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GEF/R2017-0004/1

March 2, 2017

Closing Date: Thursday, March 16, 2017 at 6 p.m.

FROM: Vice President and Corporate Secretary

China - Developing Market-Based Energy Efficiency Program in China

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed trust fund grant from the Global Environment Facility (GEF) to China for a Developing Market-Based Energy Efficiency Program in China (GEF/R2017-0004), which is being processed on an absence-of-objection basis.

Distribution:
Executive Directors and Alternates
President
Bank Group Senior Management
Vice Presidents, Bank, IFC and MIGA
Directors and Department Heads, Bank, IFC and MIGA

Document of
The World Bank

FOR OFFICE USE ONLY

Report No: PAD1064

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED GRANT

FROM THE

GLOBAL ENVIRONMENT FACILITY TRUST FUND

IN THE AMOUNT OF US$17.8 MILLION

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR A

DEVELOPING MARKET-BASED ENERGY EFFICIENCY PROGRAM IN CHINA

FEBRUARY 7, 2017

Energy and Extractives Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective February 2, 2017)

Currency Unit	=	RMB (Chinese Yuan Renminbi)
US$1	=	RMB 6.88
RMB 1	=	US$ 0.15

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

APPCAP	Air Pollution Prevention and Control Action Plan
CQS	Selection based on Consultants Qualifications
CEM	Continuous Environmental Monitoring
CHEEF	China Energy Efficiency Financing Project
CNAO	China National Audit Office
DA	Designated Account
DLI	Disbursement-Linked Indicator
EE	Energy Efficiency
EPB	Environmental Protection Bureau
ESCO	Energy Service Company
ETS	Emission Trading Scheme
EU	European Union
FM	Financial Management
FYP	Five-Year Plan
GEF	Global Environment Facility
GoC	Government of China
GRS	(WB) Grievance Redress Service
HAP	Hebei Pollution Prevention and Control Implementation Action Plan
HBDRC	Hebei Development and Reform Commission
HBPMO	Hebei PMO
HPAO	Hebei Provincial Audit Office
HPFB	Hebei Provincial Finance Bureau
HXB	Hua Xia Bank
ICB	International Competitive Bidding
IPMVP	International Performance Measurement and Verification Protocol
IVA	Independent Verification Agency
JJJ	Jing-Jin-Ji Region (Beijing, Tianjin, and Hebei Provinces)
MOF	Ministry of Finance
M&V	Measurement and Verification

MRV	Measurement, Reporting, and Verification
NCB	National Competitive Bidding
NDRC	National Development and Reform Commission
PDO	Project Development Objective
PforR	Program for Results Lending Instrument
PIP	Project Implementation Plan
PMO	Project Management Office
PP	Procurement Plan
QCBS	Quality and Cost-based Selection
QBS	Quality Based Selection
RE	Renewable Energy
SSS	Single-Source Selection
tce	Tons of Coal Equivalent

Regional Vice President:	Victoria Kwakwa, EAPVP
Country Director:	Bert Hofman, EACCF
Senior Global Practice Director:	Riccardo Puliti, GEEDR
Practice Manager:	Jie Tang, GEE09
Task Team Leader:	Todd M. Johnson, GEE09

CHINA
Developing Market-based Energy Efficiency Program in China

TABLE OF CONTENTS

PAD DATA SHEET

China

Developing Market-based Energy Efficiency Program in China (P132748)

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC

0000009534

Report No.: PAD1064

Basic Information			
Project ID P132748	EA Category B - Partial Assessment		Team Leader(s) Todd M. Johnson
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]		
Project Implementation Start Date 03-May-2017	Project Implementation End Date 30-Apr-2022		
Expected Effectiveness Date 23-May-2017	Expected Closing Date 30-Apr-2022		
Joint IFC No			GEF Focal Area Climate change
Practice Manager/Manager Jie Tang	Senior Global Practice Director Riccardo Puliti	Country Director Bert Hofman	Regional Vice President Victoria Kwakwa

Borrower: People's Republic of China			
Responsible Agency: Hua Xia Bank			
Contact:	Ling Peng	Title:	General Manager
Telephone No.:	85238612	Email:	zhpl@hxb.com.cn
Responsible Agency: Hebei PMO			
Contact:	Xin Xu	Title:	Director General
Telephone No.:	031183028069	Email:	jnzxxmb@163.com
Responsible Agency: China National Energy Conservation Center			
Contact:	Yunpeng Zhang	Title:	Director
Telephone No.:	68585777-6069	Email:	zhangyp@chinanecc.cn

Project Financing Data(in USD Million)					
[ ]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[ ]	Credit	[X]	Grant	[ ]	Other

Total Project Cost:	17.80	Total Bank Financing:	0.00
Financing Gap:	0.00		

Financing Source	Amount
Global Environment Facility (GEF)	17.80
Total	17.80

Expected Disbursements (in USD Million)

Fiscal Year	2016	2017	2018	2019	2020	2021	2022	0000	0000	0000
Annual	0.00	0.50	2.00	3.50	4.00	4.00	3.80	0.00	0.00	0.00
Cumulative	0.00	0.50	2.50	6.00	10.00	14.00	17.80	0.00	0.00	0.00

Institutional Data

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Environment & Natural Resources

Proposed Global Environmental Objective(s)

The objective of the project is to support development and implementation of China's priority energy efficiency and environment programs, with a focus on improving the results measurement and verification system and developing market-based mechanisms.

Components

Component Name	Cost (USD Millions)
Component 1. Supporting market-based priority energy efficiency and coal cap control programs	8.80
Component 2. Supporting results-based green energy financing in the Jing-Jin-Ji Region	4.50
Component 3. Supporting the results-based environmental program in Hebei Province	4.50

Systematic Operations Risk- Rating Tool (SORT)

Risk Category	Rating
1. Political and Governance	Low
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Low
4. Technical Design of Project or Program	Moderate

5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	Moderate
7. Environment and Social	Low
8. Stakeholders	Moderate
9. Other	
OVERALL	Moderate

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [X]
Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

Safeguard Policies Triggered by the Project	**Yes**	**No**
Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04		**X**
Forests OP/BP 4.36		**X**
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11		**X**
Indigenous Peoples OP/BP 4.10		**X**
Involuntary Resettlement OP/BP 4.12		**X**
Safety of Dams OP/BP 4.37		**X**
Projects on International Waterways OP/BP 7.50		**X**
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Institutional Arrangement (Project Steering Committee)		22-Aug-2017	

Description of Covenant

The Recipient shall establish, and thereafter maintain, throughout the period of Project implementation, a Project Steering Committee with terms of reference, powers, functions, and other resources satisfactory to the World Bank, and consisting of representatives from MOF, NDRC, HBDRC, and HXB, for the purpose of, inter alia, providing strategic and policy guidance and institutional coordination for Project implementation. (Section I.B.1, Schedule 2 to the Grant Agreement)

Name	Recurrent	Due Date	Frequency
Institutional Arrangement (Project Management Office)	X		CONTINUOUS

Description of Covenant

The Recipient and the Project Implementing Entities shall maintain, throughout the period of Project implementation, a Project Management Office, with terms of reference, powers, functions, and other resources satisfactory to the World Bank, including an assigned director and competent and experienced staff in adequate numbers, responsible for day-to-day implementation support of the Project, including procurement, financial management, coordination, reporting, and monitoring and evaluation of Project. (Section I.B.2, Schedule 2 to the Grant Agreement, Section I.A, Schedule to the Project Agreement)

Name	Recurrent	Due Date	Frequency
Annual Work Plans	X		Yearly

Description of Covenant

The Recipient and the Project Implementing Entities shall finalize and furnish to the World Bank Annual Work Plans satisfactory to the World Bank no later than October 31 in each year, beginning in 2017. (Section I.E, Schedule 2 to the Grant Agreement, and Section I.B, Schedule to the Project Agreement)

Name	Recurrent	Due Date	Frequency
Safeguards	X		CONTINUOUS

Description of Covenant

The Recipient and the Project Implementing Entities shall ensure that all studies and technical assistance to be supported under the Project are carried out under terms of reference satisfactory to the World Bank, and that such terms of reference are consistent with, and pay due attention to, the World Bank's Safeguards Policies. (Section I.C, Schedule 2 to the Grant Agreement, and Section I.D, Schedule to the Project Agreement)

Name	Recurrent	Due Date	Frequency
Mid-Term Review		30-Apr-2020	

Description of Covenant

The Recipient and the Project Implementing Entities shall no later than April 30, 2020, prepare and furnish to the World Bank a consolidated mid-term review report for the Project, under terms of reference satisfactory to the World Bank, summarizing the results of the monitoring and evaluation activities carried out from the inception of the Project, and setting out the measures recommended to ensure the efficient completion of the Project and to further the objectives thereof. (Section II.A.2, Schedule 2 to the Grant Agreement, and Section II.A.2, Schedule to the Project Agreement)

Conditions

Source Of Fund	Name	Type
GEFU	Global Environment Fund	Disbursement

Description of Condition

The World Bank shall have notified the Recipient of its receipt of a copy of the respective Implementation Agreement.(Section IV.B.2 (b), Schedule 2 to the Grant Agreement)

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Todd M. Johnson	Team Leader (ADM Responsible)	Lead Energy Specialist		GEE09
Zheng Liu	Procurement Specialist (ADM Responsible)	Procurement Specialist		GGO08
Fang Zhang	Financial Management Specialist	Senior Financial Management Specialist		GGO20
Aristeidis I. Panou	Team Member	Counsel	Counsel	LEGES
Chau-Ching Shen	Team Member	Senior Finance Officer	Disbursement	WFALN
Cristina Hernandez	Team Member	Program Assistant	Program Assistant	GEE09
Dafei Huang	Team Member	Environmental Specialist	Climate Change Specialist	GEN2A
Garo J. Batmanian	Team Member	Lead Environmental Specialist		GEN2A
Peishen Wang	Safeguards Specialist	Consultant		GENDR
Shanshan Ye	Team Member	Team Assistant		EACCF
Xiaodong Wang	Team Member	Senior Energy Specialist		GEE09
Youxuan Zhu	Safeguards Specialist	Consultant		GSU02
Zhuo Yu	Team Member	Finance Officer	Disbursement	WFALN

Extended Team

Name	Title	Office Phone	Location
Mark Johnson	Trading Consultant		
Noureddine Berrah	Consultant		
Pierre Baillargeon	M & V Consultant		Quebec

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
China	Beijing	Beijing		X	

Consultants (Will be disclosed in the Monthly Operational Summary)

Consultants Required?	Consultants will be required

I. STRATEGIC CONTEXT

A. Country Context

1. Over the last 35 years since the start of the open door policy, China has experienced the fastest economic growth in the world and its energy sector has developed accordingly. Energy consumption increased more than 7-fold, from 0.6 billion tce in 1980 to 4.3 billion tce in 2015,[1] to fuel an economy that increased 22-fold and to satisfy the needs of an urban population that nearly quadrupled, reaching 56.1 percent of China's population in 2015.[2] China is now the largest energy consumer in the world, greatly relying on coal to meet two-thirds of its primary energy needs. Over the next two decades, energy consumption is expected to double. This remarkable growth in energy consumption has led to twin challenges in China: environmental sustainability and energy security. China has many of the world's most polluted cities and is the largest emitter of greenhouse gases in the world. China is also facing growing energy security concerns because of the increasing dependence on oil and gas imports.

B. Sectoral and Institutional Context

2. **Government's commitment to energy efficiency.** Improving energy efficiency (EE) is the most cost-effective way to simultaneously address the twin energy challenges, namely, environmental sustainability and energy security. The Chinese Government has made energy conservation one of the top priorities for the nation, as increasing EE produces energy savings, conserves scarce natural resources, improves local air quality, and enhances energy security. Therefore, China has embarked on one of the most aggressive energy conservation campaigns in the world. The Government of China (GoC) set a mandatory target to cut energy intensity (energy consumption per unit of gross domestic product) by 20 percent in the 11th Five-Year Plan (FYP) (2006–2010) and renewed its target of 16 percent reduction during the 12th FYP (2011–2015). Between 1980 and 2005, China achieved the remarkable accomplishment of reducing energy intensity by more than 60 percent. In the 13th FYP (2016–2020), the GoC plans to implement a total energy consumption cap, in addition to a 15 percent reduction in energy intensity. Finally, the GoC made a pledge to reduce its carbon intensity by 40–45 percent from 2005 to 2020 and by 60–65 percent from 2005 to 2030, and has announced that it expects the country's carbon emissions to peak by 2030. EE is expected to make the single largest contribution to these emission reduction targets.

3. **Prospects for the 13th FYP.** President Xi Jinping has recently called for an 'energy revolution' in China, including revolutions for energy consumption, energy supply, energy institutions, and technology innovation, as well as international cooperation. Following this principle, the 13th FYP for the first time adopts a mandatory total energy consumption cap from 4.3 billion tce in 2015 to 5 billion tce by 2020, in addition to a 15 percent energy intensity reduction target. The Government also intends to increase the use of market-based mechanisms. The 13th FYP is a critical period for achieving the country's aggressive carbon intensity reduction target for

[1] 2015 China Energy Statistical Yearbook.
[2] 2015 National Economic and Social Development Statistical Bulletin, National Bureau of Statistics of China.

2020. Through this project, the Government has requested assistance from the Global Environment Facility (GEF) to help develop and implement the EE and carbon reduction goals of the 13th FYP.

