

Document of  
The World Bank

Report No: ICR00004116

IMPLEMENTATION COMPLETION AND RESULTS REPORT  
(IBRD-79350)

ON A

LOAN

IN THE AMOUNT OF US\$100 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

CHINA ENERGY EFFICIENCY FINANCING II PROJECT

June 28, 2017

Energy and Extractives Global Practice  
East Asia and Pacific Region

CURRENCY EQUIVALENTS  
(Exchange Rate Effective December 31, 2016)

Currency Unit = Chinese Yuan (CNY)  
US\$1.00 = CNY 6.94

FISCAL YEAR  
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

CBRC	China Banking Regulatory Commission
CHEEF	China Energy Efficiency Financing Project
CHUEE	China Utility-Based Energy Efficiency Project
CMBC	China Minsheng Banking Corporation Ltd.
CPS	Country Partnership Strategy
EE	Energy Efficiency
EPC	Energy Performance Contract
EIRR	Economic Internal Rate of Return
EXIM	Export-Import Bank of China
FIRR	Financial Internal Rate of Return
FYP	Five-Year Plan
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GoC	Government of China
ICR	Implementation Completion and Results Report
IFC	International Finance Corporation
JHPL	Jinan Heating Power Co.
M&E	Monitoring and Evaluation
MOF	Ministry of Finance
MTR	Midterm Review
NDRC	National Development and Reform Commission
NECC	National Energy Conservation Center
NESC	National Grid Sichuan Energy Service Co.
OM	Operational Manual
PAD	Project Appraisal Document
PDO	Project Development Objective
PFI	Participating Financial Intermediary
PMO	Project Management Office
RE	Renewable Energy
TA	Technical Assistance
TCCL	Tangshan Jiahua Coal Chemical Limited Co.
VAT	Value Added Tax

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**PEOPLE’S REPUBLIC OF CHINA**  
**China Energy Efficiency Financing II Project**

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## Data Sheet

<b>A. Basic Information</b>			
Country:	China	Project Name:	China Energy Efficiency Financing II
Project ID:	P113766	L/C/TF Number(s):	IBRD-79350
ICR Date:	06/28/2017	ICR Type:	Core ICR
Lending Instrument:	Financial Intermediary Loan	Borrower:	THE PEOPLE'S REPUBLIC OF CHINA
Original Total Commitment:	US\$ 100.00 million	Disbursed Amount:	US\$ 45.50 million
Revised Amount:	US\$ 45.50 million		
<b>Environmental Category:</b> Financial Intermediary Assessment			
<b>Implementing Agencies:</b> China Minsheng Banking Corp. Ltd. (CMBC)			
<b>Cofinanciers and Other External Partners:</b> None			

<b>B. Key Dates</b>				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	01/07/2009	Effectiveness:	11/08/2010	11/02/2010
Appraisal:	12/01/2009	Restructuring(s):		12/28/2014
Approval:	06/22/2010	Mid-term Review:	10/28/2013	11/04/2013
		Closing:	12/31/2014	12/31/2016

<b>C. Ratings Summary</b>	
<b>C.1 Performance Rating by ICR</b>	
Outcomes:	Moderately Unsatisfactory
Risk to Development Outcome:	Substantial
Bank Performance:	Moderately Satisfactory
Borrower Performance:	Moderately Unsatisfactory

<b>C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)</b>			
Bank	Ratings	Borrower	Ratings
Quality at Entry:	Moderately Satisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	Moderately Unsatisfactory
<b>Overall Bank Performance:</b>	Moderately Satisfactory	<b>Overall Borrower Performance:</b>	Moderately Unsatisfactory

<b>C.3 Quality at Entry and Implementation Performance Indicators</b>			
<b>Implementation Performance</b>	<b>Indicators</b>	<b>QAG Assessments (if any)</b>	<b>Rating</b>
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	None
DO rating before Closing/Inactive status:	Moderately Unsatisfactory		

<b>D. Sector and Theme Codes</b>		
	<b>Original</b>	<b>Actual</b>
<b>Major Sector/Sector</b>		
Financial Sector		
Banking Institutions	20	20
Energy and Extractives		
Other Energy and Extractives	80	80
<b>Major Theme/Theme/Sub Theme</b>		
Environment and Natural Resource Management		
Climate change	100	100
Mitigation	100	100

<b>E. Bank Staff</b>		
<b>Positions</b>	<b>At ICR</b>	<b>At Approval</b>
Vice President:	Victoria Kwakwa	James W. Adams
Country Director:	Bert Hofman	David R. Dollar
Practice Manager/Manager:	Jie Tang	Ede Jorge Ijjasz-Vasquez and N. Vijay Jagannathan
Project Team Leader:	Todd M. Johnson	Leiping Wang
ICR Team Leader:	Jonathan Edwards Sinton	
ICR Primary Author:	Jonathan Edwards Sinton	

## **F. Results Framework Analysis**

### **Project Development Objectives (from Project Appraisal Document)**

The project development objective is to improve the energy efficiency of selected enterprises, and thereby reduce their adverse global environmental impacts through scaling-up commercial lending for energy efficiency investment.



## Revised Project Development Objectives (as approved by original approving authority)

The project development objective remained unchanged throughout the project.

### (a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
<b>Indicator 1:</b>	Amount of accumulated energy efficiency (EE) investments and renewable commercial lending supported and leveraged by the project (million US\$)			
Value	0	1,000	1,000	2,920
Date achieved	21-May-2010	31-Dec-2014	31-Dec-2016	31-Dec-2016
Comments	This indicator measures the amount of accumulated EE investments and renewable commercial lending supported and leveraged by the project (these were to include IBRD loan commitments, parallel financing by Minsheng with its own resources, and equity investments of EE project owners). The target was exceeded, with the completion value equivalent to 292% of the target. Equity contributions to investments were 48% overall, compared to the estimate at appraisal of 40%.			
<b>Indicator 2:</b>	Associated annual energy savings from the investments (Mtce/year)			
Value	0	2.47	2.47	1.97
Date achieved	21-May-2010	31-Dec-2014	31-Dec-2016	31-Dec-2016
Comments	This indicator measures associated annual energy savings from the investments measured by Indicator 1. The target outcome was not achieved at completion and represented 80% achievement of the target value. Most of the reported energy savings came from parallel investments by Minsheng in renewable energy (RE) supply projects, which tend to have much lower energy savings per unit of investment than EE projects. Subprojects financed by the IBRD loan resulted in annual energy savings of 0.23 Mtce/year.			
<b>Indicator 3:</b>	Annual GHGs reduction capacity (Mt of CO <sub>2</sub> equivalent/year)			
Value	0	6.10	6.10	4.93
Date achieved	21-May-2010	31-Dec-2014	31-Dec-2016	31-Dec-2016
Comments	This indicator measures the reduction of greenhouse gases (GHGs) from the investments measured by Indicator 1. The target was not achieved at completion and represented 81% achievement of the target value. Subprojects financed by the IBRD loan resulted in annual emissions reductions of 0.61 CO <sub>2</sub> /year.			

### (b) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
<b>Indicator 1:</b>	<b>Component A: Energy Efficiency Investment</b>			
	Cumulative amount of energy efficiency lending (million US\$)			
Value	0	100	100	45.5

Date achieved	21-May-2010	31-Dec-2014	31-Dec-2016	31-Dec-2016
Comments	The target was not achieved at completion. The completion value represented 45.5% achievement of the target values. Minsheng faced persistent difficulties in identifying qualified subprojects that also met Minsheng's commercial criteria, in part due to economic slowdown affecting targeted sectors and to internal management factors. Moreover, near the close of the project, two subprojects, representing about a quarter of the loan amount, were removed owing to noncompliance with project requirements.			
<b>Indicator 2:</b>	<b>Component B: Technical Assistance and Capacity Building</b> Number of training courses conducted on the operation manual (Number)			
Value	0	8	8	8
Date achieved	21-May-2010	31-Dec-2014	31-Dec-2016	31-Dec-2016
Comments	The target outcome was achieved. The completion value represented 100% achievement of the target values.			
<b>Indicator 3:</b>	<b>Component B: Technical Assistance and Capacity Building</b> Environmental and social risk assessment and control system strengthening plan completed and recommended to Minsheng management			
Value	n.a.	Completed	Completed	Completed
Date achieved	21-May-2010	31-Dec-2014	31-Dec-2016	31-Dec-2016
Comments	The environmental and social risk assessment and control system was significantly improved in Minsheng management. The target was achieved 100%			
<b>Indicator 4:</b>	<b>Component B: Technical Assistance and Capacity Building</b> Study of business opportunities for Minsheng in carbon finance and trading was completed			
Value	n.a.	Completed	Completed	Completed
Date achieved	21-May-2010	31-Dec-2014	31-Dec-2016	31-Dec-2016
Comments	The target outcome was achieved 100%.			

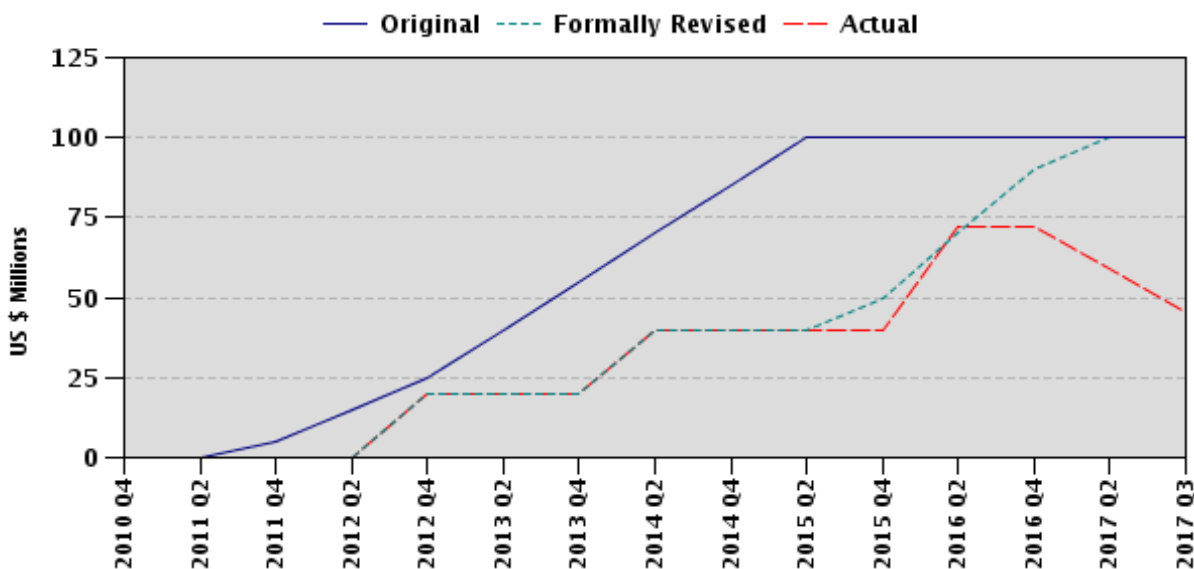
## G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	DO	IP	Actual Disbursements (US\$, millions)
1	06/28/2011	Satisfactory	Moderately Satisfactory	0.00
2	04/09/2012	Satisfactory	Moderately Satisfactory	0.00
3	12/25/2012	Moderately Satisfactory	Moderately Unsatisfactory	20.00
4	06/18/2013	Unsatisfactory	Unsatisfactory	20.00
5	12/24/2013	Unsatisfactory	Unsatisfactory	40.00
6	06/04/2014	Unsatisfactory	Unsatisfactory	40.00
7	12/15/2014	Unsatisfactory	Unsatisfactory	40.00
8	05/12/2015	Unsatisfactory	Unsatisfactory	40.00
9	08/10/2015	Moderately Unsatisfactory	Moderately Satisfactory	72.00
10	03/11/2016	Moderately Unsatisfactory	Moderately Satisfactory	72.00
11	10/28/2016	Moderately Unsatisfactory	Moderately Unsatisfactory	72.00
12	12/28/2016	Moderately Unsatisfactory	Moderately Unsatisfactory	59.12

## H. Restructuring (if any)

Restructuring Date(s)	Board Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in US\$, millions	Reason for Restructuring & Key Changes Made
		DO	IP		
12/28/2014	Not changed	U	U	40.00	A request of extension of the closing date was received through a letter from the Ministry of Finance (MOF). This was to allow the MOF and the implementing agency to develop an action plan to improve the project performance. Therefore, a 24-month extension was approved.

## I. Disbursement Profile





## 1. Project Context, Development and Global Environment Objectives Design

### 1.1 Context at Appraisal

#### *Country Context*

1. **At the time of appraisal of the China Energy Efficiency Financing II Project (CHEEF II), China's rapid economic growth had been overly dependent on the consumption of fossil energy for over 30 years.** China had become the second largest energy user and the largest emitter of GHGs in the world. If left unchecked, China's energy consumption, primarily met by coal, would accelerate the deterioration of local air quality and increase the country's contribution to GHG emissions. Several studies carried out by Chinese and international institutions had concluded that economic growth heavily dependent on consumption of energy was not sustainable and could derail the country's long-term economic and social development. Improved EE was essential to the sustainability of China's impressive economic growth.

2. **The large and growing contribution of the industrial sector in China's economy was a primary reason for the rapid increase in energy consumption in the preceding years.** This sector accounted for over 50 percent of total final energy consumption in China. A large portion of industries in China operated at relatively low levels of EE when compared to international best practices. The significant potential for EE improvements and GHG emission reductions in these sectors was only partially tapped, even though there were opportunities to garner high financial returns through the application of well-proven EE technologies and techniques.

