Report Number : ICRR0020869

1. Project Data

Project ID P114182	**Project Name** CN-GEF Provincial Energy Efficiency
Country China	**Practice Area(Lead)** Energy & Extractives

L/C/TF Number(s)	Closing Date (Original)	Total Project Cost (USD)
TF-98703	30-Jun-2016	300,741,917.00
Bank Approval Date	**Closing Date (Actual)**	
22-Mar-2011	31-Dec-2016	

	IBRD/IDA (USD)	Grants (USD)
Original Commitment	13,386,363.00	13,386,363.00
Revised Commitment	13,233,326.03	13,233,326.03
Actual	13,233,326.03	13,233,326.03

Prepared by	Reviewed by	ICR Review Coordinator	Group
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2. Project Objectives and Components

a. Objectives

This project was financed by a Global Environmental Facility (GEF) Trust fund administered by the Bank. The Project Development Objective (PDO) as stated in the GEF Grant Agreement (Schedule 1, page 6) was:

"To improve quality and sustainability of provincial energy efficiency programs in Project Provinces through technical assistance and institutional capacity building."

The PDO stated in the Project Appraisal Document (PAD, page 6) was similar.

"**To improve quality and sustainability of provincial energy efficiency programs in Shandong, Shanxi**

and Jiangxi Provinces through technical assistance and institutional capacity building.:
The project's Global Environmental Objective (GEO) was (PAD, page 6): "**To achieve energy savings and associated greenhouse gas (GHG) emission reductions through incremental energy efficiency investments and improved energy efficiency management enabled by provincial energy conservation programs that have been strengthened by the Project."**

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

No

c. Will a split evaluation be undertaken?

No

d. Components

This project comprising three provincial governments aimed at providing technical assistance and institutional capacity building activities aimed at improving the quality and sustainability of provincial energy efficiency programs tailored to the priorities of each province.
Shandong Energy Efficiency (EE) Scaling-up Program. *(Appraisal estimate 4.46 million. Actual cost at closure US$4.39 million).* This component aimed at providing technical assistance to Shandong province, China's largest energy consuming province with a high level of industrialization. Activities included: (i) capacity building for developing the EE industry (EE industry as defined in this project refers to enterprises and other organizations that undertake EE services including energy auditing, EE financing and implementation): (ii) establishing and supervising EE monitoring and information management platforms (such as, network-based data collection and reporting, advanced energy metering systems, data analysis and network-based information dissemination and communication): (iii) improving energy management system for enterprises to assess their energy consumption, identify opportunities for more efficient energy uses, establish EE goals and monitor and measure progress on a continuous basis : and, (iv) capacity building for EE program management and supervision in local enterprises and agencies in the Province.
Shanxi EE Scaling-up Program. *(Appraisal estimate US$4.46 million. Actual cost at closure US$4.51 million)*. This component aimed at providing technical assistance to Shanxi province, China's largest coal producing province. Activities included: (i) capacity building for developing the EE service industry: (ii) establishing an EE monitoring, supervision and information management platform: (iii) capacity building for activities aimed at influencing energy efficient investment behavior through fiscal and incentive policies (such as through subsidies and awards, pricing and taxation policies): (iv) capacity building for Building EE program since energy consumption in buildings was identified by the National Development and Reform Commission (NDRC) as one of three 'energy intensive' sectors (along with industry and transportation). (v) strengthening EE statistics system for providing energy consumption data: and, (vi) strengthening the capacity of local enterprises and agencies in EE management and supervision.
Jiangxi EE Scaling-up program. *(Appraisal estimate US$4.46 million. Actual cost at closure US$4.33 million).* This component aimed at providing technical assistance to Jiangxi province, a province in the cusp of large-scale industrialization. Activities included: (i) developing the EE industry: (ii) establishing an EE monitoring, supervision and information management systems: (ii) strengthening the capacity of local

enterprises and agencies in EE program management and supervision: (iii) developing energy pricing and fiscal policies to incentivize EE activities and investments: and, (iv) establishing an EE appraisal system for new, large fixed investments (such as in factories, power plants, office buildings and apartment blocks).