4. **Energy Consumption Certificates Trading.** To accomplish the total energy consumption cap, the Government is contemplating the use of an Energy Consumption Certificates Trading Program. Under this scheme, enterprises or regions (for example, eastern provinces) with limited scope to achieve the energy consumption cap will be able to trade certificates with other enterprises or regions (for example, northeast and western provinces) that have greater potential for energy savings or energy consumption growth. Enabling enterprises or regions to trade with those that have surplus certificates will help achieve China's energy consumption cap target in a more cost-effective way. However, Energy Consumption Certificates Trading is complex and challenging to design and implement and is new to China. There are three major challenges to the trading scheme in China: (a) the lack of energy saving measurement and verification (M&V) protocols and implementation capacity; (b) the need for penalties for noncompliance; and (c) the need to reconcile and coordinate between certificates trading and China's carbon emission trading scheme (ETS). The ETS has been piloted in five cities and two provinces and is planned to be rolled out nationwide during 2017.

5. **World Bank Group engagement on EE with China over the past 20 years.** The World Bank's long-term engagement with China on EE, moving from pilots to mainstreaming actions, has resulted in transformational impacts. Over the past two decades, the World Bank has been working with China to help move toward more market-based approaches for energy conservation. Support from the GEF has been instrumental in World Bank assistance to China for EE including in the following areas: (a) the Energy Conservation Project (1998) helped introduce the energy service company (ESCO) (at the time in China called 'energy management companies') concept to China, whereby for-profit investments in EE are made by third-party companies, including the support of the country's first three ESCOs; (b) when the ESCO industry started to grow, the Energy Conservation II Project provided partial risk guarantees to help ESCOs access financing and promoted the establishment of an ESCO association; from this initial start, China's ESCO industry has grown to over 5,000 companies, with nearly US$10 billion in energy performance contracts in 2012; and (c) having successfully established the ESCO industry, the next phase of support was to mainstream EE within China's banking sector by establishing EE credit lines, providing training to the banking sector, and introducing alternative financing mechanisms. The China Energy Efficiency Financing (CHEEF) Project (P084874), working with Hua Xia Bank Co. Limited (HXB), EXIM Bank, and Minsheng Bank, has financed US$2.6 billion of EE and renewable energy (RE) investments in China, of which US$350 million in financing was provided by IBRD and the remaining funding from the participating banks and industrial enterprises. The GEF Provincial Energy Efficiency Scale-Up Project (P114182) has supported market-based EE programs at the provincial level (in Shandong, Shanxi, and Jiangxi), including the introduction of an innovative and successful EE leasing model, and building capacity for expanding the ESCO industry and refining energy savings data upon which the overall EE industry depends.

6. **The World Bank is financing two Program-for-Results (PforR) operations to support the GoC's Air Pollution Prevention and Control Action Plan (APPCAP).** China is experiencing severe air pollution. The Beijing-Tianjin-Hebei Region (hereafter referred to as Jing-Jin-Ji, or the JJJ Region) has been experiencing severe air pollution in recent years, with annual average fine $PM_{2.5}$ concentrations of 93 $\mu g/m^3$ in 2014, far exceeding the national $PM_{2.5}$ standard

of 35 μg/m^3 and the World Health Organization $PM_{2.5}$ standard of 10 μg/m^3. The GoC has declared 'war on air pollution' and issued the APPCAP in 2013, which has nationwide coverage and specifically mandates the JJJ Region to reduce its annual average $PM_{2.5}$ concentration by 25 percent between 2012 and 2017. An extension to the APPCAP that will further reduce $PM_{2.5}$ concentrations in the JJJ Region beyond 2017 was announced on December 30, 2015, and aims to reduce $PM_{2.5}$ concentrations by around 40 percent from the 2013 level by 2020, reaching around 64 μg/m^3. The implementation regulations of the APPCAP in the JJJ Region also set a mandatory target to reduce coal consumption by 83 million tons from 2012 to 2017. To support the APPCAP, the World Bank is financing two PforR operations, providing US$500 million for each program: (a) the Innovative Financing for Air Pollution Control in Jing-Jin-Ji Program (JJJ PforR) and (b) the Hebei Pollution Prevention and Control Program (Hebei PforR). Both these programs use the PforR lending instrument, which requires implementing agencies to hire independent and credible third parties to verify agreed-upon results before the World Bank disbursement of funds.

7. **The Innovative Financing for Air Pollution Control in Jing-Jin-Ji Program.** This is the first operation in China using the PforR lending instrument and was approved by the World Bank Board in March 2016 (Report No. 102272-CN). The JJJ PforR aims to reduce air pollutants and carbon emissions through EE and clean energy, with a focus on the JJJ and neighboring regions. Total investment of the program is expected to be at least US$1.0 billion, of which US$500 million will come from IBRD loans and US$500 million from HXB loans. The program intends to achieve results in three areas: (a) coal reduction from eligible EE and renewable energy subprojects; (b) reduced air pollution emissions through pollution abatement measures; and (c) strengthened institutional capacity of HXB. Six disbursement-linked indicators (DLIs) have been agreed to measure these results areas. HXB is responsible for verification of the achievements of the DLIs through independent verification agencies (IVAs), based on the agreed verification protocol.

8. **The Hebei Pollution Prevention and Control Program.** The Hebei PforR, approved by the Board of Executive Directors on June 16, 2016 (Report No. 105757-CN), aims to reduce the emissions of air pollutants from key sectors in Hebei Province. The total program expenditure is expected to be at least US$650 million, of which US$500 million will come from IBRD loans and US$150 million from the Hebei Government. The program intends to achieve results in four areas: (a) comprehensive control of industrial enterprises and the reduction of emissions of air pollutants from key industrial sectors; (b) area source air pollution controls (such as from agricultural and open burning); (c) prevention and control of emissions from transport sources; and (d) establishment of monitoring and warning systems and the use of advanced planning tools. Seven DLIs have been identified to measure the results. The Hebei Government is responsible for verification of the achievement of the DLIs through IVAs, based on the agreed verification protocol.

9. **Energy savings M&V is essential for market-based mechanisms.** The establishment of a market-based, standardized, and internationally recognized M&V system for energy savings is fundamental to achieve the targets in the 13th FYP and the PforR operations. Such a system underpins any envisioned market-based energy savings mechanism for the following reasons: (a) Independent third-party verification provides credibility, can validate official statistics, and can confirm whether the 13th FYP targets are achieved; (b) A credible M&V system is a prerequisite for the pilot Energy Consumption Certificates Trading and China's ETS, since the bulk of carbon

emission reductions from both the certificates trading and ETS will come from EE; (c) M&V is required for the World Bank-financed PforR operations and any other results-based financing program; and (d) M&V is critical for the expansion of the ESCO industry, since ESCO revenues depend on actual energy savings achieved, and also for enhancing the confidence of EE investors and financiers who are uncertain if up-front investments will be paid back through claimed energy savings.

10. Under the Government's energy savings reward fund program implemented in the 12th FYP, the Ministry of Finance (MOF) and the National Development and Reform Commission (NDRC) accredited 26 third-party verifiers and issued a number of energy saving M&V guidelines and methodologies to verify eligible projects. In addition, the CHEEF project has been supporting pilot online M&V systems for energy consumption in selected sectors and provinces, and the NDRC plans to roll out this online energy monitoring platform program to all 17,000 priority enterprises nationwide.

11. **Barriers to energy saving M&V in China.** While considerable progress in EE has been accomplished, China still faces substantial challenges, particularly in the area of energy saving M&V. A few key issues are the following:

(a) **Standardized operational guidelines and methodologies for energy saving M&V are needed at both the project and enterprise levels.** China has issued national standards/protocols for energy saving calculation and guidelines for the most commonly used EE technologies. However, these standards and protocols are not sufficiently detailed to provide operational guidance to the third-party verifiers to conduct energy saving M&V for EE investments. For example, there are two commonly encountered issues: (i) defining the scope or boundary for the energy savings to be included in the calculation; and (ii) measuring energy savings from coal, oil, and gas consumption, compared to measuring only electricity savings, which is more straightforward. In addition to project-level energy saving M&V for specific EE investments, China also needs standardized methodologies for energy saving M&V at the enterprise level to determine whether its mandated energy saving targets are met and to lay the ground work for potential future EE trading between enterprises. A lack of standardized methodologies and detailed operational guidelines to calculate energy savings at both project and enterprise levels have led to large discrepancies in the measurement of project results by enterprises, the Government, and even different third-party verification agencies, thus undermining the credibility and efficacy of the EE program. Therefore, there is an urgent need to develop standardized methodologies, detailed operational guidelines, templates, case studies, and best practices for typical EE measures and their application at project and enterprise levels.

(b) **Lack of a transparent and credible accreditation process and institutional framework and limited capacity of third-party verifiers.** To measure and verify China's massive EE efforts, a large cadre of qualified third-party verifiers, much more than the existing 26 accredited third-party verification agencies is needed. Transparent qualification criteria, accreditation processes, and a credible institutional framework need to be established for both third-party verification professionals and agencies. In addition, the technical skills of many verifiers in China are still low compared to

international standards. Even among the existing 26 third-party verification agencies, technical and managerial capacities as well as professionalism vary significantly. There is an urgent need to build the capacity of third-party verifiers, including both existing verifiers and new entrants. There are also significant training needs from ESCOs, enterprises, and provincial energy monitoring centers for energy saving M&V. The Government has therefore requested the support of the GEF to learn from international experience to develop and implement market-based priority EE and coal cap programs for the 13th FYP and to improve the energy saving M&V system, both of which are essential for achieving the Government's ambitious EE programs.

C. Higher Level Objectives to which the Project Contributes

12. The proposed project is fully consistent with the 2013-2016 World Bank Group's Country Partnership Strategy (CPS) for China (Report No. 67566- CN), which was discussed by the Board of Executive Directors of the World Bank on November 6, 2012. The project supports greener growth, in particular, shifting to a sustainable energy path, and also contributes to China's efforts to improve EE and address air pollution and climate change during the 13th FYP. In addition, the proposed project will support the World Bank Group's corporate commitment to increase EE lending, scale up climate finance, and provide sustainable energy for all. The operation is also aligned with the World Bank Group's goal of promoting shared prosperity. Reducing air pollution is a top priority for the Government of China (GOC), particularly given the severe air pollution in the Jing-Jin-Ji Region and the impact on public health. Hebei Province had the highest annual average ambient PM2.5 concentration in the region with 112.9 $\mu g/m^3$ in 2012. Hebei Province is also responsible for about 70 percent of total emissions in the region. Thus, the proposed project is strategically relevant and fully aligned with the GOC's priorities.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

13. The objective of the project is to support development and implementation of China's priority energy efficiency and environment programs, with a focus on improving the results measurement and verification system and developing market-based mechanisms.

B. Project Beneficiaries

14. Project beneficiaries include the following: (a) government agencies at the national level, particularly the NDRC; (b) government agencies in Hebei Province, particularly the Hebei Development and Reform Commission (HBDRC) and Environmental Protection Bureau (EPB); (c) HXB and other financial institutions that have programs or interest in green financing; (d) the key energy-consuming industrial enterprises; (e) ESCOs, equipment manufacturers, and related service suppliers; (f) third-party energy savings verification agencies and professionals; (g) research institutions and think tanks; (h) all economic agents engaged in the EE supply and delivery chain; (i) the Chinese population, particularly those in the JJJ Region, that ultimately benefits from less air pollution; and (j) the global community that benefits from avoided greenhouse gas emissions, which contributes to global climate change mitigation.

C. PDO Level Results Indicators

15. The achievement of the Project Development Objective (PDO) will be measured through the following high-level outcome indicators: (a) energy savings measurement and verification system improved and standardized; (b) market-based mechanisms for energy savings designed and piloted; and (c) energy and environment results verified for the Jing-Jin-Ji Region and Hebei Province.

16. The project-level intermediate output indicators are as follows:

(a) Capacity built for MRV system and market-based EE mechanisms (Number of People Trained)

(b) Energy savings MRV methodologies and guidelines developed (Number)

(c) Energy consumption trading schemes designed and piloted (Y/N)

(d) Innovative financial products for green financing developed and piloted (Number)

(e) Capacity for environmental results monitoring improved (Number of People Trained)

(f) Case studies for the JJJ and Hebei PforR operations developed (Number)

(g) CO_2 emissions avoided (thousand tons)

(h) Annual energy savings (Number)

III. PROJECT DESCRIPTION

17. The proposed project will comprise the following three components: (a) Supporting Market-based Priority Energy Efficiency and Coal Cap Control Programs; (b) Supporting Results-based Green Energy Financing in the JJJ Region; and (c) Supporting the Results-based Environmental Program in Hebei Province.

18. The tasks outlined in the following paragraphs are those that need to be urgently implemented during the initial-year work program and have been agreed between the NDRC, HXB, HBDRC, and the World Bank. Other tasks will be detailed and confirmed during the annual review of the work program carried out during the supervision of the project, thus providing flexibility during project implementation.

A. Project Components

19. **Component 1: Supporting Market-based Priority Energy Efficiency and Coal Cap Control Programs (cost estimate: US$8.8 million GEF grant).** This component will support the NDRC for the development and implementation of market-based priority EE policies and programs during the 13th FYP. This component consists of four subcomponents:

(a) **Subcomponent 1.1: Supporting the development and implementation of priority EE and coal cap control programs for the 13th FYP.** This subcomponent will provide analytical and technical support to the NDRC to help it achieve its energy intensity reduction target as well as the total energy and coal consumption caps for the 13th FYP. The tasks include, but are not limited to, the following: (i) developing measures, policies, and verification protocols to reduce coal consumption in heavily polluted regions such as the JJJ Region; (ii) developing new fiscal incentive policies to encourage EE during the 13th FYP; (iii) tightening EE standards for industrial equipment and appliances and promoting industrial EE certification programs; (iv) developing energy management systems for priority enterprises; (v) promoting energy efficient products and technologies; and (vi) scaling up ESCO industries.