#### *Sectoral and Institutional Context*

3. **The Government of China (GoC) had stepped up its efforts to address China's EE challenge of maintaining high economic growth with reduced energy consumption.** Firmly committed to shifting the national economy away from its heavy reliance on energy, especially coal, the Government pledged to reduce the energy intensity of gross domestic product (GDP) (energy consumed per unit of GDP) by about 20 percent during the 11th Five-Year Plan (FYP, 2006–2010). The Government also made energy conservation one of the national priorities relating to long-term economic and social development. The Government allocated public financing, as part of the economic stimulus package in the wake of the global recession of the late 2000s, to support EE. It also initiated measures to support industry restructuring and to intensify EE supervision and monitoring systems. However, during the first three years of the 11th FYP (2006–2008), the energy intensity of the economy was reduced by about 10 percent, only half of the target. This provided impetus to redouble efforts to mobilize commercial financing through onlending projects like this one.

4. There are two primary means of improving technical EE in the industrial sector: (a) the adoption of energy-efficient technologies during capacity expansion and (b) improving the efficiency of existing assets through technical renovation or retirement of outdated equipment. Enhancing the average EE of new facilities is important for long-term growth in fast-growing economies, and China was making significant progress in this respect by adopting industrial policies to encourage investment in higher-efficiency facilities and enhancing enforcement of industrial technical standards. However, opportunities to invest in specific projects that stood to

gain considerable cost savings from renovation and replacement of existing industrial facilities with more efficient technologies, such as utilizing waste heat or installing more efficient equipment, were often left untapped, in part because of lack of financing.

**5. Investment requirements for EE improvements of existing assets to meet the government's EE target at the time of project approval were estimated at more than US\$20 billion per year, of which about US\$15 billion would be debt financed.** Financing requirements of this magnitude could not be secured without significant contributions from Chinese commercial banks. Although the stimulus package announced by the GoC in 2008 included some public investment in EE of existing industrial facilities, the amount of public financing was limited. Significant commercial debt financing would be required to achieve the government's EE target.

**6. With the assistance of the World Bank Group, the GoC initiated two programs to encourage commercial debt financing of EE projects.** The International Finance Corporation (IFC)/Global Environment Facility (GEF) China Utility-Based Energy Efficiency Project (CHUEE) and CHUEE II supported EE commercial lending through loan guarantee facilities established in select Chinese commercial banks. It made considerable progress in leveraging commercial lending, mainly for small- and medium-size EE investments.

**7. In 2008, the World Bank approved the China Energy Efficiency Financing Project (CHEEF I) funded by an IBRD loan to finance investments and a GEF loan for capacity building and policy support.** The project was the first to support EE business lines at a policy bank (Export-Import Bank of China [EXIM] Bank) and a commercial bank (Huaxia Bank) in China through a line of credit that was onlent to beneficiary enterprises that hosted EE investment projects. CHEEF I focused on promoting EE improvement activities through retrofits of existing assets of medium- and large-size industrial enterprises. CHEEF I contributed to the GoC's efforts to meet its EE targets for the 11th FYP and later for the 12th FYP, which continued to feature challenging EE targets.

**8. With these two different but complementary approaches, the GoC with the support of the World Bank Group assisted China's banking sector to increase its lending for EE projects.** Despite the large EE investment needs and the political commitment of the banking sector to government targets, the EE portfolios of Chinese banks remained small compared to their total lending volumes, abundant liquidity, and the potential size of the EE market. Although many Chinese commercial banks claimed they were providing significant amounts of financing to EE investments, an overview of the EE portfolios of two commercial banks by the World Bank found that most such investments were, in fact, capacity expansion with relatively advanced, more-efficient technologies. Few investments focused on the demand side or on EE rehabilitation of existing assets.

**9. The perceived high risk of industrial EE lending remained a common barrier for Chinese banks in expanding their lending business in the sector.** EE financing represented a relatively small and nonconventional niche business, which was significantly different from the banks' customary business lines of lending for working capital or capacity expansion projects. The absence of suitable mechanisms to address various risks of industrial EE projects, as well as the lack of suitable experience in evaluating the risks and preparing financing for such projects, continued to constrain domestic banks from providing credit systematically and at large scale for

industrial EE projects. Commercial banks were accustomed to lending to enterprises on the strength of their balance sheets considering the merits of the financed investment project often secondary.

10. **The global financial crisis slowed China’s economic growth and created even higher barriers to EE debt financing.** During meetings with Chinese commercial banks, the World Bank team learned that defaults were rising and risk aversion was growing in the banking sector. In that environment, commercial banks were increasingly reluctant to finance projects with perceived high risks such as EE renovation investments appeared.

11. **After over 30 years of economic reform, China’s banking sector had made significant progress in establishing a modern banking system but one with little experience with safeguards.** Most Chinese commercial banks had established strong credit risk management systems to control commercial risks. Few of them, however, understood how to control the environmental and social risks of their lending portfolio. As indicated by the China Banking Regulatory Commission (CBRC), the lack of understanding of how to control environmental and social risks of investment projects impeded the increase of debt financing from Chinese banks to environmentally friendly projects, such as EE investments, despite the generally good rates of return from many EE investments. Capacity building and learning through experience were needed.

12. **Finally, China’s huge stimulus program to encourage investment and boost domestic demand also displaced and slowed momentum for commercial financing of sound EE investments.** An increase in energy intensity experienced in the middle of the 11th FYP—contrary to a major policy goal—raised concerns that EE and environmental protection were not being sufficiently highlighted in the CNY 4 trillion stimulus package. It was felt that some of the new industrial operations financed by the packages were ‘causing additional problems in China’s central and western frontier regions.’

### ***Rationale for Bank Involvement***

13. **The World Bank was uniquely positioned to support the GoC’s efforts to expand commercial financing for EE, given the World Bank’s close working relationship with the GoC during the previous two decades to support successful innovation in relevant fields.** The global economic crisis raised fears of corporate defaults within the banking sector. This fear had, in turn, caused a higher degree of risk aversion within the banking system, especially toward investments that were perceived as higher risk, such as EE projects. This heightened the urgency for government intervention to scale up EE investments and led to intensified government focus on EE financing to achieve the energy conservation target for the 11th FYP and beyond. The GoC requested the World Bank to continue its strong support to China’s banking sector to scale up EE financing, building on its successful experience in integrating technical assistance (TA) and lending operations with the GoC’s policy agenda, and its successful experience in innovative EE financing in China and internationally. The project also drew on the World Bank’s experience in mobilizing onlending operations to mobilize commercial financing through onlending operations; the GoC was seeking means to leverage limited public funds and use them to scale up financing for EE. In addition, the objectives were also consistent with the World Bank’s Country Partnership

Strategy (CPS), which has supported greener growth as one of its strategic themes and ‘accelerating energy conservation and investment in energy efficiency’ as a key outcome to pursue.

14. **The GoC asked the World Bank to finance this project as a follow-up to and expansion of the GEF/IBRD-funded CHEEF I, which successfully demonstrated EE onlending through two Chinese banks.** The design of CHEEF I envisioned extending support for domestic banks beyond the two (EXIM and Huaxia) included in that project, should the onlending model prove viable. The aim of the project was to extend the model beyond the policy banks, such as EXIM, and what are sometimes called ‘state directed’ commercial banks, such as Huaxia, to those that function much more independently from government policy direction and are focused more keenly on profitability. CHEEF II was the vehicle for extending the onlending model to a third bank.<sup>1</sup> The loan amount of US\$100 million (relatively small for a large bank such as Minsheng) was in line with the amounts of IBRD financing allocated to the participating financial intermediaries (PFIs) in CHEEF I, that is, US\$200 million for EXIM and US\$100 million for Huaxia.

15. Moreover, the proposed CHEEF II, which was conceived for working within a large commercial bank, provided a unique opportunity:

- (a) To continue attracting the interest of commercial banks and bolstering their technical capacity to scale up EE and ‘clean energy’ lending in China;
- (b) To leverage a larger amount of parallel financing from the participating commercial bank for EE financing than in CHEEF I;
- (c) To strengthen the participating bank’s capacity in identifying and managing environmental and social risks; and
- (d) To assist the participating bank in exploring business opportunities in other low-carbon lending and carbon financing businesses.

## **1.2 Original Project Development Objectives (PDO) and Key Indicators (as approved)**

16. The PDO of the project was to improve the energy efficiency of selected enterprises, and thereby reduce their adverse environmental impacts through scaling up commercial lending for energy efficiency investments. The key performance indicators at appraisal<sup>2</sup> included the following:

- (a) Amount of accumulated EE investments and renewable commercial lending supported and leveraged by the project (these were to include IBRD loan

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<sup>1</sup> From the borrower point of view, CHEEF I and CHEEF II were part of a single program, but these are evaluated in separate Implementation Completion and Results Reports (ICRs) as they represent two separate World Bank investment projects.

<sup>2</sup> In the Project Appraisal Document (PAD), two slightly different definitions appear. The above definition is set out in Section II.B (p.5) and the Results Framework (Table A3.1, p. 25). This is considered the definitive description of PDO Indicator 1. A shorter description, excluding mention of renewable energy (RE), appears in the arrangements for results monitoring (Table A3.2, p. 26). This appears to be a shortened version used for convenience in tabular presentation and is not considered definitive.



commitments, parallel financing by Minsheng with its own resources, and equity investments of EE project owners);

- (b) The associated annual energy savings from the investments (*i.e.*, the investments measured by the preceding indicator); and
- (c) Annual GHGs reduction capacity (*i.e.* the annual reduction in GHG emissions associated with the investments measured by the first indicator).

### **1.3 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification**

17. The PDO and key indicators were unchanged throughout the project implementation.

### **1.4 Main Beneficiaries**

18. The primary project beneficiaries were (a) the China Minsheng Banking Corporation Ltd. (CMBC; also referred to as Minsheng), which was the financial intermediary; (b) the enterprises that hosted the EE projects financed by the loan; and (c) government agencies, including the National Development and Reform Commission (NDRC).

### **1.5 Original Components (as approved)**

19. This project was designed to facilitate and catalyze commercial investments in industrial EE renovation projects. It was meant to demonstrate viable mechanisms for financing industrial EE investments and to provide direct support to the government's energy conservation priorities during the 11<sup>th</sup> and 12<sup>th</sup> FYP periods.

20. **Component A: Energy Efficiency Investment.** This component provided sub-loans to sub-loan beneficiaries for carrying out EE subprojects. It consisted of an EE lending program of US\$100 million. Minsheng, in turn, lent the funds to industrial enterprises and/or energy service companies for eligible EE investment subprojects. The size of each sub-loan was below US\$20 million equivalent to diversify potential project risks and increase the development impacts of the IBRD loan. The lending rates were to be determined based on market conditions, to adequately cover the financial and operating costs, and to provide a reasonable profit margin for Minsheng. The subprojects would be fully financed by IBRD loan proceeds. In parallel, Minsheng would utilize its own resources to finance similar subprojects. The target for total investment was US\$1 billion, representing an intended leverage of the IBRD loan of 900 percent. By contrast, the target was US\$1.427 billion, including US\$300 million in IBRD financing, and thus a leverage of the IBRD loan of 376 percent.

21. **Component B: Technical Assistance and Capacity Building.** This component strengthened the capacity of Minsheng in (a) identifying and appraising subprojects and conducting eligibility due diligence on sub-loan beneficiaries, (b) developing credit and risk management processes for EE investments, (c) managing the social and environmental impacts of the project and its future EE lending portfolio, (d) developing a low-carbon lending business, and (e) exploring the application of the Equator Principles in its lending practices. It was originally to be financed by Minsheng with its own resources at US\$0.8 million and by the GoC from the GEF

grant (originally US\$0.8 million, at implementation US\$0.47 million) under the ongoing World Bank-financed CHEEF I, which was a blended project, comprising IBRD loans 80920-CN, 75290-CN, and 75300-CN and GEF Trust Fund TF-90719.

22. **CHEEF I is the subject of a separate Implementation Completion and Results Report- (ICR), ICR-4130, and the performance of Minsheng’s Component B is included in that ICR.** In the course of this, Minsheng commissioned 10 research reports for use in the foregoing activities. The performance of Minsheng for the GEF component was rated Moderately Unsatisfactory, for the same reasons as explained in section 5.2 with respect to Component A.

## 1.6 Revised Components

23. The project components were unchanged throughout project implementation.

## 1.7 Other Significant Changes

24. The original closing date was December 31, 2014. In December 2014, a request for extension of the closing date was received through a letter from the MOF dated September 29, 2014. The World Bank approved the extension of the closing date to allow the MOF and the implementing agency to develop an action plan to improve the project performance before further extension of the closing date. The new closing date also coincided with the extended closing date of CHEEF I, the GEF-financed component which included a subcomponent for Minsheng.

## 2. Key Factors Affecting Implementation and Outcomes

### 2.1 Project Preparation, Design and Quality at Entry

#### *Soundness of Background Analysis*

25. **This project was based in large part on CHEEF I, which was progressing well at that time and which had been conceived of as a model that could be extended to other PFIs, such as Minsheng.** Experience with CHEEF I indicated that (a) capacity building of staff within the PFIs was crucial for effective project implementation, (b) project design should use participating banks’ existing institutional arrangements and operational policies rather than create new arrangements,<sup>3</sup> and (c) participating banks should be given full authority in making lending decisions in accordance with the Operational Manual (OM) agreed with the World Bank. Experience in IFC’s EE finance program was also considered, which demonstrated the importance of (a) proper alignment of interests between PFIs and IFC, (b) strong management commitment within the PFIs, and (c) substantial TA support.

