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Report No.: 102272-CN

PROGRAM APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF EURO 460 MILLION

(US $500 MILLION EQUIVALENT)

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR

INNOVATIVE FINANCING FOR AIR POLLUTION CONTROL IN JING-JIN-JI

FEBRUARY 16, 2016

Energy and Extractives Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective as of December 31, 2015)
US$1.0 = CNY 6.4
US$1.0 = Euro 0.92

ABBREVIATIONS AND ACRONYMS

AFD	Agence Française de Developpement
ALM	assets-liability management
APPCAP	Air Pollution Prevention and Control Action Plan
CAEP	Chinese Academy of Environmental Planning
CBD	Corporate Business Division of Hua Xia Bank
CBRC	China Banking Regulatory Commission
CDM	clean development mechanism
CHEEF	China Energy Efficiency Financing
CHUEE	China Utility-based Energy Efficiency
CNAO	China National Auditing Office
CNG	compressed natural gas
CNY	Chinese Yuan Renminbi
CO_2	carbon dioxide
CRESP	China Renewable Energy Scale-up Program
CY	calendar year
DLI	Disbursement-Linked Indicator
DRC	Development and Reform Commission
EA	environmental assessment
EE	energy efficiency
EHS	environment, health, and safety
EIA	environmental impact assessment
EIRR	economic internal rate of return
EPB	Environmental Protection Bureau
EPRCD	Environmental Protection and Resource Conservation Department
ESCO	energy service company
ESSA	environmental and social systems assessment
F&C	fraud and corruption
FCUD	Foreign Capital Utilization Department
FGD	flue gas desulfurization
FIRR	financial internal rate of return
FM	financial management
FYP	Five-Year Plan
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GoC	Government of China
GRS	Grievance Redress Service
GW	gigawatt
GWh	gigawatt-hour
HQ	headquarters
HVAC	heating, ventilation, and air conditioning
HXB	Hua Xia Bank Co. Limited
IAF	independent audit firm

IBRD	International Bank for Reconstruction and Development
ICCAS	Innovation Center for Clean Air Solutions
IFC	International Finance Corporation
IVA	independent verification agency
JJJ Region	Jing-Jin-Ji Region (refers to Beijing-Tianjin-Hebei and its neighboring regions, including Shandong, Shanxi, Inner Mongolia, and Henan provinces)
JJJAP	Jing-Jin-Ji Air Pollution Prevention and Control Action Plan
KfW	Kreditanstalt für Wiederaufbau
kg	kilogram
km^2	square kilometer
kWh	kilowatt-hour
LED	light-emitting diode
m^3	cubic meter
M&E	monitoring and evaluation
M&V	measurement and verification
MDB	multilateral development bank
MEP	Ministry of Environmental Protection
MoF	Ministry of Finance
NDRC	National Development and Reform Commission
NEA	National Energy Administration
NOx	nitrogen oxides
NPL	nonperforming loan
NPV	net present value
OBS	off-balance sheet
OECD	Organisation for Economic Co-operation and Development
OM	Operational Manual
PAP	Program Action Plan
PBOC	People's Bank of China
PDO	program development objective
PforR	Program for Results
PICC	People's Insurance Company of China
$PM_{2.5}$	particulates less than or equal to 2.5 micrometers in diameter
POM	Program Operational Manual
PV	photovoltaic
RE	renewable energy
SME	small and medium enterprise
SO_2	sulfur dioxide
SOE	state-owned enterprise
SSE	Shanghai Stock Exchange
TBL	Tendering and Bidding Law of the People's Republic of China
tce	ton of coal equivalent
tCO_2e	metric ton of carbon dioxide equivalent
$\mu g/m^3$	microgram per cubic meter
WHO	World Health Organization

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PEOPLE'S REPUBLIC OF CHINA
Innovative Financing for Air Pollution Control in Jing-Jin-Ji

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PAD DATA SHEET

People's Republic of China

Innovative Financing for Air Pollution Control in Jing-Jin-Ji

PROGRAM APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC REGION

ENERGY AND EXTRACTIVES GLOBAL PRACTICE

Basic Information					
Date:	February 16, 2016		Sectors:	Energy Efficiency (50%), Renewable Energy (50%)	
Country Director:	Bert Hofman		Themes:	Climate Change (P)	
Practice Manager/ Senior Global Practice Director:	Julia Fraser/ Anita Marangoly George				
Program ID:	P154669				
Team Leader(s)	Xiaodong Wang				
Program Implementation Period:		Start Date:	July 1, 2016	End Date:	June 30, 2022
Expected Financing Effectiveness Date:		July 1, 2016			
Expected Financing Closing Date:		June 30, 2022			

Program Financing Data					
[X]	Loan	[ ]	Grant	[ ]	Other
[ ]	Credit				

For Loans/Credits/Others (US$, millions):

Total Program Cost:	1,000	Total Bank Financing:	500
Total Cofinancing:	500	Financing Gap :	0

Financing Source	**Amount (US$, millions)**
BORROWER/RECIPIENT (Hua Xia Bank Co. Limited)	500
International Bank for Reconstruction and Development	500
Total	1,000

Borrower: People's Republic of China

Responsible Agency: Hua Xia Bank Co. Limited

Contact:	Mr.Zhang Yongmiao	Title:	Deputy General Manager		
Telephone No.:	010-85238627	Email:	yongmiaozhang@hotmail.com		

Expected Disbursements (US$, millions)

Fiscal Year	2017	2018	2019	2020	2021				
Annual	152	43	69	112	124				
Cumulative	152	195	264	376	500				

Program Development Objective(s)

The program development objective is to reduce air pollutants and carbon emissions through increasing energy efficiency and clean energy, with a focus on the Jing-Jin-Ji and neighboring regions.

Compliance

Policy

Does the program depart from the CAS in content or in other significant respects?	Yes	[ ]	No	[X]
Does the program require any waivers of Bank policies applicable to Program-for-Results operations?	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 program meet the regional criteria for readiness for implementation?	Yes	[X]	No	[ ]

Overall Risk Rating: Substantial

Legal Covenants

Name	Recurrent	Due Date	Frequency
Green Finance Center	Yes		Continuous

Description of Covenant: *PA, Schedule, Section I.C, subparagraph 1 (b).* Hua Xia Bank shall, throughout the period of implementation of the program, maintain, and cause to be maintained, for purposes of carrying out the program, the Green Finance Center, with terms of reference, staffing, and other resources acceptable to the Bank, to be responsible for implementing the program, the overall green credit business line, marketing, guidance to other branches, quality control, management of subloans, and coordination with the borrower and the Bank.

Name	Recurrent	Due Date	Frequency
Program Operational Manual Program Action Plan (POM/PAP)	Yes		Continuous

Description of Covenant: *PA, Schedule, Section I.C, subparagraph 2.* Hua Xia Bank shall (a) apply the POM and undertake the actions set forth in the PAP, in accordance with the instructions of the

POM, and (b) not amend, abrogate, suspend, or waive any part of the POM without the prior written approval of the Bank.

Name	Recurrent	Due Date	Frequency
Subloans	Yes		Continuous

Description of Covenant: *PA, Schedule, Section I.C, subparagraphs 3–6.* Hua Xia Bank shall (a) select and approve subloan beneficiaries in accordance with the eligibility criteria and the procedures set forth in the POM; (b) appraise, review, approve, and supervise subprojects in accordance with the criteria, conditions, and procedures set out in the POM; and (c) make subloans to subloan beneficiaries in accordance with eligibility criteria and procedures acceptable to the Bank as set out in the POM, and shall only make the proceeds of the subloan available to such subloan beneficiary after Hua Xia Bank has entered into a **s**ubloan agreement with the subloan beneficiary on terms and conditions acceptable to the Bank.

Name	Recurrent	Due Date	Frequency
Mid-term review		April 30, 2019	

Description of Covenant: *PA, Schedule, Section III.A subparagraph 2.* Hua Xia Bank shall prepare, under terms of reference satisfactory to the Bank, and furnish to the Bank not later than April 30, 2019, a consolidated mid-term review report for the program, summarizing the results of the monitoring and evaluation activities carried out from the inception of the program and setting out the measures recommended to ensure the efficient completion of the program and to further the objectives thereof.

Name	Recurrent	Due Date	Frequency
Independent verification agency	Yes	December 31, 2016	Continuous

Description of Covenant: *PA, Schedule, Section III.C.* Hua Xia Bank shall hire and thereafter maintain, throughout the period of program implementation, verification agents having experience and qualifications in the relevant technical fields, acceptable to the Bank, and under terms of reference, including a timetable and adequate budget for its activities, satisfactory to the Bank, to monitor and verify the achievement of Disbursement-Linked Indicators 2, 3a, and 3b.

Conditions

Source of Fund	Name	Type
IBRD	Subsidiary agreement	Effectiveness

Description of Condition: *LA Article V.* The subsidiary agreement has been executed on behalf of the borrower and Hua Xia Bank.

Team Composition

Bank Staff

Name	Title	Specialization	Unit
Xiaodong Wang	Senior Energy Specialist	Task Team Leader	GEEDR
Ximing Peng	Senior Energy Specialist	Economic Analysis	GEEDR
Susan Shen	Manager	Advisor	LLIOP
Junxue Chu	Manager	Disbursement	WFALN
Chongwu Sun	Senior Environmental Specialist	ESSA	GENDR

Xiaowei Guo	Senior Procurement Specialist	Procurement	GGODR
Fang Zhang	Financial Management Specialist	Financial Management	GGODR
Zhuo Yu	Finance Officer	Disbursement	WFALN
Ronald Ping Hei Wu	Private Sector Development Specialist	Energy Efficiency	YPP
Wei Zhang	Senior Financial Sector Specialist	Financial Sector	GFMDR
Alejandro Alcala Gerez	Senior Counsel	Legal	LEGES
Aristeidis Panou	Counsel	Legal	LEGOP
Will Beloe	Principle Operations Officer	IFC	IFC
Tianxiu Kang	Program Assistant	Team Assistant	EACCF
Cristina Hernandez	Program Assistant	Team Assistant	GEEDR

Non-Bank Staff

Name	**Title**	**City**
Dilip Limaye	Energy Efficiency Technical Consultant	Philadelphia
Youxuan Zhu	Social Consultant	Washington, DC
Yongli Wang	Environmental Consultant	Shenyang
Xiaofeng Hua	Financial Sector Consultant	Washington, DC
Bernard Baratz	Environmental Consultant	New York

I. STRATEGIC CONTEXT

A. Country Context

1. **China's high growth has led to severe air pollution.** 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 come a long way. Energy consumption increased more than 6-fold to fuel an economy that increased 22-fold and to satisfy the needs of an urban population that nearly quadrupled, reaching 54 percent of China's population in 2013. However, because of this remarkable growth and rapid urbanization, China has paid a heavy environmental price. China has many of the world's most polluted cities and is the world's largest emitter of greenhouse gases (GHGs). In particular, the Beijing-Tianjin-Hebei region is experiencing severe air pollution, with an annual average fine particulate matter ($PM_{2.5}$) concentration of 93 micrograms per cubic meter ($\mu g/m^3$) in 2014, far exceeding the national $PM_{2.5}$ standard of 35 $\mu g/m^3$ and the World Health Organization (WHO) $PM_{2.5}$ standard of 10 $\mu g/m^3$. Some cities in the region experience polluted days for more than half of the year. Based on the estimates from the Chinese Academy of Environmental Planning (CAEP) under the Ministry of Environmental Protection (MEP), emissions of $PM_{2.5}$, sulfur dioxide (SO_2), and nitrogen oxides (NOx) have substantially exceeded the cities' environmental absorptive capacity by 80 percent, 50 percent, and 70 percent, respectively.

2. **The Government of China (GoC) has placed a very high priority on air pollution control.** Concerned with the adverse health and environmental consequences from the severe air pollution, the GoC has declared "war on air pollution" and has been implementing a series of mitigation actions. The most noteworthy of these actions is the Air Pollution Prevention and Control Action Plan (APPCAP) issued by the State Council in 2013, which covers nationwide and specifically mandates the Beijing-Tianjin-Hebei region to reduce its annual average $PM_{2.5}$ concentration by 25 percent between 2012 and 2017. Transboundary air pollution plays an important role. For example, one-quarter of the $PM_{2.5}$ concentration in Beijing comes from emission sources in the neighboring regions. Therefore, integrated and coordinated action to reduce air pollution in Beijing-Tianjin-Hebei and its neighboring region is an important priority for the GoC. To implement the APPCAP, the Jing-Jin-Ji Air Pollution Prevention and Control Action Plan (JJJAP) specified detailed regulations and defined the "Jing-Jin-Ji and neighboring regions" as Beijing, Tianjin, Hebei, Shandong, Shanxi, Inner Mongolia, and Henan provinces (hereinafter referred to as Jing-Jin-Ji, or JJJ Region).

B. Sectoral and Institutional Context

3. **Coal is the single-largest source of air pollutants and GHG emissions in China.** China heavily relies on coal to meet its energy demand, with "king coal" dominating 66 percent of the energy mix. China consumed approximately 4 billion tons of coal in 2014—more than the rest of the world combined. In particular, half of China's coal is used for decentralized boilers in the industrial and residential sectors, which makes it difficult and costly to control air pollutants using end-of-pipe solutions. This is in contrast to the bulk of coal used for power generation in most developed countries. Furthermore, the quality of coal in China is low, with high ash and sulfur content, and only around half of the coal is washed. In the JJJ Region, coal consumption reached almost 1.8 billion tons in 2014, accounting for 40 percent of total coal consumption in China and equivalent to the coal consumption of nearly all OECD) countries combined. Hebei Province, for example, relies on coal for more than 90 percent of its energy needs. Based on the estimates from the CAEP and Tsinghua University, coal contributes to 94 percent, 70 percent, and 70 percent of SO_2, NOx, and CO_2

emissions, respectively, as well as 63 percent of primary $PM_{2.5}$ and 56 percent of secondary $PM_{2.5}$ emissions in China.

4. **Energy efficiency (EE) and clean energy (including renewable energy (RE) and natural gas) can make the largest contribution to air quality improvement and carbon emission reduction**. Improving EE requires both structural economic changes as well as technical renovation and improvements. Scaling up clean energy penetration involves increasing the use of both RE and natural gas. To improve air quality, reducing coal consumption through improvements in EE and increasing the use of clean energy are essential solutions, together with end-of-pipe measures for particulates removal, desulfurization, and denitrification. Combined, these measures can lower the overall cost of air pollution control by 50 percent, compared with using only end-of-pipe measures, according to a study conducted by the International Institute for Applied Systems Analysis1. Furthermore, EE and non-fossil fuels (including RE and nuclear) make the single-largest contribution to reducing GHG emissions, with EE measures contributing more than 80 percent to achieving China's carbon intensity reduction target, while non-fossil fuels make up the rest, as outlined in a study undertaken by China Energy Research Institute.

5. **EE and clean energy are "win-win" options to mitigate both air pollution and climate change simultaneously.** Facing both air pollution and climate change challenges, China will need to adopt a strategy to build new infrastructure that addresses both challenges at the same time. If focusing only on air pollution without tackling GHG emissions, new carbon-intensive infrastructure built today would lock the country into a high-carbon growth path for decades to come.

6. **The GoC has undertaken one of the most aggressive EE and clean energy campaigns in the world.** President Xi recently called for an "energy revolution" that encompasses radical changes in energy consumption, energy supply, institutions, and technology, as well as strengthening international cooperation. The GoC set mandatory energy intensity (energy consumption per unit of gross domestic product (GDP)) reduction targets of 20 percent for the 11th Five-Year Plan (FYP) (2006–2010) and 16 percent for the 12th FYP (2011–2015). Because of the aggressive EE campaign, China cut energy intensity by 19.1 percent during the 11th FYP period and 13.4 percent from 2011 to 2014. For the upcoming 13th FYP (2016–2020), the GoC plans to adopt a total energy consumption cap and a coal consumption cap, in addition to the energy intensity reduction target. China currently has the world's largest installed RE capacity, with 96 gigawatts (GW) of wind and 28 GW of solar photovoltaic (PV) as of 2014. RE currently accounts for 10 percent of total primary energy; the GoC plans for non-fossil fuel to reach 15 percent by 2020 and 20 percent by 2030. Furthermore, the GoC is committed to reducing carbon intensity (carbon emissions per unit of GDP) by 40–45 percent from 2005 to 2020 and by 60–65 percent from 2005 to 2030, and has announced that it expects China's carbon emissions to peak by 2030.