(b) **Subcomponent 1.2: Improving the energy saving measurement, reporting, and verification system.** This subcomponent will include the following activities: (i) undertake analytical studies to review and learn from international experiences on energy measurement, reporting, and verification (MRV); (ii) recommend suitable principles for the development and refinement of MRV policy requirements, including coordination between energy trading and ETS MRV; (iii) develop detailed and operational MRV methodology and guidelines at enterprise and project levels; (iv) establish the institutional system for MRV, including designing the management system of third-party verifiers, recommending accreditation and regulation systems for third-party verifiers, and establishing methodology working groups and expert pools; and (v) supporting the rollout of energy online monitoring system nationwide.

(c) **Subcomponent 1.3: Designing market-based mechanisms for energy savings.** This subcomponent will provide analytical and technical support to design and pilot the energy consumption trading scheme, including determining its coverage, cap allocation, and compliance mechanisms, developing implementation guidelines and trading regulations, establishing the registry and trading platform, coordinating with the ETS, and conducting post-evaluation of the pilot energy trading systems.

(d) **Subcomponent 1.4: Building the capacity for energy saving MRV and implementation of priority EE programs.** This subcomponent will build capacity for in the following areas: (i) energy saving MRV, including developing standard training curriculum, training the trainers, and providing training to third-party verifiers, ESCOs, priority enterprises, and provincial EE centers; (ii) the pilot energy trading scheme, including developing the relevant training curriculum, training the trainers, and providing training to key stakeholders; and (iii) national and provincial EE officials on EE policy making, fiscal incentives, and compliance enforcement.

20. **Component 2: Supporting Results-based Green Energy Financing in the JJJ Region (cost estimate: US$4.5 million GEF grant).** This component will complement at least US$1.0 billion of investments in EE, RE, and emission reduction in the JJJ Region, of which US$500 million will come from IBRD loans and US$500 million from HXB loans. This component will provide advisory services and technical assistance, build capacity, and verify results to help HXB implement the World Bank-financed PforR operation—Innovative Financing for Air Pollution Control in Jing-Jin-Ji Program. It includes the following subcomponents:

(a) **Subcomponent 2.1: Undertaking marketing and business development for green energy finance.** This subcomponent will support HXB in the following areas: (i) organizing marketing workshops among financial institutions, enterprises, and government agencies; (ii) developing promotional materials; (iii) undertaking analysis of targeted markets and policies to improve the effectiveness of marketing campaigns; and (iv) contracting third parties such as industrial associations and ESCO associations to identify deals.

(b) **Subcomponent 2.2: Verifying results for the JJJ PforR operation.** Under the JJJ PforR, HXB is required to hire independent and credible third parties to verify the agreed-upon DLIs: (i) DLI-1: the sub-loans for eligible EE, RE, and pollution abatement subprojects disbursed to sub-borrowers; (ii) DLI-2: the coal reduction from eligible EE and RE subprojects; (iii) DLI-3a and DLI-3b: the reduction in SO_2 and NOx emissions from desulfurization and denitrification subprojects, respectively; (v) DLI-5: the number of different eligible innovative financial products for green financing piloted; and (vi) DLI-6: the number of ESCOs receiving sub-loans for eligible EE, RE, and pollution abatement subprojects. This subcomponent will support HXB: (i) to hire independent verification agencies (IVAs) selected from the 26 accredited verification agencies, to be approved by the World Bank, to verify the results achieved against DLI-2 and DLI-3 over the program lifetime, following agreed-upon methodologies; and (ii) to hire an independent audit firm, to be approved by the World Bank, to verify the results achieved against DLI-1, DLI-5, and DLI-6 over the program lifetime.

(c) **Subcomponent 2.3: Providing technical assistance and developing innovative financial products and models.** This subcomponent will support HXB in the following areas: (i) to hire technical experts to undertake technical assessments, fiduciary assessment of procurement and financial management (FM), and compliance with the relevant environment and social guidelines for subprojects, following the guidelines outlined in the Operational Manual; and (ii) to develop and pilot innovative financial products and models for EE, RE, and pollution abatement investments, such as project-based lending, securitization of project assets, aggregation (bundling) of small-scale distributed generation subprojects, green bonds, and other related products as required under DLI-5 of the JJJ PforR.

(d) **Subcomponent 2.4: Building capacity for HXB and disseminating lessons learned from the JJJ PforR.** This subcomponent will support HXB: (i) provide training to HXB management and staff, particularly the Green Finance Center, and branches/sub branches in the JJJ Region, on lending for EE, clean energy, and pollution control subprojects, and provide guidance to a bank wide green lending business; (ii) enhance mechanisms and infrastructure at HXB for green financing, purchase and maintain a database for the implementation of sub-loans for EE, clean energy, and pollution control subprojects, and exchange knowledge with relevant stakeholders; and (iii) develop a case study of the JJJ PforR and disseminate knowledge and lessons learned from the program.

21. **Component 3: Supporting the Results-based Environmental Program in Hebei Province (cost estimate: US$4.5 million GEF grant).** This component will complement at least US$650 million of investments in air pollution control in Hebei Province, of which US$500 million will come from IBRD loans and US$150 million from the Hebei Government. This component will help enhance the capacity of the Government to implement the Hebei PforR. It includes the following three subcomponents:

(a) **Subcomponent 3.1: Providing analytical studies and technical assistance to support the Hebei PforR.** This subcomponent will undertake analytical studies and provide technical assistance to the Hebei Government in the following areas: (i) comprehensive control of industrial enterprises and the reduction of emissions from key industrial sectors; (ii) area source air pollution controls (such as from agricultural and open burning); (iii) prevention and control of emissions from transport sources; and (iv) establishment of monitoring and warning systems and planning tools for pollution control.

(b) **Subcomponent 3.2: Verifying results for the Hebei PforR operation.** Under the Hebei PforR, the Hebei Government is required to hire independent and credible third parties to verify the seven DLIs: (i) DLI-1: the number of EPBs at the provincial and prefecture level implementing standard protocols on continuous environmental monitoring (CEM) systems for air emissions; (ii) DLI-2: the percentage of enterprises in state-controlled lists and municipal-controlled lists integrated in the improved CEM and environmental enforcement systems for air pollutants; (iii) DLI-3: the number of clean stoves installed that meet technical emissions standards, acceptable to the World Bank; (iv) DLI-4: the number of hectares with increased nitrogen utilization efficiency of at least 37 percent due to the application of formula fertilizer based on soil testing; (v) DLI-5: the number of clean energy buses replacing diesel buses, which are disposed of in accordance with National Regulations; (vi) DLI-6: implementation of a comprehensive official emissions inventory system, acceptable to the World Bank, populated with emissions data for the year before the effective date; and (vii) DLI-7: approval of a cost-effective comprehensive plan on air quality control for the next five years, acceptable to the World Bank. This subcomponent will support the Hebei Government to hire IVAs), to be approved by the World Bank, to verify the results achieved against the seven DLIs over the program lifetime.

(c) **Subcomponent 3.3: Building capacity for the Hebei Government and disseminating lessons learned from the Hebei PforR.** This subcomponent will including the following: (i) provide training to Hebei Government officials, particularly those at the DRC, EPB, Transport Bureau, and Agriculture Bureau, on emission reduction and control policies and enforcement and results monitoring; (ii) purchase environmental monitoring software and equipment as needed; and (iii) develop a case study of the Hebei PforR and disseminate knowledge and lessons learned from the program.

B. Project Financing

22. The proposed project is an Investment Project Financing operation that will be financed by a GEF Grant.

C. Project Cost and Financing

23. The project cost is US$17.8 million, which will be wholly funded from a GEF grant. The GEF grant will support two World Bank-financed PforR operations in China and complement US$1.65 billion of investments: (a) Innovative Financing for Air Pollution Control in Jing-Jin-Ji Program (P154669), which has a total investment of at least US$1.0 billion in EE, RE, and emission reductions (US$500 million from IBRD and US$500 million from HXB); and (b) the Hebei Air Pollution Prevention and Control Program (P154672), which has a total program expenditure of US$650 million (US$500 million from IBRD and US$150 million from the Hebei Government).

Project Components	Project Cost (US$, millions)	GEF Financing (US$, millions)	% Financing
1. Supporting Market-based Priority Energy Efficiency and Coal Cap Control Programs	8.80	8.80	100
2. Supporting Results-based Green Energy Financing in the JJJ Region	4.50	4.50	100
3. Supporting the Results-based Environmental Program in Hebei Province	4.50	4.50	100
Total Project Costs and Financing	**17.80**	**17.80**	**100**

D. Lessons Learned and Reflected in the Project Design

24. The project design has incorporated lessons learned from international and Chinese experiences. In particular, during the preparation of the project, two Energy Sector Management Assistance Program studies were commissioned to review international experiences regarding energy saving M&V and the coordination of EE, RE, and ETS and their relevance to China. Some key lessons are summarized as follows:

- **Energy policy seeks to achieve multiple objectives, and it is justified to set multiple targets for EE, RE, and carbon emissions.** Many developed countries, such as European Union (EU) countries and some U.S. states, have established EE, RE, and carbon emission targets concurrently, as in China. The overarching objectives of energy policy are multidimensional, covering energy security (reducing energy supply and price vulnerability), resource conservation, increased access and affordability for the poor, and improved local environment and global climate change mitigation. These multiple objectives often lead to multiple targets for EE, RE, and

carbon emissions, in which each contributes to different aspects of a country's energy policy. In China, EE not only has the largest potential to contribute to the carbon intensity reduction target, but also addresses concerns of energy security, resource scarcity and affordability.

- **Multiple policy objectives have led to the use of multiple trading schemes, and carbon cap and trade alone will not tap the full potential of EE.** This is because carbon pricing alone cannot remove all the market barriers and failures for EE, partly due to the low-price elasticity of energy in the short term. The use of EE trading schemes focuses abatement on energy reduction, which has been seen to benefit energy security, fuel poverty, reduction of energy bills, and avoiding investment in energy system expansion and is complementary to carbon cap and trade. There is a need for EE policies such as demand-side bidding or "white certificates"[3] to be complementary with carbon reduction policies. This also ensures that if one policy fails to meet the carbon reduction target, the other complementary policies may compensate.

- **International experience from the United Kingdom, Italy, and California demonstrates that EE, RE, and carbon trading schemes can coexist and complement each other.** To be successful, it is important for close coordination among the multiple trading schemes, particularly on the target allocation, coverage, and obligated parties. In each of the studied countries and regions, each trading scheme targets different obligated parties, energy systems, and sectors. In Europe, for example, the ETS covers large industries and power generators to achieve the emission reduction targets. Simultaneously, the complementary Energy Saving Certificates Trading puts EE obligations on electricity distributors, covering decentralized consumers in the residential and commercial sectors that are not directly covered by the ETS to tap the additional emission reduction potential. Whenever and wherever necessary, changes are made to the trading schemes to avoid conflicts. For example, when the trading schemes apply to the same sectors and obligated parties, specific rules are introduced to avoid overlap of energy coverage (for example, primary fuels versus electricity). The key is to have institutional coordination at the top for EE, RE, and carbon reduction and for each trading scheme to target different obligated parties, sectors, or fuels.

- **MRV is essential to both the EE trading scheme and the ETS.** A credible MRV system is a prerequisite for both the EE trading scheme and the ETS. Metropolitan Tokyo, for example, spent 10 years putting in place their MRV system before formally launching their ETS. In China, where 90 percent of CO_2 emissions come from the energy sector, energy saving MRV is critical for both the EE trading system and the ETS.

[3] Demand-side bidding enables electricity consumers to offer a specific reduction in demand, at a given time, in exchange for monetary compensation. White certificates are documents specifying that a certain reduction in energy consumption has been attained and such certificates can be traded in the market.

- **China's energy saving M&V system should build on good international experience.** There is a considerable body of international experience and knowledge on energy saving and carbon emission MRV methodologies and institutional frameworks. For instance, there is the International Performance Measurement and Verification Protocol (IPMVP) for energy savings and the Clean Development Mechanism at the project level, the California Energy Efficiency Evaluation Protocol at the program level, MRV in the EU ETS, and energy saving M&V in the European White Certificates Trading program. The lessons from international experience demonstrate: (a) a clear definition of the concept of energy savings is important to avoid misinterpretation when protocols and methodologies are implemented; (b) flexibility and a broad applicability of protocols are key elements of success; and (c) the level of rigor and the cost of M&V depend on the objective of the project or program, the project size, and the expected savings. It is important to maintain a balance between the complexity and robustness of the methodologies and the time and effort required to develop and implement them in real projects. In addition, transparent institutional structures and decision-making processes are critical to the establishment of a credible energy saving M&V system. Such an institutional structure could include the following: (a) an accreditation body for third-party verification agencies and professionals with transparent criteria and procedures; (b) a strong methodology panel with the best experts in the market to develop, approve, and update the M&V methodologies to ensure credibility of the whole scheme; and (c) an independent and executive body to oversee the M&V process and arbitrate when required.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

25. A Project Steering Committee, comprising the Environmental Protection and Resource Conservation Department of the NDRC (which will chair), the International Economic and Financial Cooperation Department of the MOF, HBDRC, and HXB, will be set up by the time of project effectiveness to provide overall strategic and policy guidance and coordinate between various government agencies to implement the project activities. The NDRC is responsible for sector policies, in particular for achieving the EE targets under the 13th FYP, managing the 17,000 priority enterprises program, and implementing the envisioned energy consumption trading scheme, and will therefore lead the implementation of Component 1. HXB is responsible for implementing the JJJ Bank-financed PforR operation and Component 2. The HBDRC will lead the implementation of the Hebei Province Bank-financed PforR operation and Component 3. It is agreed that MOF, NDRC, HBDRC, and HXB will coordinate closely on this project through the Project Steering Committee.

