.0) years, thus demonstrating their financial viability. Assuming tax of 25 percent, the FIRR would be 22 (ranging from 7.4 to 37) percent and payback period 3.9 (2.2 to 9.6) years.

The ex-ante analysis showed the aggregate economic internal rate of return (EIRR) would be 34 (ranging from



13 to 63) percent, accounting for environmental benefits from reduced emissions with conservative assumed values of US\$4,978 per ton (t) of particulates, US\$218/t sulfur dioxide (SO₂), and US\$10/t carbon dioxide (CO₂). Accounting for CO₂ alone, but using an updated value of the social cost of carbon starting at US\$30/t in 2015, produces a similarly high aggregate EIRR of 40 (16 to 77) percent.

At AF, the AF Project Paper reported that the EIRRs were estimated for two representative AF project investments, and these were lower compared to the original project, as the investment costs of industrial EE renovations showed an upward trend in China, and EE retrofit projects in the building sector tend to have much longer payback periods than industrial EE renovation projects (AF Project Paper, 2011). The AF did not include the actual economic analysis.

At completion, a representative sample of 9 subprojects was selected. The analysis at completion took the final reported values of investment amount, energy savings and emissions reductions, and combined these with the cash flows expected according to the feasibility report for the sampled subprojects to derive IRRs and payback periods. The analysis suggested an aggregate IRR of at least 35 percent in economic terms (including CO₂ emissions reductions valued at US\$30/t in 2015 rising to US\$65/t in 2040, in accordance with 2015 World Bank guidance), or 16 percent in financial terms (including tax) with a payback period of 5.9 years. These values are broadly on par with those expectations at appraisal, demonstrating economic and financial viability.

Administrative/ Operational Efficiency.

The project was extended by a total of three years as a result of additional financing to expand the scope. There were some initial delays and slow disbursements, along with ineligible expenditures, but these were solved during implementation.

Efficiency Rating

Substantial

a. If available, enter the Economic Rate of Return (ERR) and/or Financial Rate of Return (FRR) at appraisal and the re-estimated value at evaluation:

	Rate Available?	Point value (%)	*Coverage/Scope (%)
Appraisal	✓	40.00	8.00 <input type="checkbox"/> Not Applicable
ICR Estimate	✓	35.00	35.00 <input type="checkbox"/> Not Applicable

* Refers to percent of total project cost for which ERR/FRR was calculated.

6. Outcome

The relevance of both original and revised objectives is assessed as high, and the relevance of design under both objectives is rated substantial. The project substantially achieved its original objective of improving energy efficiency of selected medium and large industrial enterprises in China, and the revised objective with the expanded market segment to incorporate selected energy end-users in key energy-consuming



sector, thereby reducing their adverse environmental impacts on climate. Efficiency is assessed as substantial based on satisfactory economic and financial rates of return.

The outcome rating under both original and revised objectives is satisfactory. The overall project outcome rating is satisfactory.

a. Outcome Rating

Satisfactory

7. Rationale for Risk to Development Outcome Rating

- *Institutional capacity and commitment.* The PFIs are maintaining and expanding the units they set up to implement the project and are diversifying their purview to include clean energy sectors other than industrial EE. The PFIs are able to continue to assess and to finance sound EE projects in industrial sectors going forward and to develop pipelines of clean energy projects.

- *Policy and regulatory environment.* Over the course of the project, China continued its efforts to improve EE, combining strong regulatory measures with market-based programs. Energy consumption is now regulated at national, provincial, and local government and large enterprise levels. China continues to be dedicated to improving EE, and the adoption of energy caps in the 13th FYP ensures that new facilities built will be more energy efficient and also exerts pressure for energy conservation from existing facilities.

a. Risk to Development Outcome Rating

Negligible

8. Assessment of Bank Performance

a. Quality-at-Entry

The project built on the experience of the World Bank Group and the GEF working with China on EE technical assistance and operations. The project design was informed by a review of EE financing experience in Brazil, China, and India, and a technical study carried out as part of project preparation that identified key energy-intensive industrial subsectors and energy conservation project types with significant potential for EE improvements and attractive financial returns.