7. **The GoC has adopted a combination of regulatory measures and financial incentives to achieve the EE and RE targets.** It has (a) allocated quantitative energy-saving targets to each province and 17,000 priority energy-consuming enterprises to achieve the energy intensity reduction targets in the 12th FYP; (b) provided output-based financial

1 M. Amann, Air Quality Management in Europe and Recommendations for China, GAINS-Asia model, International Institute for Applied Systems Analysis, November 2014.

incentives per ton of coal-equivalent (tce) energy savings for EE investments to both industrial enterprises and energy service companies (ESCOs) from 2007 to early 2015; (c) adopted feed-in tariffs for wind, solar PV, and biomass power, passing the incremental costs between RE and fossil fuels through to consumers; and (d) issued feed-in tariff premiums and mandatory grid access for RE distributed generation.

8. **The APPCAP has set long-term goals and short-term targets.** The APPCAP aims to make significant improvements in air quality between 2012 and 2022, and mandates the JJJ Region to reduce its $PM_{2.5}$ concentration by 25 percent from 2012 to 2017. The implementation regulations of the APPCAP in the JJJ Region set a mandatory target to reduce coal consumption by 83 million tons from 2012 to 2017. Specifically, the National Development and Reform Commission (NDRC) issued a detailed implementation regulation to supervise and enforce the achievement of these coal cap targets in the JJJ Region. The NDRC has also set coal reduction targets for China's top-10 most polluted cities, almost all of which are located in the JJJ Region.

9. **The GoC's commitment to air pollution control will continue beyond 2017, and the APPCAP is expected to be followed by subsequent phases of planning and air pollution reductions.** Green development is a central theme of the upcoming 13th FYP (2016–2020), and air pollution control will remain a high priority on the long-term government agenda beyond 2017. Even after reaching the APPCAP targets by 2017, $PM_{2.5}$ concentrations in the JJJ Region will still be more than double the national standard of 35 $\mu g/m^3$. An extension to the APPCAP that will further reduce $PM_{2.5}$ concentrations in the JJJ Region beyond 2017 was newly announced on December 30, 2015, and aims to reduce $PM_{2.5}$ concentrations by around 40 percent from the 2013 level by 2020, with a target of around 64 $\mu g/m^3$. Based on international experience, it took London 20 years to reduce its particulates and SO_2 concentration by 90 percent and 80 percent, respectively, from 1958 to 1978. Therefore, air pollution control is a long-term effort, and the GoC's commitment will continue beyond 2017.

10. **The APPCAP has specified the following 10 key areas of air pollution prevention and control measures:**

(a) Reduce coal consumption by 83 million tons in the JJJ region, specifically, 13 million tons in Beijing, 10 million tons in Tianjin, 40 million tons in Hebei, and 20 million tons in Shandong. This target is to be achieved by (i) improving EE in the industrial, power, and building sectors; and (ii) increasing the use of clean energy, particularly natural gas and RE, with specific targets to increase natural gas consumption by 50 billion cubic meters (m^3) and the share of non-fossil fuels in primary energy to 15 percent in the JJJ Region by 2017.

(b) Reduce emissions from (i) point sources in the industrial and power sectors by implementing end-of-pipe measures for particulates removal, desulfurization, and denitrification; (ii) area sources to reduce dust emissions; and (iii) mobile sources in the transport sector by increasing public transport, improving fuel quality, phasing out inefficient vehicles, and promoting electric and compressed natural gas (CNG) vehicles.

(c) Increase the use of market mechanisms and expand green financing to EE, clean energy, and emission reduction investments by scaling up green financing from domestic banks and piloting innovative financing models and products.

(d) Adjust economic structure by closing down inefficient energy-intensive industries.

(e) Accelerate technological innovation.

(f) Strengthen environmental standards and permitting for newly built infrastructure.

(g) Strengthen legal framework and enforcement.

(h) Establish regional collaboration mechanisms, particularly in the JJJ Region.

(i) Establish environmental monitoring and warning systems.

(j) Specify the responsibilities of the government, enterprises, and citizens.

11. **This proposed operation will contribute to achieving the results of the APPCAP, with a focus on the coal reduction targets in the JJJ Region.** Specifically, this proposed operation intends to focus primarily on improvement in EE and expansion of clean energy, contributing to the coal reduction targets (area (a) in the APPCAP outlined above); to a lesser degree, on end-of-pipe measures and clean fuels in the transport sector (area (b) in the APPCAP); and on the commercial financing channel (area (c) in the APPCAP). These measures will support the implementation of the APPCAP and the 13th FYP for EE and clean energy in the JJJ Region. The companion operation, the proposed World Bank-supported Hebei Air Pollution Prevention and Control Program, intends to focus on other areas of the APPCAP, such as phasing out inefficient vehicles and enhancing environmental monitoring in Hebei Province, and complements this proposed operation.

12. **This proposed operation will bring value-added by emphasizing EE measures to combat local air pollution without compromising economic growth.** While the APPCAP is comprehensive, it heavily relies on administrative measures to close down small-scale, inefficient factories to achieve the coal cap targets. However, closure of factories has faced strong resistance due to the risk of increased unemployment and a slowdown of economic growth. Strengthened EE and clean energy measures are needed to achieve the coal cap and air pollution control targets without compromising economic growth. EE is the largest and lowest-cost source of emission reductions for both local air pollutants and GHGs, and is fully justified by the resulting development benefits and future energy savings. One of the major value additions of the proposed operation is to focus on EE and clean energy measures, to complement the GoC's program.

13. **Achieving the APPCAP targets requires a substantial amount of green financing—Chinese Yuan Renminbi (CNY) 1.8 trillion (US$ 280 billion) nationwide and CNY 250 billion (US$ 40 billion) in the JJJ Region from 2012-2017,** according to estimates by the CAEP, Tsinghua University, and the Innovation Center for Clean Air Solutions (ICCAS). Looking ahead, a recent joint study by the People's Bank of China (PBOC) and the United Nations Environment Programme estimates that the investment needs for achieving the 13th FYP's targets for air, water, and soil pollution control nationwide would be at least CNY 2 trillion (or US$325 billion) per year, which amounts to 3 percent of GDP.

14. **This proposed operation will bring much-needed financing and will mainstream green financing in financial institutions to contribute to achieving the results of the APPCAP.** The APPCAP specifies the implementation responsibilities of the government and

enterprises, where the government is primarily in charge of setting clear targets, issuing supportive policies, and strengthening monitoring and enforcement. Enterprises are responsible for reducing emissions and investing in clean energy production and pollution abatement measures. The lion's share of the investments needed to achieve the targets of the APPCAP will need to come from commercial financing for enterprises. This proposed operation will provide much-needed financing through a financial institution to contribute to the APPCAP. Mainstreaming green financing in existing financial institutions also supports the green finance agenda laid out by the PBOC.

15. **Many enterprises face difficulties in obtaining access to financing.** Many EE and RE developers, particularly small and medium enterprises (SMEs) such as ESCOs, face difficulties in accessing financing because of the following:

(a) Most local banks usually rely on balance sheet financing, which requires that borrowers have either good credit ratings or high levels of collateral, which in turn favors large-scale borrowers. The concept of project-based financing that focuses on the cash flows from energy savings has not yet been widely accepted by financial institutions. The result is that the most creditworthy potential clients do not necessarily need financing for EE, while the customers most in need of financing are typically not creditworthy from the lenders' perspectives.

(b) Lenders also perceive EE investments to be highly risky, because they are not convinced that the expected future savings will be realized or captured by the investors.

(c) Most financial institutions still lack the required technical expertise and interest in financing EE and RE distributed generation.

(d) EE and RE distributed generation investments tend to be small, with high transaction costs, and most banks' short-term tenures do not match the long-term payback of RE technologies. As a result, despite the fast growth of the ESCO industry in China, only 20 percent of the ESCOs are financed through external financing sources, while the majority relies on self-financing.

16. **Despite the emerging green financing market in China, the banking sector's uptake of green financing remains low relative to the huge investment needs.** A number of Chinese banks have established business lines of green financing, partly attributed to the role of several international financial institutions, such as the World Bank, International Finance Corporation (IFC), Agence Française de Developpement (AFD), European Investment Bank, KfW (Kreditanstalt für Wiederaufbau, formerly KfW Bankengruppe), and so on. The regulatory authorities have also started to build basic regulatory and institutional frameworks for green financing. However, the majority of Chinese banks still do not fully understand how to control the environmental and social risks of their lending portfolios. Most banks' average maturity of liabilities (mainly deposits) is only six months, while many green projects require financing of three to five years or longer. As indicated by the China Banking Regulatory Commission (CBRC), these impediments have hindered the increase of debt financing from Chinese banks to environmentally friendly projects, such as EE investments.

17. **Public funding is warranted to remove market failures and barriers and unlock project financing by lowering risks and closing finance gaps.** EE continues to face market failures and barriers. The fact that a large share of the EE potential remains to be tapped

demonstrates that the EE market is not yet fully commercial. Therefore, public funds are justified to cover the externalities of public goods and remove market barriers. In addition, public funds are essential to mitigate financiers' risk perception by enhancing the interests and capacity of domestic banks through a learning-by-doing process, increasing access to financing for SMEs and ESCOs, and providing long-term tenures to match the long-term payback period of RE investments.

18. **This proposed operation has many innovative features to address the financing barriers and scale up green financing.** First, this operation adopts the new lending instrument of Program for Results (PforR) for the first time in China and the energy sector. Second, this program intends to push the envelope to address the financing barriers outlined, by encouraging the participating banks to deploy innovative financial products tailored to EE and RE markets, such as project-based lending, and to expand their clientele base to underserved clients, such as ESCOs. Finally, this program will scale up green financing and leverage International Bank for Reconstruction and Development (IBRD) funds by (a) piloting innovative financial products, including syndication with other banks and green bonds; (b) mobilizing counterpart funding from the participating bank and equity contribution from the sub-borrowers; and, (c) mainstreaming green financing at the participating bank. The proposed Green Finance Center within the participating bank expects to finance at least CNY 150 billion in green lending by the end of the program's implementation.

19. **The World Bank Group has had a long-term engagement in China's EE and RE sectors over the past 20 years.** The Bank's long-term engagements with China, moving from pilots to mainstreaming actions, have resulted in transformational impacts. Over the past two decades, the Bank has been working with China to help it move toward more market-based approaches for energy conservation under the three phases of the projects supported by the Bank and the Global Environment Facility (GEF): (a) The Energy Conservation Project first introduced the ESCO concept to China about a decade ago by supporting the establishment of China'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, the ESCO industry in China has grown to nearly 5,000 companies, with nearly US$10 billion in energy performance contracts in 2012; and (c) In recent years, the China Energy Efficiency Financing (CHEEF) program has been supporting the mainstreaming of EE lending in the Chinese banking sector through EE credit lines. The CHEEF program, working with Hua Xia Bank Co. Limited (HXB), EXIM Bank, and Minsheng Bank, has already financed US$2.2 billion of EE/RE investments in China, of which US$300 million in financing has been provided by IBRD and the remaining funding from the participating banks and industrial enterprises. These investments resulted in an annual energy savings of 3 million tce and carbon dioxide (CO_2) emission reduction of 7.3 million tons per year.

20. **The IFC has also been active in China's EE field through the China Utility-based Energy Efficiency (CHUEE) project.** The CHUEE project promotes EE improvements through commercial bank financing backed by a partial risk guarantee facility. The project has been working with seven participating banks, with the first loss provided by a combination of GEF and Ministry of Finance (MoF)/Clean Development Mechanism (CDM) Fund and a provincial Department of Finance in one case to date. The project has supported 217 loans in EE, RE, coal-bed methane, and municipal solid waste, with a volume of US$884 million, mobilizing US$2.2 billion in EE/RE project investment. The total annual GHG emission reduction is about 20 million tons.

21. **Similarly, the Bank and GEF also have a strategic long-term partnership with the GoC on RE through the China Renewable Energy Scale-up Program (CRESP).** Phase I of the CRESP has made significant contributions to the scale up of RE in China, which has transformed from a global marginal player 10 years ago to the world leader today. The ongoing Phase II of the CRESP intends to move RE development in China from quantitative scale-up under Phase I to sustained growth under Phase II, with a focus on efficiency improvement, cost reduction, and smooth grid integration. The success of these long-term sector engagements is largely due to well-timed interventions, strong government commitment and support, and continuity of the teams from both the government and the Bank.

22. **The ongoing dedicated credit lines through local banks have demonstrated their success and effectiveness in scaling up clean energy financing.** The CHEEF program not only has provided substantial financing to EE/RE investments with high leverage but has also significantly increased the participating banks' capacity, interest, and confidence in mainstreaming EE and RE investments. To date, engaging domestic banks seems to have had the greatest success in unlocking commercial financing with high leverage in China and other countries.

23. **However, a result-based approach is needed to help the GoC achieve its results-oriented energy and environment targets.** The primary objective of the ongoing EE credit lines under the CHEEF program is to scale up EE financing. Measurement and verification (M&V) of energy savings and emission reductions are not the focus of the credit-line operations. However, the APPCAP and the EE/clean energy program all have mandatory result-based targets and a greater focus on results achievement than past programs. Therefore, a new targeted, results-based operation is needed to support the GoC's output-based targets for the reduction of coal consumption and emissions, particularly in the JJJ Region. This proposed PforR operation builds on the success and lessons learned from the CHEEF program, but shifts from the CHEEF's focus of scaling up EE financing, to a new focus on emission reductions through mainstreaming green financing in a domestic bank.

C. Relationship to the Country Assistance Strategy/Country Partnership Strategy and Rationale for Use of Instrument

24. **The proposed operation is fully consistent with the Country Partnership Strategy** for FY2013–2016 for China, "supporting greener growth, in particular, shifting to a sustainable energy path." The operation also contributes to China's efforts to improve EE, increase the use of RE, and address air pollution and climate change during the 13th FYP. In addition, the proposed operation will support the World Bank Group's corporate commitment to increasing EE and RE lending, scaling up climate financing, and providing sustainable energy for all. The operation is also aligned with the Bank Group's goal of promoting shared prosperity.

25. **The proposed operation supports the GoC's top priority of air pollution control in the JJJ Region, with a focus on the coal reduction target**, and the operation is an important means to support the implementation of the APPCAP in the JJJ Region. This proposed operation intends to reduce air pollutant emissions from the source by improving EE and increasing clean energy, thereby contributing to the GoC's coal cap and emission reduction targets. Since most EE and clean energy investments are commercially oriented to end users or project developers, this operation adopts a market-based approach to set up a

financing platform at a government-designated domestic financial institution to help achieve result-based targets.

26. **The Bank is well positioned to support the GoC's EE, clean energy, and emission reduction campaign.** Given the urgency to control air pollution in the JJJ Region, the GoC has intensified its efforts to reduce coal consumption by improving EE and increasing clean energy supply. The Bank is uniquely positioned to support the GoC in its clean energy campaign to reduce emissions, given the Bank's close working relationship with the GoC in the EE and RE sectors over the last two decades, its successful support to innovative EE financing in China and other countries, and its successful experience in integrating technical assistance and lending operations with the GoC's policy agenda. The Bank team plans to mobilize the US$18 million GEF project Developing Market-Based Energy Efficiency Program in China under preparation as potential parallel grant funding, in addition to the existing GEF funding under the ongoing CHEEF program and the CRESP, to support local capacity building, proactive outreach, and independent third-party verification of the results to complement this PforR program.