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

Project cost and Financing: The project was financed by a GEF grant**.** *(Appraisal estimate US$299.43 million: Amount disbursed at closure US$13.23 million).* There was parallel financing for complementary sector activities from the Australian Agency for International Development (AusAid) and the multi-donor Energy Sector Management Assistance Program managed by the World Bank.
Borrower contribution. Borrower contribution for the EE programs in the three provinces was estimated at US$287.36 million. Their contribution at closure was US$287.26 million.
Dates. The project closing date was extended through a Level 2 restructuring by six months until December 31, 2016 to allow for completion of activities associated with disseminating lessons from the project to other provinces.

3. Relevance of Objectives & Design

a. Relevance of Objectives

The PDO was highly relevant to the Government strategy. At appraisal, China's leadership had called for a reduction in carbon dioxide intensity (CO2 emissions per unit of GDP) in the economy by 40-45% between 2005-2010, through reducing energy intensity and increasing the share of non-fossil fuels in the energy mix. China's 11th Five Year Plan for the 2006-2010 period set a domestic energy intensity reduction target of 20% per unit GDP between 2006-2010 and a non-fossil fuel target of 15% of primary energy by 2020. The plan also set mandatory energy savings targets for the top 1,008 energy consuming industries in the country. In the years before appraisal, China's provinces had negotiated specific energy intensity reduction targets with the central government as their contribution to the national goal and provincial governors were to be held accountable for achieving these targets. The 12th Five Year Plan for the 2011-2015 period reiterated the goal of improving energy efficiency, expanding the use of renewable energy and set a new energy intensity reduction target of 16% per unit of GDP. The 13th Five Year Plan for the 2016-2020 period identified green development as a major priority for the government.
The PDO was well-aligned with one of the five pillars of the Bank's Country Partnership Strategy (CPS) for the 2006-2010 period: managing resource scarcity and environmental challenges. The PDO was consistent with the CPS for the 2013-2016 which identified the need for "shifting to a sustainable energy path" through "accelerating energy conservation and investment in Energy Efficiency".
The PDO was consistent with the GEF climate change focal area and the GEF strategic objectives of: (i) promoting industrial energy efficiency: and, (ii) promoting energy-efficient practices in the appliance and building sectors. The PDOs were also relevant to China's Intended Nationally Determined Contributions as submitted to the Conference of the Parties on June 30, 2015 which included goals of lowering carbon intensity of GDP by 60-65% and reducing carbon dioxide (CO2) by 40 to 45%, below the 2005 level by 2020.

Rating
High

b. **Relevance of Design**

The statement of the PDO was clear. The design identified barriers to scaling up Energy Efficiency (EE) programs such as due to inadequate information, limited human capital and absence of an Energy Efficiency market and the causal links between the project activities, their outputs and outcomes were clear. Capacity building activities that were common to the three provinces included developing the EE industries, establishing EE monitoring and information management platforms and EE program management and supervision in local enterprises. These activities were combined with activities that were customized to reflect provincial priorities such as: (i) Capacity building for promoting Enterprise Energy Management in Shandong province: (ii) Building Energy Efficiency program and strengthening the energy use statistics system in Shanxi province: (iii) Establishing EE appraisal system for large, new fixed-asset investment system in Jiangxi province: and, Developing energy pricing and fiscal policies in Shanxi and Jiangxi provinces. The combination of these activities were likely to contribute to the PDO of improving the quality and sustainability of energy efficiency programs in the three provinces. These activities also could be expected to contribute to the GEO objective of achieving energy savings and reducing greenhouse (GHG) emissions. The project activities which aimed at influencing behavior change relating to energy efficiency in the provinces were likely to contribute to the long term development objectives of improving energy efficiency, expanding the use of renewable energy and addressing climate change considerations in China.

Rating
Substantial

4. Achievement of Objectives (Efficacy)

Objective 1
Objective
To improve quality and sustainability of provincial energy efficiency programs in Project Provinces.

Rationale
Outputs (ICR, Data Sheet and pages 29-41).
The following outputs were completed in the Shandong Province.