#### *Assessment of Project Design*

26. **CHEEF II took these lessons into account to create a strong design, with an important exception.** The project (a) selected a strong commercial bank that expressed a keen and genuine interest and commitment to establishing EE lending and other low carbon businesses, (b)

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<sup>3</sup> One element of success evident from CHEEF I was the creation of a dedicated unit for EE, but this organizational innovation augmented and did not displace any of the bank’s existing commercial institutional arrangements.

incorporated the ongoing CHEEF I TA program for capacity building and EE lending support, (c) prepared an OM by adapting the participating bank’s existing manual in accordance with the nature of EE lending and specific requirements of the World Bank, (d) considered practical ways to mainstream EE lending into the participating bank’s existing institutional setup, and (e) decided to give the participating bank full authority to make lending decisions in accordance with the OM.

27. **The PFI, however, selected an organizational structure that, in the course of project implementation, turned out to be relatively weak.** Minsheng selected the Trade Finance Department as the locus for its project management team (as opposed to the Industrial Department which was responsible for industrial renovation loans such as EE). The Trade Finance Department of this vertically organized bank was authorized to handle foreign exchange transactions. It was understood at appraisal that this team would work with corresponding Trade Finance units in branch banks, however, as a unit responsible for financing trade deals, and Minsheng’s leadership declared its intention to support the work of the project management team. As implementation of the project progressed, it became apparent that the Trade Finance Department was unable to exercise significant authority over other departments with authority to originate domestic loans and consequently was dependent on other departments for the deal flow. This circumstance, which emerged during project implementation, meant that the success of the project would be dependent on a high degree of cooperation between other loan origination departments and the project management team’s department. Much of the effort in improving project implementation focused on overcoming this design flaw.

28. **The OM set out eligibility requirements for subprojects financed by the IBRD loan and by Minsheng’s parallel financing.** This clearly set out the requirement that IBRD-financed subprojects would all be for EE investments. However, for the parallel-financed subprojects RE projects were a growing ‘clean energy’ investment supported by government policy because of their ability to reduce the fossil fuel intensity (and associated air pollution) of China’s energy system, and were thus permitted as well.<sup>4</sup>

29. As noted in section 2.3, energy savings from RE investment projects are counted as the equivalent amount of fossil fuel use avoided by power plants (mainly coal-fired in China), whereas energy savings from EE investment projects included not just reductions to electricity use but also reductions to on-site fuel use. RE investment projects depend on the value of electricity generated for their financial returns, and energy savings (and associated emissions reductions) are a side benefit. EE investment projects, on the other hand, depend on the value of energy savings for their financial returns. The energy savings associated with a given amount of investment in RE, are typically much lower than for the same amount of investment in EE.

**Table 1. Subproject Eligibility Criteria for CHEEF II**

<b>Subproject eligibility for the IBRD loan:</b>
<ul style="list-style-type: none"> <li>• Subproject investments were limited to renovation and rehabilitation (adjustment, replacement, or extension) of existing physical industrial component(s) and system(s) with the major objective of achieving higher EE.</li> <li>• The major types of EE subprojects eligible for financing under the project included the following:</li> </ul>

<sup>4</sup> RE investment projects can potentially have more significant environmental impacts than EE investments, which are typically rated Category B or C. While the OM in principle permitted Category A subprojects to be considered for eligibility of parallel financing, in the end no such subprojects were included in this project.

- Replacement of inefficient industrial technologies with energy saving technologies, for example, more efficient industrial boilers, kilns, and heat exchange systems
- Recovery and utilization of by-product gas, waste heat, and pressure
- Installation of highly efficient mechanical and electrical equipment, including motors, pumps, and heating and ventilation equipment
- Industrial system optimization to reduce energy use
- Other projects agreed between the World Bank and the GoC

**Subproject eligibility for Minsheng parallel financing:**

In addition to the eligible subprojects mentioned above, the following subprojects were eligible for parallel financing by Minsheng:

- New industrial and commercial facilities, of which the EE is at least 20 percent higher than common practice in China, or which are proved to be the best technologies in terms of EE commercially available in the world
- Wind power projects
- Small hydropower projects (below 50 MW)
- Solar power projects
- Biomass power generation projects
- Other projects as agreed with the World Bank

30. Although the PDO stated that the aim of the project was ‘to improve the energy efficiency of selected enterprises,’ the project also explicitly allowed energy savings from parallel-financed RE subprojects. This has been a common practice in EE projects in China, particularly during the 12th FYP with the growing concerns of air pollution and with the falling costs of and government support for RE. During the 12th FYP, RE investments began contributing in a major way to the broader social goal of reducing impacts of fossil fuel use by avoiding coal use at central power stations. Nevertheless, for consistency in project design, the PDO should have included mention of the project’s support for RE, even if indirect. The opportunity to revise the PDO to explicitly include RE at the time of restructuring was not taken.

***Adequacy of Government Commitment***

31. **The GoC evinced strong support for this project at the time of appraisal**, and was deeply engaged in selection of the PFI and design of the project. It maintained a high level of commitment throughout the project. Because Minsheng is a bank that operates on a commercial basis, the influence of government agencies on its operations is necessarily limited.

***Assessment of Risk at Time of Appraisal***

32. **At appraisal, the most important risk identified to the proposed approach was the effect of the global financial crisis.** At the time of appraisal in late 2009, the negative impacts of the financial crisis on China’s banking sector appeared to be less significant than in North America or Europe. As economic statistics showed a strong recovery of the Chinese economy, the risk of the global financial crisis on the project was rated as moderate. As the project progressed, the impacts on the heavy industrial sector grew, and the demand for financing of large EE renovation projects remained depressed. This situation was also experienced in other World Bank EE projects in China (CHEEF I and Shandong Energy Efficiency Project), but through dedicated teams that pivoted to other sectors and the use of other business models those other projects were able to continue to finance EE investments.

## 2.2 Implementation

### *Institutional and Implementation Arrangements*

33. **The MOF represented the People’s Republic of China in signing the Loan Agreement and onlent the funds to Minsheng** through a subsidiary loan agreement. Minsheng, as the project’s PFI, had full responsibility over the EE lending and related TA activities.<sup>5</sup> Minsheng established a project unit in its Trade Finance Department to coordinate and implement the sub-lending activities. It prepared an OM for project implementation, covering financial management, procurement arrangements, detailed institutional arrangements, and economic, financial, technical, environmental, and social due diligence procedures and methodology. The manual was reviewed and approved by the World Bank during appraisal.

34. **The CHEEF I Project Management Office (PMO) provided advisory support.** Minsheng benefited from support provided under the GEF-financed capacity-building component of CHEEF I by the PMO for that project, located at the National Energy Conservation Center (NECC). The CHEEF I PMO had authority only with respect to the GEF-financed activities undertaken by Minsheng and in that capacity assisted in facilitating GEF-financed activities, such as recommending experts and consultants for preparation of sectoral EE market studies. For CHEEF II, it functioned only in an advisory capacity.

35. **The project suffered from slow implementation from the beginning and fell into unsatisfactory status for over two years.** In the first two years of effectiveness, there were no disbursements. Delays at that time were found to be because of internal organizational issues within Minsheng, underutilization of the GEF grant funds for supporting activities, and poor economic performance of the heavy industrial sectors that were the original focus of the project. The slowdown of the industrial economy reduced the demand for financing of EE investments in the primary focus of Minsheng’s Industrial Department. Given the ability of both Huaxia and EXIM to overcome the economic downturn, internal organizational issues within Minsheng were the most important reasons for the poor performance. The frequent turnover of staff within the PMO and the placement of Minsheng’s PMO within the Trade Finance Department were the primary reasons for slow implementation.

36. **Staff turnover.** During this time (and on subsequent implementation support missions), the World Bank team noted and the Minsheng project team acknowledged that a key factor behind slow implementation was high turnover. This affected not just the staff in Minsheng’s project office but in the bank in general. As a commercial bank, staff in branch units were frequently reassigned, so the project office itself experienced instability in communications between the PMO and department staff responsible for subprojects. This was an unanticipated problem resulting from the nature of Minsheng’s structure and mode of operation and not easily rectified.

37. **Defect in organizational structure.** The suboptimal structure of responsibility for the project within Minsheng made it difficult to overcome staff turnover because the project management team was in an organizationally weak position with respect to the departments responsible for loan origination and evaluation. On multiple occasions, from early stages of the

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<sup>5</sup> In carrying out these activities, Minsheng received guidance from the CHEEF I PMO (as the other GEF grant recipients did) to ensure that the terms of the project were observed.

project, the GoC and the World Bank team raised this matter with Minsheng's leadership. The explanation within Minsheng was that CHEEF II had been placed in the Trade Finance Department because the IBRD loan came from a foreign source of capital. Eventually, Minsheng leadership (in the action plan required for the restructuring at the end of 2014) tried to remedy this structural defect by sharing responsibility for the project across departments but with marginal results, as described below (paragraphs 44-46).

38. **In addition to these problems, Minsheng initially was not able to report satisfactorily on parallel financing**, which was needed to report on progress toward the goals for energy savings and CO<sub>2</sub> emissions reductions. The reasons for this are not entirely clear, but it was a matter raised by the World Bank team repeatedly during implementation support missions with Minsheng's successive project management teams. In the latter part of the project, with support from the CHEEF I PMO and with the aid of a third-party consultant with expertise in evaluation of clean energy investments, the project management team was able to work with other departments to produce satisfactory reports.

39. **With support from the World Bank team and with encouragement from the GoC, Minsheng developed an action plan** in late 2012 to address issues that were agreed by all parties to be hindering implementation. The action plan's elements included expanding the range of industries in which to seek subprojects, strengthening risk management and training, improving collaboration with branch banks, utilizing grant funds to hire technical experts, and adopting incentive mechanisms for staff (as Huaxia did in CHEEF I). Minsheng at this time also assigned new personnel to the project management team.

40. **Despite the changes, implementation delays continued, which elicited a stronger action and a restructuring was undertaken.** In mid-2013, after Minsheng nearly missed deadlines of the time-bound action plan, it finally began implementation of its first subproject.<sup>6</sup> With World Bank team guidance Minsheng prepared a pipeline of potential subprojects, which were intended to be considered for financing under the project. Still, the MOF and NDRC agreed with the World Bank that if there was no further progress by the third year after project effectiveness then reallocation of loan funds to the PFIs in CHEEF I (EXIM and Huaxia) would be considered.

41. **By the midterm review (MTR) in November 2013, disbursement had begun, but progress remained slow, and the project was rated Unsatisfactory.** This was despite repeated implementation support missions in which the World Bank team sought, with participation of the MOF and NDRC, to assist Minsheng to achieve revised targets. It was also found at the MTR that senior management at Minsheng lacked a full understanding of the nature of the project and did not sense its urgency, but at the same time were not willing to consider cancellation of the project. An action plan was agreed which required Minsheng to do the following:

- (a) Meet the disbursement target of US\$65 million of the IBRD loan

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<sup>6</sup> As for PFIs of other onlending projects, the OM called for the World Bank team to perform a prior review of the first two subprojects implemented by Minsheng. The prior review takes time but is meant to ensure that PFIs are able to satisfactorily handle the requirements of the loan. Subsequent projects are subject to post review to facilitate timely implementation of the project, while still allowing appropriate oversight.

- (b) Prepare a list of subprojects by parallel financing with required information and justification that those projects meet the parallel financing criteria
- (c) Reflect progress on TA and capacity-building activities in the intermediate indicators

42. **In early 2014, the action plan steps had not been taken.** When no new subprojects were forthcoming, discussions were held between the GoC and the World Bank on a possible restructuring that would reallocate undisbursed funds to Huaxia. It was agreed that the GoC would submit a request for restructuring to the World Bank that proposed reallocation of the loan to one of the CHEEF I PFIs.

43. **Before the original closing date of December 31, 2014, however, the ground was laid for restructuring of the project** and the necessary preparations had been made by Huaxia and the CHEEF I PMO to receive the undisbursed funds that were to be reallocated from CHEEF II. By that time, however, Minsheng had submitted a second subproject for financing. In September 2014, the GoC submitted to the World Bank a request for a two-year extension to December 2016 but without specifying a reallocation to a different PFI. After a series of communications to clarify the borrower's intent, an initial three-month extension was granted, contingent on Minsheng's submission of a detailed restructuring plan to rectify previous deficiencies in implementation. Following intensive consultations, Minsheng submitted an action plan satisfactory to the World Bank, and on that basis a two-year extension of the closing date was granted (in parallel to the extension granted to CHEEF I and the associated GEF project).

44. **The restructuring initially seemed to lead to accelerated disbursement.** With the support of Minsheng leadership, the project team was strengthened by drawing membership from across departments and oversight by senior management coordinating with the risk control appraisal departments. Incentives were offered to departments that originated deals. By mid-2015, Minsheng had financed four EE subprojects. It had also progressed with the TA activities (Component B), for example, commissioning studies on EE markets in different sectors. Moreover, with repeated support and instruction from the CHEEF I PMO, Minsheng improved its reporting of parallel financing, providing data to confirm significant investments in EE and RE projects, quickly exceeding the project's end target.

45. **As the 2016 closing date approached, however, it was clear that any performance of the project was still slow.** Of the total of five subprojects that Minsheng implemented under the CHEEF II, it was found that two subprojects were out of compliance with procurement rules. In both cases, the annual audits required to be submitted to the World Bank revealed, for one sub-loan granted in 2014 and one in 2015, that sub-borrowers had used loan funds for ineligible expenditures.<sup>7</sup> In both instances, the sub-borrowers had investments that were in line with the OM. In the first instance, found in the 2014 audit report (issued in June 2015), the subproject had gone through prior review and received a 'no objection' from the World Bank team based on close examination of the required documentation and compliance with conditions required by the World Bank team. The World Bank team warned Minsheng to improve its supervision of sub-borrowers

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<sup>7</sup> The problems were revealed in the annual audits, which were required to be submitted to the World Bank in June following the calendar years audited, that is, in June 2015 and in June 2016. The audits were reviewed by the World Bank team and necessary actions recommended subsequently.

to prevent any further occurrences. A second instance, however, was revealed in the 2015 audit report (issued at the end of June 2016), shortly before the close of the project. In the second instance, the subproject was subject to post review and therefore did not require a ‘no objection’ from the World Bank team (see annex 2).<sup>8</sup> Unfortunately, in carrying out the investments, the sub-borrowers utilized their own funds for the investments that had qualified for the onlending, then used the project loan proceeds for other uses, that is, operating capital, in violation of the project Loan Agreement and domestic procurement regulations.