27. **In coordination with the Bank team, IFC is exploring potential parallel financing to complement this operation.** The Bank team has been working closely with IFC to enhance coordination, including possible parallel financing in the form of equity, partial risk guarantees, green bonds, and/or advisory services. The Bank and IFC have jointly discussed potential ideas with the senior management of the participating bank, who welcomed the joint Bank Group intervention and expressed particular interest in IFC's assistance with green bonds.

28. **The proposed operation will adopt the PforR instrument.** This is the first operation in the China portfolio and in the energy sector to use the PforR instrument. The PforR instrument can provide incentives to change the portfolio of the participating bank to support EE and clean energy and contribute directly to the results-based emission reduction targets outlined in the APPCAP. In addition, this PforR operation builds on the prior successes of the CHEEF program, and will serve as a vehicle to adapt those successes and apply them to HXB's own systems and procedures. The Bank team considered and discussed with the clients the option of results-based Investment Project Financing, but rejected this option, as it is contrary to the GoC's intention to use the Bank's new lending instrument to streamline and accelerate implementation. Therefore, the PforR instrument is the most suitable option for Bank support. Specifically, the use of the PforR will add significant value to the implementation by:

- ensuring a sharper focus on the most important results GoC wants to achieve (that is, reduction in coal use and air pollutant emissions);

- bolstering support to the participating bank's own program, through its own systems and procedures, and reinforcing the institutional capacity needed for the program to achieve its desired results; and

- mainstreaming EE, clean energy, and emission reduction financing in the participating bank's portfolio; strengthening the participating bank's focus on output and outcome monitoring and evaluation (M&E); and executing an independent and credible verification system.

II. PROGRAM DESCRIPTION

A. Program Scope

A.1 The Government Program and Linkage with the Bank-financed PforR Program

29. **APPCAP: The MEP leads and coordinates the GoC's air pollution control efforts.** The MEP is leading the overall implementation of the APPCAP, and emission reduction actions and responsibilities have been assigned to relevant line ministries and departments in specific sectors. In the JJJ Region, each provincial/municipal government has set up its own implementation structure, with the provincial/municipal Environmental Protection Bureau (EPB) coordinating with the relevant line departments to implement the APPCAP. Each provincial/municipal government has also developed its own implementation plan to achieve the targets set in the national APPCAP. Since transboundary air pollution plays an important role, a JJJ Region coordination working group has been set up for integrated and coordinated actions to reduce air pollution in the JJJ Region. This working group is headed by a vice premier, and the secretariat is housed in the Beijing EPB.

30. **Coal cap control is an essential solution in the APPCAP.** The NDRC Environmental Protection and Resource Conservation Department (EPRCD) is in charge of China's coal cap control and is responsible for allocating the targets, issuing supportive policies, providing fiscal support, and monitoring and enforcing the results. The NDRC issued a Management Measure for Coal Cap Control in Priority Regions, including the JJJ Region. This regulation laid out coal cap control measures by phasing out inefficient and high-polluting industrial projects and boilers, supporting priority EE projects, and replacing coal with natural gas and RE.

31. **The government is responsible for policies, while enterprises are responsible for emission reductions.** The APPCAP specifies the implementation responsibilities of the government and enterprises, where the GoC is primarily in charge of setting clear targets, issuing supportive policies, providing fiscal support, and strengthening monitoring and enforcement, and the enterprises have the main responsibilities for reducing emissions and investing in clean production and pollution abatement measures.

32. **The GoC allocated a dedicated budget of CNY 15 billion (roughly US$2.5 billion) for air pollution control in the JJJ Region in 2013–2014,** with additional budgets from the provincial/municipal governments. For example, based on the survey from the ICCAS and the CAEP, the Beijing Municipal Government spent CNY 2.8 billion of its own budget on air pollution control in 2013. In Hebei Province, the majority of the GoC's allocation of CNY 4 billion in 2014 was used for industrial end-of-pipe pollution abatement, phase-out of yellow-sticker vehicles, closure of inefficient small-scale factories, and deployment of EE and clean energy. The Hebei Provincial Government used its own budget of CNY 800 million in 2014 for electric vehicles and closure of polluting iron and steel factories.

33. **The lion's share of the CNY 250 billion investments needed to deliver the results of the APPCAP in the JJJ Region will come from commercial financing for enterprises.** The GoC's budget of CNY 15 billion is expected to leverage CNY 250 billion from other sources for air pollution control investments in the JJJ Region. For example, the national and provincial governments' subsidies provide less than 10 percent of the investments for industrial end-of-pipe pollution abatement and 20 percent for retrofitting coal-fired boilers

and electric vehicles in the JJJ Region. Therefore, the bulk of the required air pollution control investments will come from commercial financing.

34. **The implementation of the APPCAP has made good progress.** Because of the massive campaign for air pollution control in the JJJ Region, the annual average $PM_{2.5}$ concentration declined by 12.5 percent in 2014 and 18.2 percent in the first half of 2015, compared with the 2013 level. In 2014, the JJJ Region phased out 55,000 small-scale, inefficient coal-fired boilers and 6 million old, inefficient yellow-sticker vehicles; improved coal and gasoline quality standards; and increased the use of electric vehicles. Total coal consumption declined for the first time in history in 2014, despite the slight increase in total energy consumption from the 2013 level, and RE and natural gas grew rapidly.

35. **However, there is a risk that the JJJ Region may not achieve the $PM_{2.5}$ target by 2017, and strengthening EE and clean energy measures is needed with increased use of market mechanisms.** Tsinghua University undertook an analysis with a simulation model and concluded that Tianjin and Hebei may not achieve the target of 25 percent reduction in $PM_{2.5}$ concentration from 2012 to 2017, even if they implement all the currently planned air pollution control measures. Based on the analysis from the ICCAS and the CAEP, most of the provincial/municipal governments in the JJJ Region heavily rely on closing inefficient factories and switching from coal to gas to achieve the coal cap targets. However, closure of factories has faced strong resistance due to the risk of increased unemployment. Switching from coal to gas has also run into difficulties with high gas prices and limited gas supply. Therefore, strengthened EE and clean energy measures are needed to achieve the coal cap and air pollution control targets without compromising economic growth. Furthermore, the GoC heavily relies on administrative measures and subsidies for air pollution control measures. However, the enterprises are responsible for implementing air pollution control measures, and the GoC's subsidies are scarce and can meet only a small percentage of the huge investment needs. Therefore, scale-up of commercial financing is critical.

36. **The PforR program is closely linked with and brings value-added contributions to the government program.** This proposed operation adds value and contributes to the APPCAP by strengthening EE and clean energy to reduce coal consumption through commercial financing. The GoC issues supporting policies; provides financial incentives; and sets EE, RE, and emission reduction targets, which are allocated to priority enterprises. The proposed PforR program supports a GoC-designated commercial bank to provide financing for the enterprises obliged to take action under the APPCAP and their service providers, thereby contributing to achieving the results of the APPCAP. The PforR program will closely involve relevant government agencies, including the NDRC Foreign Capital Utilization Department (FCUD), MoF, NDRC EPRCD, National Energy Administration (NEA), MEP, and the local governments in the JJJ Region. They will provide overall guidance to ensure the investments made under the PforR program directly support the government priorities of the APPCAP and recommend potential sub-borrowers and their subprojects obliged to achieve the government targets.

A.2 Bank-financed PforR Program Scope

37. **The proposed PforR program is a results-based program supported by the Bank and aimed at improving EE, increasing clean energy, and reducing emissions,** contributing to the APPCAP, with a focus on the coal reduction targets. The PforR program covers seven provinces and municipalities in the JJJ Region and its neighboring regions—specifically, Beijing, Tianjin, Hebei, Shandong, Shanxi, Inner Mongolia, and Henan, as

defined in the JJJAP. The duration of the program will be six years, with a start date of July 2016 and targeted completion in June 2022.

38. **The PforR program will finance activities through three key Result Areas,** aligned with the priorities outlined in the APPCAP: (I) reduced coal consumption from increased EE and RE, (II) reduced air pollution emissions from pollution abatement measures, and (III) strengthened institutional capacity of the HXB.

39. **Activities within Result Area I—Reduced coal consumption from increased EE and RE.** Result Area I includes both EE and RE activities. EE activities will focus on retrofit and renovation of industrial facilities, commercial buildings, and public buildings and facilities, including, but not limited to, (a) replacing inefficient energy-intensive industrial equipment with highly efficient equipment, such as boilers, motors, and pumps; (b) replacing inefficient industrial processes and technologies with highly efficient ones, particularly in energy-intensive sectors (such as iron and steel, chemicals, and building materials); (c) recovering and utilizing by-product gas, waste heat, and pressure for electricity generation or cogeneration; (d) optimizing industrial systems to reduce energy use; (e) implementing green building EE (in commercial and government public buildings), including efficient lighting, such as light-emitting diodes (LEDs); heating, ventilation, and air conditioning (HVAC) and heat pumps; and building envelope measures (insulation for roof, walls, windows, and doors); (f) using cogeneration for power and heat; and (g) improving the efficiency and reducing energy loss of district heating systems. RE activities include, but are not limited to, (a) centralized solar PV, wind, and biomass systems; (b) distributed solar PV and other RE systems; (c) rooftop solar systems; (d) solar water heating; and (e) geothermal and water source heat pumps. EE and RE activities will account for approximately 40 percent and 50 percent of the total program expenditure, respectively. The subproject eligibility criteria are listed in Annex 4.

40. **Activities within Result Area II—Reduced air pollution emissions from pollution abatement measures.** To achieve the goal of Result Area II, activities will focus on air pollution abatement measures that will lead to significant reduction in local air pollutant emissions, including, but not limited to, (a) installing end-of-pipe equipment for particulate removal, flue gas desulfurization (FGD), and denitrification; (b) replacing coal with natural gas in industrial boilers, cogeneration systems, heating boilers, and power plants; and (c) replacing diesel and gasoline vehicles with electric and compressed or liquefied natural gas vehicles and charging stations. The GoC-issued premium tariffs for end-of-pipe measures in the power plants are 0.2 fen/kilowatt-hour (kWh) for particulate removal, 1.5 fen/kWh for desulfurization, and 0.8 fen/kWh for denitrification to make these investments in the power plants commercially viable. Almost all the power plants have installed particulate removal and FGD technologies, while denitrification is a new government requirement. The FGD installations under the program are expected mostly in industrial facilities. These are the important measures listed in the APPCAP. These activities account for approximately 10 percent of the total program expenditure.

41. **Activities within Result Area III—Strengthened institutional capacity of the HXB.** The HXB will perform the following:

(a) Set up internal institutional arrangements for green finance, and the HXB plans to establish a Green Finance Center with a dedicated team to lead and coordinate all bank-wide green financing activities, primarily EE and clean energy lending.

(b) Set up internal green lending procedures for loan origination, risk assessment and appraisal, and project approval; set green financing as a priority investment area for the branches in the JJJ Region; and provide incentives for staff to undertake green financing projects.

(c) Provide training to staff on EE and clean energy financing, particularly staff responsible for deal origination and risk assessment.

(d) Undertake marketing and business development for deal origination.

(e) Develop and pilot innovative financing models and products tailored to EE; distributed RE, such as project-based lending; market aggregation for small-scale projects; syndication with other banks; and green bonds.

(f) Scale up lending to SMEs and ESCOs.

(g) Strengthen the capacity for M&V of operation results.

42. These capacity-building activities will encourage the HXB to build a balanced portfolio covering different market segments, including those sub-borrowers with difficulties in access to financing and those subprojects with lower returns and longer payback. The Bank team plans to mobilize the US$18 million GEF project Developing Market-Based Energy Efficiency Program in China under preparation as a potential parallel grant funding, in addition to the existing GEF funding under the ongoing CHEEF program and the CRESP, to support the HXB's institutional strengthening and outreach. This will contribute to APPCAP's goal of expanding green financing and support the Energy Efficiency Credit Guideline recently issued by the CBRC and the NDRC, as well as the green finance agenda laid out by the PBOC.

A.3 Program Beneficiaries

43. Program beneficiaries include (a) the residents of the JJJ Region who benefit from reduced air pollution and the resulting improved health impacts, particularly such vulnerable groups as women, children, and elders; (b) the national government, particularly the NDRC, the NEA (which is in charge of clean energy supply), the MEP, and the MoF; (c) provincial and municipal governments in the JJJ Region, particularly Development and Reform Commissions (DRCs), the EPB, and the Finance Bureau; (d) the participating bank and its branches in the JJJ Region; (e) key energy-consuming industrial enterprises, ESCOs, equipment manufacturers and related service suppliers, building owners and property management companies, project developers, and public transport companies; (f) third-party energy-saving verification agencies and professionals; (g) all economic agents engaged in the EE and clean energy supply and delivery chain; and (h) the global community that benefits from avoided GHG emissions, which contribute to global climate change mitigation.

A.4 Total Financing

44. The expenditure of the PforR program will be at least US$1 billion, comprising the Bank financing of US$500 million and the HXB financing of US$500 million. Table 1 summarizes the program financing. This will leverage an additional US$400 million equity contribution from sub-borrowers, with a total investment of US$1.4 billion.

Table 1. Program Financing

Source	Amount (US$, millions)	% of Total
IBRD	500	50
HXB	500	50
Total Program Financing	**1,000**	**100**

B. Program Development Objective

45. The program development objective (PDO) is to reduce air pollutants and carbon emissions through increasing energy efficiency and clean energy, with a focus on the Jing-Jin-Ji and neighboring regions.

C. Program Key Results and Disbursement-Linked Indicators

C.1 Results Indicators

46. The major results indicators are the following; the detailed results framework is provided in Annex 2.

- **PDO indicators:**
  - Reduction in local air pollutant emissions of particulates, SO_2, and NOx from eligible EE, RE, desulfurization, and denitrification subprojects (tons).
  - Reduction in GHG emissions (CO_2) from eligible EE and RE subprojects (tons).
- **Intermediate indicators:**
  - Subloans (for eligible EE, RE, and pollution abatement subprojects) disbursed to sub-borrowers (US$).
  - Total investments in eligible EE, RE, and pollution abatement subprojects (US$).
- **Result Area I**: Coal reduction from eligible EE and RE subprojects (tce). This indicator is the sum of energy savings from eligible EE subprojects and RE electricity generation from eligible RE subprojects that is converted to coal reduction with an agreed-upon conversion factor.
- **Result Area II:** Reduced air pollution emissions from pollution abatement measures.
  - Reduction of SO_2 emissions from desulfurization subprojects (tons).
  - Reduction of NOx emissions from denitrification subprojects (tons).
- **Result Area III:** Strengthened institutional capacity of the HXB.

- Establishment of a Green Finance Center at the HXB and adoption of internal procedures for the identification, risk assessment, appraisal, and approval of green lending.

- Number of different eligible innovative financial products for green financing. Eligible innovative financial products include (a) project-based lending in which the loan is collateralized by the cash flows resulting from energy cost savings and/or revenues from RE power generation. (b) securitization of project assets. (c) aggregation (bundling) of small-scale projects to increase the loan size and reduce transaction costs. (d) green bonds. and (e) other innovative products proposed by the HXB and approved by the Bank.

- Number of different ESCOs receiving subloans (for eligible EE and RE subprojects). An ESCO is a sub-borrower that provides EE and RE services to a host enterprise and is paid by energy performance.

- Number of subprojects financed by syndicated loans. Syndication refers to a financial product under which the HXB collaborates with one or more other financial institutions to co-finance projects as a leader or a joint financing partner to finance larger subprojects and thereby increase the leveraging of IBRD funds.

47. It should be noted that the replaced or avoided coal consumption and related emission reductions (particulates, SO_2, NOx, and CO_2) from applying RE heating (for example, solar water heaters and geothermal pumps), replacing coal with gas, and replacing diesel vehicles with clean vehicles are counted in neither the program results nor the disbursement-linked indicators (DLIs), given the difficulties to foresee the amount of loans in these areas and to measure and verify the results. Therefore, the results indicators and DLIs on reduction in coal consumption and emissions are conservative estimates, and the actual emission reductions are likely to be higher.