- Guidelines for measuring and calculating energy savings that are recognized standards in Shandong Province since January 2016 were developed and supporting policies for development of EE

industries were implemented.
- 736 Energy Performance Contracts (EPCs) were conducted at project closure. This exceeded the target of 225. (An EPC contract refers to an arrangement between an Energy Savings Company (ESCO) and an energy consuming enterprise. The ESCO identifies energy savings opportunities, makes the investment necessary for pursuing them and recoups the investment costs from payments in return for guaranteed savings as specified under the terms of the contract) (ICR, page 13).
- 1,518 enterprises were connected to the information platform. This exceeded the target of 200. 1,040 staff/officials were trained to use the platform. This exceeded the target of 400.
- Shandong province developed its own accreditation system known as the performance evaluation method for the adoption of EMS (Previously firms in Shandong Province could become certified for EMS only through the national certification method administered by 26 entities that were accredited to the National Government to perform certification.
- Three studies were completed: A study on energy conservation working measures of the 12th Five Year Plan, industrial boiler EE promotion, research on using low heat value to generate electricity and research on the influence of urbanization on long term energy supply, consumption and saving in Shandong province.

The following outputs were completed in the Shanxi Province.

- Supporting policies for development of EE industries were implemented.
- 50 EPC projects were completed. This was short of the target of 105.
- 20 buildings obtained EE labels in the province as part of the Province's efforts to scale up the national labeling program as targeted.
- 400 enterprises were connected to the information platform as compared to the target of 100. 480 officials were trained to use the information platform as compared to the target of 300.
- A study of coal-bed methane gas pricing was completed. The implementation of the recommendations of this study was under discussion at project closure. Taxation policies and other fiscal policies to promote energy conservation had not been implemented at project closure.
- Energy efficiency indices system for improving the capacity for collecting and processing energy statistics data in the enterprises were developed and implemented at project closure. 949 officials were trained to use the system as compared to the target of 150.

The following outputs were completed in the Jiangxi Province.

- Supporting policies for development of EE industries were implemented.
- 96 EPC projects were conducted at project closure. This exceeded the target of 75.
- 518 enterprises were connected to the information platform. This exceeded the target of 200. 2,400 officials were trained to use the platform as compared to the target of 400.
- Policies pertaining to development of fiscal subsidies and rewarding policies, taxation policies and energy pricing adjustment policies to promote energy conservation were implemented.
- An energy conservation monitoring implementation plan for key energy consuming industry was developed. 981 officials were trained in the EE monitoring and supervision system at project closure as

compared to the target of 300.
- Energy efficiency appraisal methods for fixed assets investment were implemented. 2,171 officials were trained in energy efficiency appraisal methods for fixed investment as compared to the target of 20.

Outcomes.

- Energy Saving Companies (ESCOs) in the three provinces invested US$737.00 million over the course of the project. This exceeded the original target of US$429.00 million.
- 2006 enterprises were connected to the EE monitoring and supervision information platform as compared to the target of 500.
- Investments in EE resulted in cumulative lifetime energy savings of 65.92 units of megawatt hours (MWh) (MWh were calculated using a conversion factor of 8.14 per ton of coal equivalent). This exceeded the target of 18.20 units of megawatt hours. These savings brought about reductions in greenhouse gas emissions of 173.93 Million tons of Carbon dioxide (MtCo2) as compared to the target of 44.40 MtCO2.

The key outcome indicators of the PDOs and the GEOs and most of the intermediate indicators were either realized or exceeded. Given that activities supported by the project were mainly technical assistance and capacity building activities, while it is difficult to assess the extent to which the project activities contributed to the PDOs, it is reasonable to assume that the project made a significant contribution to realizing the PDOs.