46. In both instances, Minsheng took prompt action to recover the funds when the ineligible expenditures were brought to its attention, the funds were returned to the designated account and its procurement staff were alerted to be more vigilant in the proper uses of funds. Because similar instances had occurred (and been dealt with appropriately) in CHEEF I, the World Bank team repeatedly advised the Minsheng project team to adhere closely to the procurement rules. The frequent turnover in Minsheng’s project team was felt to be a risk factor and so the World Bank team engaged in repeated training and advisory sessions. However, because project identification occurred in different departments at the sub-branch level, it was difficult for the procurement rules to be understood and followed.

47. The World Bank team worked with Minsheng, the NDRC, and the MOF to set new, time-bound action plans. In spite of this effort, although the Minsheng project team did identify what appeared to be a strong pipeline of projects, internal factors prevented them from being carried out. For instance, even after several years of capacity-building efforts, the credit department at Minsheng remained unwilling to approve lending on the basis of strong project quality; in an environment of economic downturn, overall creditworthiness of the borrower took precedence. Only one more subproject was financed, for a total of three. The result was that new subprojects were not found to utilize either the funds recovered from the two ineligible subprojects mentioned above or the remaining project fund, such that by the close of the project less than half of the loan funds had been disbursed.

## **2.3 Monitoring and Evaluation (M&E) Design, Implementation, and Utilization**

### ***Design***

48. **The Minsheng project office was responsible for the M&E system**, which comprised (a) regular monitoring of performance indicators, (b) provision of annual progress reports, and (c) an MTR of implementation progress. The CHEEF I PMO advised Minsheng on overall M&E of implementation progress, including the collection of project performance information and reporting on the impact and results of the project. The intent was to share the experience of the two CHEEF I PFIs, which had been performing similar monitoring. The Minsheng project team developed an M&E plan during the first year of implementation, and a member of the team was assigned to collect information and maintain databases to monitor the implementation performance of all the project components. The CHEEF I PMO had the responsibility to track Minsheng’s activities related to Component B that were financed under the GEF grant.

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<sup>8</sup> In this project, as in CHEEF I, only the first two subprojects required prior review by the World Bank, on the principle that two instances of prior review would suffice to ensure that PFIs’ systems for due diligence were operating sufficiently well.



49. **The eligibility of RE investments for parallel financing is at odds with the PDO.** An important concern at the project design stage was to show leverage of IBRD loan funds. It was agreed to include RE investments as part of the amount counted for parallel-financed projects. An RE project, even one like rooftop photovoltaic that provides all of its electricity to the host enterprise, does not in and of itself improve end-use EE at that enterprise. It is thus fundamentally different from EE investments that reduce end-use energy consumption. However, from the broader social perspective adopted by the GoC, RE projects are a means of reducing fossil fuel use and therefore of reducing the fossil fuel intensity of the economy overall. Moreover, an important aim of EE projects in China is to reduce air pollution, whether from host enterprises themselves or from the power plants that supply them electricity. This contributes toward important policy goals but the mobilization of financing for RE projects was not the main goal of the project. The project design should have taken this into account. For instance, one option would have been to change the PDO to include mention of support for RE projects. Another would have been to set separate outcome indicators for energy savings attributed to EE subprojects, whether from IBRD- or parallel-financed, and from parallel-financed RE subprojects.

50. For parallel-financed RE subprojects, the project followed the method that the GoC recognizes for counting energy savings, that is, counting RE-generated electricity as the equivalent amount of coal use in central power plants to generate the same amount of electricity. Fossil energy savings from a regional or national perspective are attributed through a conversion factor such as the average coal consumption rate for coal-fired power plants in a given year. This approach is adopted for counting energy savings from RE investments in the results framework for the Program-for-Results project approved in 2016, Innovative Financing for Air Pollution Control in Jing-Jin-Ji (P154669).

### ***Implementation***

51. **The PDO indicators were straightforward and easy to monitor in principle.** Minsheng provided information to the World Bank team and to the CHEEF I PMO. Initially, the Minsheng project team had difficulty in monitoring and reporting on parallel financing. This was an issue addressed repeatedly by the World Bank team during implementation support missions. By early 2015, however, with repeated instances of support from the CHEEF I PMO and with support of senior management to its project team, Minsheng was able to reliably report on its parallel-financed investments.

52. At the time Minsheng did begin to report on its portfolio of parallel-financed projects, it should have been apparent to the World Bank team that most of the investments were going toward RE rather than EE projects as anticipated at the design stage. Because RE projects have lower attributed energy savings per unit of investment than EE projects, this could have raised concerns about missing the overall target for energy savings and prompted reconsideration of the targets. On the other hand, the amount of investment in parallel-financed subprojects was much greater than anticipated, offsetting to a great extent the lower energy savings per unit of investment. In any case, the main factor behind the gap in meeting PDO Indicators 2 and 3 (energy savings and CO<sub>2</sub> reductions) was the counting of two instead of the five EE subprojects financed by the IBRD loan. This was not anticipated and a circumstance that was known until near the project closing date, so it is unlikely that the borrower or the World Bank team would have had an opportunity to effect an alteration to the end target values.

53. **For activities implemented by Minsheng, its project team was responsible** for collecting information with the assistance and quality control of the PMO and for reporting to the World Bank and to the PMO. Minsheng contracted an independent third party to monitor and validate their subproject-related lending disbursements and associated energy savings.

54. **Indicators were calculated in line with the original project design.** The calculations of annual energy savings capacity (tons of standard coal equivalent per year) resulting from EE subprojects financed by Minsheng was performed in line with the methods developed for CHEEF I (covered in ICR-4130) and with oversight by the PMO. Energy savings resulted from investments in EE subprojects that received debt financing from the IBRD loan, as well as EE and RE subprojects that Minsheng financed using its own resources in line with the project targets and operations guidelines.

### *Utilization*

55. **Indicators were tabulated semiannually and reported to the World Bank** on the same schedule, at the time of each implementation support mission. The M&E results were used by Minsheng to measure progress and provided the basis for adjustments to the implementation plan to achieve the project's objectives. Minsheng was the source of reported data with vetting by an independent third party.

## **2.4 Safeguard and Fiduciary Compliance**

### *Environmental Safeguards*

56. **This project was classified as financial intermediary as per OP 4.01. As the proposed project was to finance EE rehabilitation subprojects within existing industrial facilities, it had minor manageable or no adverse environmental impacts and provided significant environmental benefits.** Because of the nature of the subprojects, natural habitats, cultural resources, pest management, and forest safeguards policies were not triggered. The Environmental Assessment Framework was developed and incorporated into Minsheng's OM. Minsheng paid attention to environmental safeguards and followed the requirements of the OM for their subprojects with regard to compliance verification during the loan appraisal stage and field supervision during the implementation stages. As a prerequisite for the loan appraisal, all subprojects under the loan were required to provide necessary environmental safeguards documents and approval from local environmental authorities according to OM requirements for full environmental compliance. Minsheng established site supervision practice to inspect progress of subprojects during construction and operation, in which environmental performance was part of the supervision. The overall environmental safeguards implementation was satisfactory for this project.

### *Social Safeguards*

57. **No resettlement and no social hardships were expected or encountered during project implementation,** therefore social safeguards policies (OP 4.12 Involuntary Resettlement and OP 4.10 Indigenous Peoples) were not triggered. A resettlement policy framework and procedures were incorporated into the OM in case any subprojects involved land acquisition, but no subprojects required land acquisition.

## *Fiduciary Compliance*

58. **The project was not well implemented by Minsheng Bank because of lack of attention by Minsheng management and frequent staff changes.** As such, the project implementation was extremely delayed. At the end of the project, IBRD loan funds of US\$45.5 million were disbursed, accounting for 45.5 percent of the total World Bank loan. The interim unaudited financial statements were not submitted by due dates as required by the Loan Agreement. Because of insufficient credit control and unfamiliarity with the World Bank's requirements, two of the five sub-loans undertaken by Minsheng were identified by the auditor and the World Bank as ineligible expenditures and were refunded to the World Bank.<sup>9</sup> The project demonstrates that attention by the leadership of Minsheng, placement of the PMO within the organization, and stability in staffing are prerequisites to ensure that financial management work is done well.

### **2.5 Post-completion Operation/Next Phase**

59. **Of five subprojects financed by the CHEEF II loan, two were operational at the close of the project, one had not gone into operation owing to financial circumstances of the host enterprise, and two were deemed ineligible and the funds returned.** Two of the subprojects financed at beneficiary enterprises have been incorporated into their day-to-day operations and are expected to continue to deliver energy savings over the lifetimes of the subprojects. One of the subprojects did not go into operation, owing to other circumstances that affected the overall financial performance of the host enterprise, forcing it to close. Funds disbursed to the remaining two subprojects, as discussed above, were returned as the host enterprises were found to have violated procurement rules, even though the subprojects that were to have been funded by the sub-loans did go forward.

60. **Minsheng to a small degree increased its interest, capacity, and confidence in handling EE financing over the course of the project, but has been unable to mainstream EE financing into its business.** Minsheng had no significant EE business line at the beginning of the project. By the end, it was financing some EE investments, but in a piecemeal fashion without establishment of a sustainable and coherent business line or team to support it. Minsheng's successive project management teams received training and advice in World Bank financial management and procurement approaches, adding to Minsheng's capacity in that respect. In part, the difficulties in EE financing reflected the softening market for large-scale EE renovation projects in heavy industry, which was hard hit by the economic slowdown. At the time of project close, it was not clear to what extent Minsheng would continue to pursue financing of EE investments. While its project team had clearly become adept at producing lists of potential EE subprojects, most of these never led to actual financed subprojects. This was, perhaps, a reflection of this successful private bank's strong focus on profitability and its vertical organization—cultural and organizational factors that this project could not overcome.

61. **At the same time, Minsheng's lending for RE was rising.** During the course of the project, the demand for commercial financing for RE projects rose tremendously, spurred in large part by feed-in tariffs for wind and solar PV. As a result, 85 percent of the parallel-financed investments were for RE projects, whereas at appraisal it was envisioned that most of the parallel-

financed subprojects would be for EE. The RE investments contribute to reductions in fossil fuel use by power plants (which are mainly coal-fired) and thus to national goals for reducing fuel intensity of the economy as well as CO<sub>2</sub> reductions. However, as explained earlier, because their main purpose is to generate electricity, the unit investment for energy savings is significantly higher than for EE projects.

### 3. Assessment of Outcomes

#### 3.1 Relevance of Objectives, Design and Implementation

62. **The relevance of the PDO is rated High** and remained so throughout the project. It was 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 which emphasized the need to develop market mechanisms to promote EE investment. The objectives are also consistent with the World Bank's CPS (FY13–FY16; Report No. 67566-CN), which has supported greener growth as one of its strategic themes and 'accelerating energy conservation and investment in energy efficiency' as a key outcome. The objectives also contribute to China's Intended Nationally Determined Contributions as submitted to the Conference of the Parties, which include goals (a) to lower carbon intensity of GDP by 60 percent to 65 percent below the 2005 level by 2030 and (b) to reduce CO<sub>2</sub> emissions per unit of GDP by 40 percent to 45 percent below the 2005 level by 2020.

63. **The relevance of project design and implementation is rated Substantial.** The project design was based firmly on relevant experience up to the time of appraisal, was targeted at key barriers to scaling up debt financing of EE projects, and adopted innovative approaches to foster needed changes in organizations and institutions. The project also aimed to leverage limited public capital by fostering the growth of commercial bank financing for EE. The performance indicators were well suited to measure outputs and outcomes. The implementing arrangements, as far as they went, were appropriate. The selection of a commercial bank was appropriate, but in retrospect, the placement of the PMO in a unit not involved in project identification and loan origination was a mistake. The project could also have benefited from more than one PFI included in the project, which could have spurred competition and promoted the most successful operational and business models to EE financing. The focus on EE renovation investments in heavy industry became a challenge early in project implementation; however, improving EE in industry remained a top priority of the GoC's overall economic strategy and this contributed to its commitment to continuing implementation of the project despite the difficulties encountered. At the same time, however, Minsheng's project management team was able to identify potential subprojects for successive iterations of pipelines that it presented to the GoC and the World Bank, just as EXIM and Huaxia were able to for CHEEF I. These candidate subprojects were within the set of end users targeted by the project and fulfilled the eligibility criteria set out in the OM. Minsheng, however, was not able to take the next steps to actually carry through in financing the identified investments.

64. **Even though the approach to implementation remained relevant, there were significant deficiencies in execution.** The main issues encountered that led to delays in implementation were related to (a) building capacity in Minsheng, (b) sustained leadership support for cross-departmental cooperation, and (c) building up a pipeline of suitable subprojects before effectiveness of the loan. Based on experience with previous projects, these issues were anticipated

and addressed by including capacity-building activities in the design of the project. Moreover, the original target values took account of the likelihood that progress in implementation would become faster as the project progressed. The World Bank team provided assistance to Minsheng's project team, including training and advice on financial management and procurement. This was done repeatedly, as over the course of the project, Minsheng changed project teams six times. While each of Minsheng's teams exhibited willingness to learn, none of them had sufficient time to apply the skills learned. (This situation contrasts strongly with the PFIs for CHEEF I, where teams were in place much longer, with some individuals involved from the beginning to the end of the project or about eight years.)