C.2 Results Chain

48. Table 2 outlines the results chain for the PforR program and highlights the DLIs in bold. Bank disbursements will be made against achievement of a pre-agreed set of DLIs. The choice of DLIs is based on five factors: (a) importance of the indicator in promoting a critical action/output along the results chain, (b) need to introduce strong financial incentives to deliver the expected results, (c) practical aspects of verifying achievement, (d) capacity of the participating bank to achieve the DLI during the implementation period of the program, and (e) the built-in flexibility to achieve each DLI to minimize the need for program restructuring. The IBRD loan funds will be disbursed directly to the participating bank, based on the achievement of DLIs.

Table 2. PforR Program Results Chain and DLIs

Result Area	Actions	Outputs/ Intermediate results	Outcomes
PDO-level indicators: Reduced air pollutants and GHG emissions	(1) Scale up EE and RE investments. (2) Increase financing for pollution abatement. (3) Strengthen institutional	**(1) Subloans (for eligible EE, RE, and pollution abatement subprojects) disbursed to sub-borrowers (US$)** (2) Total investments in	Particulate, SO_2, NOx, and CO_2 emissions reduced from eligible EE, RE, and pollution abatement subprojects

from EE, RE, and pollution abatement	capacity of HXB.	eligible EE, RE, and pollution abatement subprojects (US$) (3) Improved EE, increased clean energy, and installed pollution abatement equipment	(tons)
Result Area I: Reduced coal consumption from increased EE and RE	Scale up EE and RE investments.	(1) Subloans for eligible EE and RE subprojects disbursed to sub-borrowers (US$) (2) Energy savings from eligible EE subprojects (tce) (2) Electricity generation from eligible RE subprojects (GWh)	**(1) Coal reduction from eligible EE and RE subprojects (tce)** (2) Particulate, SO_2, NOx, and CO_2 emissions reduced from eligible EE and RE subprojects (tons)
Result Area II: Reduced air pollution emissions from pollution abatement measures	Increase financing for pollution abatement measures, such as installing desulfurization and denitrification, replacing coal with natural gas, and replacing gasoline vehicles with electric and CNG vehicles.	(1) Subloans for eligible pollution abatement subprojects disbursed to sub-borrowers (US$) (2) Increased installation of FGD and denitrification (3) Increased use of natural gas (4) Increased clean vehicles	**(1) Reduction of SO_2 emissions from desulfurization subprojects (tons)** **(2) Reduction of NOx emissions from denitrification subprojects (tons)**
Result Area III: Strengthened institutional capacity of the HXB	(1) Establish a Green Finance Center. (2) Set up internal green credit procedures and provide sticks and carrots to incentivize staff. (3) Provide training to staff. (4) Undertake marketing and business development for deal origination. (5) Develop and pilot innovative financing models and products. (6) Increase lending to ESCOs. (7) Strengthen capacity in M&V of results.	**(1) Establishment of a Green Finance Center and adoption of internal procedures for the identification, risk assessment, appraisal, and approval of green lending** **(2) Number of different eligible innovative financial products for green financing deployed** **(3) Number of different ESCOs receiving subloans (for eligible EE and RE subprojects)** (4) Number of subprojects financed by syndicated loans	Institutional capacity improved and green financing mainstreamed at the HXB

C.3 DLIs

49. Consistent with the PforR framework, six DLIs have been identified over five disbursement periods corresponding to the five years of the program implementation period, in consultation with the HXB. The details of the DLIs are provided in Annex 3.

50. DLI-1 relates to an important output indicator—subloans (for eligible EE, RE, and pollution abatement subprojects) disbursed to sub-borrowers, measured in U.S. dollars. This DLI demonstrates the scale of green financing provided to support the implementation of the APPCAP and will directly result in substantial emission reductions. The subloan eligibility criteria are listed in the Operational Manual (OM) and Annex 4.

51. DLI-2 relates to an outcome indicator under Result Area I—coal reduction from eligible EE and RE subprojects, measured in tce. (Please refer to results indicators in paragraph 46 for details.) This DLI directly contributes to the GoC's coal reduction target. However, given the unpredictable market demand, there is an uncertainty over the investment

portfolio regarding the share of each technology. Due to the wide variation in costs among different EE and RE technologies, this uncertainty increases the risk of not achieving this DLI. The achievement of this DLI also depends on factors beyond the HXB's control; for example, reduced industrial production from economic slowdown will lead to less energy savings, and the difficulties in access to the grid will affect RE electricity generation. Therefore, the IBRD loan allocated for this DLI is modest.

52. DLI-3a and DLI-3b relate to outcome indicators under Result Area II. They are the reduction in SO_2 and NOx emissions from desulfurization and denitrification subprojects, respectively, measured in tons. These DLIs are selected as the most appropriate indicators to measure the results under Result Area II because of the importance of FGD and denitrification technologies to emission reductions, the significant contribution of these DLIs to the emission reduction objective, and the GoC's mandatory requirements for installation of desulfurization and denitrification equipment in industrial and power plants. DLI-3a and DLI-3b are designed as subsets of DLI-3 to allow for maximum flexibility during implementation, given the uncertainty over the market demand for each type of subproject.

53. DLI-4, DLI-5, and DLI-6 relate to output indicators under Result Area III.

- DLI-4 is a prior result triggered upon the action taken before the signing of legal agreements of the operation, for which the HXB will establish a Green Finance Center that provides guidance on the HXB's green financing business and adopt internal procedures for the identification, risk assessment, appraisal, and approval of green lending. The most important lesson learned from the ongoing CHEEF program demonstrated that the participating banks' internal structure—including their management commitment, dedicated teams, internal organization, and coordination between the headquarters (HQ) and branches—and deal origination, risk assessment, appraisal and approval, incentive schemes, and so on, is essential to green lending. Therefore, this DLI is a prior result to ensure the HXB's readiness to implement the operation.

- DLI-5 is the number of different eligible innovative financial products for green financing. Another major lesson learned from the CHEEF program is that most local banks usually rely on balance sheet financing, which requires that borrowers have either good credit ratings or high levels of collateral, which, in turn, favors large-scale borrowers. The concept of project-based financing that focuses on the cash flows from energy savings has not yet been widely accepted by financial institutions. The result is that the most creditworthy potential clients do not necessarily need financing for EE/RE, while the customers most in need of financing are typically not creditworthy. In addition, EE/RE investments tend to be small, with high transaction costs. Therefore, innovative financial products tailored to EE and RE markets are critical to scale up green lending in these areas. Eligible innovative financial products are described in detail under result indicators in paragraph 46.

- DLI-6 is the number of different ESCOs receiving subloans (for eligible EE, RE, and pollution abatement subprojects). This DLI intends to incentivize the HXB to expand its clientele to ESCOs, which are mostly SMEs with difficulty accessing financing.

D. Key Capacity-Building and Systems-Strengthening Activities

54. An important element of this operation is to enhance the capacity of the HXB and strengthen its internal systems and procedures for green lending. The HXB will establish a Green Finance Center that will focus on lending for EE, clean energy, and pollution control projects and provide guidance to a bank-wide green lending business. In addition, under the CHEEF program, the HXB has identified a number of innovative financial products for green lending and has financed a number of ESCO projects. Under this operation, the HXB needs to further strengthen its capacity to pilot these innovative financial products and expand the ESCO client base.

55. These activities have been incorporated into the design of this PforR program by setting specific DLIs (DLI-4, DLI-5, and DLI-6) to incentivize the HXB by linking disbursements with these important capacity-building results.

56. Furthermore, the HXB needs to strengthen its capabilities in M&E of results, particularly verification of DLIs. The HXB also needs to enhance its procurement, financial management (FM), and environmental and social capacities. The Bank team will provide training to the HXB to strengthen its capacity in these areas. Detailed capacity-building activities are outlined in the Program Action Plan section (IV.E).

III. PROGRAM IMPLEMENTATION

A. Institutional and Implementation Arrangements

57. **Government.** The GoC is responsible for laying out priority investment areas, issuing policies and regulations, and providing financial incentives, under the context of the APPCAP and clean energy and emission reduction programs. The HXB will work closely with relevant government agencies, including the NDRC FCUD, MoF, NDRC EPRCD, NEA, MEP, and local governments in the JJJ Region. These agencies will provide overall guidance to ensure the investments made under the PforR program directly support the priorities of the APPCAP program and recommend potential sub-borrowers and subprojects obliged to achieve the APPCAP targets. The NDRC FCUD is responsible for approving and supervising foreign capital utilization. The MoF is the official government counterpart of the Bank and provides sovereign guarantee to IBRD loans.. The NDRC EPRCD is in charge of targets and policies for EE and coal cap control, and the NEA is in charge of RE targets and policies. The MEP is responsible for the overall implementation of the APPCAP. In the seven provinces and municipalities in the JJJ Region, the provincial/municipal DRCs in charge of EE and RE as well as EPB will also be closely involved in the program, because they have the ultimate responsibility to implement the targets set in the APPCAP. The local governments are responsible for issuing local supporting policies and providing additional fiscal incentives and are best equipped to know the local market and investment needs.

58. **HXB.** The GoC has designated the HXB as the implementing agency for this PforR operation. This implementation modality is chosen because: (a) given the fragmented and decentralized nature of many retail small-scale EE and clean energy investments, it is cost-effective for the government and multilateral development banks (MDBs) to adopt a wholesale approach that engages the domestic banks that are responsible for managing the EE and clean energy investment portfolio to achieve the maximum leverage of public funds and ensure sustainability; (b) this proposed operation builds on the successful experience of the ongoing CHEEF program, but with a results-based focus; and (c) the GoC intends to use

this operation to explore ways in which a financing platform could be set up to support the implementation of the APPCAP.

59. The HXB is listed on the Shanghai Stock Exchange (SSE). Two large state-owned companies with metallurgy and power generation backgrounds together with Deutsche Bank hold more than 50 percent of the bank's shares. The bank was first set up in Beijing and has strong operational presence in the JJJ Region.

60. The HXB is a leader in green financing in China, with a proven track record and experience in EE and clean energy financing. The bank has demonstrated its interest, capacity, and expertise in EE and clean energy financing under the ongoing IBRD/GEF CHEEF program and AFD-funded EE and RE financing project. The HXB top management is fully committed to green financing; has established a dedicated team at HQ and branches, internal systems, and procedures for green energy financing; and has developed innovative financing products. A set of criteria based on the regulatory guidelines has been put in place to manage the social and environmental risks of the bank's operations. The management of the HXB considers air pollution control in the JJJ Region as a top priority and has announced the establishment of a CNY 5 billion Blue Sky and Clear Water Fund in the JJJ Region to provide debt and potentially equity financing for green investments. The HXB also plans to dedicate CNY 20 billion each year for integrated development in the JJJ Region, mostly for infrastructure investments in the energy, transport, water, and environment sectors.

61. The HXB will be responsible for identifying, appraising, and financing eligible subprojects that meet the criteria in the OM, measuring and verifying results, and bearing the full default risks. The detailed eligibility criteria and appraisal guidelines are outlined in the OM.

62. HXB's implementation structure for green credit financing in the JJJ Region follows a three-level structure: (a) the HXB has established a JJJ Leading Group in charge of bank-wide investments in the JJJ Region; (b) at HXB HQ, the Green Finance Center to be established will be responsible for overall green finance in the HXB, marketing, guidance to branches, quality control, project management, and liaison with the government and the Bank; the HXB also plans to assign dedicated staff for risk assessment and approval of green lending and develop special underwriting policies and tailored financial products to green lending; and (c) the branches are responsible for deal origination and supervision, and HXB also plans to assign designated units in the JJJ Region branches to take the lead in green credit. The HXB envisions the proposed Green Finance Center could finance up to CNY150 billion green lending by the end of the PforR program's implementation. The detailed institutional arrangements and business procedures within the HXB are summarized in Annex 1.

B. Results M&E

63. Under this PforR operation, the HXB, as the implementing agency, is responsible for results M&E and verification of the DLIs, based on the agreed verification methodology, protocols, and procedures outlined in the following section. This PforR program adds value to strengthen the focus on results M&E through an independent and credible verification system, since the current M&V system under the government's APPCAP relies primarily on reporting from enterprises, rather than verification by independent third parties.

C. Disbursement Arrangement and Verification Protocols

64. **Advances.** The borrower informed the Bank that advances will be needed. Advances up to 25 percent of total program financing (advance), or US$125 million, can be made by the Bank to HXB. When the DLI(s) against which an advance has been disbursed are achieved, the amount of the advance will be deducted (recovered) from the total amount due to be disbursed under such DLI(s). The advance amount recovered by the Bank is then available for additional advances (revolving advance). The Bank requires that the borrower refund any advances (or portion of advances) if the DLIs have not been met (or have been only partly met) by the closing date, promptly upon notice thereof by the Bank.

65. If the Bank establishes after the closing date that the withdrawn financing balance exceeds the total amount paid for program expenditures, exclusive of any such amounts financed by any other financier or by the Bank under any other loan, credit, or grant, the borrower must, promptly upon notice from the Bank, refund to the Bank such excess amount of the withdrawn financing balance. The Bank must then cancel the refunded amount of the withdrawn financing balance.

66. **Prior results.** The Bank will disburse up to US$50 million and US$10.75 million for prior results achieved under DLI-1 and DLI-4, respectively. These include HXB disbursing eligible subloans (result under DLI-1) and establishing a Green Finance Center and adopting internal procedures for the identification, risk assessment, appraisal, and approval of green financing projects (both results under DLI-4), between January 21, 2016, and the date of signing the legal agreements.

67. **Disbursement arrangement.** The HXB is responsible for verification of the achievements of the DLIs through independent verification agencies, based on the agreed verification protocol. Disbursements will be made upon verification of the results of the DLIs. Since the DLIs, with the exception of DLI-4, are scalable, the actual disbursement will depend on the verified results. The conservative estimates of FY17 disbursement entail advanced payment ($125 million), payment for prior result against DLI-4 ($10.75 million), front end fee ($1.25 million), and estimated disbursement for achieving DLI-1.

68. **Verification protocol.** The protocol for verification of achievements of DLIs builds on the existing national verification system wherever possible. The verification will be conducted annually. See Annex 3 for details.

69. DLI-1 will be verified by an independent audit firm (IAF), commissioned by the HXB and approved by the Bank, against the subloan eligibility criteria agreed in the OM.

70. DLI-2 is a combination of energy savings achieved from eligible EE subprojects and electricity generated from eligible RE subprojects financed by the HXB. The energy savings M&V system builds on the existing preliminary system in place in China. From 2007 until early 2015, the MoF and NDRC formulated a series of basic policies and regulations on EE M&V methodologies and protocols, and accredited 26 independent third-party verification agencies to implement the output-based EE reward fund. Under this PforR program, the HXB will engage an independent verification agency (IVA) selected from the 26 accredited verification agencies, following the national EE M&V guidelines. RE electricity generation will be verified by the IVA using metered data and converted to coal reduction with an agreed-upon formula. The verification will be undertaken on a sampling basis. Annex 3 describes the M&V details.

71. Since actual measurement of emission reductions is difficult and unreliable, DLI-3a and DLI-3b will be verified by IVAs engaged by the HXB, which will (a) use a "deemed reduction" approach to confirm the emission reduction based on verification of the technical assumptions and calculations in the feasibility study reports of desulfurization and denitrification investments and (b) verify the actual installation and operation of desulfurization and denitrification equipment.

72. The HXB will provide evidence of DLI-4 to the Bank. The IAF will audit and verify DLI-5 and DLI-6.

IV. ASSESSMENT SUMMARY

A. Technical Assessment

73. **Strategic relevance.** Improving EE, increasing clean energy, and reducing air pollutants and carbon emissions are top priorities for the GoC, particularly given the severe air pollution in the JJJ Region. The proposed program is thus strategically relevant and aligned with the GoC's priorities.