26. For Component 1, a project management office (PMO) has been established under the Environmental Protection and Resource Conservation Department of NDRC. The PMO will be responsible for overall implementation, coordination, monitoring, and reporting during project implementation. NDRC will assign a current director to oversee the PMO, and the PMO will include one full-time executive director, two to three project managers, one procurement specialist, and one financial specialist. A technical expert group will also be formed under the PMO.

27. HXB, particularly its Green Finance Center, will lead the implementation of Component 2. HXB will assign dedicated staff to manage the GEF grant, supported by technical experts on an as-needed basis. The NDRC PMO and HXB staff, with experience in managing GEF grants under the CHEEF project, are familiar with the World Bank procurement, FM, and safeguard guidelines and procedures and have demonstrated satisfactory performance under the CHEEF project.

28. HBDRC will lead the implementation and coordination of Component 3 in Hebei Province. It is in the process of establishing the Hebei PMO (HBPMO). The World Bank team requested that HBDRC assign a current director to oversee the PMO, and the PMO will include one full-time executive director, two to three project managers, one procurement specialist, and one financial specialist familiar with the World Bank's fiduciary guidelines and procedures. A technical expert group will also be formed under the HBPMO.

29. The NDRC PMO and HXB have prepared a GEF Project Implementation Plan (PIP), with a detailed work plan for each activity and tasks, outputs, budgets, schedule, PMO structure, and plans for supervision and quality control, as well as the first 18-month Procurement Plan (PP).

B. Results Monitoring and Evaluation

30. Project monitoring will involve the following: (a) the monitoring of performance indicators as included in the Results Framework in Annex 1; (b) annual progress reports; and (c) a midterm review of implementation progress. The three PMOs will be responsible for overall monitoring and systematic evaluation of implementation progress including the collection of project performance information and reporting on the impact and results of the project.

C. Sustainability

31. The likelihood of sustainability of the project is moderate. The Government's commitment to energy conservation is high, implementing administrative measures of allocating energy saving targets to provinces and key enterprises and shifting toward market-based mechanisms. The establishment of an M&V system is fundamental for the implementation and evaluation of all these measures and will play a critical role in both the envisioned energy consumption trading scheme and ETS. The market-based energy trading scheme sustains the energy conservation commitment and efforts by providing a market-based option for the obligated parties to meet their energy consumption caps in a cost-effective way, while also incentivizing non-obligated parties to invest in EE measures to generate tradable energy certificates. Close monitoring and coordination between the EE Trading System and the carbon ETS will ensure that the two trading schemes complement each other. The program design integrates policy support, institutional strengthening, technical studies, and capacity building to ensure that the proposed interventions achieve a sustainable growth of EE development in China.

V. KEY RISKS AND MITIGATION MEASURES

A. Overall Risk Rating and Explanation of Key Risks

32. The overall implementation risk of the project is rated Moderate. The major risks relate to the coordination of different institutional agencies at the national and subnational level with respect to monitoring energy savings and environmental compliance, as well as in the coordination of

complementary programs and practices (such as the energy savings certificates program and the carbon emissions trading system). Project risks will be mitigated through the provision of adequate training to project staff and by implementing the lessons learned from international experience and from stakeholder consultations conducted during project preparation. One new project participant (HBPMO) had no previous experience with implementing Bank-financed projects prior to the Hebei PforR. Substantive actions during project preparation for the Hebei PforR and for this project have been taken to mitigate this risk, including strengthened institutional arrangements for internal control in the areas of procurement and financial management.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analyses

33. The proposed project will have potentially significant impacts on energy conservation and emission reduction in China, as a well-established energy saving M&V system will bring credibility and accountability to the Government's EE trading systems and the Government-supported incentive programs. A credible M&V system is the foundation for establishing the Energy Consumption Certificates Trading scheme. The energy trading system is expected to provide additional incentives for participating enterprises to undertake energy conservation efforts beyond the allocated EE targets, which will lead to additional carbon emission reductions.

34. The broad justification of the proposed project is based on incremental cost reasoning required by the GEF. The incremental global environmental benefit is measured by the incremental CO_2 emission reduction attributable to the GEF assistance based on comparison of a baseline scenario and a GEF alternative scenario. Since the proposed project primarily supports improvements of policies and implementation capacities, the full impact of these policy and capacity improvements on emissions is likely to take longer than the implementation period of the project. A conservative approach is adopted to estimate the incremental benefits associated with the proposed project: (i) the annual CO_2 emission reduction achieved at the end of project implementation is estimated based on incremental EE improvements and RE electricity generation resulting from the JJJ PforR attributable to the GEF direct global environmental benefits during the project implementation period; (ii) the cumulative CO_2 emission reduction attributable to the GEF direct global environmental benefits at the end of project implementation is calculated for 10 years; and (iii) an undiscounted GEF incremental cost per ton of CO_2 emission reduction is calculated. Based on the analysis, the total estimated incremental emission reduction resulting from the JJJ PforR implemented by HXB attributable to the GEF direct global environmental benefits at the end of project implementation is about 25 million tons of CO_2. The undiscounted GEF incremental cost is about US$0.7 per ton of CO_2, compared to the current price of about US$4 per ton of CO_2 of certified emission reduction in the EU. Annex 5 provides the details on the GEF incremental cost analysis.

B. Technical

35. The technical design and approach for this proposed project has integrated features of relevant global experiences and knowledge on energy saving M&V and EE trading. The EE technologies expected to be covered by the project are mature with broad commercial application. The project itself will primarily support technical studies and policy analysis. The PMOs will hire

world-class international and Chinese technical experts to review and approve those activities and provide quality control of the results. Capacity building will be provided to the PMOs during implementation.

C. Financial Management

36. The PMO established under NDRC (NDRC PMO), and the PMO to be established at the HBPMO, and HXB will be responsible for the project management and implementation, including project financial management (FM). The grant proceeds, including overseeing two Designated Accounts (DA), will be managed by NDRC and Hebei Provincial Finance Bureau (HPFB). The main FM risk identified at the preparation stage is that the HBPMO lacks experience with the World Bank operations. The action plan has consisted of strengthening the FM capacity of HBPMO as part of the Hebei PforR, including the preparation and distribution of an FM manual and provision of extensive training and peer learning.

37. With implementation of the proposed actions, the FM arrangements will satisfy the World Bank's requirements under OP/BP 10.00 (See Annex 3 for additional information).

D. Procurement

38. A procurement capacity and risk assessment of the three PMOs was conducted. The assessment shows that: (a) the NDRC PMO and HXB have qualified and experienced staff who have met the World Bank procurement capacity requirements; and (b) procurement staff in the HBPMO have no World Bank procurement experience except for limited experience in government procurement. The key procurement risks have been identified and the mitigation measures have been agreed between the World Bank and the PMOs. Further details are provided in Annex 3. A PP for the first 18 months of project implementation has been prepared.

E. Social (including Safeguards)

39. The project is primarily technical assistance. There is no land acquisition, resettlement, physical cultural resources, or indigenous people involved in the project, and therefore there is no social safeguards policy triggered.

40. The project will involve consultations with civil society organizations and nongovernmental organizations in all three components. The project will benefit women and men equally. During consultation and assessment with beneficiaries, surveys and interviews will be designed with gender sensitivity to ensure that women are given equal opportunities.

F. Environment (including Safeguards)

41. The project activities are all technical assistance activities (for example, analytical support on energy policies, M&V systems, energy trading mechanisms, and institutional capacity building). The project does not finance any physical investments or activities. Subsequent physical investments not financed by this project, for instance in new energy efficiency products or technologies and investments by ESCOs, are envisioned to have largely environmental and social benefits. However, these activities may have potential negative environment and social impacts.

The project is therefore classified as Category B, and no further Environmental Assessment action is required for project preparation according to the provisions of OP 4.01.

42. Environmental and social considerations will be included in the terms of reference for any consultancies related to studies, assessments, and capacity-building activities under the project shall be satisfactory to the World Bank, and, to that end, such terms of reference shall, among others, duly incorporate the requirements of the World Bank's safeguard policies then in force, as applied to the advice conveyed through such studies, assessments, and capacity-building activities.

G. Citizen Engagement

43. In the process of developing market-based energy efficiency priority policies, consultations will be made by NDRC among relevant government agencies and civil society organizations. Consultations will also be carried out by Hua Xia Bank and Hebei Government in organizing marketing workshops among financial institutions, enterprises, and government agencies to promote green financing; and in exploring comprehensive control of industrial enterprises and the reduction of emissions from key industrial sectors. Although different stakeholders will be involved in these consultations, a stakeholder mapping is needed to inform the design of the engagement mechanism through an understanding of the interests, incentives, and objectives of key stakeholders, ensuring inclusion and representation, including for women and marginal and vulnerable groups.

H. World Bank Grievance Redress

Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring

Country: China

Project Name: Developing Market-based Energy Efficiency Program in China (P132748)

Results Framework

Global Environmental Objectives

PDO Statement

The objective of the project is to support development and implementation of China's priority energy efficiency and environment programs, with a focus on improving the results measurement and verification system and developing market-based mechanisms.

These results are at	Project Level

Global Environmental Objective Indicators

Indicator Name	Baseline	Cumulative Target Values					
		YR1	YR2	YR3	YR4	YR5	End Target
Energy savings measurement, reporting and verification system improved and standardized (Y/N)	n.a.	n.a.	n.a.	n.a.	n.a.	Energy savings M&V methodologies developed	MRV system for energy savings improved and standardized
Market-based mechanisms for energy savings designed and piloted (Y/N)	n.a.	n.a.	n.a.	Development of EE 13th FYP supported	n.a.	Market-based EE trading mechanisms designed	Market-based EE trading mechanisms designed and piloted
Energy and environment results verified for Jing-Jin-Ji Region and Hebei Province (Y/N)	n.a.	DLIs for the JJJ and Hebei PforR operations verified	DLIs for the JJJ and Hebei PforR operations verified	DLIs for the JJJ and Hebei PforR operations verified	DLIs for the JJJ and Hebei PforR operations verified	DLIs for the JJJ and Hebei PforR operations verified	Verification systems for green energy financing and environmental programs in JJJ Region

		beginning in YR1					and Hebei Province established

Intermediate Results Indicators

Indicator Name	Baseline	Cumulative Target Values					
		YR1	YR2	YR3	YR4	YR5	End Target
Capacity built for MRV system and market-based EE mechanism (Number of people trained) (Number)		0	100	400	800	1200	1200
Energy savings M&V methodologies and guidelines developed (Number)		0.00	5.00	12.00	18.00	25.00	25.00
Energy consumption trading schemes designed and piloted (Y/N)		Y	Y	Y	n.a.	n.a.	Develop policy guideline for Energy Saving Certificates Trading scheme to launch the pilot in 2020
Innovative financial products for green financing developed and piloted (Number)		0.00	1.00	2.00	3.00	3.00	3.00
Capacity for environmental results monitoring improved (Number of people trained) (Number)		0	240	480	480	480	480
Case studies for the JJJ and Hebei PforR operations developed (Number)		0.00	1.00	1.00	2.00	2.00	2.00

Avoided CO2 emissions (thousand tons)		123	369	738	1353	1969	1969
Annual energy savings (thousand tce) (Number)		50.00	150.00	300.00	550.00	800.00	800.00

Indicator Description

Global Environmental Objective Indicators

Indicator Name	Description (indicator definition etc.)
Energy savings measurement, reporting and verification system improved and standardized	China's energy savings MRV system will be improved relative to global good practices with respect to policies, MRV protocols, accreditation and regulation systems for third-party verifiers, and on-line monitoring network.
Market-based mechanisms for energy savings designed and piloted	An energy consumption trading scheme (or similar market-based energy savings program) will be designed and piloted, including determining the coverage, cap, allocation and compliance mechanisms, implementation guidelines and trading regulations, registry and trading platform, coordination with the ETS, and conducting post-evaluation.
Energy and environment results verified for Jing-Jin-Ji Region and Hebei Province	An energy and environmental monitoring system will be developed to help implement two results-based programs for air pollution control in the Jing-Jin-Ji Region (including Hebei Province).