Rating
Substantial

5. Efficiency

Economic Analysis. A conventional economic and financial analysis through calculating the Economic or Financial Internal Rate of Return was not conducted either at appraisal or at closure as the project activities consisted of mainly technical assistance and capacity building activities. An incremental cost -benefit analysis was conducted for the project activities. Incremental economic costs and benefits of the project as defined in this project are those that arise relative to a situation in the absence of the project. The incremental costs included: (i) the costs associated with technical assistance and capacity building activities through the GEF and counterpart funding from the provinces: and, (ii) the associated capital cost of additional energy efficiency investments facilitated through the strengthened energy efficiency industry. These costs were to contribute to incremental energy efficiency investments. Cumulative incremental energy efficiency investments from Energy Service Companies (ESCOs) in the three provinces was US$737.00 million at project closure as compared to US$429.00 million estimated at appraisal. The incremental energy efficiency investments were expected to come from cumulative energy savings measured in million tons of coal equivalent (Mtce) and associated greenhouse emission (GHG) reductions measured in million tons of Carbon Dioxide (MtCO2). The cumulative energy savings at project closure were estimated to be about 65.9 Mtce at

closure as compared to 18.2 Mtce at appraisal. The associated reductions in GHG emission were estimated to be 173.9 mtCO2 as compared to 44.4 mtCO2 at appraisal.
Administrative and operational issues. The procurement delays and delays associated with implementing the rollout of hardware systems for the online energy consumption monitoring platforms necessitated redesign of system (partly due to the rapid evolution of hardware and software systems). However, the drop in the cost of these systems allowed for cost savings that allowed expansion of activities in the same or other project areas. At project closure, the activities were completed, within the revised project timeline. At project closure, most though not all of the project activities had been completed, although six months behind schedule.

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		0	0 ☐Not Applicable
ICR Estimate		0	0 ☐Not Applicable

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

6. Outcome

The PDO's relevance to the government, the Bank and the GEO strategies was rated as High. Relevance of design was rated as Substantial, given the logical links between project activities (which included both common activities across the three provinces and provincial-specific activities), their outputs and outcomes. Efficacy was rated as Substantial. Given that the project activities supported mainly technical assistance and capacity building activities, while it is difficult to attribute the extent to which the PDOs were realized due to the project activities, it is reasonable to conclude that the project made a significant contribution to realizing the PDOs and GEOs. Efficiency was rated as Substantial. The incremental benefits exceeded costs at appraisal and at closure, most of the project activities were completed.

a. Outcome Rating
Satisfactory

7. Rationale for Risk to Development Outcome Rating

Government Commitment and Ownership. Government commitment to energy efficiency remains high as demonstrated by the specification of mandatory energy intensity reduction targets in the 1th and 12th Five Year Plans and by providing the legal foundation for the energy conservation program through the revised energy conservation law in 2007. The government's commitment to reducing energy intensity remained high during the 13th Five Year Plan. Further, given that the provincial governors are held accountable by the national government for achieving targets relating to energy efficiency, the risk to development outcome is rated Negligible.

a. Risk to Development Outcome Rating

Negligible

8. Assessment of Bank Performance

a. Quality-at-Entry

The project was prepared based on lessons from prior Bank-financed energy sector projects in China (Energy Conservation Project I and II, Heat Reform and Building EE Project and EE Financing project). The lessons incorporated in the design of this project included, using local institutions to the extent possible, adapting to local situations given that each province has its own priorities and characteristics, dedicating resources for capacity building to the Project Management Office and aligning project components with the government's broader initiatives to better secure government commitment. The design also incorporated recommendations of three studies. (i) *Survey Report on the Energy Conservation Measures and Actions of Chinese Provincial Governments* by the National Development and Reform Commission (NDRC) in 2008: (ii) *Best Practice Case Studies of Chinese Provincial Energy Conservation Actions* by NDRC in 2009: and, (iii) *Accelerating Energy Conservation in China's Provinces* by the Bank *in 2010.* The recommendations of these studies that were incorporated at design included, using market-based tools for energy efficiency and strengthening implementation of the energy efficiency regulatory programs through capacity building activities at the provincial, prefectural and even county levels. Several risks were identified at appraisal including risks associated with the weak implementation capacity of provincial governments and difficulties associated with supervision due to the large number of project activities in the three provinces. The design included provisions for facilitating inter-provincial knowledge exchange (discussed in section 9b) The preparation team worked with the government in developing an M&E framework that addressed the issues relating to measuring the impact of Carbon Dioxide (CO2) emissions as required for a GEF financed project. Appropriate mitigation measures were incorporated at design and appropriate arrangements were made for fiduciary compliance (discussed in section 11).
There were some shortcomings in M&E design (discussed in section 10a).