74. **Technology soundness.** The PforR program will finance technically proven and commercially viable EE, clean energy, and pollution abatement investments with substantial field experience. The technical eligibility criteria for EE, RE, and pollution abatement subprojects are provided in Box 4.1 in Annex 4. The HXB has demonstrated experience and a proven track record to evaluate and appraise the technical aspects of these investments. In fact, the HXB has prior experience in financing all of these technologies. The HXB will ensure that the investments comply with Chinese technical policies and regulations.

75. Institutional capacity. The HXB has demonstrated extensive experience in financing EE, clean energy, and pollution abatement technologies and in implementing Bank operations under the CHEEF program. They have adopted most of the Bank's technical, fiduciary, and environmental and social requirements under the CHEEF program and mainstreamed into their own lending procedures. Under the PforR program, one area of concern is the HXB's capacity in results M&E and verification of DLIs. This risk will be mitigated by engaging IVAs.

76. **Expenditure framework.** The proposed program will be US$1 billion, of which US$500 million will be financed from IBRD and US$500 million will be financed from the HXB. The program expenditure occurs when the HXB disburses the subloans to the sub-borrowers. All the program funds will be included in the HXB's existing budgeting system.

77. The HXB mobilizes funding mainly from company and household depositors and extends loans and other financing products primarily through its banking offices at the HQ and more than 30 branches. The bank has put in place a reasonable framework for credit risk control and credit administration. Loans are disbursed based on the progress of projects or repayments of working capital loans. The Bank funds will be managed and disbursed the same way the HXB manages its credit risk. The HXB's borrowing of the Bank funds through the MoF and the loans funded by this source will be recorded on the balance sheet, which is subject to annual audits by an external auditor. The HXB's financial situation is detailed in Annex 4.

78. The HXB's management decides the annual credit guidance and business priority based on the GoC development strategy and target. To ensure the financing made under the operation supports government priorities and contributes to achieving the results of the APPCAP, the HXB made JJJ air pollution control as one of its business priorities over the next few years. This PforR program, therefore, is included in the HXB's prioritized business plan. To ensure the availability of the program funds, the HXB plans to earmark the program funds in its annual lending envelope. The HXB's Blue Sky and Clear Water Fund in the JJJ Region and JJJ Integrated Development Fund also support, but are not limited to, PforR program activities.

79. **Results framework.** Six DLIs have been identified that will provide a balance between providing incentives to achieve the key outputs and outcomes under each result area and the feasibility to achieve and verify the results. The IBRD loan amount of US$500 million will be disbursed against the attainment of the DLIs. Result indicators include both DLIs and core sector indicators. The selection of IVAs is critical for the credibility and operations of the program, and the HXB has agreed to engage IVAs by December 31, 2016.

80. **Economic analysis.** The economic analysis was conducted for EE and RE subprojects under Result Area I, which accounts for approximately 90 percent of the program expenditure. Cost-benefit analysis was used. Considering the different types of investments under the operation, cost-benefit analysis was undertaken for each type of investment subproject, and then the results were added together based on the weighted average to evaluate the economic justification of the program. Quantitative analysis was not conducted for Result Area II on pollution abatement measures due to data unavailability. Since this investment area represents only 10 percent of the program expenditure and preliminary analysis demonstrates that pollution abatement measures are likely to have positive economic returns, this exclusion should not affect the overall economic justification of the program.

81. The investment cost of each subproject varies, and the total investments are large and uncertain. Based on the information provided by the HXB, the investments of 23 industrial EE subprojects financed under the CHEEF program range from CNY 1,510 to CNY 5,989 per tce, with total investments ranging from CNY 30 million to CNY 460 million for each subproject. The same will be true for other types of investments, even though the variation for RE subprojects could be much smaller. So, generic subprojects based on average investment and average performance are used to represent the typical subprojects under the program for economic analysis.

82. Following a cost-benefit analysis approach, the costs include both capital investments and operational costs, while the benefits include energy savings for EE subprojects, electricity sales for RE subprojects, and both local and global environmental benefits resulting from avoided coal consumption.

Table 3. Summary Results of the Economic Analysis

Type	EIRR (%)		NPV @ 5% (US$, millions)	
	Without Carbon	With Carbon	Without Carbon	With Carbon
Area 1.1 EE				
Industrial EE	46.9	72.4	1,373.2	1,930.9
Building EE	18.0	25.1	117.9	180.6
Area 1.2 RE				
Solar PV	8.6	11.0	78.1	133.3

Biomass power	16.9	29.8	134.1	275.3
Wind power	11.3	15.6	137.9	238.3
Whole program	22.6	31.9	1,795.0	2,666.9

Note: CO_2 is valued at US$30/metric ton of carbon dioxide equivalent (tCO_2e) based on the Guidance Note on Social Value of Carbon in Project Appraisal. EIRR = economic internal rate of return; NPV = net present value.

83. As shown in Table 3, the EIRR of the PforR program was estimated at 22.6 percent without the social value of carbon and 31.9 percent with the social value of carbon. The EIRR is higher than the Bank's requirement of 5 percent, so the program is economically justified. The NPV of the program was estimated at US$1,795 million without carbon value and US$2,667 million with carbon value, discounted at a rate of 5 percent. Sensitivity analysis was conducted with different discount rates ranging from 0 percent to 12 percent, and the NPV of the program was positive, ranging from US$4,262 to US$574 million without carbon value, or from US$5,991 to US$1,035 million with carbon value.

84. **Financial analysis.** Similar to the economic analysis, the financial analysis was conducted for EE and RE generic investment subprojects under Result Area I. Cash flow analysis was undertaken to estimate the financial internal rates of return (FIRRs) for each type of investment subproject and then added together based on the weighted average to evaluate the overall financial viability of the program.

85. The FIRRs were estimated at 14.4 percent for the industrial EE subproject, 5.2 percent for the building EE subproject, 8.6 percent for the solar PV subproject, 16.9 percent for the biomass power subproject, and 11.3 percent for the wind power subproject. The weighted FIRR for the whole program was estimated at 11.5 percent. Considering the interest rate of commercial loan was about 5 percent in China, the program demonstrates its financial viability.

86. **Financial sector due diligence of the HXB.** A financial sector due diligence of the HXB has been conducted in accordance with the principles followed by the Bank in cases of financial intermediaries (as reflected in Operational Policy 10.00), and it was confirmed that HXB meets the Bank's criteria as a participating bank.

87. The HXB appears to be profitable and compliant with the prudential regulations on liquidity, loan portfolio quality, capital adequacy, and connected-party transactions. As a listed public company, the bank's institutional arrangements for corporate governance and financial reporting meet the authorities' requirements. The HXB is governed by an independent and commercially-oriented board. Its president is appointed by the Board. The HXB retains autonomy in strategic decision making, so long as it complies with relevant government laws and regulations. The HXB has also significantly improved its credit risk management framework. The business strategy appears to be relevant, and the assets-liability management (ALM) effective. Based on the available information, the due diligence finds no major financial problems that would threaten the HXB's viability in the next few years.

88. However, nonperforming loans (NPLs) are rising in China's banking sector amid the current economic downturns, which are considered to be a "new economic normality." Against this backdrop, the HXB's loan quality is deteriorating, particularly with regard to credit quality migrations, although the level of NPLs remains low. The economic slowdown, together with intensified competition for viable borrowers and lower-cost funding in a more liberalized environment for interest rate formations, has also added pressure on the banking sector's profit margins. The HXB's net profit growth pattern is evidence of this system-wide

development. In addition, the bank's operational cost is relatively high, although it has started to decline. These external and internal factors have overstretched the HXB's capital base at a time when the bank needs to become fully compliant with the CBRC's capital management regulation by 2018.

89. The HXB has tried to mitigate the increased financial constraints by making more provisioning for NPLs, maintaining high liquidity, seeking higher-earning assets and lower-cost funding, and issuing additional shares and debts. Similar to its peers, the bank has also expanded the off-balance-sheet (OBS) businesses in the last three years. The volume and value of wealth management products, entrusted loans, and other trust facilities have grown exponentially, which have helped alleviate the pressure on profitability. The bank has reported compliance with a regulation on these businesses.

90. For this PforR program, the HXB will rely on its internal risk-control mechanisms to ensure portfolio quality. The HXB has a lower NPL level compared with its peers. In addition, it had no default in its existing EE and RE portfolio under the CHEEF program and AFD projects. Experience from other Chinese banks has proved that EE and RE investments have lower default risk than other infrastructure sectors. The HXB also plans to strengthen its internal risk control and approval at HQ. To ensure the transparency and quality of the portfolio under the PforR program, the HXB has agreed to report on its portfolio quality in its program report to the Bank.

91. The HXB bears 100 percent of default risk of the IBRD loans. The HXB is responsible for establishing the on-lending rate based on the risk profile and the nature of the sub-borrowers and subprojects. The HXB is willing to provide long-term maturity loans to match the long payback period of RE technologies.

92. Based on the above assessment, it is recommended that the annual program supervision should include desk reviews of the HXB's annual financial statements, to help identify early warning signs of any major implementation risks involving the bank. If these reviews indicate an increased risk of the HXB, the Bank team may consider an update of the due diligence review at the mid-term review. Annex 4 provides detailed findings of the due diligence review.

B. Fiduciary Assessment

93. The HXB is the implementing agency of the operation, which will on-lend the program funds at market rates to commercial enterprises for financing of eligible subprojects, in accordance with the HXB's existing institutional arrangements, procedures and requirements, assessment and appraisal of subprojects, supervision, and oversight arrangements. The institutional arrangements, lending practices, eligibility criteria, and governance and risk controls are included in the OM, which has been agreed with the Bank. The HXB will be responsible for repayment of the loan to the GoC and will assume all financial risks as well. The Corporate Business Division (CBD) of the HXB has accumulated extensive experience with Bank operations from the CHEEF program. The Green Finance Center, to be established within the CBD, will continue to take primary responsibility in marketing and developing pipeline under the program; appraise and approve potential subprojects against eligibility criteria outlined in the OM; and provide day-to-day program-related disbursement and FM work, including accounting and financial reporting, and coordination with the Bank.

94. The HXB has demonstrated capacity and experience and has mainstreamed EE and clean energy financing in its current business lines. The HXB has fully disbursed IBRD funds under the CHEEF program, and its fiduciary performance on procurement and FM under the CHEEF program has been satisfactory. The HXB has adequate systems in place for oversight, appraisal, and supervision of subprojects to avoid misuse of the loan and to reduce the risk of NPLs. For subproject loan appraisal, the HXB assesses the reasonableness of cost estimates and the capacity of the beneficiary to implement the subproject, including its FM and procurement capacities. With the exception of the requirements for accounting, financial reporting, auditing, and introduction of DLIs and the associated protocols for verification under the PforR policy, the program fiduciary systems for the HXB will largely be the same as the existing systems within the HXB. Therefore, the procurement and FM assessment found the HXB's fiduciary system can meet the Bank's requirements under the Bank Policy on Program for Results Financing, and fiduciary risk is rated as Moderate.

95. **Procurement.** Procurement under the program will mostly include (a) goods; nonconsulting services; and design, supply, and installation of plant and equipment for rehabilitation, renovation, retrofitting, and reconfiguration of production lines and facilities in enterprises for the purpose of energy conservation; and (b) small- and medium-size civil works and associated design and consulting services for such works. There are no large contracts valued at or above Operational Procurement Review Committee thresholds under the program.

96. An assessment was conducted of the HXB's governance and institutional arrangements and its systems, processes, and controls for screening, appraising, and approving subprojects and supervising procurement and implementation under the subprojects. Field visits were made to some entities that have ongoing subprojects financed under the CHEEF program. Procurement under the program will be undertaken by the respective subloan beneficiaries, in accordance with well-established commercial practices in China. The commercial sector procedures and practices for procurement are much simpler than those for the public sector and require less documentation. However, given the industry's profit-driven nature and the highly competitive local market for works, goods, and consulting and nonconsulting services, the procurement methods used in the commercial sector are efficient, are fit for the purpose, and achieve value for money. The general rule for enterprises is to carry out a market analysis of available products/technologies/providers and then, through a series of negotiations, try to establish long-term, mutually beneficial relationships with the providers. The review shows that many enterprises have purchasing departments that are subject to corporate internal control. Audit and supervision departments in the enterprises also monitor expenditures. Given the market situation of providers and the corporate controls, the procurement fiduciary risk is well managed. Further details on the integrated fiduciary assessment are provided in Annex 5.

97. Gaps were identified at the program preparation stage, and will be addressed through appropriate actions agreed with the HXB in the Program Action Plan (PAP), which is described in detail under section E.

98. **Financial management.** The IBRD loan will be disbursed directly into the accounts of the HXB upon realizing the DLIs and will be pooled with the HXB's own contributions. The program funds will be on-lent to sub-borrowers, based on the HXB's commercial practices. The program funds will be included in the HXB's own budgeting system. The HXB will set up a program-specific accounting and reporting system, and its existing auditing system will be used for the program financial audit. The HXB has a governance and

internal control system in place, including internal and external audit. The program will be included in the HXB's monitoring and control scopes. The program-specific FM and disbursement arrangements are documented in the OM agreed with the Bank.

99. **Fraud and corruption risks.** As with other aspects of the PforR program, the GoC will use its own systems and internal control structures to take all appropriate measures to prevent fraud and corruption (F&C) in connection with the program. As noted in the Bank's Guidelines on Preventing and Combating Fraud and Corruption in Program-for-Results Financing, the Bank's debarment and suspension list, which is easily accessible, will apply and should be checked by all procuring entities to ensure that no debarred or suspended contractors are awarded any contract under the program. On a periodic basis, the HXB will handle and report to the Bank allegations occurring under the program. Likewise, the Bank will inform the HXB of any similar allegations, if received. Reporting is expected to be on an annual basis. In cases where the Bank will need to carry out administrative inquiries, the government's collaboration with such inquiries has been confirmed during appraisal.

C. Environmental and Social Assessment

100. Following the principles outlined in Policy and Directive on Program for Results Financing, an environmental and social systems assessment (ESSA) for the proposed program was prepared, which is based on a review of existing laws and regulations and consultations with key stakeholders ranging from the HXB; developers of different types of EE, RE, and pollution abatement projects; and government officials and individuals. The ESSA concluded that the overall environment, health, and safety (EHS) and social systems in China—the JJJ Region in particular——are considered acceptable for use under this PforR operation.

101. **Environment.** China has established a comprehensive system for management of EHS issues, which consists of laws, regulations, guidelines, and specifications and standards. There is no difference between the system and the Policy and Directive on Program for Results Financing regarding principle and substance. The system provides a reasonable basis for addressing the environmental issues that are likely to arise in the proposed investment areas of the PforR program. Although the EHS management system in China is complex and involves various government and nongovernment organizations, the approval procedure of the subproject has been clearly arranged to ensure these concerns regarding EHS aspects are considered in a consolidated way in the decision-making process.

102. During the early screening process to identify the PforR program scope, the activities of potentially high-risk Category A-type subprojects have been excluded from the program. The initial screening of the EHS effects has been made primarily based on the nature and location of the investment areas. According to the initial screening, the proposed program may cause diversified effects in the construction and operation stages. However, these environmental effects are anticipated to be site specific, moderate, or minimal and can be avoided, minimized, and mitigated through the early screening, alternatives comparison, consultation, and proper design of mitigation measures.

103. **Social.** The proposed program will have limited land acquisition impacts, as most EE and emission reduction activities will be confined within the existing premises of enterprises, and the degree of land acquisition will be moderate for some clean energy projects. Based on a review of similar projects and experience, construction of certain facilities of RE projects, such as a biomass power plant site, windfarm generator base, and substation, will involve a

certain degree of permanent land acquisition. For other facilities, including construction areas and access roads for windfarms, land for installing solar panels for centralized solar power projects, and fuel storage sites for biomass power plants, temporary land occupation will be involved during both project construction and operations.