Intermediate Results Indicators

Indicator Name	Description (indicator definition etc.)	Frequency	Data Source / Methodology	Responsibility for Data Collection
Capacity built for MRV system and market-based EE mechanisms (Number of people trained)	The indicator measures the number of personnel trained, although capacity building also includes the development of curricula, and other institutional capacity building. The definition of relevant	Progress Report and Annual Report	NDRC	PMO

	capacity building is provided in Subcomponent 1.4.			
Energy savings MRV methodologies and guidelines developed	Indicator is for the number and type of methodologies and guidelines developed. Details are outlined in Component 1 and in the Operations Manual.	Progress Report and Annual Report	NDRC	PMO
Energy consumption trading schemes designed and piloted	Indicator is both the number and specific type of market-based energy savings schemes piloted. Details are provided in Subcomponent 1.3 and in the Operations Manual.	Progress Report and Annual Report	NDRC	PMO
Innovative financial products for green financing developed and piloted	Indicator is for the number of type of green energy financing products developed. Details are provided in Subcomponent 2.3 and in the Operations Manual.	Progress Report and Annual Report	HXB	HXB
Capacity for environmental results monitoring improved (Number of people trained)	Indicator is the number of people trained that will be involved in environmental results monitoring in Hebei Province. Details are provided in Subcomponent 3.3 and in the Operations Manual.	Progress Report and Annual Report	HBDRC & HXB	PMO & HXB
Case studies for the JJJ and Hebei PforR operations developed	Indicator is the development of case studies on the lessons of energy and environmental results monitoring based on the experiences from the two PforR operations. Details are provided in the Operations Manual.	Progress Report and Annual Report	HBDRC &HXB	PMO&HXB
Avoided CO2 emissions	Methodologies for calculating energy savings are provided in the PAD for the Jing-Jin-Ji PforR.	Progress Report and Annual Report	HXB	HXB

Annual energy savings	Methodologies for calculating energy savings are provided in the PAD for the Jing-Jin-Ji PforR.	Annual Report	HXB	HXB

Annex 2: Detailed Project Description

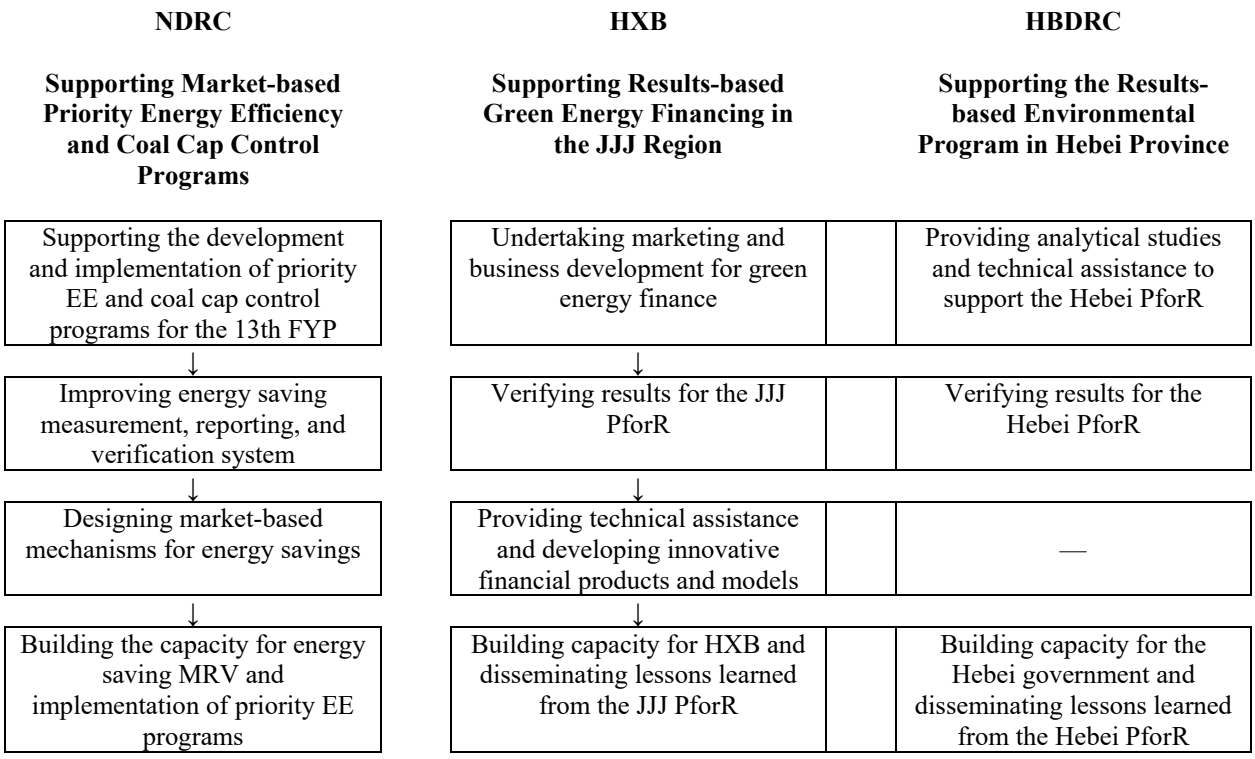
China: Developing Market-based Energy Efficiency Program in China

1. The proposed project will comprise the following three components: (a) Supporting Market-based Priority Energy Efficiency and Coal Cap Control Programs; (b) Supporting Results-based Green Energy Financing in the JJJ Region; and (c) Supporting the Results-based Environmental Program in Hebei Province, as illustrated in Figure 2.1.

2. The PMOs have prepared a GEF PIP, with a detailed work plan for each activity and task, outputs, budget, schedule, PMO structure, and plans for supervision and quality control, as well as the first 18-month PP.

3. The tasks outlined in the following paragraphs are those that need to be urgently implemented during project preparation and the initial-year work program and have been agreed between the NDRC, HXB, HBDRC, and the World Bank. Other tasks will be detailed and confirmed during the annual review of the work program carried out during the supervision of the project, thus providing flexibility during project implementation.

Figure 2.1 Project Design



4. **Component 1: Supporting Market-based Priority Energy Efficiency and Coal Cap Control Programs (indicative cost estimate: US$8.8 million GEF grant).** This component will support the NDRC for the development and implementation of market-based priority EE policies and programs during the 13th FYP. This component consists of four subcomponents:

5. **Subcomponent 1.1: Supporting the development and implementation of priority EE and coal cap control programs for the 13th FYP.** This subcomponent will provide analytical and technical support to the NDRC to help it achieve its energy intensity reduction target as well as the total energy and coal consumption caps for the 13th FYP. The tasks include, but are not limited to the following: (a) developing measures, policies, and verification protocols to reduce coal consumption in heavily polluted regions such as the JJJ Region; (b) developing new fiscal incentive policies to encourage EE during the 13th FYP; (c) tightening EE standards for industrial equipment and appliances, and promoting industrial EE certification programs; (d) developing energy management systems for priority enterprises; (e) promoting energy efficient products and technologies; and (f) scaling up ESCO industries.

6. **Subcomponent 1.2: Improving the energy saving measurement, reporting, and verification system.** This subcomponent will include the following activities:

- **1.2.1 Reviewing international experience.** This subtask will build on a preliminary study that has been done by carrying out a more in-depth review of international experience on governance and institutional frameworks for MRV systems and their relevance for China.

- **1.2.2 Refining MRV policy requirements.** 'Measurement' should include (a) refining the boundary and baseline at both project and enterprise levels, and (b) reviewing and improving the consistency and applicability of existing M&V methodologies. 'Reporting' should include (a) developing legal frameworks for mandatory reporting, (b) putting in place data disclosure systems, (c) refining enterprise reporting requirements (including data requirements for enterprises, metrics, adjustment factors, baselines, conversion factors, and the format/quality of reporting documents), (d) linking with the online energy monitoring platform. 'Verification' should include (a) developing consistent comprehensive verification principles such as level of rigor (depending on the objective), duration, procedures, and requirements for project-level M&V versus enterprise-level MRV, and (b) coordinating between EE MRV and ETS MRV methodologies.

- **1.2.3 Developing energy saving MRV methodologies.** This subtask will develop methodologies at the following two levels:

  (a) **Individual project level** for the purpose of output-based EE financing mechanisms and ESCOs. This subtask will consider international best practices for individual project M&V (ASHRAE 14 and IPMVP), as well as other protocols based on these standards and adjusted for specific programs. A survey and analysis conducted during project preparation identified insights and limitations regarding the M&V activities currently being carried out in China. These findings will be reviewed to enable making improvements to the newly designed methodologies. The methodologies to be developed will be selected according to the energy saving and replication potential of the most commonly encountered EE technologies among the five main categories already identified. The objective will be to target a limited set of methodologies that represent a large share of the EE potential among large energy users in China. Detailed

operational methodologies will be developed, including guidelines, templates, and instructions for their utilization. The new and existing enhanced methodologies will be peer-reviewed to ensure that the resulting methods are robust, applicable, and accurate. Case studies will be provided to help facility owners, consultants, and third-party verifiers understand how the methodologies should be applied in practice.

(b) **Enterprise level** for the purpose of the potential EE trading and evaluation of the EE targets for the 12th and 13th FYP. The activities will first review international practices, such as EU ETS and EE trading in Europe, India, and some U.S. states, and develop detailed operational guidelines for enterprise energy saving M&V and reporting systems by key energy-consuming sectors.

- **1.2.4 Establishing institutional management systems for MRV.** This subtask will define the roles and functions of institutional management systems for the supervising body of third-party verifiers and its relationship with third-party verifiers. The management structure proposed will cover the following: (a) the decision makers at the policy level; (b) the system operator in charge of third-party supervision; (c) the roles and functions of the methodology panel for methodology development, approval, and update (the responsibilities and processes for the development, quality control, approval, and updating of methodologies will be defined, including the criteria and procedures for both the methodologies initiated by the methodology panel [top down] and methodologies proposed by verifiers [bottom up]); (d) the accreditation and regulation body of third parties (the tasks will define the responsibility, criteria, and procedure to certify third-party verifier professionals and the accreditation of third-party verification agencies and how to regulate and oversee third-party verifiers); and (e) the arbitration body in case of disputes between the third party and the host facility owner—stakeholder consultations will be held to discuss the proposed schemes for third-party verifier management and methodology development to ensure that the most important comments, concerns, and suggestions are taken into consideration. This subtask will also develop regulation and oversight implementation guidelines for accreditation and management of third-party verifiers and establish the methodology panel by developing detailed internal operational procedures and guidelines for methodology development. Support will be provided to establish the core team and build its internal capacity for developing methodologies during the initial establishment stage. A self-sustaining mechanism will be proposed to ensure long-term financing of this institution.

- **1.2.5 Rolling out the online energy monitoring system nationwide.** Establishing an online energy monitoring platform in priority enterprises is a top priority for the GoC to strengthen energy saving M&V. The World Bank/GEF CHEEF project has supported the design of an online energy monitoring platform, which has been approved by decision makers and piloted in three provinces and three sectors. The Government plans to replicate this experience nationwide to cover 17,000 priority enterprises. This subtask will support the design of the national online energy monitoring platform.

7. **Subcomponent 1.3: Designing market-based mechanisms for energy savings.** This subcomponent will provide analytical and technical support to design and pilot the energy consumption trading scheme and include the following activities:

- **1.3.1 Undertaking analytical studies on the rationale and the economic impact analysis of the proposed energy trading scheme.**

- **1.3.2 Developing a pilot energy trading scheme.** This includes but may not be limited to the following: (a) the scope and coverage of trading: options of trading parties and eligibility of obligated parties, for example, the rules determining which enterprises are covered, which thresholds apply as a minimum size for inclusion, and the enterprise boundary for included energy savings; (b) the nature of the cap and whether performance against energy consumption or energy saving is required; (c) the allowance allocation methods, such as benchmarking, allocations according to historic baselines, and the rules applied to new entrants and the closing of installations/enterprises; (d) offset mechanisms that incentivize actions beyond the scope of the obligated entities, so as to achieve more cost-effectiveness, and study the pros and cons of permitting offsetting, options for offsetting eligibility, and the rules for offsets if they are permitted; (e) the design of penalties to provide a proportionate incentive for compliance and a regime that adequately deters noncompliance; (f) rules for trading and penalties associated with infringements; (g) the compliance period and the establishment of grace periods and the basis for regulator discretion in the application of penalties; (h) system evaluation procedures to ensure the allocated cap is met and guidelines for carrying out evaluations; (i) pricing mechanisms such as price ceilings and floors and pricing for government intervention; and (j) risk management. The energy saving MRV system established under Component 1 is to provide a solid foundation for trading.

- **1.3.3 Developing implementation guidelines.** Energy consumption trading is to be an important policy measure in the 13th FYP. The implementation guidelines will define the timescales and the relationship between energy consumption trading and the achievement of provincial energy consumption caps for the period, including accounting principles for savings certificates that are subject to interprovincial trading.

- **1.3.4 Developing energy trading regulations and institutional frameworks.** This activity supports the development of energy trading regulations. This will provide the regulatory basis for the implementation of the system, including the formal rules for participation and the responsibilities of the main stakeholders. It will include the rules by which enterprises and other market participants must comply, the role of the regulator in overseeing the trading market, and the conduct of participant enterprises (including their MRV obligations). It is envisaged that the Government may participate in the market to provide price stabilization and capital support. The rules for that intervention will be defined so as to provide clarity to other market participants. The regulations will also cover accounting rules for trading revenues and arrangements for appeals and arbitration. This activity also supports the development of institutional frameworks, including who will regulate the trading, how to regulate

obligated enterprises and other market participants, how to regulate the trading market, rules for government involvement in the market, accounting methods to account for enterprises' trading revenues, and arbitration.

- **1.3.5 Coordinating between the energy consumption trading scheme and the ETS.** The framework for coordination will include (a) interactions on system design, such as the scope, coverage, cap/target setting, (b) system interactions such as registries and trading platforms, and (c) enforcement and penalty regimes.

- **1.3.6 Post evaluation of the pilot energy trading scheme.** This will cover the following activities: (a) evaluation of the direct results of energy trading, such as reported savings, trading market participation, and compliance performance, with appropriate sector disaggregation; (b) lessons learned, such as administrative/process effectiveness, the effectiveness of design, success of capacity building, and functioning of the market; and (c) impacts of the system including abatement performance, costs of compliance, and cost-effectiveness, wider consequences including the level and distribution of environmental pollution, social, and competitiveness impacts.