This was a financial intermediary operation, for which fiduciary and safeguards arrangements were



adequate. The most significant risks identified at appraisal included weak implementation capability of the GoC, slow development of the subproject pipeline, and slow pace in establishing the NECC (the PMO) owing to budget and staff constraints. The mitigation measures included capacity building under the project. The design stage did not anticipate increasing EE financing risks following the global financial crisis and rising unit investment cost of energy savings. The subsequent operation (China Energy Efficiency Financing Project II-P113766) approved two years later in 2010 had a similar design, however the energy saving targets were not met under EE investments (the project extended the model beyond policy banks (such as EXIM) and 'state-directed' commercial banks (such as Huaxia); it was implemented through a more commercially oriented PFI- Minsheng Banking Corp.Ltd (ICR-CEEF II P113766).

Creating a new entity to be the PMO--National Energy Conservation Center (NECC), an agency under the direction of the National Development and Reform Commission (NDRC)--was a risk that in the end was adequately addressed through technical support turning the agency into a leading center for technical support.

Monitoring and evaluation design was adequate (see Section 10).

Quality-at-Entry Rating

Satisfactory

b. Quality of supervision

The World Bank team conducted annual supervision missions, after the approval of AF these were semi-annual. According to the ICR (page 32), the team engaged frequently with the PMO and the Project Implementation Units to support their implementation, resolving issues as they arose, and seeking the attention and support of the Government as needed.

The oversight over fiduciary and safeguards compliance was strong. When several instances of ineligible expenditures were found in the early stages of the project, the Bank ensured that remedial actions were taken, guiding the PFIs to ensuring compliance. While environmental impacts were expected to be minor, the PFIs, with support from World Bank safeguards specialists, established appropriate systems for monitoring of subproject performance. When an unforeseen instance of relocation was found for a subproject of Huaxia, the team took immediate action to work with the PFI to resolve the situation, and to modify the Operations Manual to ensure proper handling of such instances. There was another such instance of relocation, and inspection by the World Bank team found that Huaxia and the subproject complied with the safeguard requirements (ICR, page 32).

Overall, the Bank team was proactive and addressed issues and delays in implementation promptly. The intended expansion of the scope of lending under AF to include building sector EE subprojects, however, did not, materialize, despite the efforts to do so.

Quality of Supervision Rating

Satisfactory

Overall Bank Performance Rating

Satisfactory



9. Assessment of Borrower Performance

a. Government Performance

The National Development and Reform Commission (NDRC) remained highly engaged throughout the project. As the ICR (page 33) reports, it provided timely guidance and support to the PMO, and cooperated with the World Bank team to address issues of project design and implementation. It provided direction to the PMO on policy development and capacity-building activities, and ensured that outputs were designed so they could make effective contributions to the national policy making process. The NDRC regularly met with the PFIs, recommended potential subprojects, and took measures to urge them to accelerate project implementation.

Government Performance Rating

Satisfactory

b. Implementing Agency Performance

PMO-NEEC. As reported by the ICR (page 33), the PMO cooperated well with the World Bank team, and was active in providing support to the PFIs, which was essential in assisting them to learn compliance with World Bank systems, and how to utilize effectively the resources available through the project, particularly the GEF funds. While a change in PMO leadership led to a short period of delay, the hiring of a highly capable new head through a competitive process led to even stronger performance later.

PFIs-EXIM and Huaxia. Turnover of staff in the PFIs was a constant challenge, but a number of staff, particularly at Huaxia, were allowed to remain in place and develop further expertise. In the early stages of implementation of the loan portion of the project by the PFIs, some ineligible expenditures were found, and qualified audit opinions were issued for EXIM in 2008 and for Huaxia in 2010 and 2011 owing to a lack of supervision and guidance to the bank's branches, as well as to weakness in prior- and post-credit control. The two banks paid considerable attention to the issues raised, which were subsequently addressed. Both EXIM and Huaxia made significant efforts to develop their dedicated teams, provide performance incentives to staff and branches, establish effective EE financing procedures and regulations, and develop new financial products to implement the projects and mainstream EE financing. Utilizing a portion of the GEF grant allocated for performance-based funding of TA presented administrative challenges. The project met targets despite the rising cost of unit energy savings in EE investments over the course of the project. The PFIs were able to find sufficient volume of projects in industrial sectors to meet the project outcome targets.