Quality-at-Entry Rating

Moderately Satisfactory

b. Quality of supervision

There were two project missions per year during the lifetime of the project. The supervision team included in addition to external consultants, technical, financial management and procurement specialists. Although the supervision team's leadership changed three times during the lifetime of the project, continuity of leadership was maintained as the new task team leader was brought into the project at least a year before assuming responsibility. During implementation, the supervision team was proactive and supported the Project Management Office staff in the respective provinces to develop working mechanisms to maintain and extend the mandate for provincial EE regulation and enforcement.
The Implementation Status Report (ISR) ratings for implementation progress which started as 'Satisfactory" was downgraded to "Moderately Satisfactory" due to the delays associated with procuring goods for the monitoring and supervision information platform and both Shanxi province and Jiangxi Province were not meeting targets for connecting enterprises to the platform nor training staff. By the end of 2015, implementation progress had been rated as :"Moderately Unsatisfactory", with significant risk attached to the possibility that the targets would not be met without an extension to the project closing date. Things however rectified and project activities were completed with an extension of the closing date by six months. Given that three provinces were involved in the project, the supervision team could have provided more support for clear and consistent data collection by the Project Management Offices (PMOs) and given that some of the targets were exceeded by large margin, the targets could have been revised upwards during implementation.

Quality of Supervision Rating

Moderately Satisfactory

Overall Bank Performance Rating

Moderately Satisfactory

9. Assessment of Borrower Performance

a. Government Performance

Government was strongly committed to the PDO through the lifetime of the project. The government had specified energy intensity reduction targets in the successive Five Year Plans. The government provided the legal foundation for the energy conservation program through the promulgation of a revised conservation law in 2007. The three provinces demonstrated commitment by taking initiatives for providing an enabling environment supportive of furthering energy savings that went beyond the project mandate. For instance, Shandong province developed a "Performance Evaluation Method" to assess Energy Performance Systems that complemented the existing national "certification method". The Project Management Offices (PMOs) in the three provinces had grant funds in addition to project funds. Given that it takes time for the PMOs to become familiar with the rules and practices for handling funds from an international financial institution, this access to financing from provincial governments enabled the project activities to move forward in the initial years of project implementation. The Government provided the financial resources and this aided in providing the necessary staffing for the Project Management Offices (PMOs).

Government Performance Rating
Satisfactory

b. Implementing Agency Performance
The Project Management Offices (PMOs) established in the provinces were responsible for project coordination and implementation (In Shandong Province the PMO was established under the Provincial Energy Conservation office. In Shanxi, the PMO was established under the Shanxi Provincial Financial Bureau and in Jiangsu Province, the PMO was established under the Jiangxi Provincial Commission) (PAD, page 11). An internationally experienced energy efficiency technical advisor was recruited to facilitate exchange of information during project implementation across the three project provinces. The fiduciary functions were carried out in compliance with World Bank and government policies and procedures. Although there were disbursements due to procurement delays in Shanxi province due to a wave of personnel changes that occurred between 2014 and 2015, these were rectified. The PMOs in the respective provinces maintained proactive communications with partners and stakeholders at national and departmental levels and the PMOs made effective use of the systems to identify lessons learnt that could be used to adjust and improve operating procedures and shared information with other provinces.