8. **Subcomponent 1.4: Building the capacity for energy saving MRV and implementation of priority EE programs.** This subcomponent will build capacity in the following areas: (a) energy saving MRV, including developing standard training curriculum, training the trainers, and providing training to third-party verifiers, ESCOs, priority enterprises, and provincial EE centers; (b) the pilot energy trading scheme, including developing the relevant training curriculums, training the trainers, and providing training to key stakeholders; and (c) national and provincial EE officials on EE policy making, fiscal incentives, and enforcement.

9. **Component 2: Supporting Results-based Green Energy Financing in the JJJ Region (indicative cost estimate: US$4.5 million GEF grant).** This component will complement at least US$1.0 billion of investment in EE, RE, and emission reduction in the JJJ Region, of which US$500 million will come from IBRD loans and US$500 million from HXB loans. This component will provide advisory services and technical assistance, build capacity, and verify results to help HXB implement the World Bank PforR operation—Innovative Financing for Air Pollution Control in Jing-Jin-Ji Program. It includes the following subcomponents:

10. **Subcomponent 2.1: Undertaking marketing and business development for green energy finance.** This subcomponent will support HXB: (a) to organize marketing workshops among financial institutions, enterprises, and government agencies; (b) to develop promotional materials; (c) to undertake analysis of targeted markets and policies to improve the effectiveness of marketing campaigns; and (d) to contract third parties such as industrial associations and ESCO associations to identify deals.

11. **Subcomponent 2.2: Verifying results for the JJJ PforR operation.** Under the JJJ PforR, HXB is required to hire independent and credible third parties to verify the six agreed-upon DLIs: (a) DLI-1: the sub-loans for eligible EE, RE, and pollution abatement subprojects disbursed to sub-borrowers; (b) DLI-2: the coal reduction from eligible EE and RE subprojects; (c) DLI-3a and DLI-3b: the reduction in SO_2 and NOx emissions from desulfurization and denitrification

subprojects, respectively; (d) DLI-4: HXB will establish a Green Finance Center that provides guidance on HXB's green financing business and adopt internal procedures for the identification, risk assessment, appraisal, and approval of green lending; (e) DLI-5: the number of different eligible innovative financial products for green financing piloted; and (f) DLI-6: the number of ESCOs receiving sub-loans for eligible EE, RE, and pollution abatement subprojects. This subcomponent will support HXB to hire (a) IVAs selected from the 26 accredited verification agencies, to be approved by the World Bank, to verify the results achieved against DLI-2 and DLI-3 over the program lifetime, following agreed-upon methodologies, and (b) an independent audit firm, to be approved by the World Bank, to verify the results achieved against DLI-1, DLI-5, and DLI-6 over the program lifetime.

12. **Subcomponent 2.3: Providing technical assistance and developing innovative financial products and models.** This subcomponent will support HXB: (a) to hire technical experts to undertake technical assessments, fiduciary assessment of procurement and FM, and compliance with the relevant environment and social guidelines for subprojects, following the guidelines outlined in the Operational Manual; and (b) to develop and pilot innovative financial products and models for EE, RE, and pollution abatement investments, such as project-based lending, securitization of project assets, aggregation (bundling) of small-scale distributed generation subprojects, green bonds, and other related products as required under DLI-5 of the PforR operation.

13. **Subcomponent 2.4: Building capacity for HXB and disseminating lessons learned from the JJJ PforR operation.** This subcomponent will entail the following capacity building activities: (a) provide training to HXB management and staff at headquarters, particularly the Green Finance Center, and branches/sub branches in the JJJ Region, on lending for EE, clean energy, and pollution control sub-projects and provide guidance to a bank-wide green lending business; (b) enhance mechanisms and infrastructure at HXB for green financing, purchase and maintain a database for the implementation of sub-loans for EE, clean energy, and pollution control subprojects, and exchange knowledge with relevant stakeholders; and (c) develop a case study of the JJJ PforR and disseminate knowledge and lessons learned from the program.

14. **Component 3: Supporting the Results-based Environmental Program in Hebei Province (indicative cost estimate: US$4.5 million GEF grant).** This component will complement at least US$650 million of investments in air pollution control in Hebei Province, of which US$500 million will come from IBRD loans, and US$150 million from the Hebei Government. This component will help enhance the capacity of the Hebei Government to implement the Hebei PforR. It includes the following three subcomponents:

15. **Subcomponent 3.1: Providing analytical studies and technical assistance to support the Hebei PforR.** This subcomponent will undertake analytical studies and provide technical assistance to Hebei Government in four areas: (a) comprehensive control of industrial enterprises and the reduction of emissions from key industrial sectors; (b) area source air pollution controls (such as from agricultural and open burning); (c) prevention and control of emissions from transport emissions; and (d) establishment of monitoring and warning systems and planning tools for pollution control.

16. **Subcomponent 3.2: Verifying results for the Hebei PforR operation.** Under the Hebei PforR, the Hebei Government is required to hire independent and credible third parties to verify the seven DLIs: (a) DLI-1: the number of EPBs at the provincial and prefecture level implementing standard protocols on continuous environmental monitoring (CEM systems for air emissions; (b) DLI-2: the percentage of enterprises in state-controlled lists and municipal-controlled lists integrated in the improved CEM and enforcement systems for air pollutants; (c) DLI-3: number of clean stoves installed, which meet technical emissions standards, acceptable to the World Bank; (d) DLI-4: the number of hectares with increased nitrogen utilization efficiency of at least 37 percent due to the application of formula fertilizer based on soil testing; (e) DLI-5: the number of clean energy buses replacing diesel buses, which are disposed of, in accordance with National Regulations; (f) DLI-6: implementation of a comprehensive official emissions inventory system, acceptable to the World Bank, populated with emissions data for the year before the effective date; and (g) DLI-7: approval of a cost-effective comprehensive plan on air quality control for the next five years, acceptable to the World Bank. This subcomponent will support the Hebei government to hire IVAs, to be approved by the World Bank, to verify the results achieved against the seven DLIs over the program lifetime.

17. **Subcomponent 3.3: Building capacity for the Hebei Government and disseminating lessons learned from the Hebei PforR.** This subcomponent will include the following: (a) provide training to Hebei Government officials, particularly those at the DRC, EPB, Transport Bureau, and Agriculture Bureau, on emission reduction and control policies and enforcement, and results monitoring; (b) purchase environmental monitoring software and equipment as needed; and (c) develop a case study of the Hebei PforR operation and disseminate knowledge and lessons learned from the program.

Annex 3: Implementation Arrangements

China: Developing Market-based Energy Efficiency Program in China

Project Institutional and Implementation Arrangements

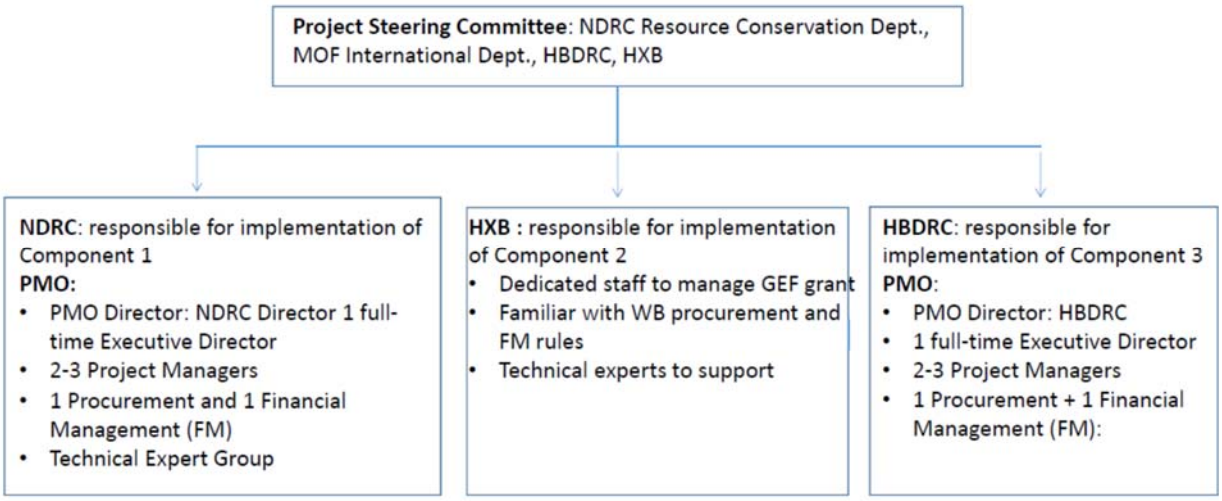
1. A Project Steering Committee, comprising the Environmental Protection and Resource Conservation Department of the NDRC, the International Cooperation Department of the MOF, HBDRC, and HXB, will be set up by project effectiveness to provide overall strategic and policy guidance and coordinate between various government agencies for the implementation of project activities. The NDRC is responsible for sector policies, in particular achieving the EE targets under the 13th FYP, managing the 17,000 priority enterprises program, and implementing the envisioned energy consumption trading scheme, and therefore will lead the implementation of Component 1. HXB is responsible for implementing the JJJ PforR operation and Component 2. The HBDRC will lead the implementation of the Hebei PforR operation and Component 3. It is agreed that the MOF, NDRC, HBDRC, and HXB will coordinate closely on this project.

2. For Component 1, a PMO has been established under the Environmental Protection and Resource Conservation Department of the NDRC. The PMO will be responsible for overall implementation, coordination, monitoring and reporting during project implementation. The NDRC will assign a director to head the PMO, and the PMO will include one full-time executive director, two to three project managers, one procurement specialist, and one financial specialist. A technical expert group will also be formed under the PMO.

3. HXB, particularly its Green Finance Center, will lead the implementation of Component 2. HXB will assign dedicated staff to manage the GEF grant, supported by technical experts on an as-needed basis. The NDRC PMO and HXB staff have experience in managing GEF grants under the CHEEF project, are familiar with the World Bank procurement, FM, and safeguard guidelines and procedures, and have demonstrated satisfactory performance under the CHEEF project.

4. The HBDRC will lead the implementation and coordination of Component 3 in Hebei Province. They are in the process of establishing the PMO. The World Bank team requested that the HBDRC assign a director to head the PMO, and the PMO include one full-time executive director, two to three project managers, one procurement specialist, and one financial specialist who are familiar with the World Bank's fiduciary guidelines and procedures. A technical expert group will also be formed under the HBPMO.

Figure 3.1. Project Implementation Arrangement



5. **Implementation agency risks.** The implementation agency risk is Moderate. The NDRC is in charge of sector policies. The NDRC Environmental Protection and Resource Conservation Department and the NDRC Climate Change Department need to closely coordinate between the proposed Energy Consumption Certificates Trading scheme and the ETS. The need for close coordination has been emphasized throughout the project preparation and is reflected in the implementation arrangements.

6. The NDRC PMO and HXB have been implementing the World Bank/GEF CHEEF project, under the leadership of the NDRC Environmental Protection and Resource Conservation Department, and have demonstrated satisfactory performance. Therefore, the NDRC, the PMO, and HXB are familiar with the World Bank fiduciary and safeguard procedures and requirements. The HBPMO is new and not familiar with World Bank operations. However, as part of the PforR operation, they are establishing core skills in these areas. For example, the World Bank team has requested that the HBPMO identify and hire procurement and FM staff familiar with the World Bank procedures and guidelines and that the entire HBPMO staff receive adequate training. Therefore, the risk rating for the implementing agencies is Moderate.

Financial Management, Disbursements, and Procurement

Financial Management

7. The principle FM risk identified is that the HBPMO financial staff lack experience in managing World Bank-financed projects. The following mitigation measures to address this risk have been taken and agreed to: (a) preparing and issuing an FM Manual acceptable to the World Bank to define roles and responsibilities of relevant parties and to standardize project FM procedures; and (b) in addition to FM and disbursement training provided by the World Bank during preparation, extensive FM and disbursement training and workshops for knowledge sharing by the World Bank and the NDRC PMO and HXB that have experience with World Bank-financed operations will continue to be provided during implementation.

8. Overall, the residual project FM risk at preparation stage after mitigation is assessed as Moderate.

9. The NDRC PMO, HBPMO, and HXB will be responsible for the project management and implementation, including project FM-related day-to-day works such as project accounting and financial reporting. The NDRC PMO and HXB have extensive experience with the World Bank-administered trust funds operations through implementing the GEF CHEEF project. The three PMOs have assigned one financial officer each. The financial officers of the NDRC PMO and HXB have been well trained through participating in the World Bank's FM and disbursement trainings and on-the-job experience accumulated in the past few years. The one of the HBPMO is new to World Bank operations. Through observation and review of the educational background and work experience of the financial officer, the task team noted that the financial officer is qualified and appropriate to conduct the work that can be expected.

10. **Budgeting.** The project is fully financed by the GEF grant proceeds. Each implementing agency will prepare the annual PIP and budget. Budget variance analysis will be conducted semiannually by each agency to inform management of significant variance from the plan that may need corrective actions.