Implementing Agency Performance Rating

Satisfactory

Overall Borrower Performance Rating

Satisfactory

10. M&E Design, Implementation, & Utilization



a. M&E Design

The outcome indicators that measured energy savings and CO2 reductions were appropriate to assess the achievement of the objective of improving energy efficiency and reducing the related adverse environmental impacts on climate. Another outcome indicator captured mobilization of funds for energy efficiency- the co-funding that went toward EE along with the IBRD loan funds. At AF, an additional outcome indicator was added to reflect lending for both ESCO and building sector EE projects. The targets were revised upward to reflect the expanded scope of the project.

Several intermediate outcome indicators were subsets of the PDO and GEO indicators and duplicative; for example, energy savings and CO2 emissions reductions from EE subprojects.

The NDRC, through the PMO, was responsible for the M&E system.

b. M&E Implementation

The PFIs and the PMO had the responsibility for collection of data on the indicators, which were reported to the GoC and the World Bank. The reporting was initially annual and then semiannual for the remainder of the project.

The PFIs provided information to the PMO, which also tracked indicators relating to indicators for which it was responsible, primarily intermediate results indicators relating to capacity building. The PFIs contracted independent third parties to monitor and validate their energy conservation-related lending disbursements. The calculations of annual energy savings capacity (tce per year) resulting from EE subprojects financed by the PFIs was performed in line with the PAD. The annual CO2 emissions reductions capacity (PDO and GEO indicator) were based on these energy savings at an emission factor of 2.44 t CO2/tce. EE investments in subprojects were the total of debt financing from the IBRD loan and the PFIs own resources, as well as the funding provided by the host (beneficiary) enterprises.

c. M&E Utilization

The M&E results were used by the PMOs and the PFIs to measure their progress, and provided the basis for adjustments to their respective implementation plans to achieve the project's objectives. Indicators were used as diagnostic tools for identifying areas where emerging issues require attention.

M&E Quality Rating

Substantial

11. Other Issues

a. Safeguards

The project was assigned Category FI. This was a financial intermediary operation, and individual subprojects financed by the PFIs were to be identified during project implementation. Only the Environmental



Assessment safeguard policy was triggered at appraisal (PAD). Sub-projects are expected to be Category B or C. Typical subprojects included waste heat boilers, pressure recovery turbines, and changes of inefficient equipment with efficient ones, which usually have either minor or no negative environmental impacts. The Environmental Assessment Framework was developed and incorporated into the Operations Manual (OM) of the PFIs.

At AF in 2011, another Bank safeguard policy was triggered- OP 4.12 Involuntary Resettlement (AF Project Paper, 2011). A resettlement policy framework and procedures were incorporated into EXIM's OM for subprojects involving land acquisition. None of EXIM's subprojects required land acquisition, however, one subproject financed by Huaxia involved land acquisition. Although inspection by the World Bank revealed that local and national regulations had been complied with, the failure of the PFI to obtain prior review by the World Bank resulted in the subproject being eliminated from the project. Steps were subsequently taken to strengthen safeguards oversight by Huaxia, including amending the OM to ensure proper oversight. Subsequently, Huaxia proposed to finance one other subproject that required land acquisition. In this case, proper oversight procedures were followed, due diligence showed compliance with applicable regulations, and the subproject was supported under the project.

b. Fiduciary Compliance

Financial management. In the early stages of implementation of the loan portion of the project by the PFIs, some ineligible expenditures were found, and qualified audit opinions were issued for EXIM in 2008 and for Huaxia in 2010 and 2011 owing to a lack of supervision and guidance of the bank's branches, as well as to weakness in prior- and post-credit control. The two banks paid considerable attention to the issues raised. Efficient and effective remedial actions were taken according to the World Bank's and the auditor's recommendations, including optimizing credit control procedures, strengthening field supervision and recalling the problematic on-lent funds and replacing them in the project portfolio with other eligible expenditures. Since that time, the project accounting and financial reporting were in line with the relevant regulations issued by the MoF and with the requirements specified in the Loan Agreement. No further significant financial management issues were noted by the World Bank and the auditors.