65. **Ensuring cross-departmental cooperation was a great challenge and never effectively achieved.** The 2015 restructuring plan, agreed to by Minsheng with encouragement from the GoC, was intended to address this issue, among others. One element of the plan was an enhanced institutional structure, giving both the Corporate Banking and the Trade Finance Departments (the original lead for the project team) joint responsibility. It also created an expanded project management team with senior management oversight. In subsequent implementation, however, the promised attention from senior management was not maintained, rendering the new structure ineffective. The project management unit in the Trade Finance Department did not grow into the more functional and powerful EE units that Huaxia and EXIM (CHEEF I) set up. The reasons for this are not entirely clear and may have to do with the singular focus of Minsheng, as a highly successful private bank, on profitability and the relative independence of its vertically organized departments.

66. **The Minsheng project team was able to produce subproject pipelines that included numerous promising subprojects.** Most such subprojects failed to obtain project financing for a variety of reasons. In some cases, Minsheng's credit risk department deemed host enterprises to be ineligible in accordance with their commercial lending criteria, regardless of the merits of the project. In other cases, the procedures required for obtaining the project financing were felt to be too onerous by the branch banks originating the sub-loans and Minsheng proceeded to finance them with its own capital.

67. **The financing terms of the IBRD loan were less attractive to end users than domestic currency financing.** Minsheng reported that the weakening exchange rate made IBRD financing less attractive to its customers than RMB-denominated financing. This is an issue that was also reported by PFIs in other projects, including CHEEF I and the Shandong Energy Efficiency Project. While not subject to control by the parties to this project, it is a risk factor that could have been explicitly noted in the project design.

### 3.2 Achievement of Project Development Objectives

68. **The achievement of the PDO is rated Modest.** While the target for overall financing was exceeded by a factor of two, that is, US\$2,920 million achieved compared to a target of US\$1,000 million (including US\$239 million for IBRD-financed subprojects and US\$2,681 for parallel-financed investments), the other two PDO targets for energy savings and associated CO<sub>2</sub> emissions reductions were fulfilled to less than half that extent, that is, 80 percent and 81 percent, respectively. Minsheng's parallel financing exceeded the IBRD lending by more than an order of magnitude and was nearly matched by equity contributions from the enterprises that hosted those

subprojects. However, most of the parallel-financed subprojects (86 percent of investment) were RE projects. The IBRD-financed subprojects, by contrast, were EE projects that had much lower investment costs per unit of annual energy savings. As described above, RE projects in general produce less energy savings per dollar invested than EE projects. The result of exceeding the target for the PDO indicator for investment (IBRD loan plus parallel financing) was an underachievement on the energy savings and emissions reduction targets. Given the flexibility in project design, that is, allowing the inclusion of RE investments among the parallel-financed subprojects, Minsheng was able to fulfill the majority of the targets for energy savings and CO<sub>2</sub> emissions reductions.

69. **Less than half of the IBRD loan funds were disbursed.** All of these funds supported EE investments, as required by the terms of the loan. Two subprojects received investment funds from the IBRD loan and successfully went into operation and thus contributed to achieving the PDO targets for energy savings and CO<sub>2</sub> emissions reductions (Table 2). A third eligible subproject received financing from the IBRD loan but unfortunately the host enterprise suffered from the economic downturn and closed before the subproject was put into operation. A further two subprojects that received IBRD loan financing had to be removed from the project owing to noncompliance with the project’s eligibility requirements, as described above. The loan funds were subsequently returned to the World Bank in accordance with normal practice in such cases. If the sub-loans had been handled properly, then overall disbursement of the loan would have been 77 percent (instead of the 45 percent actually disbursed), and while energy savings and emissions reductions still would have been short of end targets, they would have been much better than actual performance. In this regard, the outcome was only Modest.

**Table 2. Subprojects Financed by CHEEF II IBRD Loan**

Subproject	World Bank Loan Withdrawals (US\$, millions)	Total Investment (US\$, millions)	Annual Energy Savings (ktce/year)	Annual CO <sub>2</sub> Reductions (kt CO <sub>2</sub> /year)
Upgrading waste gas power generation facilities at iron and steel plant	17.25	35.94	91.8	238.7
Replacement of heat supply network and upgrading of coal-fired boilers	11.50	163.77	141.5	367.9
Coke dry quenching <sup>a</sup>	16.50	25.80	48.0 <sup>a</sup>	124.8 <sup>a</sup>
Coke dry quenching <sup>b</sup>	20.00 <sup>a</sup>	—	39.1 <sup>a</sup>	—
Metallurgical gas recovery and utilization <sup>b</sup>	12.88 <sup>a</sup>	—	59.9 <sup>a</sup>	—
<b>Total</b>	<b>45.25</b>	<b>225.51</b>	<b>233.3</b>	<b>606.6</b>

Note: a. Project not put into operation. Energy savings and CO<sub>2</sub> reductions excluded from totals.

b. Subprojects found to be ineligible, IBRD financing withdrawn. Lending and results excluded from totals.

70. **An important question is whether the project mobilized commercial financing for EE investments.** The primary means by which this was to be done was through the parallel financing, with the idea that the structures and procedures created for handling the IBRD-financed subprojects would be applied equally to those financed with Minsheng’s own loans, but following commercial practice and therefore proceeding more quickly and achieving the aim of scaling up commercial financing for EE. Although Minsheng reported that CHEEF II did enable it to understand markets for EE better and to pursue such projects with its own resources, only about 15 percent of the parallel financing was directed toward EE projects of the kind defined in the OM. In this regard, the outcome of the project was no more than Modest.

71. **While a certain amount of capacity building and greater understanding of EE lending opportunities was developed at Minsheng through this project, the result fell short of what was anticipated.** The challenges in implementation discussed above have meant that substantive outcomes, such as the training of individuals and the creation of valuable intelligence regarding EE markets, were not fully utilized. In the latter stages of the project, Minsheng’s project staff made significant progress in identifying potential new EE investments. However, they did not have direct contact with the operational departments in local branches that had decision-making power over EE loans—instead working with the Trade Finance units in local branches that in turn worked with the units responsible for identifying and evaluating loans. This was a fault in organization that was not apparent at the beginning of the project, although it was eventually identified by the World Bank team and acknowledged by successive Minsheng project teams and discussed with the GoC; the problem was never rectified.

### 3.3 Efficiency

72. **Implementation efficiency is rated Modest** based on substantial efficiency of the two subprojects effectively implemented and counterbalanced by low implementation efficiency. Analysis at completion suggests an aggregate internal rate of return of at least 35 percent in economic terms (including CO<sub>2</sub> emissions reductions valued per World Bank guidelines) or 16 percent in financial terms, including tax (Table 3). These values are similar to the expectations at appraisal, demonstrating economic and financial viability. The economic rate of return would be higher if the benefits of local pollution reduction were included. The subprojects’ designs are in line with the project’s intended objectives and, despite the higher unit cost of energy savings, represent a substantial level of efficiency, similar to what was expected for hypothetical subprojects at appraisal. Indicators at appraisal and completion are summarized as follows. Annex 3 provides details including associated assumptions and methodology.

**Table 3. Economic and Financial Analysis of CHEEF II Subprojects**

Parameter	Unit	Three Subprojects at Appraisal	Three Subprojects at Completion
Total lending investment in subprojects	US\$, millions	131	239
Average investment cost of annual energy savings	US\$/(tce/year)	393	1,022
Average emissions intensity of energy savings	tCO <sub>2</sub> /tce	2.48	2.60
FIRR (including tax)	%/year	16	16
Payback period (including tax)	years	5.7	4.5
EIRR (including CO <sub>2</sub> benefit, excluding local pollutants)	%/year	42	35

Note: FIRR = Financial Internal Rates of Return, EIRR = Economic Internal Rates of Return.

73. Although the period of implementation was extended by two years to give Minsheng additional time to rectify deficiencies and meet the project targets, the achievement of the PDO remained Modest. This delay, without improvement in results to justify it, contributes further to the rating of efficiency as Modest.

### **3.4 Justification of Overall Outcome Rating**

Rating: Moderately Unsatisfactory

74. Achievement of the project targets and efficiency cannot be rated higher than Modest, while the relevance of the PDO was High throughout the project, design and implementation were Substantial. The disbursement of less than half of the project loan is a major defect. Overall, the project is rated Moderately Unsatisfactory.

### **3.5 Overarching Themes, Other Outcomes and Impacts**

#### **(a) Poverty Impacts, Gender Aspects, and Social Development**

75. **Gender, poverty, and ethnic minorities were not identified as concerns in the PAD.** The benefits of EE, however, are multiple and go beyond enhancing economic and social development, reducing pollutant emissions and improving environmental sustainability, and strengthening energy security.

#### **(b) Institutional Change/Strengthening**

76. This project was intended to foster the development of a commercial capability to sustainably finance EE investments. Given the outcome and the contrast with the outcome of CHEEF I, the project reinforced some of the lessons that informed the design, for example, that success requires (a) strong, consistent management commitment, (b) strengthening of staff capabilities not just in the core team but across units, and (c) appropriate internal organization and coordination among different functional and geographic units. For commercial banks, which are less susceptible to government influence than policy banks (such as EXIM, one of the CHEEF I PFIs), management commitment is of particular importance, because that enables action to address the other factors that contribute to success.

### **4. Assessment of Risk to Development Outcome**

Rating: Substantial

77. The direct impact of the investment activity was to effect energy savings at two industrial enterprises, as analyzed in annex 3. These will continue to deliver energy savings and associated emissions reductions so long as these facilities continue operating. The risk to this is low. However, disbursement of the loan was less than 50 percent, and two of the five subprojects were found to be ineligible, indicating that the intended capacity was not fully in place as a result of this project. Beyond that, the project was intended to mainstream EE financing in a commercial bank. While some capacity has resulted from this project, it is not clear whether and how this will persist and there appears to be substantial risk to this outcome. The overall risk is therefore judged to be Substantial.



## **5. Assessment of Bank and Borrower Performance**

### **5.1 Bank Performance**

#### **(a) Bank Performance in Ensuring Quality at Entry**

Rating: Moderately Satisfactory

78. The project design was good, given what was known about such operations at the time of appraisal. While the concept of relying as much as possible on a commercial bank's internal systems and procedures is attractive in principle, in practice it meant that the project approach was too weak to overcome ingrained habits and views. One important point that could potentially have been addressed at the design stage was the selection of the Trade Finance Department as the locus for Minsheng's project management unit. While it is not possible to know if the World Bank team would have been successful, working toward a more effective organizational structure could have improved the chances of successful project implementation.

79. The time elapsed from concept approval to Board approval was under 18 months, within the norm for World Bank projects.

#### **(b) Quality of Supervision**

Rating: Moderately Satisfactory

80. The World Bank team provided strong and consistent advice and support throughout the project. However, despite consistent and repeated efforts on a number of fronts it proved difficult to support more than temporary improvements in results. For instance, the World Bank team provided training and advice, especially in financial management and procurement on numerous occasions. This required application of significant supervisory resources. However, given the frequent turnover of Minsheng's project team and the departmental mismatch (CHEEF II management staff were not directly involved in loan origination), the positive impact of the training was limited.

81. The project had a persistent unsatisfactory rating from 2012 onwards, despite encouragement and support from the World Bank team as well as the GoC. Beginning in April 2013, the GoC and the World Bank began discussing the possibility of restructuring the project with a different PFI, as described above. Preparations were made and agreed upon in 2014 for such a restructuring. However, the borrower decided to continue the project with Minsheng implementing the project, and the GoC requested an extension to the project with no change or addition of PFIs. With regard to the option of cancelling the project, there was strong pressure by the Government to support continued progress in implementing industrial EE under challenging economic conditions, and in view of the World Bank's long-term relationship in supporting the GoC to meet its EE goals, the World Bank felt that it was important to continue to support the project rather than to cancel it. The Country Management Unit thus agreed to the extension in 2014 (in parallel with the extension of CHEEF I), subject to preparation of an acceptable action plan for completing the project. The World Bank team then supported Minsheng in its preparation of a satisfactory time-bound plan for implementation and completion, within a two-year extension.

82. After the restructuring, Minsheng's implementation accelerated both for the onlending program and the associated GEF-financed activities under CHEEF I. The World Bank team

maintained its support and encouraged the CHEEF I PMO to lend assistance as necessary. However, in August 2015, the annual audit found that the subproject implemented in the previous year had been ineligible. The World Bank team took immediate action to assist Minsheng to take remedial action. In 2016, a similar case occurred. The World Bank team stepped up oversight with a view toward ensuring compliance, but was unsuccessful in obtaining requested meetings with senior management at Minsheng to address outstanding implementation issues.

83. The first of the two subprojects found by annual audits to be ineligible was revealed in mid-2015, shortly after the restructuring. This could have been an occasion for a restructuring. Instead, the World Bank team opted for more intensive supervision, and Minsheng's project management team at the time was responsive both to concerns expressed about implementation capacity and availability of potential subprojects needed to complete loan disbursement. By the time the second ineligible subproject was revealed, there was less than six months before the close of the project, and the decision taken to allow the project to close with return of the ineligible expenses and cancellation of the unused portion of the IBRD loan was justified.

84. The mismatch between the PDO, which specified the project would improve EE 'at selected enterprises' could have been addressed at the time of extension of the end date of the project. This may have been seen as a minor issue at the time, given that there were many issues crucial to the project at play during the discussion of transferring the loan to another PFI. Nevertheless, the World Bank should have taken the opportunity to revise the PDO to conform with the inclusion through parallel financing of RE projects.