11. **Funds flow.** The GEF grant will flow from the World Bank into the DAs that will be respectively set up and managed by the NDRC and HPFB. Hua Xia will not open a segregated DA under this project but will use reimbursement and direct payment only. For the NDRC PMO and HXB, payments from the DA or from HXB's own account will follow the existing internal payment review procedures of the NDRC and HXB, which have been assessed as satisfactory to the World Bank. The HDRC will prepare the payment request and submit to the HPFB for review before making payment from the DA. Withdrawal applications will be prepared and submitted to the World Bank by the NDRC, HXB, and HPFB for reporting expenditures paid already, requesting replenishment of DAs, as well as requesting reimbursement or direct payment from the World Bank.

12. **Accounting and financial reporting.** The administration, accounting, and reporting of the project will be set up in accordance with 'Accounting Regulations for Trust Fund Projects' issued by the MOF. The standard set of project financial statements has been agreed between the World Bank and MOF.

13. Each implementing agency will be responsible for the overall project implementation, management, monitoring, and coordination. Original accounting documents for project activities will be retained by each of them. Three unaudited semiannual project interim financial reports will be prepared and furnished to the World Bank by the NDRC PMO, HBPMO, and HXB no later than 45 days following each semester (the due dates will be August 15 and February 15), in form and substance satisfactory to the World Bank.

14. The task team will monitor the accounting process, including the adequacy of the FM system, especially during the initial stage to ensure complete and accurate financial information is provided on time.

15. **Internal control.** The NDRC PMO and HXB have adequate FM regulations in place. The World Bank has assessed the HBPMO's FM system during appraisal. In addition, the project-related accounting policy, procedures, and regulations were issued by the MOF, and the FM Manual will be prepared and issued to standardize the project FM procedures.

16. **Audit.** China National Audit Office (CNAO) and Hebei Provincial Audit Office (HPAO) have been identified as the auditors for the project. The annual audit reports will be issued by CNAO and HPAO and will be due to the World Bank within six months after the end of each calendar year. CNAO and HPAO have extensive experience with auditing World Bank-financed operations. According to the World Bank Policy on Access to Information, the audit reports for all investment lending operations for which the invitation to negotiate was issued on or after July 1, 2010, need to be made publicly available on time and in a manner acceptable to the World Bank. Audit reports will be made publicly available on the website of the provincial auditor. Following the World Bank's formal receipt of the audited financial statements from the borrower, the World Bank will also make them available to the public in accordance with the World Bank Policy on Access to Information. The responsible agency and timing is summarized in Table 3.1.

Table 3.1. Responsible Agency and Timing

Audit Report	Submitted By	Due Date
Project financial statements prepared by the NDRC PMO and audited by the Audit Service Center of CNAO	NDRC PMO	June 30 of each calendar year
Project financial statements prepared by HXB and audited by the Audit Service Center of CNAO	HXB	June 30 of each calendar year
Project financial statements prepared by the HBPMO and audited by HPAO	HBPMO	June 30 of each calendar year

Disbursements

17. Three disbursement methods are available for the project: advance; reimbursement; and direct payment. Supporting documents required for World Bank disbursement under different disbursement methods will be documented in the Disbursement Letter issued by the World Bank.

18. Two DAs in U.S. dollars will be opened at a commercial bank acceptable to the World Bank and will be managed by the NDRC and HPFB. HXB will not open a segregated DA under this project but will use reimbursement and direct payment only. The ceiling of the DAs will be determined and documented in the Disbursement Letter.

19. The GEF grants will be disbursed to finance 100 percent of eligible expenditures (inclusive of taxes and duties) consisting of goods, non-consulting services, consultants' services, training, and incremental operating costs, as detailed in Table 3.3.

Table 3.3. Disbursement Category

Category	Amount of the Grant Allocated (Expressed in US$)	Percentage of Expenditures to be Financed (Inclusive of Taxes)
(1) For Part 1 of the project:		

(a) Goods, non-consulting services, consultants' services, and training	8,600,000	100
(b) Incremental operating costs	200,000	100
(2) For Part 2 of the project:		
(a) Goods, non-consulting services, consultants' services, and training	4,400,000	100
(b) Incremental operating costs	100,000	100
(3) For Part 3 of the project:		
(a) Goods, non-consulting services, consultants' services, and training	4,300,000	100
(b) Incremental operating costs	200,000	100
Total	17,800,000	

20. Retroactive financing for payments made before the signing date of the Grant Agreement but on or after April 15, 2016, will be available for financing eligible expenditures, up to the following amounts, provided that the World Bank's relevant procurement rules are followed:

(a) US$1,760,000 under Category (1) or Part 1 of the project

(b) US$900,000 under Category (2) or Part 2 of the project

(c) US$900,000 under Category (3) or Part 3 of the project

21. **Supervision plan.** The supervision approach for this project is based on its FM risk rating, which will be evaluated on a regular basis by the FM specialist in line with the FMSB's FM Manual and in consultation with relevant task team leader. The initial FM supervision will focus on quality and timeliness of project accounting and financial reporting as well as compliance of the World Bank's FM and disbursement-related requirements.

Procurement

22. **Capacity assessment.** A procurement capacity and risk assessment of three PMOs was conducted. The assessment shows that (a) the NDRC PMO and HXB are equipped with experienced staff who have the World Bank's procurement capacity, and (b) procurement staff in the HBPMO have no World Bank procurement experience and only have limited experiences in government procurement. The key procurement risks identified were the following: (a) the capacity of HBPMO staff is weak; (b) three PMOs lack the experience of the World Bank's consultant selection; and (c) procurement staff in three PMOs may be replaced during the project implementation and potential delay and noncompliance caused by the lack of experience of the

replacement staff in the PMO. Mitigation measures agreed to include the following: (a) continuous procurement training should be provided to PMO staff as necessary; (b) a procurement agent or an individual procurement expert with experience in World Bank procurement procedures should be timely recruited to provide assistance for the three PMOs; (c) the HBPMO shall hire a consultant who has qualified procurement experience to guide the procurement to be carried out by the HBPMO; (d) the procurement training with emphasis on selection and employment of consultants shall be provided by the World Bank Procurement Specialist to the procurement staff of the PMOs; and (e) a set of separate prior review thresholds will be established for the HBPMO to address the increased risk caused by the weak capacity. The overall procurement risk is considered Moderate while the procurement risk for the HBPMO is particularly rated Substantial. A PP for the first 18 months of project implementation has been prepared.

23. **Applicable Guidelines**. Procurement for the proposed project will be carried out in accordance with the World Bank's 'Guidelines: Procurement of Goods, Works, and Non-consulting service under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' dated January 2011 and revised July 2014; 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers', dated January 2011 and revised July 2014; and the provisions stipulated in the Loan Agreement. World Bank standard procurement methods and procedures and the provisions stipulated in the Grant Agreement will apply to all procurement activities carried out by PMOs. National Competitive Bidding (NCB) shall be carried out in accordance with the Law on Tendering and Bidding of China promulgated by Order of the President of China on August 30, 1999, subject to the modifications stipulated in the Grant Agreement to ensure consistency with World Bank Procurement Guidelines.

Procurement Arrangements

24. **Goods and non-consulting services procurement.** The project will finance the procurement for improving of information systems to meet the project needs, such as computers, network equipment, and operational software. Office equipment could also be procured. National Model Bidding Documents for Goods issued by the MOF in June 2012 shall be used for all NCB. For some subcomponents, non-consulting services contracts and direct contracting will be used for the purpose of public awareness or specific equipment and some patents in the energy sector.

(a) **Selection of consultants.** Consulting services will be focused on policy reforms and regulations for EE or related areas and the development of methods to verify or measure the quantity of EE in China. Universities and research institutes may be included in short lists as a source of consultants, provided they possess the relevant qualifications and there is no conflict of interest. In such cases, Quality-Based Selection or Selection Based on the Consultants' Qualifications (for small assignments) will be used, if the short list also includes consulting firms. The Single-Source Selection (SSS) method shall be used only in exceptional cases and shall be specified in the PP. A sufficiently detailed justification, including the rationale for SSS instead of a competitive selection process and the basis for recommending a particular firm or individual, will be required.

(b) **Training and workshops.** Plans for training and workshops will be developed by the PMOs and included in the project annual work plan for World Bank review.

Expenditures incurred in accordance with the approved plans for training and workshops will be the basis for disbursement.

(c) **Procurement Plan.** A PP for the first 18 months of project implementation has been prepared by each PMO and was reviewed by the World Bank. The PP will be agreed with the World Bank no later than negotiations and will be made available in the project's database and on the World Bank's external website. The PP will be updated annually or as required to reflect implementation needs and improvements in institutional capacity.

(d) **Frequency of procurement supervision.** Procurement supervision will be carried out once a year. Procurement post reviews will be carried out by the World Bank every 12 months. The procurement post review sampling ratio will be 1 out of 10 contracts.

25. **Thresholds for procurement methods and prior review.** The procurement methods and prior review thresholds are indicated in Table 3.4.

Table 3.4. Thresholds for Procurement Methods and Prior Review

Expenditure Category	Contract Value Threshold (US$)	Procurement Method	Prior Review Threshold (US$)
1. Goods and non-consulting services	≥ 10,000,000	ICB	All ≥ 4,000,000 (moderate risk) All ≥ 2,000,000 (substantial risk)
	< 10,000,000	NCB	
	< 250,000	Shopping	
	None	Direct Contracting	
2. Consultants services	≥ 300,000	QCBS/QBS	Consultant (firms): All ≥ 2,000,000 (moderate risk) All ≥ 1,000,000 (substantial risk) Consultant (individuals): All ≥ 400,000 (moderate risk) All ≥ 300,000 (substantial risk)
	< 300,000	CQS	
	None	Individual Consultant	
	None	SSS (firm)	
	None	SSS (individual)	

Note: CQS = Selection Based on the Consultants' Qualifications; ICB = International Competitive Bidding; QCBS = Quality- and Cost-Based Selection; QBS = Quality-Based Selection.

26. **Advance contracting and retroactive financing.** Contracts expected to be procured and signed in advance of grant signing have been identified in the agreed PP for the project. Any payments made under such contracts before the date of signature of the Grant Agreement will be eligible for retroactive financing of up to a maximum of US$3.56 million and within the limits specified in the Grant Agreement.

Environmental and Social (including Safeguards)

27. The project activities are all technical assistance activities (for example, analytical support on energy policies, M&V systems, energy trading mechanisms, and institutional capacity building). The project does not finance any physical investments or activities. Subsequent physical investments not financed by this project, for instance in new energy efficiency products or technologies and investments by ESCOs, are envisioned to have largely environmental and social benefits. However, these activities may have potential negative environment and social impacts. The project is therefore classified as Category B, and no further Environmental Assessment action is required for project preparation according to the provisions of OP 4.01.

28. Environmental and social considerations will be included in the terms of reference for any consultancies related to studies, assessments, and capacity-building activities under the project shall be satisfactory to the World Bank, and, to that end, such terms of reference shall, among others, duly incorporate the requirements of the World Bank's safeguard policies then in force, as applied to the advice conveyed through such studies, assessments, and capacity-building activities.

29. Energy efficiency projects are typically expected to benefit women and men fairly equally. For household energy efficiency measures, women are often more knowledgeable of household energy expenditures and use, and should thus be consulted when designing energy efficiency policies. While there are not large gender differences in the benefits of energy efficiency, there is an opportunity to better understand gender roles in energy management. As such, during consultations with beneficiaries, surveys and interviews will be designed to help ensure that gender issues are captured.

Monitoring and Evaluation

30. Annex 1 provides a detailed description of the performance indicators to be tracked under the project and specifies the source and schedule for data collection. The PMOs will be responsible for the overall monitoring and evaluation system, including regular data collection to assess progress toward achieving results. The PMOs will furnish to the World Bank semiannual progress reports on project implementation by February 15 and August 15 of each year, starting with August 15, 2017. In addition, it will prepare a midterm review report by June 30, 2020. Based on the recommendations of these reports and the World Bank's reviews and comments thereon, the PMOs will take actions, satisfactory to the World Bank, to address any emerging issues to meet the targets set in the Results Framework. In addition, a completion report due three months after the closing date will be prepared by the PMOs to evaluate the overall project implementation and results achieved under the project.

Role of Partners

31. There are many bilateral and multilateral donors active in energy conservation and climate change in China. The project will coordinate with and complement the existing related EE and climate change initiatives. Many of the EE and climate change initiatives are supported by the World Bank and the GEF, such as the CHEEF project and the Partnership for Market Readiness Initiative. The World Bank team will periodically organize donor coordination meetings during

project preparation and implementation to coordinate with the key active donors and programs in the EE and climate change fields in China.

Annex 4: Implementation Support Plan

China: Developing Market-based Energy Efficiency Program in China

Strategy and Approach for Implementation Support

1. This annex lays out the key activities that the World Bank team will implement to appropriately mitigate the risks identified during project implementation. It will focus on the key risks defined in the Operational Risk Assessment Framework and will strive to provide the client with the most effective implementation support. Under the proposed project, the key risks revolve around the close coordination required between the Energy Saving Certificates Trading and the carbon cap-and-trade scheme, between the MOF and NDRC, and between the NDRC Environmental Protection and Resource Conservation Department and the NDRC Climate Change Department. In addition, implementing agencies have limited capacity in project implementation.

2. **Institutional coordination**. The World Bank team has confirmed with the Government on the implementation arrangement that the NDRC, HBDRC, and HXB will be represented in the Project Steering Committee and the PMOs. The World Bank team will periodically organize stakeholder coordination meetings during project preparation and implementation, to coordinate key issues moving forward. In particular, as the project is closely related to the CEEF project (with the counterpart government agency of the NDRC Environmental Protection and Resource Conservation Department) and the Partnership for Market Readiness Initiative (with the counterpart government agency of NDRC Climate Change Department), both managed by the World Bank, the World Bank team will also coordinate internally to ensure effective implementation.