Under the GEF- funded portion of the project, which involved expenditures by the PMO for TA and capacity building, no significant financial management issues were noted throughout the project implementation, and all financial management-related weaknesses raised during project supervision were resolved in a timely fashion. The project audit reports all had unqualified audit opinions (ICR, page 20).

Procurement. The ICR does not discuss the procurement procedures under sub-projects.

c. Unintended impacts (Positive or Negative)

d. Other



12. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	---
Risk to Development Outcome	Negligible	Negligible	---
Bank Performance	Satisfactory	Satisfactory	---
Borrower Performance	Satisfactory	Satisfactory	---
Quality of ICR		Substantial	---

Note

When insufficient information is provided by the Bank for IEG to arrive at a clear rating, IEG will downgrade the relevant ratings as warranted beginning July 1, 2006.

The "Reason for Disagreement/Comments" column could cross-reference other sections of the ICR Review, as appropriate.

13. Lessons

IEG selected four lessons from the ICR with some adaptation of the language:

- **The approach in energy efficiency financing needs to be flexible and ready to be adjusted to adapt to the changing market.** In the early years of the project, the industrial economy was strong, and many technically and financially viable EE projects were available in China. The economic slowdown hit hard energy-intensive manufacturing industries, which were the original target of the project. In the latter stages of the project, softening energy prices and demand for industrial products reduced the pool of eligible projects, while the gradual devaluation of the CNY rendered the U.S. dollar-denominated loans offered through the project less attractive. Additionally, the market demand for financing of RE projects—which also reduce CO2 emissions—was on the rise. Introducing flexibility in scope for implementation in future projects is needed to adapt to Government's emerging priorities and changes in the economic and technical environment.
- **Generating sufficient deal flows for energy efficiency financing is challenging.** Under the project, as EE projects have been undertaken nationwide in China, and as the number of large industrial enterprises shrank owing to consolidation, the project turned towards low-hanging fruit in the form of discrete, large retrofit projects affecting single processes or even single pieces of major equipment. Great potential still lies in systemic retrofits, but these tend to be technically complex and difficult to evaluate. This highlights the importance of capacity building; the skills of the EE units in the PFIs were significantly strengthened in the early years of the project, so they were able to continue to identify and finance industrial EE investments



even in the more challenging environment.

- **Building sector EE remains a difficult market segment for financing institutions to lend to.** Despite allocation of significant resources to expand EE financing to the building sector, the PFIs were unable to find building sector EE projects suitable for financing, whether single subprojects, or packages of subprojects. The barriers to engaging in building energy retrofits are high. There are, for instance, split incentives between developers, owners, operators and tenants; in addition, the small typical size of building sector EE projects leads to difficulty in aggregating them into the kinds of large lending packages handled by the PFIs. Continued innovation is needed in this sector.

- **Commitment of project entities and their internal organization are essential factors in project implementation and the achievement of development results.** Commitment is exhibited in a number of areas, including management commitment, formation of and long-term support for dedicated teams, provision of incentives to staff, and flexibility and innovation in developing and adapting financial products. This was the success factor under this project that was implemented through two financial intermediaries.

14. Assessment Recommended?

No

15. Comments on Quality of ICR

The ICR is concise and results-oriented. The ICR provides an adequate level of detail covering issues that affected the project implementation. Annex 3 is particularly notable for its discussion of economic and financial analyses, assumptions and input data. Annex 2 offers an important level of detail into the project outputs, including subproject-level data and results. Lessons are insightful and evidence-based. The relevance of objectives and design should have been assessed separately under the original and revised objectives.

a. Quality of ICR Rating

Substantial