### **(c) Justification of Rating for Overall Bank Performance**

Rating: Moderately Satisfactory

85. Despite the project outcome, the World Bank was persistent in seeking alternative ways to support the borrower to address challenges in the project. Nevertheless, design flaws that could have been addressed at appraisal hobbled the project and an opportunity was lost at the time or restructuring either to cancel the project or to switch or add other more-capable PFIs. Moreover, although discussions were held after 2014 with the GoC regarding the possibility of further restructuring or cancellation, no change to the project was made resulting in an overall rating of Moderately Satisfactory.<sup>10</sup>

## **5.2 Borrower Performance**

### **(a) Government Performance**

Rating: Moderately Satisfactory

86. The MOF and NDRC were supportive throughout and sought to find solutions throughout the course of the project. During the period from 2012, when the project fell into an unsatisfactory rating, to the restructuring in late 2014, for instance, both the MOF and NDRC were actively engaged with the World Bank in working with Minsheng to seek a solution. As the objective of the project was to provide a commercial bank with the means to undertake actions on its own, however, there may have been limits to the influence the GoC was able to exert. Any inducements

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<sup>10</sup> Note that the Borrower ICR prepared by Minsheng and summarized in annex 6, assigned different ratings than in this document. The ratings given in that document, however, are somewhat at odds with the evidence found by the World Bank's ICR team and the ratings that are presented here.

in its power to offer, such as participation in future government support for EE financing, would have been offset by the softening market environment for large-scale EE investment projects. Most tellingly, although the result of discussions in 2014 regarding restructuring was that Minsheng agreed to the terms of a time-bound action plan and initially demonstrated compliance, implementation gradually reverted to the earlier lower quality. This indicated that the decision to continue with Minsheng instead of either canceling the project or switching to a more-capable PFI may have been a lost opportunity. As the end of the project approached, the GoC met multiple times with Minsheng to encourage completion of the project, but as it became clear that the situation would not improve, it allowed the remaining loan to be cancelled. Despite a high level of commitment demonstrated, the rating is Moderately Satisfactory.

### **(b) Implementing Agency Performance**

Rating: Moderately Unsatisfactory

87. Minsheng's performance was inconsistent, at times satisfactory, but falling into the unsatisfactory range for extended periods. Turnover among team members was quite high, with six distinct teams over the course of its participation in the project. While each new team demonstrated willingness and ability, none were in place long enough to become effective. Moreover, there appeared to be issues in internal organization. One team in particular was able to effect implementation of a significant set of market research activities, but by themselves these were insufficient to make a large difference. This negatively affected the implementation and eventual outcome of both the CHEEF II loan project and the activities to support the CHEEF II loan that were implemented under the GEF portion of CHEEF I.

### **(c) Justification of Rating for Overall Borrower Performance**

Rating: Moderately Unsatisfactory

88. While the government rating is satisfactory, the implementing agency is rated moderately unsatisfactory. In view of the low (45 percent) disbursement of the loan and the failure to achieve the targets for the PDO indicators for energy savings and CO<sub>2</sub> emissions reductions and despite the significant efforts put into the project by the GoC as well as members of successive project teams, the overall rating is Moderately Unsatisfactory.

## **6. Lessons Learned**

89. The project yielded a number of important lessons:

- (a) **PFI's continuing commitment and appropriate internal organization are essential factors in the success in EE lending.** There is no single ingredient to this; rather, commitment needs to be 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. For this project, the frequent (approximately annual) replacement of Minsheng's implementation team and the turnover in leadership hindered cumulative learning and the strengthening of capacity. The placement of Minsheng's project team in a unit with duties peripheral to loan origination greatly reduced the effectiveness of the team's efforts. With regard to design of future onlending operations, a clear lesson

is that at appraisal there must be an evaluation not just of the PFI overall but the project management unit responsible for executing the project and its relationships with other units within the PFI that are essential to successful implementation. In addition, competition among multiple PFIs (like in the case of CHEEF I) could have improved the overall performance of the project. It may also be useful to include trigger conditions for continuation of the project (for example, targets for percentages of loan disbursement by certain dates) and previously agreed alternatives in case of nonperformance by a PFI (for example, reallocation of loan funds to another competing PFI) to avoid the round of renegotiation of commitments that CHEEF II suffered from.

- (b) **TA and training can have a high payoff but not in the face of high staff turnover.** Minsheng reported that they found the TA to be effective in generating knowledge about unfamiliar market segments, to becoming aware of new market opportunities, and to designing new products to take advantage of them. Once generated, however, mechanisms need to be in place to make effective use of this knowledge and capacity building. Although Minsheng was able to leverage the TA component (financed under the GEF component of CHEEF I) for its business development, because of the implementation issues identified previously it did not utilize the TA resources to implement new financial product lines. It is important to ensure that training for capacity building is offered to staff at local branches, which have the direct relationship with the beneficiary enterprises. Huaxia, which was successful in implementation of CHEEF I, held its training sessions in many provincial branches across the country and throughout the entire life of CHEEF I, a practice that Minsheng was aware of but did not adopt in its execution of CHEEF II.
- (c) **Training in World Bank procedures is essential to effective implementation.** The issues encountered in subproject implementation were due in part to insufficient understanding by branch banks, which handled all of the subprojects that received onlent funds, of the conditions and procedures that pertained to them. Training is necessary, and particularly challenging for commercial banks, where staff rotate frequently and it is difficult to maintain specialized expertise—such as knowledge of procedures concerning projects financed by international financial institutions—and where financing with a specialized instrument like the one in this project is a very small portion of the PFI’s overall business. Moreover, although Minsheng completed the targeted number of training sessions on the OM, two of its five subprojects were found to be ineligible owing to failure to implement practices covered by the OM training. The implication is that training needs to be provided over the entire course of a project, especially when staff turnover is high. An ancillary lesson may be that additional World Bank support for implementation is needed to assist commercial banks in EE onlending projects.
- (d) **A model that is successful for one type of PFI may require significant efforts and modification to replicate successfully with another type of PFI.** This project was patterned on the successful experience of CHEEF I, with the intent of extending the EE onlending model to a large commercial bank with nationwide reach. The implementation approach taken by Minsheng for this project, however, did not feature

certain key aspects, noted above. For instance, Minsheng is more commercially oriented than the PFIs for CHEEF I, which are state-guided banks (and a policy bank, in the case of EXIM), and therefore more attentive to policy imperatives and to the influence of government interlocutors. As a result, Minsheng's project team did not enjoy consistent, strong backing from top management throughout the project, as was the case for CHEEF I. The contrast in results between CHEEF I and CHEEF II provides powerful evidence that the design offered for market-driven banks needs to be different than for policy-oriented banks and the value of persuasion is limited for the former group.

- (e) **Where financing is permitted to be used for both EE and RE projects, it is possible, and probably likely, for it to flow mostly toward one or the other.** This was demonstrated by the flow of 85 percent of the parallel financing to RE projects as a result of market conditions and government policies. This can be seen as allowing flexibility, depending on the objective of the project. If a project is intended to finance both, it is worthwhile to consider setting boundaries on the amount that can go toward each type of project.
- (f) **The commitment of a commercial PFI to implement a credit line should be evaluated carefully at design.** Without a clear policy environment to stimulate demand by sub-borrowers for commercial financing of EE investments, commercial lending institutions will have difficulty sustaining a business case for promoting such lending. Where there is a risk that implementation will not be sustained, innovative approaches could be built into the design, for example, dates by which certain shares of disbursement must be reached for the project to continue. A design that introduces competition between two or more lenders could also be considered, under which all PFIs have equal access to a limited pool. This could guard against the inability or unwillingness of a given PFI to implement the project.

## **7. Comments on Issues Raised by Borrower and Implementing Agencies**

90. No comments on this ICR were received from the GoC, Minsheng, or the CHEEF I PMO. Minsheng provided its views of the project in its own, separate Borrower ICR, which is summarized in annex 6.

## Annex 1. Project Costs and Financing

### (a) Project Cost by Component (in US\$, millions equivalent)

China Energy Efficiency Financing II – P113766			
Components	Appraisal Estimate (US\$, millions)	Actual/Latest Estimate (US\$, millions)	Percentage of Appraisal
Component A: Energy Efficiency Investment	100.0	45.5	45.5
Component B: Technical Assistance and Capacity Building <sup>a</sup>	—	—	—
<b>Total Financing Required</b>	<b>100.0</b>	<b>45.5</b>	<b>45.5</b>

Note: a. Covered in ICR for CHEEF I project.

### (b) Financing

Source of Funds	Appraisal Estimate (US\$, millions)	Actual/Latest Estimate (US\$, millions)	Percentage of Appraisal
International Bank for Reconstruction and Development Loan	100.0	45.5	45.5
Borrowing Country's PFIs <sup>a</sup>	—	—	—
Sub-borrowers (Industrial Enterprises)	—	—	—
<b>Total</b>	<b>100.0</b>	<b>45.5</b>	<b>45.5</b>

Note: a. The borrower committed to parallel financing of similar EE subprojects, financed by the PFI and the beneficiary enterprises with their own resources. There was no cofinancing by Minsheng of subprojects financed with IBRD loan proceeds.

## Annex 2. Outputs by Component

### Component A: Energy Conservation Investment

1. This component provided sub-loans to several beneficiaries for carrying out EE subprojects. The IBRD loan was onlent by the GoC to Minsheng. Minsheng, in turn, lent the funds to industrial enterprises for eligible EE investment subprojects. The size of each sub-loan was required to be below US\$20 million equivalent to diversify potential project risks (there was no minimum size established). Minsheng offered financing to five projects. Three subprojects were implemented, and IBRD funds were withdrawn for the associated investments (**Error! Reference source not found.**). Unfortunately, one of the subprojects, Tangshan Jiahua Coal Chemical Limited Co. (TCCL), did not go into operation, as the subproject beneficiary suffered bankruptcy just as this project was closing—an example of a worthy EE investment project that was not brought to fruition owing to external circumstances. The two subprojects that were completed reduced energy consumption by 233,000 tce annually and CO<sub>2</sub> emissions by 607 million tons annually.

2. Two subprojects were found to be unqualified during the course of the project, and IBRD loan financing was recalled (**Error! Reference source not found.**). One of them, at Xinchangnan Coking Chemical Co., was the second of the two subprojects subject to prior review. It received a ‘no-objection’ from the World Bank team in June 2014, based on review of the investment documentation. The IBRD loan was to finance the subproject’s purchase of equipment according to documentation submitted by Minsheng. The annual audit report for 2014, submitted to the World Bank in June 2015, showed that the loan funds had in fact been misappropriated by Xinchangnan, which had used falsified contracts to send the loan funds to three other companies, which returned the funds to Xinchangnan to use for operating capital. The World Bank team followed proper procedure without delay to inform the borrower of this and to request remedial action. The funds were recovered and returned to the project’s Designated Account by June 2016.

3. The Jinan Heating Power Co. (JHPL) subproject was found in the annual audit report for 2015 (submitted June 2016) to have also been used for operating capital instead of for the investment subproject as intended by the subproject Loan Agreement. As such, this was also found to be ineligible, and in accordance with the normal procedure, the funds were recovered and returned by February 2017. In this instance, the underlying cause of the ineligibility appears to have been that the host enterprise (sub-borrower) was insufficiently familiar with permitted practice under the CHEEF II Loan Agreement, and followed accepted commercial practice in handling the sub-loan proceeds. This indicates that, even late in the project, Minsheng did not have the capacity to ensure that its sub-borrowers were compliant with the requirements of the project. Factors contributing to this state of affairs are discussed in the main text of this report.

**Table 2.1. Minsheng: Eligible Subprojects**

No.	Subcomponent	World Bank Loan Withdrawals (US\$, millions)	Annual Energy Savings (ktce per year)	Annual CO <sub>2</sub> Reductions (kt CO <sub>2</sub> per year)	Year	Project
1	National Grid Sichuan Energy Service Co. (NESC) Energy Performance Contract (EPC)	17.25	91.80	238.7	2015	Updating to a 50 MW high efficient gas generator
2	JHPL coal-fired replace main heat supply network of the Eastern Jinan	11.50	141.50	367.9	2016	Replacing a heat supply pipe network and coal boilers
3	TCCL Coke Dry Quenching	16.50	47.99 <sup>a</sup>	124.8 <sup>a</sup>	2013	Renovation of coking line; project eventually not put into operation
	Total	45.25	233.30	606.6	—	—

Note: a. Excluded from totals.

**Table 2.2. Minsheng: Dropped Subprojects**

No.	Subcomponent	World Bank Loan Withdrawals (US\$, millions)	Refunds to World Bank Account (US\$, millions)	Year	Reason for Dropping
1	Xinchangnan Coking Chemical Co. Coke Dry Quenching	20.00	20.00	2014	Loan used for purpose other than intended
2	Lianyuan Iron and Steel Co. Phase V Metallurgical Gas Recovery and Utilization	12.88	12.88	2015	Initiating of project without proper environmental impact assessment

### Component B: Technical Assistance and Capacity Building

4. This component removed key barriers to developing energy conservation financing businesses in the domestic banking sector primarily for medium- and large-sized industrial energy conservation investments. This component was financed by the GEF grant, which was part of the CHEEF I, and is included in the ICR for that project (ICR 4130). Note that this component corresponds to ‘Component A’ in CHEEF I.



### Annex 3. Economic and Financial Analysis

1. Project efficiency is rated as Modest, based on substantial efficiency of the two subprojects effectively implemented, counterbalanced by low implementation efficiency, as detailed in this section. Key indicators are summarized in **Error! Reference source not found.**

#### Analysis at Project Appraisal

2. According to the PAD, the project was built on the premise that the expected type of EE projects would be economically justified if they were financially viable. The PAD noted that most such investments are economically justified, especially at high energy prices, which were expected to prevail in the medium term. In China, where coal is the dominant fuel, the economic justification would be even stronger because of the significant environmental benefits expected from EE investments. Analyses conducted during project preparation, as outlined in the following paragraphs, validated the conclusion that typical subprojects would both be financially viable and have economic returns exceeding financial returns. For this reason, the onlending bank was required to analyze and confirm that the selected subprojects were financially viable, without further analyzing expected economic impacts.