3. **Technical support.** The World Bank team has provided extensive technical expertise during project preparation, and will continue to provide technical support to the PMO to effectively monitor and implement the project activities according to the PIP for the GEF grant.

4. **Procurement.** Procurement implementation support will include:

- facilitating a multistage training program targeting procurement staff in the PMO to help them fully understand the World Bank's procurement guidelines;
- reviewing procurement documents and timely provision of feedback on the results of prior and post reviews to the parties concerned; and
- monitoring procurement progress against the agreed PP for the GEF grant.

5. **Financial Management.** The project FM will be reviewed and evaluated on a regular basis by the World Bank's FM specialist. The specialist will join the World Bank's supervision missions and review the implementation of the FM Manual. The specialist will also provide technical support to the project implementing agencies and help with timely resolution of potential FM issues or any issues identified by the auditors. The review and monitoring will include the evaluation of the adequacy of the FM arrangements in place, disbursement processes, on-granting arrangements, counterpart fund allocations, and document filing systems.

6. **Environmental and Social Safeguards.** The World Bank project's environmental and social development experts will supervise the implementation of the project. They will provide guidance to the project implementing agencies on how to best address relevant issues that arise during project implementation. They will also help ensure that the planned community and stakeholders consultations have been undertaken during the project design phase and will continue during the project implementation stage.

Implementation Support Plan

7. Most World Bank team members will be based in the China Country Office, located in Beijing. This will help ensure rapid and effective response to the borrower's needs for implementation support. In addition, a few Washington-based staff and international consultants will also be part of the task team to bring global experience to the project. Formal supervision and field visits covering all aspects of project implementation will be carried out semiannually during the early stage of project implementation, complemented by occasional visits by small missions on an as-needed basis. Estimated inputs from different specialists at different stages of project implementation are outlined below.

Table 4.1. Project Implementation Support Input Requirements

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months	• Team and project leadership • Project design and technical supervision • FM and procurement • Safeguards supervision • Capacity building	• Technical • FM • Procurement • Safeguards	6–7 staff, 2 trips per staff	n.a.
12–48 months	• Project implementation and supervision • FM, procurement and safeguards • M&E	• Technical • Safeguards • FM • Procurement	6–7 staff, 2 trips per staff annually	n.a.

Annex 5: Incremental Cost Analysis

China: Developing Market-based Energy Efficiency Program in China

1. While China has made considerable progress in energy conservation, it faces substantial challenges in meeting its ambitious 13th FYP EE targets, particularly the expected total energy consumption cap in the 13th FYP. The command-and-control type of administrative measures has reached its limits and the Government intends to increase the use of the market-based mechanisms to unleash more energy saving potential in the economy. In response to the government request, the project is designed to introduce and establish the market-based mechanism for energy savings. The core concept of the project design is to commodify energy savings to make them valuable products, thus to incentivize the efforts to create more energy savings.

2. International assistance from the World Bank/GEF has been critical to support the GoC's efforts on energy conservation, particularly for introducing market-based mechanisms based on international best practices and customizing them according to China's conditions. This project is a continuation of this partnership to address the new challenges and barriers facing the GoC on achieving its ambitious EE targets.

3. **Baseline.** During the 11th FYP, the GoC relied extensively on regulatory and administrative measures and also provided financial incentives to promote EE to achieve the energy intensity reduction target. While these measures have been successful and effective, market-based mechanisms did not play a major role. As such, there may be significant untapped potential for enterprises to improve EE based on financial self-interest. According to the China Energy Research Institute, the 12th FYP EE targets were double the direct EE investments of the 11th FYP. As many low-cost EE potentials have largely been harvested, EE investments per unit of energy savings have been increasing. More and more enterprises, especially those who had invested substantially in EE during the 11th and 12th FYPs, find that EE projects are more expensive and are reluctant to invest in them. Therefore, achieving the 13th FYP energy consumption target must increase the use of market-based mechanisms and require more enterprises to take actions on EE. Finally, the two World Bank-supported PforR operations (JJJ and Hebei PforR) are the first time that the PforR lending instrument has been used in China, which requires implementing agencies to hire independent and credible third parties to verify results before the World Bank disburses funds. Without GEF support, the two PforR operations may not be implemented smoothly, due to low capacity to verify results.

4. **Alternative.** The GEF project is designed to support the development and implementation of China's priority EE and environment programs, with a focus on improving results M&V systems and developing market-based mechanisms. The approach is to commodify energy savings by establishing a credible M&V system to certify energy savings and to develop a trading scheme for certified energy savings. Such a market-based mechanism will incentivize market participants to achieve greater energy savings and thus contribute more to the Government's ambitious EE targets. In addition, the GEF funds are sought to support the implementation of the two PforR operations through capacity building and technical assistance to implementing agencies, proactive outreach, and independent third-party verification of the results. GEF funds are critical to ensure successful implementation of the PforR operations and results verification.

5. The key barriers and challenges that China is currently facing and the project will address are detailed in the following paragraphs.

6. **Urgent needs for standardized operational guidelines for project-level energy saving M&V.** China has issued national standards/protocols for calculating energy savings and guidelines for five major categories of the most commonly used EE technologies: (a) boilers and kilns; (b) energy system optimization; (c) fuel switching (including the substitution of oil products); (d) motor drives; and (e) waste heat recovery. However, these standards and protocols are not sufficiently detailed to provide operational guidance to third-party verifiers to conduct energy saving M&V for EE investments. For example, there are two common issues encountered: (a) defining the scope or boundary for the energy savings to be included in the calculation; and (b) measuring energy savings from coal, oil, and gas consumption, compared to measuring only electricity savings, which is more straightforward. As a result, the lack of a standardized methodology and detailed operational guidelines to calculate energy savings have led to large discrepancies in the measurement of project results for energy savings by the enterprises, the Government, and even different third-party verification agencies, thus undermining the efficacy of the EE program. Therefore, there is an urgent need to develop standardized methodologies, detailed operational guidelines, templates, case studies, and best practices for typical EE measures and their application at the project and enterprise level.

7. **Urgent needs for standardized methodology for enterprise-level energy saving M&V.** In addition to project-level energy saving M&V for specific EE investments, China also needs standardized methodologies for energy saving M&V at the enterprise level to determine whether its mandated energy saving targets are met and to lay the ground work for the future potential EE trading between enterprises. The Government faced many obstacles while verifying whether the priority enterprises have met their 12th FYP targets. Enterprise-level energy savings result from not only specific EE investments (or project-level energy savings), but also more efficient energy management, decreased production, or closure of facilities. Therefore, enterprise-level energy saving M&V requires a different methodology to measure and verify energy savings from measures other than EE investments.

8. **Lack of rigor in energy saving M&V.** China's energy saving M&V practices are generally less rigorous than the most commonly used international protocol—IPMVP. China's current practice is to use host enterprises' energy bills to estimate and calculate energy savings and rarely installs meters and sub-meters to measure energy usages before and after EE measures. The IPMVP requires actual measurement of energy consumption before the EE project, as the baseline, and after the EE projects are implemented. In addition, in North America, an M&V plan needs to be developed and reviewed before the EE projects are implemented and will be used to guide the M&V practice. As a result, M&V costs often represent about 2 percent to 3 percent of the total project costs. In China, due to the much lower budget for M&V paid by the Government and much shorter time for verification, M&V is generally conducted with much lesser detail and rigor compared with the IPMVP.

9. **Lack of transparent and credible accreditation process and institutional framework for third-party verifiers**. Under the energy saving reward program, 26 third-party verification agencies were selected and approved by the MOF and NDRC, through the process of recommendation and assessment of their capacity and performance. However, this process was

not transparent and no specific entity or institution was appointed to accredit third-party verifiers. To measure and verify the massive EE efforts, China needs a large cadre of qualified third-party verifiers, much more than the existing 26 accredited third-party verification agencies. Transparent qualification criteria, accreditation processes, and a credible institutional framework need to be established for both third-party verification professionals and agencies.

10. **Need for capacity building of third-party verifiers.** Third-party verification of energy savings is still in its infancy in China. The technical skills of many verifiers in China are still low compared to international standards. Even among the existing 26 third-party verification agencies, technical and managerial capacities and professionalism vary significantly. In addition, measurement equipment is obsolete and measurement is conducted at a very preliminary level. There is an urgent need to build the capacity of third-party verifiers, both for existing and new entrants. Finally, there are also significant training needs from ESCOs, priority enterprises, and provincial energy monitoring centers on energy saving M&V.

11. **The Energy Consumption Certificates Trading scheme is complex and challenging to design and implement**. Such a scheme is new to China. To date, only a few countries around the world—the United Kingdom, France, Italy, a few U.S. states, and India—have adopted such a scheme, also called White Certificates Trading. Two major challenges to the Energy Consumption Certificates Trading in China are energy saving M&V and a penalty for noncompliance. In addition, GoC agencies need to reconcile and coordinate between the pilot Energy Consumption Certificates Trading scheme and the ETS.

12. **Urgent need for standardization of environmental monitoring and operational guidelines**. Hebei Pollution Prevention and Control Implementation Action Plan (HAP) includes a rather detailed plan on how to reduce emissions from the four main sectors—iron and steel, electric power, cement, and glass—as well as how to monitor emissions as a basis for checking the emissions compliance of the various sources. However, there are presently three different online CEM platforms in Hebei Province: the Hebei Environmental Information Center platform, involving the provincial level and nine cities; the independent platforms of Shijiazhuang and Tangshan; and a platform being established by Chengde. There is presently no single platform where all the monitored data are collected, cleaned, and reviewed, for the purpose of checking compliance and enforcement. The maintenance of CEM platforms at various industries and plants are carried out using different protocols. There are no measures taken to ensure the consistency of environmental enforcement at different levels. Thus, there is no standardization of the monitoring platform, operation, and management, and a risk that less data than needed is collected, risking the quality and economic efficiency of the system.

13. **Lack of capacity in area source pollution monitoring.** The Hebei HAP includes initiatives for reducing emissions from households and rural areas, for example, the promotion of clean and efficient stoves and appropriate fertilizer application based on soil testing. There is generally a lack of capacity in the testing and monitoring for such initiatives. For example, there is currently no testing data or analysis on the emission levels of clean stoves compared to baseline stoves. Thus, it is not clear whether and by how much those stoves reduce PM2.5 emissions compared to the baseline. For fertilizers, the intensity of soil sampling is currently low (1 soil sample per 300 Mu or 20 ha) and is only repeated at the same site after five years. This means that some soil analyses may not be representative of the sample area. Furthermore, the initiative does

not systematically assess whether there is an increase of fertilizer use efficiency as a result of the soil testing. This is a key step that should be taken to assess whether the initiative is achieving the expected results.

14. Therefore, the Government requested for GEF funding to learn from international experience and benefit from timely and adequate support to develop and implement market-based priority EE and coal cap control programs for the 13th FYP and to improve the energy saving M&V system, contributing to the Government's ambitious EE programs.

15. In addition, GEF funds will also be used to support the implementation of the two World Bank-financed PforR operations by enhancing the capacity of implementing agencies, providing technical assistance, verifying results, and disseminating case studies of results-based financing programs. This will also complement a significant amount of counterpart funds totaling US$1.65 billion from the two PforR operations and result in significant reduction in coal consumption and CO_2 emissions.

16. **Increment.** The incremental costs of the project is estimated at US$17.8 million from the GEF contribution, incremental to the baseline funding of US$1.65 billion of investments under the Innovative Financing for Air Pollution Control in Jing-Jin-Ji and the Hebei Air Pollution Prevention and Control Programs. The total costs of the project are estimated at US$1,667.8 million, of which US$17.8 million are considered incremental.

17. **Domestic benefits.** The project will assist key energy-consuming enterprises in meeting their EE targets in a more cost-effective way, incentivize enterprises to gain additional revenue through selling surplus energy savings, and provide more EE businesses for ESCOs and other service suppliers. More energy savings also means that scarce natural resources are conserved, that energy security is enhanced, and that air quality is improved resulting in better health for Chinese citizens. The project will also assist in the scaling up of market-based green energy financing from domestic financial institutions. In addition, the two PforR operations focused on air pollution control are expected to substantially reduce the amount of air pollution in the JJJ Region, which will reduce the health impacts associated with air pollution.

18. **Global environmental benefits.** Funding from the GEF will help develop and implement EE and environmental priorities under the 13th FYP, and will benefit the PforR operations by enhancing the MRV and the capacities of the implementing agencies. Currently, government agencies and financial institutions in China still generally suffer from limited capacity to implement EE projects, in their abilities both to promote these initiatives and to verify their results. Funding from the GEF will help address these issues by enhancing the capacity of government agencies and financial institutions to initiate quality projects in alignment with the national strategy under the 13th FYP and to accurately verify the environmental impacts from the projects. Based on the estimates of the JJJ PforR, the sub-loans disbursed by HXB for eligible EE and RE subprojects are expected to result in reduction of coal consumption of 1 million tons of coal equivalent. This is equivalent to a reduction of 25 million tons of CO_2 over a 10-year lifetime. The undiscounted GEF incremental cost is about US$0.7 per ton-$CO_2$, compared to the current price of about US$4 per ton-$CO_2$ of certified emission reduction in the European Union. Further, the policy support during the 13th FYP will result in significant energy savings, thereby reducing emissions. Air pollution control measures will also reduce black carbon and emissions in the

transport sector. Therefore, the project's real global environment benefits will be greater than this estimate.