104. For such social impacts, China has an established system to ensure that project location avoids or minimizes acquisition of primary farmland. Regarding the potential social impacts caused by land acquisition, China has a clear procedure for obtaining approval of land acquisition and managing the process with defined responsible government institutions. The procedure does not allow the implementation of a subproject without approval of the land acquisition requirement. Review of similar projects indicated that all project sponsors have obtained relevant land approval, and all land was obtained by following the established land acquisition process, with villages notified, measurement confirmed, and compensation provided. For the required temporary land, agreements were reached between project sponsors and local villages. Finally, the PforR program will exclude any subprojects with potential job losses.

105. **Assessment of the HXB's capacity and performance.** The HXB's capacity for and performance on managing EHS and social risks are often reflected in its independent risk management system, which is handled by the risk control department in the bank's HQ and local branches. The capacity of the risk management system is established largely on the experience and lessons obtained from projects financed by the HXB. So far, the HXB has obtained some prior experience from EE, wind, and solar PV projects, and still needs to strengthen its EHS capacity. In addition, the business department usually depends on the evidence of approval of the project proposal, feasibility study report, environmental impact assessment (EIA), and land preliminary verification to ensure the proposed project is eligible for loan. While the current system meets the basic requirement of managing loan application, it does not provide evidence regarding satisfactory implementation of the mitigation measures, including the internal system for managing EHS issues within the enterprises during the operating stage and completion of actual land acquisition procedures for the acquired land. However, the HXB has committed to dedicate resources to strengthen its capacity on management of EHS, particularly on the implementation stage of subprojects.

106. **Consultation and disclosure.** Consultation on the draft ESSA was conducted with stakeholders on September 21, 2015. The representatives of HQ and branches of the HXB and relevant government agencies participated in the consultation and provided comments and suggestions. During the consultation, the representatives of the HXB highlighted the importance of sound environmental and social management to the HXB's reputation, and agreed with the key findings and recommendations of the ESSA. Based on the comments, the revised ESSA was disclosed at the InfoShop of the Bank on November 7, 2015, and was disclosed in country on November 13, 2015.

107. **Gender.** The program 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. For eligible sub-borrowers, guidelines will be developed to ensure that women-owned companies will not be discriminated.

108. **Grievance redress.** Communities and individuals who believe that they are adversely affected as a result of a Bank-supported PforR operation, as defined by the applicable policy and procedures, may submit complaints to the existing program grievance redress mechanism

or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address pertinent concerns. Affected communities and individuals may submit their complaints to the Bank's independent Inspection Panel, which determines whether harm occurred, or could occur, because of the Bank's noncompliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention and the Bank management has been given an opportunity to respond. For information on how to submit complaints to the Bank's corporate GRS, please visit www.worldbank.org/grs. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

D. Integrated Risk Assessment Summary

109. **The overall risk rating of the program is Substantial,** as shown in Table 4. As this is the first PforR operation in China, it is expected that there will be a learning curve for the government and the HXB during the program implementation. Based on the experience from the CHEEF program, the biggest risk during implementation of the operation will be generating sufficient deal flows in the relatively limited geographic focus of the JJJ Region, particularly given the slowdown of the economy, and the closure of inefficient industrial factories where EE potential is great. Furthermore, given the uncertainties over market demand and the factors beyond the HXB's control detailed in paragraphs 51 and 52, the risks of not achieving the projected result indicators and DLIs are substantial. Finally, verification of results is new to the HXB.

110. Mitigation measures will include the following:

(a) The Bank team has provided and will continue to provide training to the government and the implementing agency on PforR operations during preparation and implementation of the operation.

(b) The HXB will work closely with the NDRC, NEA, MEP, local governments in the JJJ Region, industry associations, ESCOs, and third parties and will undertake marketing campaigns for deal origination. The overall policy environment is conducive to EE, RE, and pollution abatement investments in the JJJ Region, and the policies for RE grid access have improved substantially in recent years.

(c) The HXB is building a robust pipeline in the JJJ Region and will develop and pilot innovative financing products that are tailored to the EE/RE market to reach out to underserved clients.

(d) The design of result indicators and DLIs has been based on a market survey in the JJJ Region and built-in contingencies to factor in the uncertainties to achieve actual results on the ground.

(e) The HXB will strengthen its capacity in results M&E and engage IVAs for verification of DLIs. Additional risk mitigation measures are listed in the Program Action Plan section (IV.E).

111. The PforR instrument allows more flexibility in implementation than the input-based approach under the CHEEF program. The PforR program adopted strengthening the institutional capacity of the HXB as a DLI to provide strong financial incentives for the HXB

to align its internal structure and incentives with deal origination. Much has been learned during the preparation and implementation of the CHEEF program, and the PforR instrument is expected to accelerate implementation of the capacity building program.

Table 4. Risk Assessment Summary

Risk	Rating
Country	Moderate
Stakeholder	Moderate
Technical	Moderate
Fiduciary	Moderate
Environment and Social	Moderate
Disbursement-Linked Indicator	Substantial
Overall Risk	**Substantial**

E. Program Action Plan

112. The program assessment identified a number of issues, and the Bank team agreed with the HXB on the following action plan. A major issue is that the HXB needs to enhance its capacity and strengthen its close supervision of the sub-borrowers for results M&E and compliance with the requirements for procurement, FM, and environmental and social areas. This concern can be mitigated by the following actions: (a) the ongoing CHEEF program and the CRESP will provide grant funding, and the Bank team is seeking additional grant funds to the HXB for technical assistance and capacity building; (b) the Bank team will continue to provide training to the HXB in technical, procurement, FM, environmental, and social areas; (c) the HXB will provide extensive training to its staff at its HQ and branches; (d) the HXB will engage IVAs for results M&V and experts for technical, fiduciary, and environmental and social support, as needed; (e) the HXB will clearly specify the fiduciary and environmental and social requirements and procedures in the OM and in the subloan agreements with sub-borrowers; and (f) the HXB will annually report to the Bank the actions it has taken.

113. **Technical.** The HXB will continue to build in-house capacity for technical appraisal of subprojects and M&V of program results, and will outsource IVAs for validation of DLIs and technical support. The HXB's OM includes requirements and procedures in results M&E and validation of DLIs and relevant training to be provided to staff in charge of M&E.

114. **Procurement.** The mitigation measures agreed for the program are as follows:

(a) In line with Article 34 of the Regulation on the Implementation of the Tendering and Bidding Law of the People's Republic of China, the subproject application and the subloan agreement with beneficiaries will include a mandatory provision that the beneficiaries will not award contracts to their parent or affiliate companies, unless there is an established arm's-length arrangement, with the exception for ESCOs on the basis they are providers and are sourced by their

clients through commercial practices to provide EE/RE services under performance-based contracts. The procurement plan accompanying the application for the ESCOs should identify contracts that will be procured directly from parent or affiliated companies and the HXB, as part of the application review process should satisfy itself that the products offer value for money.

(a) The HXB will set up a complaints-handling mechanism and reporting procedures, details of which will be included in the subproject application package and on the HXB's website.

(b) Beneficiaries will confirm, as part of the subloan agreement, that they will not award contracts to firms and individuals on temporary suspension or debarment by the Bank and other MDBs.

(c) The HXB will strengthen its capacity to assess the capacity of beneficiaries to carry out procurement and contract management efficiently as part of subproject appraisal and will provide guidance to beneficiaries with inadequate procurement capacity. The HXB and beneficiary enterprises will hire expertise, as needed, to strengthen procurement and contract management.

115. **Financial management.** To meet the reporting requirements for the program, the following mitigating measures are agreed with the HXB: (a) the CBD of the HXB sets up the memorandum records for the program to record each subloan released and related reference information for ease of tracking the record in the corporate accounting system and the original supporting documents; (b) reconciliation is made between the CBD and the accounting division on a quarterly basis; and (c) the CBD prepares the program-specific financial report according to the format specifically tailored and agreed with the Bank for the program on a semester basis, and submits the report to the Bank.

116. **Environmental and social.** The agreed mitigation measures to manage environmental and social risks are (a) strengthening environmental and social impact management within the HXB by specifying the requirements and procedures in the OM, and (b) enhancing the capacity of the HXB staff by designating staff, allocating resources, specifying operating arrangements, and coordinating with other departments in the HXB.

Annex 1: Detailed Program Description

Program Development Objective

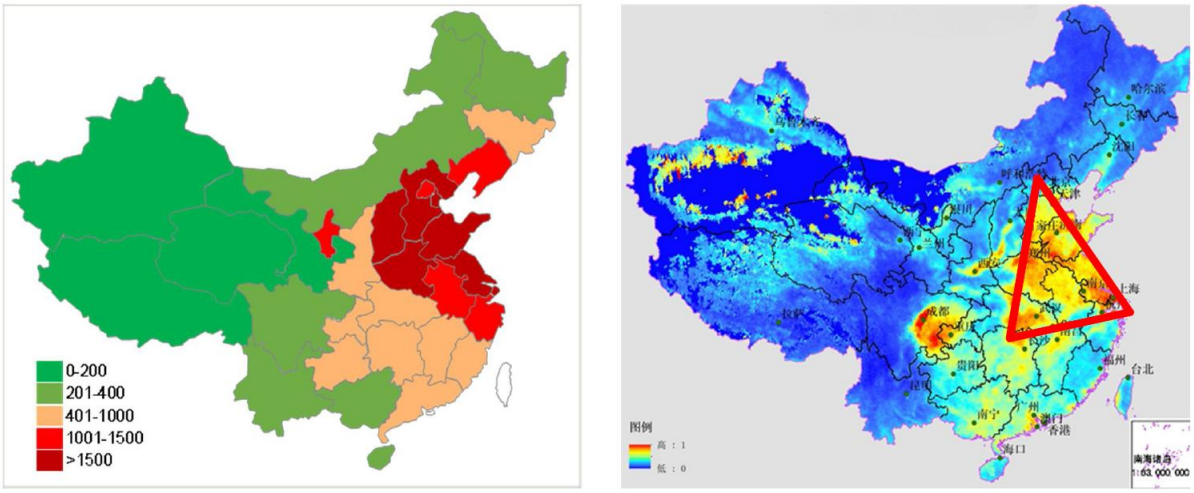
1. The PDO is to reduce air pollutants and carbon emissions through increasing energy efficiency and clean energy, with a focus on the Jing-Jin-Ji and neighboring regions.

Government Program

2. **The JJJ Region has the most severe air pollution in China,** as shown in figure 1.1. According to the MEP, nearly 90 percent of Chinese large cities failed to meet the air quality standards in 2014. The annual average $PM_{2.5}$ concentration in Beijing, Tianjin, and Hebei reached 86, 83, and 95 $\mu g/m^3$, respectively, in 2014, far exceeding the national $PM_{2.5}$ standard of 35 $\mu g/m^3$ and the WHO $PM_{2.5}$ standard of 10 $\mu g/m^3$, as shown in figure 1.2. Nine out of the top ten most polluted cities in China are in the JJJ Region—seven in Hebei Province, one in Shandong Province, and one in Tianjin. The JJJAP defines the JJJ Region as comprising seven provinces—Beijing, Tianjin, Hebei, Shandong, Shanxi, Inner Mongolia, and Henan.

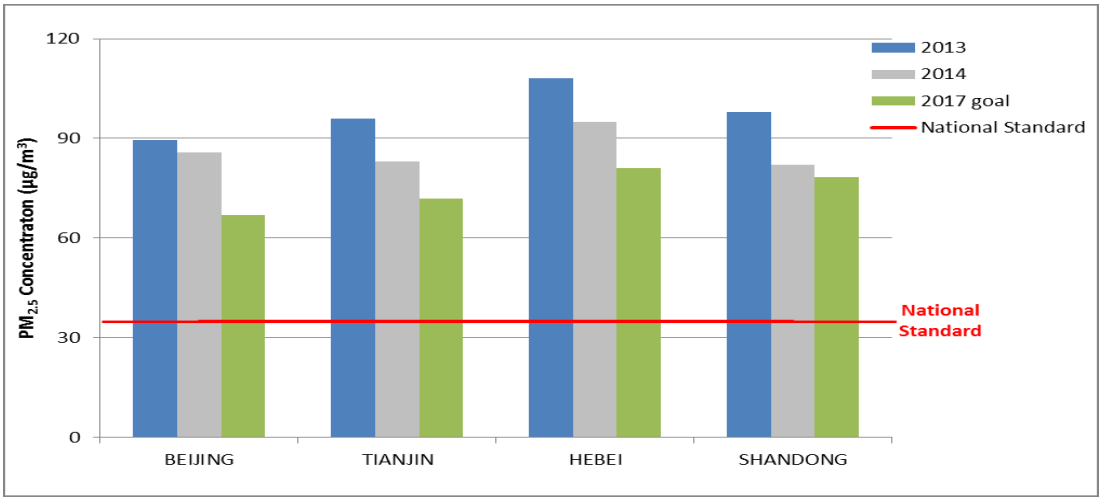
Figure 1.1. The Jing-Jin-Ji Region Has the Most Severe Air Pollution in China, and Coal Consumption Is Highly Correlated with Regional Air Pollution

China's Coal Consumption Density in 2012 (ton/km^2) Spatial Distribution of $PM_{2.5}$ Concentrations in 2012



Source: Chinese Academy for Environmental Planning, 2014.

Figure 1.2. $PM_{2.5}$ Concentrations in the JJJ Region Far Exceeded the National Air Quality Standard



Source: Innovation Center for Clean Air Solutions, 2015.

3. **Coal is the single largest source for air pollutants and GHG emissions in China**. Based on the estimates from the CAEP and Tsinghua University, coal contributes to 94 percent, 70 percent, and 70 percent of SO_2, NOx, and CO_2 emissions, respectively, as well as 63 percent of primary $PM_{2.5}$ and 56 percent of secondary $PM_{2.5}$ emissions in China.

4. **Coal consumption, which highly correlates with regional air pollution, is also concentrated in the JJJ Region,** as shown in figure 1.1. Coal consumption in the seven provinces and municipalities of the JJJ Region reached almost 1.8 billion tons in 2014, accounting for 40 percent of total coal consumption in China and equivalent to coal consumption in nearly all OECD countries. In particular, Hebei relies on coal for more than 90 percent of its energy needs.

5. **The APPCAP issued by the State Council is the most important watershed government policy and program for the GoC's "war on air pollution" efforts**. The APPCAP has set long-term goals and short-term targets. The APPCAP covers nationwide and aims to make significant improvements in air quality between 2012 and 2022 for the country, and specifically mandates the JJJ Region to reduce its $PM_{2.5}$ concentrations by 25 percent from 2012 to 2017. The implementation regulations of the APPCAP in the JJJ Region set a mandatory target to reduce coal consumption by 83 million tons from 2012 to 2017. Specifically, the NDRC issued a detailed implementation regulation to supervise and enforce the achievement of these coal cap targets in the JJJ Region. The NDRC has also set coal reduction targets for China's top-10 most polluted cities, almost all of which are located in the JJJ Region.

6. **The GoC's commitment to air pollution control will continue beyond 2017, and the APPCAP is expected to be followed by subsequent phases of planning and air pollution reductions.** Green development is a central theme of the upcoming 13th FYP (2016–2020), and air pollution control will remain a high priority on the long-term government agenda beyond 2017. Even after reaching the APPCAP targets by 2017, $PM_{2.5}$ concentrations in the JJJ Region will still be more than double the national standard of 35 $\mu g/m^3$. An extension to the APPCAP that will further reduce $PM_{2.5}$ concentrations in the JJJ Region beyond 2017 was newly announced on December 30, 2015, and aims to reduce $PM_{2.5}$ concentrations by around 40

percent from 2013 levels by 2020, with a target of around 64 $\mu g/m^3$. Based on international experience, it took London 20 years to reduce its particulate and SO_2 concentrations by 90 percent and 80 percent, respectively, from 1958 to 1978. Therefore, air pollution control is a long-term effort, and the GoC's commitment will continue beyond 2017.