3. Economic and financial analyses were carried out on three representative potential subprojects. Each would generate electricity from the by-products of various industrial facilities, namely (a) gas from plants that coke coal as an input for steel production; (b) gas, heat, and steam from a steel plant; and (c) heat from a cement plant. The assumed baseline scenario without the project was that these by-products would be wasted and latent demand for associated potential electricity would be met by grid electricity, which in China is mostly coal-fired. The impacts of the subprojects were analyzed based on the benefits from newly generating electricity for use or sale (with associated avoided emissions), and the costs of investment plus incremental operating costs. Key assumptions are set out in **Error! Reference source not found.**

4. The analysis at appraisal showed that, excluding income tax, these three subprojects would have an aggregate FIRR of 22 percent (ranging from 14 percent to 24 percent) and corresponding payback period of 4.4 (4.2 to 6.6) years, thus demonstrating their financial viability.<sup>11</sup> The return rates (excluding tax) exceed the 8 percent weighted average cost of capital assumed for a typical medium to large commercial enterprise in China. The analysis showed an aggregate EIRR for the three subprojects of 34 percent (ranging from 23 percent to 35 percent), accounting environmental benefits from reduced emissions with assumed values of US\$5,716 per ton of particulates, US\$373 per ton of sulfur dioxide (SO<sub>2</sub>), US\$265 per ton of nitrogen oxides (NO<sub>x</sub>), and US\$12 per ton of

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<sup>11</sup> Analysis at appraisal calculated a median payback period of 2.8 years based on gross cash inflow (excluding operation costs) and FIRR of 22 percent based on net cash flow (including operation costs). The value of payback period would be 4.4 years, which is a recalculation using net cash flow, to be consistent. These values excluded income tax. For comparison, in the stated FIRR, assuming weighted average effective tax rate for the two subprojects evaluated at completion is 14 percent. Applying net cash flow and assuming a tax rate of 14 percent, the FIRR of the four subprojects at appraisal would be 16 percent (ranging from 9 to 19 percent) and payback period 5.7 years (ranging from 5.1 to 8.9 years). Analysis at appraisal also included a scenario of carbon financing, which made the projects more attractive. As no project received carbon finance, that scenario is not reported here.

CO<sub>2</sub>.<sup>12</sup> These rates exceed the 12 percent economic discount rate normally applied to World Bank projects in China at the time of appraisal, thus demonstrating economic efficiency. Accounting for CO<sub>2</sub> alone, but with social cost of carbon valued around US\$30 per ton according to the latest World Bank guidelines, produces similarly high economic rates of return of 42 percent (30 percent to 43 percent).

5. The total investment size for the three hypothetical subprojects analyzed was CNY 898 million (US\$131 million), equivalent to 13 percent of the cumulative billion dollars of incremental EE investments expected to be supported or leveraged by the project. For the results framework, energy savings and emissions reductions were assumed to apply pro rata to other subprojects and investments supported by the project to derive the target results of annual energy savings of 2.469 million metric tons of coal equivalent (Mtce) and annual emissions reductions of 6.098 MtCO<sub>2</sub>.<sup>13</sup>

### Analysis during Implementation

6. Implementing enterprises submitted a feasibility study for their respective subproject as part of the loan approval process. The method and metrics used for each subproject were broadly similar, though with some variation for details. **Error! Reference source not found.** details the key assumptions and results for the two subprojects that were implemented effectively: (a) upgrading of facilities associated with generating electricity from blast furnace gas at an iron plant of the NESG (the ‘Sichuan’ subproject) and (b) upgrading of coal-fired boilers and related facilities for district heating by the JHPL (the ‘Jinan’ subproject). These subprojects are of a similar type to those analyzed at appraisal, such that their economic benefits would exceed financial returns. The feasibility reports for these subprojects analyzed univariate sensitivity of the FIRR as follows. The Sichuan subproject found the FIRR was robust for ±15 percent variation in (a) sales volume, (b) sales price, (c) variable costs, and (d) construction investment changes. The Jinan subproject found the FIRR was robust for ±10 percent variation in (a) construction investment, (b) heating price, and (c) heat purchase costs.

### Analysis at Completion

7. The Borrower ICR provides investment size, energy savings, and emissions reductions for the three financed subprojects—Sichuan, Jinan, and Tangshan. The Jinan subproject is only partially completed as of the project closing date, but is expected to be completed in future, so its results are counted in full. The Tangshan subproject received around US\$29 million investment and was successfully completed, so it is included in the total financing costs. However, the facility is no longer operating at completion, so the energy savings and emissions reductions totals include zero from the Tangshan subproject. Analysis of internal rates of return and payback periods relies

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<sup>12</sup> The PAD (page 45) states that these emission reduction values for particulates SO<sub>2</sub>, and NO<sub>x</sub> are “based on the comparison of the results derived from different studies or methods,” while carbon emissions were valued at the “recent carbon trade market price.”

<sup>13</sup> Compared to values derived from the subproject analysis at appraisal, the PAD results framework used coefficients of average emissions intensity of energy savings at 2.47 tCO<sub>2</sub> per tce, and unit investment costs of annual energy savings at US\$405 per tce per year. These differences are immaterial for the purposes of high-level qualitative results.

on cash flow data from the feasibility stage, as ex post data was not available at completion. The project did not require participating entities to collect or report such data after implementation.

8. Together, the three financed subprojects represent a total investment of US\$239 million, representing 100 percent of the total lending to investments supported directly by the project, and 8 percent of the US\$2,920 million accumulated energy savings supported or leveraged by the project. The analysis suggests an aggregate internal rate of return of at least 35 percent in economic terms (including CO<sub>2</sub> emissions reductions valued at US\$30 per ton in 2015 rising to US\$65 per ton in 2040, in accordance with 2015 World Bank guidance), or 16 percent in financial terms (including tax). While the Tangshan subproject itself thus has no FIRR (because it generated no returns), exclusion of the Tangshan investment would increase the FIRR to 37 percent for the two successful subprojects. The payback periods (including tax) for Jinan and Sichuan subprojects are 2.9 and 6.0 years, respectively. These values are similar to the expectations at appraisal, demonstrating economic and financial viability. The economic rate of return would be higher still including the benefit of local pollution reduction, which are excluded here for simplicity given that local environmental impacts are extraneous to the PDO.

9. In summary, the subprojects' designs are in line with the project's intended objectives and, despite the higher unit investment cost of energy savings, represent a substantial level of efficiency, similar to what was expected for hypothetical subprojects at appraisal.

### **Implementation Efficiency**

10. Implementation efficiency is rated low, as disbursement was less than half of the loan amount, and the Tangshan subproject was financed but was ineffective. The extension of closing date reflected in part the difficulty in implementation due to a slowing economy that negatively affected the project's target market of renovation projects in energy-intensive industries.

**Table 3.1. Input Values and Results for Analyses of Three Hypothetical Subprojects at Appraisal and Three Effective Subprojects at Implementation**

Row	Parameter	Unit	Three Subprojects at Appraisal	Three Subprojects at Completion
	<b>Assumptions</b>			
1	Exchange rate <sup>a</sup>	CNY/US\$	6.85	6.16 to 6.89
2	Electricity tariff (excluding tax) <sup>b</sup>	CNY/kWh	0.269 to 0.330	n/e
3	Tax rate for electricity and coal <sup>c</sup>	%	14	14
4	CO <sub>2</sub> emissions factor for electricity generation	g/GWh	869.5	869.5
5	Unit value of CO <sub>2</sub> emissions avoided (updated) <sup>d</sup>	US\$/tCO <sub>2</sub>	30	21 to 56
6	Effective operating lifetime (excluding Tangshan subproject)	years	20	20
7	Social discount rate	percent/year	12	12
	<b>Implementation data</b>			
8	Total lending investment in subprojects	US\$, millions	131	239
9	Annual energy savings during operation	Mtce/year	0.333	0.233
10	Average annual net financial benefits to implementing entity (cash flows) <sup>c</sup>	US\$, millions/year	18 (0.4 to 11)	42 (nil, 14, 28)
11	Annual CO <sub>2</sub> emissions avoided during operation	Mt CO <sub>2</sub> /year	0.828	0.607
12	Average annual economic value of CO <sub>2</sub> emissions avoided	US\$, millions/year	10	26
13	Average unit investment cost of annual energy savings ([8] / [9])	US\$/(tce/year)	393	1,022
14	Average emissions intensity of energy savings ([11] / [9])	t CO <sub>2</sub> /tce	2.48	2.60
	<b>Economic and financial analysis results<sup>f</sup></b>			
15	FIRR (including tax)	percent/year	16 (9 to 19)	16 (nil, 15, 35)
16	Payback period (including tax)	years	5.7 (5.1 to 8.9)	4.5 (nil, 2.9, 6.0)
17	EIRR (including CO <sub>2</sub> benefit at updated value, excluding local pollutants)	percent/year	42 (30 to 43)	35 (nil, 25, 68)
18	Economic net present value (excluding CO <sub>2</sub> benefit, discount rate as at [7])	US\$, millions	70 (0.5 to 44)	52 (nil, 43, 77)
19	Marginal abatement cost (-[18] / ([6] x [12]))	US\$/t CO <sub>2</sub>	-4 (-6 to -1)	-4 (-16, -6, nil)

Note: n/e = not estimated.

a. The exchange rate for analysis at completion uses actual average annual historic rates from 2014 to 2016, and CNY 6.89 per U.S. dollar for 2017 onward.

b. Feed-in tariffs vary by province, and exclude value added tax (VAT). Analysis at completion takes values of energy savings as reported by the counterpart, for which underlying assumptions are not available. The tariff for the Sichuan subproject at feasibility analysis was CNY 0.570 per kWh (excluding tax). The Jinan subproject does not rely on electricity savings.

c. The analysis at appraisal assumed VAT of 17 percent for electricity and coal, and excluded income tax. Analysis at completion suggests the Jinan and Sichuan subprojects had effective tax rates of 8 percent and 25 percent, respectively, with weighted average of 14 percent, based on the cash flow statements from the feasibility reports. Re-analysis of the hypothetical subprojects from appraisal applies a tax rate of 14 percent to improve comparability.

d. Net cash flows include benefits from energy savings and costs of operation and maintenance. Average annual net cash flows are inferred from the subproject investment divided by the reported payback period for each subproject.

- e. Appraisal values of FIRR and payback period are based on net cash flows (including operation and maintenance costs) and assume tax of 25 percent. Completion values are based on data and methodologies in the feasibility reports of sampled subprojects, which vary across subprojects. For some subprojects, average annual net cash flow was inferred from the payback periods reported in the feasibility reports.
- f. Appraisal values of FIRR and payback period are based on net cash flows (including operation and maintenance costs) and assume tax of 25 percent. Completion values are based on data and methodologies in the feasibility reports of sampled subprojects, which vary across subprojects. For some subprojects, average annual net cash flow was inferred from the payback periods reported in the feasibility reports.



## Annex 4. Bank Lending and Implementation Support/Supervision Processes

### (a) Task Team Members

Names	Title	Unit	Responsibility/ Specialty
<b>Lending</b>			
Leiping Wang	Senior Energy Specialist	GEE09	Task Team Leader
Yabei Zhang	Senior Energy Specialist	GEE05	Task Team Leader
Bernard Baratz	Consultant	GEEDR	Consultant
Haixia Li	Senior Financial Management Specialist	GGO20	Financial Management
Meixiang Zhou	Senior Development Specialist	LEGAM	Social Development
Xin Ren	Senior Environment Specialist	GFM08	Environment Safeguards
Youxuan Zhu	Consultant	GCCFM	Social Safeguards
Peishen Wang	Consultant	GEE03	Environment Safeguards
Xiaowei Guo	Senior Procurement Specialist	GGOGI	Procurement
Dan Xie	Program Assistant	EACCF	Assistant
Cristina Hernandez	Program Assistant	GEE02	Assistant
<b>Supervision/ICR</b>			
Todd Johnson	Senior Energy Specialist	GEE09	Task Team Leader
Fang Zhang	Senior Financial Management Specialist	GGO20	Financial Management
Xiaowei Guo	Senior Procurement Specialist	GEE03	Procurement
Zheng Liu	Procurement Specialist	GGO20	Procurement
Xiaodong Wang	Senior Energy Specialist	LEGAM	Task Team Leader
Yun Wu	Energy Specialist	GFM08	Technical
Youxuan Zhu	Consultant	GCCFM	Environment Safeguards
Xiaowei Guo	Senior Procurement Specialist	GGOGI	Procurement
Ximing Peng	Senior Energy Specialist	GEE09	Technical
Jonathan Sinton	Senior Energy Specialist	GEE05	Co-TTL/ICR Author
Alan David Lee	Energy Specialist	GEE09	ICR Team
Takayuki Doi	Senior Power Engineer	GEE09	ICR Team
Shanshan Ye	Team Assistant	EACCF	Assistant
Cristina Hernandez	Program Assistant	GEE02	Assistant
Dan Xie	Program Assistant	EACCF	Assistant
Tianxiu Kang	Program Assistant	EACCF	Assistant

### (b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of Staff Weeks	US\$, Thousands (including travel and consultant costs)
<b>Lending</b>		
	—	94.83 (travel)
	—	51.00 (consultants)
<b>Total:</b>	30.44	145.83
<b>Supervision and ICR</b>		
	—	64.90 (travel)
	—	5.91 (consultants)
<b>Total:</b>	61.78	70.81

## Annex 5. Stakeholder Workshop

1. A knowledge exchange workshop was held in Xiamen, Fujian Province on November 7, 2016 (agenda in table 5.1). It was a joint workshop of CHEEF I and II, and was attended by the NDRC, NECC, CBRC, PMO, three participating banks (EXIM, Huaxia, and Minsheng), and selected grantees for strategic policy studies for developing the 13th FYP (2016–2020), improving the fiscal and taxation policies for EE using public funds, and replacing decentralized coal boilers.