Implementing Agency Performance Rating
Satisfactory

Overall Borrower Performance Rating
Satisfactory

10. M&E Design, Implementation, & Utilization

a. M&E Design
The two key PDO indictors for the activities supported by the project - the number of enterprises connected to the online energy monitoring and supervision information platforms and investment flows from Energy Saving Companies (ESCOs) were adequate. The two indicators - cumulative lifetime energy savings and greenhouse gas (GHG) reductions through incremental EE investments and improved EE management enabled by provincial programs - were appropriate for measurement of the GEO objectives. The intermediate indicators for each province were tailored to each province's needs.
Given that the project supported only supported capacity building activities, the M&E design did not include indicators aimed at tracking the extent to which training contributed to improving the operation and monitoring of the energy data platforms.

b. M&E Implementation
Each provincial PMO was responsible for overall monitoring of project performance. Data for monitoring performance was collected by the respective Project Management Office (PMO). Data for monitoring performance with aspects relating to energy savings for the ESCOs and other GEF indicators were collected through official channels that reports this information (For example, in Shandong province, the data was

obtained from the Annual Notification of Energy Saving Service Industry Development, reported by 200 energy saving companies). Better support by the Bank team could have helped in consistent data collection by the three Project Management Offices during implementation.

c. M&E Utilization

The M&E results were used by the PMOs during implementation as a diagnostic tool for identifying issues and taking corrective actions and to measure project performance.

M&E Quality Rating

Substantial

11. Other Issues

a. Safeguards

Safeguards. No safeguard policies were triggered by this project (PAD, page 16). The ICR (page 15) reports that the project only financed technical assistance and institutional capacity building activities and that no works were performed with GEF financing. The PAD (78) reports that an Environmental Assessment was not required because GEF funds would be used to fund upstream activities.

b. Fiduciary Compliance

Financial Management. An assessment of the financial management arrangements was conducted at appraisal. The assessment concluded that the arrangements were deemed to be satisfactory and the financial management risk was rated as Moderate. The ICR (page 15) reports that the financial management system provided timely information and that the project accounting and financial reporting were in line with the regulations issued by the Ministry of Finance and the requirements of the Grant Agreement. The project audit reports were unqualified and the financial management arrangements were deemed to be satisfactory (ICR, page 15).

Procurement. An assessment of the capacity of the Project Management Offices of the three project provinces was conducted at appraisal. The assessment concluded that the procurement risk was Moderate. The ICR (page 15) notes that all procurement was conducted in accordance with the required procedures. There were no procurement issues during implementation and procurement arrangements were deemed to be satisfactory.

c. Unintended impacts (Positive or Negative)

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d. Other

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12. Ratings

Ratings	ICR	IEG	Reason for Disagreements/Comment
Outcome	Satisfactory	Satisfactory	---
Risk to Development Outcome	Negligible	Negligible	---
Bank Performance	Moderately Satisfactory	Moderately 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

The ICR draws the following main lessons from the experience of implementing this project, with some adaptation of language.
(1) Tailoring approaches at the subnational level can aid in national Energy Efficiency (EE) goals. Working closely with each province and designing appropriate set of activities in each province helped in contributing to the national EE goals.
(2) A flexible approach to project design can provide scope for innovation. One key development, not foreseen at design, was equipping inspectors in Jiangxi and Shanxi provinces with software and hardware, including body cameras. This multiplied the enforcement capability of inspectors. This was made possible by developments and cost reductions in mobile technologies that could not have been predicted, but which provided an opportunity that the provinces were able to exploit quickly.
(3) While having multiple Project Management Offices (PMOs) can introduce complexities in management, it can also provide an opportunity for realizing significant benefits through peer learning. In the case of this project the Jiangxi and Shanxi PMOs benefitted greatly from Shandong's early experience and greater implementation capacity of energy efficiency measures.
(4) Attribution of outcomes to capacity building projects can be challenging. The typically long chain of causality makes it challenging to design an indicator that could be attributed to capacity building project activities. However, in projects which mainly support technical assistance and capacity building activities as in the case of this one, efforts still need to be made to measure the impact of training activities supported by the project.

14. Assessment Recommended?

No

15. Comments on Quality of ICR

The ICR provides a detailed overview of the project and is, for the most part, well-written. The quality of evidence and analysis is aligned to the messages and lessons offered. The ICR is consistent with the OPCS guidelines.
The description of the project cost and financing given in Annex 1 (page 28) is confusing and is not consistent with the figures provided for borrower contribution.

a. Quality of ICR Rating
Substantial