7. **The APPCAP has specified the following 10 key areas of air pollution prevention and control measures:**

(a) Reduce coal consumption by 83 million tons in the JJJ Region, specifically 13 million tons will be in Beijing, 10 million tons in Tianjin, 40 million tons in Hebei, and 20 million tons in Shandong. There will also be no approval for new coal-fired power plants in the JJJ Region. Based on the Tsinghua University study, most of the coal reduction is expected to come from the industrial sector, as shown in figure 1.3. This reduction target will be achieved by the following:

(i) Increasing the use of alternative clean energy, particularly natural gas and RE, with specific targets to increase natural gas consumption by 50 billion cubic meters (m^3) and the share of non-fossil fuels in primary energy to 15 percent in the JJJ Region by 2017; reforming natural gas pricing; and increasing the share of coal washing to at least 70 percent.

(ii) Improving EE in the industrial, power, and building sectors, such as phasing out and retrofitting small-scale, inefficient, coal-fired boilers; converting decentralized coal-fired heating boilers to district heating; promoting clean and efficient energy production and technologies in energy-intensive industries; adopting international advanced EE standards for energy-intensive products; and developing green buildings.

(b) Reduce emissions from (i) point sources in the industrial and power sectors by implementing end-of-pipe measures for particulate removal, desulfurization, and denitrification; (ii) area sources to reduce dust emissions; and (iii) mobile sources in the transport sector by increasing public transport, improving fuel quality and supplying gasoline and diesel in compliance with national standard V, phasing out inefficient yellow-sticker vehicles, limiting the number of vehicles in large cities, and promoting electric and CNG vehicles.

(c) Increase the use of market mechanisms and expand green financing to EE and clean energy; increase emission reduction investments by scaling up green financing from domestic banks; pilot innovative financing models and products, such as project-based financing and leasing; adopt the principle of "penalizing polluters and rewarding top performers"; and improve pricing and tax policies.

(d) Adjust economic structure by phasing out and closing down existing, inefficient energy-intensive industries, particularly iron and steel, cement, aluminum, and glasses industries, and strictly controlling the new incremental production from energy-intensive and polluting industries.

(e) Accelerate technological innovations.

(f) Improve environmental standards and strengthen environmental permitting for newly built infrastructure investments.

(g) Strengthen legal framework, enforcement, and disclosure.

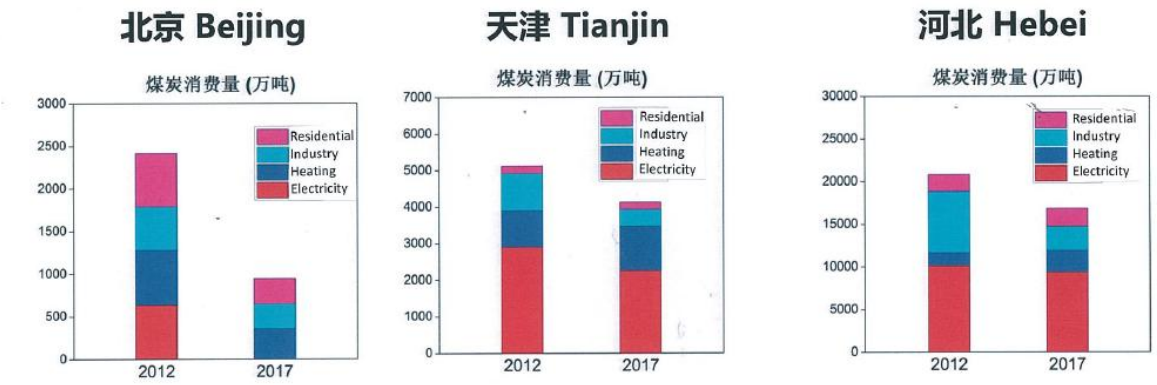
(h) Establish regional coordination and collaboration mechanisms, particularly in the JJJ Region.

(i) Establish environmental monitoring and warning systems.

(j) Specify the responsibilities of the government, enterprises, and citizens.

Figure 1.3. The Bulk of Coal Reduction Would Come from the Industrial Sector

Coal Consumption Levels in 2012 and Targets in 2017 with Sector Breakdown in JJJ



Source: Tsinghua University, 2014.

8. **APPCAP—The MEP leads and coordinates the GoC's air pollution control efforts**. The MEP is leading the overall implementation of the APPCAP, and emission reduction actions and responsibilities have been assigned to relevant line ministries and departments in specific sectors. In the JJJ Region, each provincial/municipal government has set up its own implementation structure, with the provincial/municipal EPB coordinating with the relevant line departments to implement the APPCAP. Each provincial and municipal government has also developed its own implementation plans to achieve the targets set in the national APPCAP. Since transboundary air pollution plays an important role, a JJJ Region coordination working group has been set up for integrated and coordinated actions to reduce air pollution in the JJJ Region. This working group is headed by a vice premier and the secretariat is housed in the Beijing EPB.

9. **Coal cap control is an essential solution in the APPCAP.** The NDRC EPRCD is in charge of China's coal cap control and is responsible for allocating the targets, issuing supportive policies, providing fiscal support, and monitoring and enforcing the results. The NDRC issued a Management Measure for Coal Cap Control in Priority Regions, including the JJJ Region. This regulation laid out coal cap control measures by phasing out inefficient and high-polluting industrial projects and boilers, supporting priority EE projects, replacing coal with natural gas and RE, installing central heating facilities to replace inefficient decentralized heating boilers, and supplying high-quality coal, with institutional coordination mechanisms, supporting policies, and monitoring methods.

10. **The government is responsible for policies, while enterprises are responsible for emission reductions and pollution abatement.** The APPCAP specifies the implementation responsibilities of the government and enterprises, where the GoC is primarily in charge of setting clear targets, issuing supportive policies, providing fiscal support, and strengthening monitoring and enforcement; and the enterprises have the main responsibilities for reducing emissions and investing in clean production and pollution abatement measures.

11. **GoC has allocated a dedicated budget of CNY 15 billion (roughly US$2.5 billion) for air pollution control in the JJJ Region in 2013–2014,** with additional budgets from the provincial/municipal governments. For example, based on the survey from the ICCAS and the CAEP, the Beijing Municipal Government spent CNY 2.8 billion of its own budget and CNY 0.6 billion from the GoC's budget on air pollution control in 2013. Based on the data from Hebei Province, which has the most severe air pollution levels and the bulk of emissions and coal consumption in the JJJ Region, the majority of the GoC's allocation of CNY 4 billion in 2014 was used for industrial end-of-pipe pollution abatement measures, phase-out of yellow-sticker vehicles, closure of inefficient small-scale iron and steel plants, deployment of clean energy in rural areas, and retrofit of inefficient coal-fired boilers. The Hebei Provincial Government's own budget of CNY 800 million in 2014 was used for electric vehicles and closure of polluting iron and steel factories.

12. **The lion's share of the CNY 250 billion investments needed to deliver the results of the APPCAP in the JJJ Region will come from commercial financing for enterprises.** Based on the estimates by the CAEP, Tsinghua University, and the ICCAS, GoC's budget of CNY 15 billion is expected to leverage approximately CNY 250 billion from other sources to achieve the AAPCAP targets in the JJJ Region. For example, the national and provincial governments' subsidies provide less than 10 percent of the investments for industrial end-of-pipe pollution abatement measures and 20 percent for retrofitting coal-fired boilers and electric vehicles in the JJJ Region. Therefore, the bulk of the required air pollution control investments will come from commercial financing.

13. **Many enterprises face difficulties in obtaining access to financing.** Many EE and RE developers, particularly SMEs, such as ESCOs, face difficulties in accessing financing, because of the following:

(a) Most local banks usually rely on balance sheet financing, which requires that borrowers have either good credit ratings or high levels of collateral, which in turn, favors large-scale borrowers. The concept of project-based financing that focuses on the cash flows from energy savings has not yet been widely accepted by financial institutions. The result is that the most creditworthy potential clients do not necessarily need financing for EE, while the customers most in need of financing are typically not creditworthy from the lenders' perspectives.

(b) Lenders also perceive EE investments to be highly risky, because they are not convinced that the expected future savings will be realized or captured by the investors.

(c) Most financial institutions still lack the required technical expertise and interest in financing EE and RE distributed generation.

(d) EE and RE distributed generation investments tend to be small, with high transaction costs, and most banks' short-term tenures do not match the long-term payback of the RE technologies. As a result, despite the fast growth of the ESCO industry in China, only 20 percent of the ESCOs are financed through external financing sources, while the majority relies on self-financing.

14. **A green financing market has emerged in China.** In response to the call from the Chinese government and society to reverse the trend in environmental damages, a number of Chinese banks have established business lines of green financing. The emergence of the green financing market may also be attributed to the role of several international financial institutions, such as the World Bank, IFC, KfW, AFD, European Investment Bank, and so on. The regulatory authorities have started to build a basic institutional framework for green financing. For example, the CBRC's Green Credit Guidelines require banks to establish credit policies, processes, and systems for due diligence on environmental and social risks. The Credit Reference Department under the PBOC now collects information on breaches of environmental laws and regulations by commercial borrowers.

15. **However, China's banking sector's uptake of green financing remains low relative to the huge investment needs.** Not many Chinese banks fully understand how to control the environmental and social risks of their lending portfolio; in particular, most of them do not have the required expertise and are not familiar with EE and distributed RE investments. In addition, most banks' average maturity of liabilities (mainly deposits) is only six months, while many green projects require financing of three to five years or longer. A green bond market that helps banks extend their funding maturities has not yet been developed, although the PBOC has drafted regulations on the definition, purposes, disclosure, and credit ratings of green bonds to be traded on the interbank market. On the corporate bonds market, regulatory changes are also needed so that green projects can be financed by medium-term debt instruments. As indicated by the CBRC, these impediments have hindered the increase of debt financing from Chinese banks to environmentally friendly projects, such as EE investments.

16. **Public funding is warranted to remove market failures and barriers and unlock project financing by lowering risks and closing finance gaps.** EE continues to face market failures and barriers. The fact that a large share of the EE potential remains to be tapped demonstrates that the EE market is not yet fully commercial. Therefore, public funds are justified to cover the externalities of the public goods and remove market barriers. In addition, public funds are essential to mitigate financiers' risk perception by enhancing the interest and capacity of domestic banks through a learning-by-doing process, increasing access to financing for SMEs and ESCOs, and providing long-term tenures to match the long-term payback period of RE investments. As such, the proposed operation targets mainstreaming green financing at the participating banks and encourages them to expand their lending portfolios beyond their "comfort zones" to underserved clients, such as the SME and ESCO markets and the underfinanced EE/RE technologies and sectors.

17. **The implementation of the APPCAP has made good progress**. Because of the massive campaign for air pollution control in the JJJ Region, the annual average $PM_{2.5}$ concentrations declined by 12.5 percent in 2014 and 18.2 percent in the first half of 2015 compared with the 2013 level. In 2014, the JJJ Region phased out 55,000 small-scale, inefficient coal-fired boilers and six million old, inefficient yellow-sticker vehicles; improved coal and gasoline quality standards; and increased the use of electric vehicles. Total coal consumption declined for the first time in history in 2014, despite the slight increase in total energy consumption from the 2013 level, and RE and natural gas grew rapidly.

18. **However, there is a risk that the JJJ Region may not achieve the $PM_{2.5}$ target by 2017, and strengthening EE and clean energy measures is needed with the increased use of market mechanisms**. Tsinghua University undertook an analysis with a simulation model and concluded that Tianjin and Hebei may not achieve the target of 25 percent reduction in $PM_{2.5}$ concentrations from 2012 to 2017, even if they implement all the currently planned air pollution control measures. Based on the analysis from the ICCAS and the CAEP, most of the provincial/municipal governments in the JJJ Region heavily rely on closing inefficient factories and switching from coal to gas to achieve the coal cap targets. However, closure of factories has faced strong resistance due to the risk of increased unemployment. Switching from coal to gas has also run into difficulties with high gas prices and limited gas supply. Therefore, strengthened EE and clean energy measures are needed to achieve the coal cap and air pollution control targets without compromising economic growth. Furthermore, GoC heavily relies on administrative measures and subsidies for air pollution control measures. However, the enterprises are responsible for implementing air pollution control measures, and the GoC's subsidies are scarce and can meet only a small percentage of the huge investment needs. Therefore, scale-up of commercial financing is critical.

Linkage with the Bank-financed PforR Program

19. **The PforR program is closely linked with and brings value-added contributions to the government program.** This proposed operation adds value and contributes to the GoC's APPCAP by strengthening EE and clean energy through the commercial financing channel. The GoC issues supporting policies; provides financial incentives; and sets EE, RE, and emission reduction targets that are allocated to priority enterprises. The proposed PforR program supports a GoC-designated commercial bank to provide financing for the enterprises obliged to take action under the APPCAP and for their service providers, thereby contributing to the APPCAP. The HXB will work closely with relevant government agencies, including the NDRC FCUD, the MoF, the NDRC EPRCD, the NEA, the MEP, and the local governments in the JJJ Region, which will provide overall guidance to ensure the investments made under the PforR program directly support the government priorities of the APPCAP, and will recommend potential sub-borrowers and subprojects obliged to achieve the government targets.

Bank-financed PforR Program Scope

20. This results-based program is targeted at contributing to the GoC's effort to reduce air pollution in the JJJ Region. The GoC has assigned a very high priority to reducing pollution in this region and has developed the APPCAP, which aims at significantly improving air quality. This APPCAP has specified 10 key areas of air pollution prevention and control measures.

Consistent with these high-priority areas, the NDRC and the MoF have requested the Bank to implement this program as an important means to support the APPCAP in the JJJ Region.

21. This proposed operation intends to reduce air pollutant emissions from the source, cut coal consumption by improving EE and increasing clean energy, and implement pollution control projects, thereby contributing to the GoC's coal reduction cap and emission reduction targets. This operation adopts a market-based approach in cooperation with a government-designated domestic financial institution (HXB) to increase commercial financing for green projects.

22. **This proposed operation has many innovative features to address the financing barriers and scale up green financing.** First, this operation adopts the new lending instrument of PforR for the first time in China and the energy sector. Second, this program intends to push the envelope to address the financing barriers outlined by encouraging the participating banks to deploy innovative financial products tailored to EE and RE markets, such as project-based lending, and to expand their clientele base to underserved clients, such as ESCOs. Finally, this program will scale up green financing and leverage IBRD funds by (a) piloting innovative financial products of syndication with other banks and green bonds, (b) mobilizing counterpart funding from the participating banks and equity contribution from the sub-borrowers, and (c) mainstreaming green financing at the participating bank. The proposed Green Finance Center within the participating bank expects to finance at least CNY 150 billion in green lending by the end of the program's implementation.

23. **The proposed PforR program is a results-based program supported by the Bank, aimed at improving EE, increasing clean energy, and reducing emissions**, contributing to the coal cap control program and the APPCAP. The PforR program covers seven provinces and municipalities in the JJJ Region—specifically, Beijing, Tianjin, Hebei, Shandong, Shanxi, Inner Mongolia, and Henan. The duration of the program will be six years, with a start date of July 2016 and targeted completion in June 2022.

24. The PforR program will finance activities through three key Result Areas, aligned with the priorities outlined in the APPCAP: (I) reduced coal consumption from increased EE and RE, (II) reduced air pollution emissions from pollution abatement measures, and (III) strengthened institutional capacity of the HXB.

25. **Activities within Result Area I—Reduced coal consumption from increased EE and RE.** Result Area I includes both EE and RE activities. EE activities will focus on the implementation of EE measures through retrofit and renovation of industrial facilities, commercial buildings, and public buildings and facilities. Potential subprojects may include (but are not limited to) (a) replacing inefficient energy-intensive industrial equipment with highly efficient equipment, such as boilers, motors, pumps, and heat exchange systems; (b) replacing inefficient industrial processes and technologies with highly efficient ones, particularly in energy-intensive sectors (such as iron and steel, chemicals, building materials, and metallurgy), including more efficient industrial kilns and chemical production technologies; (c) recovering and utilizing by-product gas, waste heat, and pressure for electricity generation or cogeneration; (d) optimizing industrial systems to reduce energy use; (e) implementing green building EE (in commercial and government public buildings), including efficient lighting, such as LEDs,

HVAC, and building envelopes (insulation for roof, walls, windows, and doors); (f) using cogeneration for power and heat; and (g) improving efficiency and reducing loss in district heating systems. Based on the Tsinghua University study on the JJJAP, the bulk of the coal reduction will come from the industrial sector, as shown in figure 1.3; therefore, most of the energy savings are expected from industrial EE subprojects. EE activities account for approximately 40 percent of the total program expenditure.