2. During the workshop, key success factors and lessons learned from the project implementation were summarized and shared. Moreover, the participating banks exchanged their experience in deal origination, innovative financing products, and banks' internal organization and incentives. The participants also shared thoughts on the trends and future focus of EE financing in China.

3. As pointed out by the NDRC representative, the CHEEF Program was China's first experiment with financing EE through a credit line offered through domestic banks. The results proved successful, and the experience learned has been very valuable to the government's policy making and to the national market for EE. The NDRC is contemplating rolling out a similar credit line with Government funds to scale up EE financing.

4. The NDRC proposed to organize a high-level project closing workshop in 2017 to publicize the project impacts and further disseminate the experiences and lessons learned to a broader audience.

**Table 5.1. China Energy Efficiency Financing Program Knowledge Exchange Workshop Agenda  
Xiamen, Fujian, China, November 7, 2016**

Topic	Presenter(S)
<ul style="list-style-type: none"> <li><b>Opening Remarks</b></li> </ul> Moderator: Xu Zhiqiang, Deputy Director General, NECC	
CHEEF Program: Contributions to China's EE Program in the 12th and 13th FYP	Zhao Huaiyong, Director, NDRC
Green Financing: Ecological dividend	Ye Yanfei, Deputy Director General CBRC
GEF Funding to Support China's EE Policy and Build Capacity	Tian Min, Deputy Director, MOF
CHEEF Program: Contributions to China's Green Finance and EE Programs	Wang Xiaodong, Task Team Leader for CHEEF I, World Bank
<ul style="list-style-type: none"> <li><b>CHEEF Program: Progress, Success Experience, and Lessons Learned</b></li> </ul> Moderator: Wu Yun, Co-Task Team Leader for CHEEF I, World Bank	
NECC/NDRC/PMO	Zhang Yunpeng, PMO Director
Support to 13th FYP: Energy conservation action plan	Chinese academy of social sciences
Support to 12th FYP: fiscal and taxation policies	Central University of Finance and Economics
EXIM Bank	Zhang Ying, Deputy General Manager, EXIM
Huaxia Bank	Zhang Yunmiao, Deputy General Manager, Huaxia Bank
Minsheng Bank	Minsheng representative
<ul style="list-style-type: none"> <li><b>Knowledge Exchange – World Bank's Internal Organization and Deal Origination</b></li> </ul> Moderator: Ministry of Finance and China Banking Regulatory Commission	
<ul style="list-style-type: none"> <li>What is the successful experience?</li> <li>What are the lessons learned?</li> <li>What can be done differently?</li> </ul>	All participants



<ul style="list-style-type: none"> <li>• What are the financial products that are better tailored to the market?</li> <li>• What are the future trends and innovative ideas</li> </ul>	
<ul style="list-style-type: none"> <li>• <b>Knowledge Exchange—Enabling Environment for Scaled-up EE</b></li> </ul> Moderator: Jiang Jinghao, Deputy Director, NDRC	
<ul style="list-style-type: none"> <li>• What is the successful experience?</li> <li>• What are the lessons learned?</li> <li>• What are the incentive policies to promote EE financing?</li> <li>• What are Government’s plan to use public funds to leverage commercial financing for EE?</li> </ul>	All participants
<ul style="list-style-type: none"> <li>• <b>Next Steps</b></li> </ul> Moderator: Todd Johnson, Task Team Leader for CHEEF II, World Bank	
<ul style="list-style-type: none"> <li>• How to more widely disseminate the knowledge from the CHEEF Program</li> <li>• How to further scale up EE in China and internationally</li> <li>• Suggestions on the next steps</li> </ul>	All participants
<ul style="list-style-type: none"> <li>• <b>Closing Remarks</b></li> </ul>	
Closing remarks	XuZhiqiang, Deputy Director General, NECC; Wang Xiaodong, Task Team Leader for CHEEF I, World Bank

## **Annex 6. Summary of Borrower's ICR and Comments on Draft ICR**

1. CMBC submitted the Borrower ICR to the World Bank. The entire report and annexes are available in the World Bank files. This executive summary preserves the language of the original report with minimal edits for the purpose of brevity.

### **Introduction**

2. This report concerns CHEEF II. The Project Agreement between IBRD and People's Republic of China, dated August 11, 2010, sets out the requirements for the report. Specifically, Section II.A.2. (c) provides that CMBC shall prepare and submit the report to the MOF and the World Bank not later than four months after the closing date. The report includes the execution of the project, performance by CMBC of its obligations under the agreement, accomplishments of the purpose of the loan, and plan designed to ensure the substantiality of the project's achievements.

### **Assessment of Project Objective and Design at Entry**

#### ***Original Objectives***

3. The PDO was to enhance the ability of energy saving. It would reduce the negative impact on the environment by providing facilities to sub-borrowers (high-energy consuming or energy-saving companies) of CMBC. At the same time, the GEF funds supported CMBC to strengthen its team construction and train professional employees. Finally, it was expected to build a sustainable green energy financing scheme.

#### ***Revised Objectives***

4. Although there have been changes in project content and in detailed design of some components during implementation, there has been no change in the project objectives, which end as stated in the appraisal document.

#### ***Original Project Components***

5. The total amount of the lending was estimated to be US\$100 million. The maximum loan that a subproject was able to borrow was US\$20 million. The term of the loan would be terminated no later than December 15, 2027. The project closing date was scheduled on December 31, 2014.

#### ***Project Changes***

6. In August 2014, CMBC lent US\$20 million to a coke company for supporting a coke dry quenching project. However, the National Audit Office discovered that the loan was ineligible under the terms of the IBRD project. As a result, this subproject was terminated and CMBC was requested by the World Bank to refund all the loan in December 2015.

7. In August 2015, CMBC lent US\$12.88 million to a steel company for supporting a metallurgical gas recovery and utilization project. Thereafter, the National Audit Office discovered that the steel company initiated the project without the environment influence assessment and

disbursed the previous costs without the approval of IBRD. As a result, this subproject was terminated and CMBC was requested by the World Bank to refund all the loan in December 2016.

### ***Project Delays***

8. On March 26, 2015, IBRD agreed to extend the account closing date to December 31, 2016.

### ***Project Quality at Entry***

9. Except the basic materials for loan application, the subproject needed additional materials, which included the (a) scope of the project and borrower's operation overview, (b) application purpose and motivations, (c) summary of technical evaluation, (d) standard energy consuming data and energy saving plan, (e) society and environment influence evaluation with necessary government permission, and (f) project investment analysis.

10. CMBC asked the sub-borrowers to submit the basic loan application materials and following materials: (a) a feasibility study report, (b) approval of initiation from Government, (c) environment permission from Government, (d) PMO's unopposed opinion, and (e) other related materials, such as a standard energy audit report.

### **Achievement of Objectives**

11. Until December 12, 2016, CMBC lent US\$78.13 million in total to five projects. Two out of five projects turned out to be unqualified and recalled. The remaining three projects were given US\$45.23 million. The details of the three subprojects are provided in the following paragraphs.

### ***NESC 50 MW high efficient gas generator EPC Subproject***

12. This project updated the previous five sets of 3 MW generators and built a new 240 tons per hour gas boiler, one set of 50 MW gas generator, a desalting water station, and a recycle water system. The self-owned generator can send out the electricity to the existing 110 kV grid system.

13. After the commercial operation date in November 2014, the generator has been operated for more than two years in a good condition. From January 1, 2015 to December 31, 2015, the generator produced 34,717 GWh of electricity. This subproject has reduced 65,956 tce of energy, 164,890 tons of CO<sub>2</sub>, 1,029 tons of NO<sub>x</sub>, and 1,088 tons of SO<sub>x</sub>. The unit energy-saving investment return is 2.66 tce per CNY 10,000, unit lending energy saving return is 3.8 tce per CNY 10,000, unit CO<sub>2</sub> reduce emission return is 6.64 tons per CNY 10,000, unit lending CO<sub>2</sub> reduce emission return is 9.49 tons per CNY 10,000. The annual energy saving is 46,169 tce. On the condition of CNY 0.57 per kWh, the project annually saves CNY 119 million.

14. The project brought a considerable benefit, but it still has space for improvement. The problem is that the generator needs a run-in period and some reasons cause it to stop working. The result is the difference between the feasibility report data and reality data. The feasibility report expects that the on-grid power is 372 million kWh but the real number is 314 million kWh. The fluctuation rate is 15.6 percent.

### ***Replacement of JHPL Coal-fired Heat Supply Network Subproject***

15. This project had two periods of construction. In the first period, a heat supply pipe network was replaced. In the second period, a main heat supply network, a heat transfer station, and a subsidiary network were replaced. At the completion of the work, 68 coal boilers were replaced. Annual reductions from the project were 420,000 tons of coal consumption, 5,100 tons of SO<sub>x</sub>, 1,742 tons of NO<sub>x</sub>, and 1,177 tons of particulate emissions.

16. As of February 2017, the first period of the project was completed, but the second period is still in progress. Although it is not possible to accurately measure the energy-saving level, environment protection, and economic benefits at this moment, it is obvious that the project will have a positive effect on the energy saving.

### ***TCCL Coke Dry Quenching Subproject***

17. The original plan of this subproject was to build two sets of coke ovens, which would reduce energy consumption by 47.2 ktce per year. From the environmental point of view, the dry coke method can reduce air pollution emissions compared to the standard wet coke method. Annual energy savings and emissions reductions were expected to be as in table 6.1.

**Table 6.1. Energy savings and emissions reductions from TCCL coke dry quenching subproject**

<b>Standard Coal</b>	<b>CO<sub>2</sub></b>	<b>SO<sub>x</sub></b>	<b>NO<sub>x</sub></b>
47,253 tce/year	73,241 t/year	1,360 t/year	782 t/year

18. As of April 2015, the site preparatory works were completed. However, due to the company's financial situation, the project was halted and had not been completed at that time.

### **Process Management**

19. To complete subprojects successfully, CMBC issued the World Bank project management handbook and participated in the training of the PMO. At the same time, CMBC learned the advanced project management experiences from the exchanges with other banks involved in the GEF-financed component of the project. Internally, CMBC organized related departments to complete the audit with the National Audit Office.

### **Significance of Project Outcomes**

20. If a country pays more attention to environment protection, citizens become more sensitive to environmental changes. This World Bank project provided an effective foundation for future sustainable developments.

21. The NESO project reached the design expectation with sustainable operational conditions. The economic benefits, environment protection effect, and society contribution were obtained.

22. The JHPL project completed its first phase and built a crucial infrastructure. It played an important role in environment protection and society concord.

23. The TCCL project completed its first phase. However, due to the sub-borrower's bankruptcy crisis, the project became unsustainable.

24. Through the implementation of the project, CMBC could consolidate the team. The GEF funds supported development of related research and reinforced the relationship between CMBC and the World Bank. This helped CMBC to promote its green financing service and business sustainability.

### **Performance of Borrower**

25. The Government and the implementing agencies ensured the quality of preparation and implementation and complied with covenants and agreements. The details are in the following paragraphs.

#### ***Government***

26. **Highly Satisfactory.** There were no shortcomings in the government performance. The related department included the NDRC, PMO, MOF, and the National Audit Office. These departments provided great efforts to support the project, including but not limited to solving the problems during the project implementation, improving compliance management, and ensuring the project complies with the World Bank requirements.

#### ***Implementing Agency***

27. **Moderately Satisfactory.** There were minor shortcomings in the implementing agency's performance. There were two subprojects (subject to post review) that upon audit were found to be unqualified.<sup>14</sup> However, the management team paid attention to the project after the visit of the World Bank project team. During the process, CMBC built a steady project team and communicated with the state office and the other banks involved in the GEF-financed technical assistance component. This effort led to the refund from the unqualified projects.

### **Performance of the World Bank**

28. **Moderately Satisfactory.** The team fulfilled the CMBC's requirements quickly, communicated with CMBC positively, and helped to develop the project. However, the explanation of the standard for the qualification of project entry was vague. During the communication, the previous and later descriptions sometimes did not correspond to each other. This resulted in ineffective work.

### **Lessons Learned**

- (a) The EE industry has huge potential market in China and more capital needs to be invested.
- (b) The green financing service is in the start-up stage, and financial institutions need to understand this market more. The World Bank and other related departments should

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<sup>14</sup> The circumstances of these two subprojects are described in section 2.2 of the main text.

enhance the promotion, provide training opportunities, develop commercial banks' recognition, and join the green financing business.

- (c) The borrower's bank should organize a special team for the World Bank project. The team should have professional employees and management policies. These are good for the project's development and ability enhancement.

### **Comments on Draft ICR**

- 29. No comments were received from the borrower or the PFI on the World Bank's draft ICR.

## **Annex 7. List of Supporting Documents**

- Project Appraisal Document: China Energy Efficiency Financing II Project, May 2010
- Project Appraisal Document: China Energy Efficiency Financing Project, April 2008
- Project Paper on a Proposed Additional Loan: China Energy Efficiency Financing Project, September 2011
- Project Brief: China Energy Efficiency Financing Project, March 2006
- Global Environment Facility Grant Agreement: China Energy Efficiency Financing Project, July 2008
- Project Restructuring Paper China of Energy Efficiency Financing II Project, March 2015
- Implementation Status and Results Reports, Sequence 1–12, 2011–2017
- Aides Memoire
- Borrower's Implementation Completion Report, February 2017