26. RE activities will include (but are not limited to) (a) centralized solar PV, wind, and biomass systems; (b) distributed solar PV and other RE systems; (c) rooftop solar systems; (d) solar water heating; and (e) geothermal and water source heat pumps. These RE activities account for approximately 50 percent of the total program expenditure. The subproject eligibility criteria are listed in Annex 4.

27. **Activities within Result Area II—Reduced air pollution emissions from pollution abatement measures.** To achieve the target of Result Area II, activities will focus on air pollution abatement measures that will lead to significant reduction in local air pollutant emissions, including (but not limited to) (a) installing end-of-pipe equipment for particulate removal, FGD, and denitrification; (b) replacing coal with natural gas in industrial boilers, cogeneration systems, heating boilers, and power plants; and (c) replacing diesel and gasoline vehicles with electric and CNG vehicles and charging stations. The GoC-issued premium tariffs for end-of-pipe measures in power plants are 0.2 fen/kWh for particulate removal, 1.5 fen/kWh for desulfurization, and 0.8 fen/kWh for denitrification—to make these investments in power plants commercially viable. Almost all the power plants have installed particulate removal and FGD technology, while denitrification is a new government requirement. The FGD installations under the program are expected mostly in industrial facilities. These are the important measures listed in the APPCAP. These activities account for approximately 10 percent of the total program expenditure.

28. **Activities within Result Area III—Strengthened institutional capacity of the HXB.** The HXB will perform the following:

(e) Set up internal institutional arrangements for green finance. The HXB plans to establish a Green Finance Center with a dedicated team to lead and coordinate the all bank-wide green financing activities, primarily EE and clean energy lending.

(f) Set up internal green lending procedures for deal origination, risk assessment and appraisal, and project approval; set green financing as a priority investment area for the branches in the JJJ Region; and provide incentives for staff to undertake green financing projects.

(g) Provide training to staff on EE and clean energy financing, particularly staff responsible for deal origination and risk assessment.

(h) Undertake marketing and business development for deal origination.

(i) Develop and pilot innovative financing models and products tailored to EE; distributed RE, such as project-based lending; market aggregation for small-scale projects; syndication with other banks; and green bonds.

(j) Scale up lending to SMEs and ESCOs.

(k) Strengthen the capacity for M&V of operation results.

29. The Bank team plans to mobilize the US$18 million GEF project Developing Market-Based Energy Efficiency Program in China under preparation as a potential parallel grant funding, in addition to the existing GEF funding under the ongoing CHEEF program and the CRESP, to provide technical assistance and capacity building to the HXB. This funding will expand green financing in the APPCAP, and support the Energy Efficiency Credit Guideline recently issued by the CBRC and the NDRC, as well as the green finance agenda laid out by the PBOC.

Implementation Arrangement

30. **Government.** GoC is responsible for laying out priority investment areas, issuing policies and regulations, and providing financial incentives under the context of the APPCAP and clean energy and emission reduction programs. The HXB will work closely with relevant government agencies, including the NDRC FCUD, the MoF, the NDRC EPRCD, the NEA, the MEP, and the local governments in the JJJ Region. These agencies will provide overall guidance to ensure the investments made under the PforR program directly support the priorities of the APPCAP program and will recommend potential sub-borrowers and subprojects obliged to achieve the APPCAP targets.

31. At the national level, the NDRC FCUD is responsible for approving and supervising foreign capital utilization. The MoF is the official government counterpart of the Bank and provides sovereign guarantee to IBRD loans. The NDRC EPRCD is in charge of targets and policies for EE and coal cap control, and the NEA is in charge of RE targets and policies. The MEP is responsible for the overall implementation of the APPCAP.

32. In the seven provinces and municipalities in the JJJ Region, the provincial/municipal DRCs in charge of EE and RE, as well as the EPB, will be closely involved in the program because they have the ultimate responsibility to implement the targets set in the APPCAP. The local governments are responsible for issuing local supporting policies and providing additional fiscal incentives and are best equipped to know the local market and investment needs.

33. **Hua Xia Bank.** GoC has designated the HXB as the implementing agency for this operation. This implementation modality is chosen because (a) given the fragmented and decentralized nature of many retail small-scale EE and clean energy investments, it is cost-effective for the government and the MDBs to adopt a wholesale approach that engages the domestic banks that are responsible for managing the EE and clean energy investment portfolio to achieve the maximum leverage of public funds and ensure sustainability; (b) this proposed operation builds on the successful experience of the ongoing CHEEF program, but with a results-based focus; and (c) the government intends to use this operation to explore ways in which a financing platform could be set up to support the implementation of the APPCAP.

34. The HXB is a leader in green financing in China, with a proven track record and experience in EE and clean energy financing. The bank has demonstrated its interests, capacity, and expertise in EE and clean energy financing under the ongoing IBRD/GEF CHEEF program

and the AFD-funded EE and RE financing project. The HXB's management is fully committed to green financing; has established a dedicated team at HQ and branches, internal systems, and procedures for green energy financing; and has developed innovative financing products. A set of criteria based on the regulatory guidelines has been put in place to manage the social and environmental risks of the bank's operations. The top management of the HXB considers air pollution control in the JJJ Region as a top priority and has announced the establishment of a CNY 5 billion Blue Sky and Clear Water Fund in the JJJ Region to provide debt and equity financing for green investments. The HXB also plans to dedicate CNY 20 billion each year for integrated development in the JJJ Region, mostly for infrastructure investments in the energy, transport, water, and environment sectors.

35. The HXB will be responsible for identifying, appraising, and financing eligible investments that meet the criteria in the OM, measuring and verifying results, and bearing the full default risks. The detailed eligibility criteria and appraisal guidelines are outlined in the OM.

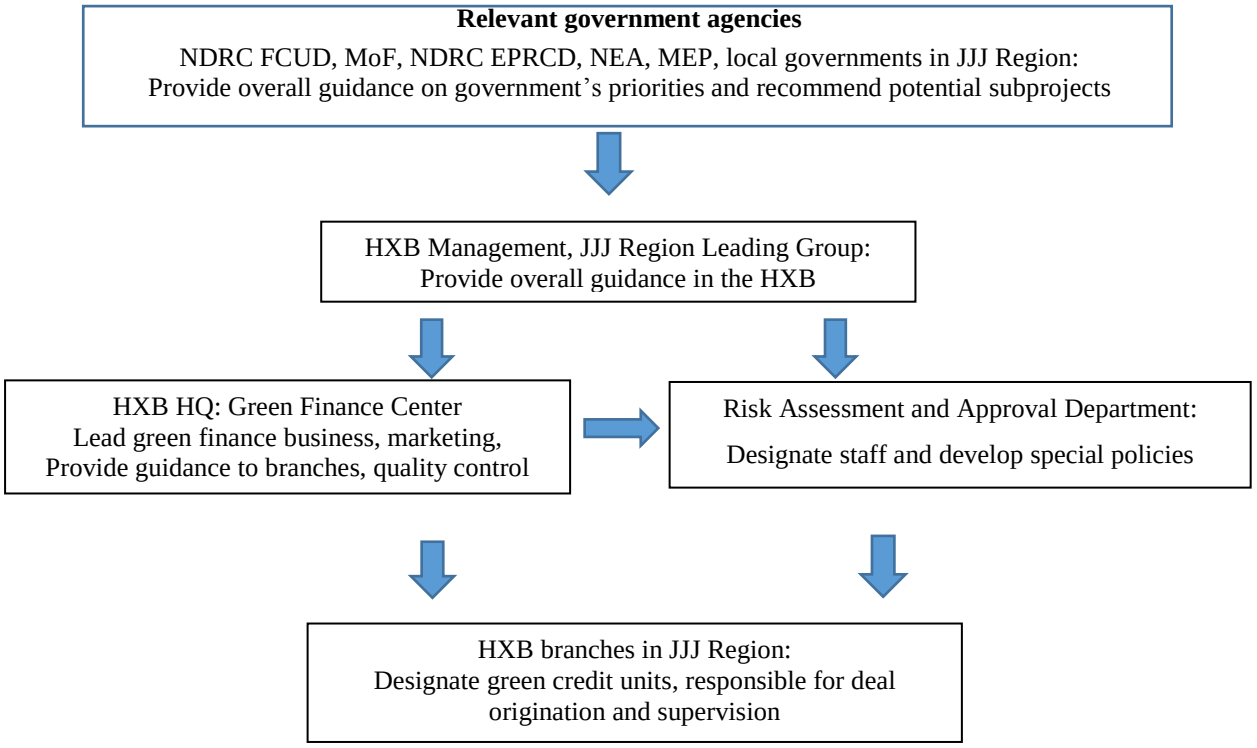
36. HXB's implementation structure for green credit in the JJJ Region follows a three-level structure, as shown in figure 1.4:

(a) The HXB has established a JJJ Leading Group in charge of bank-wide investments in the JJJ Region.

(b) At the HQ level, the envisioned Green Finance Center to be established would be composed of 8–10 staff members who will be responsible for overall green finance in the HXB, marketing, guidance to branches, quality control, project management, and liaison with the GoC and the Bank. The Green Finance Center will assign dedicated staff for technical, environmental, and social appraisal and supervision of subprojects. In addition, the risk assessment and approval department is usually a major bottleneck for green lending projects because it is extremely risk averse and not familiar with green lending projects. To overcome this barrier, the HXB plans to assign dedicated staff for risk assessment and approval of green lending at HQ and develop special underwriting policies and financial products tailored to green lending.

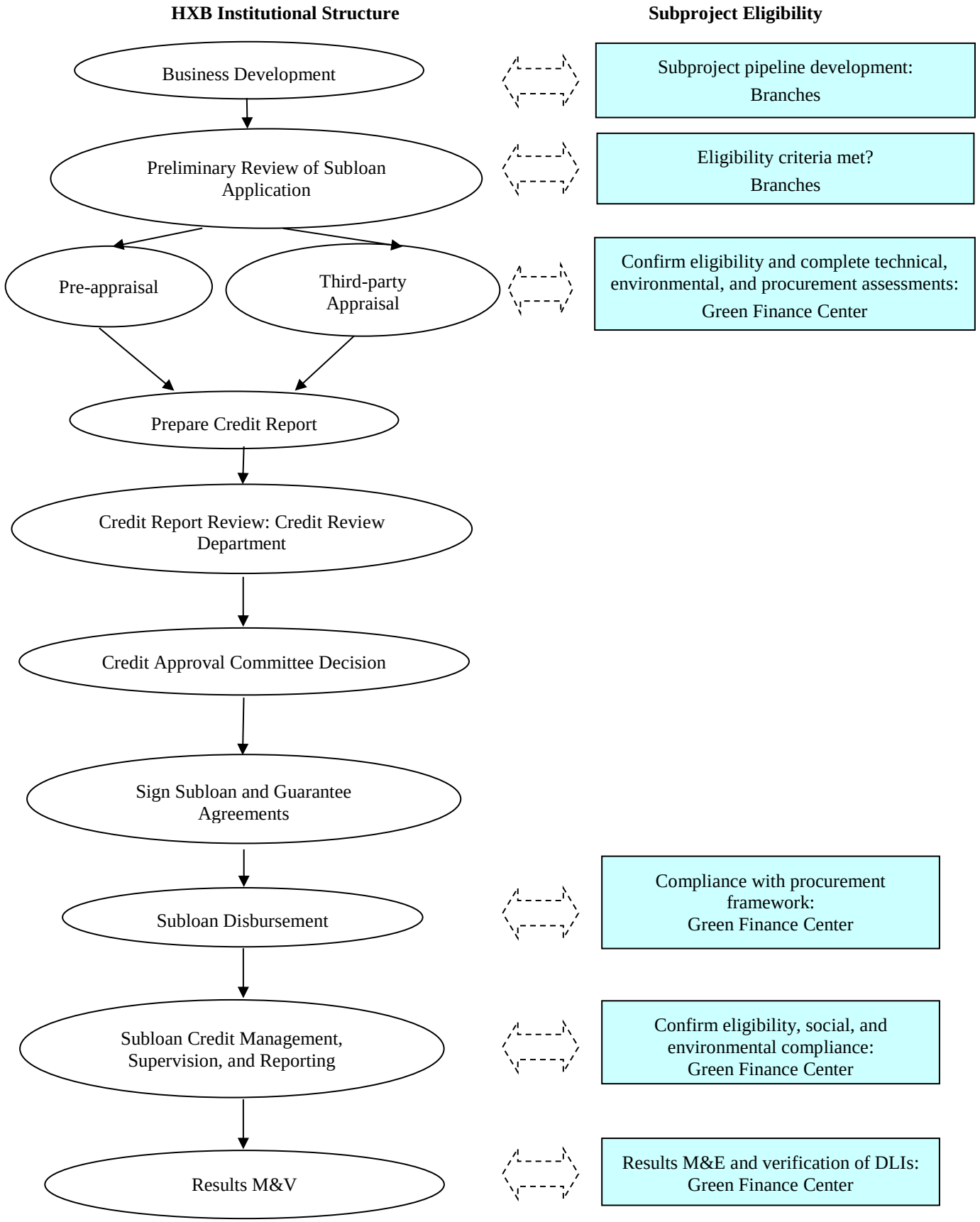
(c) The branches are responsible for deal origination and supervision. The HXB also plans to assign designated units in the JJJ Region branches to take the lead in green credit. Furthermore, the HXB will continue its effective reward scheme that provides bonuses for investment officers to undertake green financing. Therefore, the HXB envisions setting up a comprehensive green finance system extending from the Green Finance Center in HXB HQ to its units in the branches, with dedicated staff from deal origination to risk assessment and approval, which could finance up to CNY 150 billion green lending by the end of the PforR program implementation.

Figure 1.4. Implementation Structure of the PforR Program



37. Figure 1.5 outlines the HXB's internal procedures from deal origination, evaluation, processing, supervision, and credit management, to results verification of subloans, in a sequential order and the responsible parties involved. The figure also presents, in rectangular boxes, the additional obligations for EE, RE, and pollution abatement lending under this program and the parties responsible within the HXB for undertaking these additional obligations.

Figure 1.5. HXB's Internal Institutional Arrangement and Procedures



Annex 2: Results Framework and Monitoring

Result Indicators	Core	DLI	Unit	Baseline	Accumulative Targets						Frequency	Data Source	Data Collection
					CY2016	CY2017	CY2018	CY2019	CY2020	CY2021			
	Program Development Objective: The PDO is to reduce air pollutants and carbon emissions through increasing energy efficiency and clean energy, with a focus on the Jing-Jin-Ji and neighboring regions.												
PDO Indicator 1: Reduction in particulate emissions from eligible EE and RE subprojects[1]			Thousand tons	0	0.2	0.5	1.1	2.0	2.9	3.6	Annual	HXB	HXB
PDO Indicator 2: Reduction in SO_2 emissions from eligible EE, RE, and desulfurization subprojects[2]			Thousand tons	0	0.8	2.5	5.1	9.3	13.5	16.9	Annual	HXB	HXB
PDO Indicator 3: Reduction in NOx emissions from eligible EE, RE, and denitrification subprojects[2]			Thousand tons	0	0.6	1.9	3.8	7.0	10.1	12.7	Annual	HXB	HXB

PDO Indicator 4: Reduction in CO_2 emissions from eligible EE and RE subprojects[3]	**X**		Thousand tons	0	123	369	738	1,353	1,969	2,461	Annual	HXB	HXB
Intermediate Results Indicators													
Intermediate Result Indicator 1: Total investments in eligible EE, RE, and pollution abatement subprojects			US$, millions	0	71	214	429	786	1,143	1,400	Annual	HXB	HXB
Intermediate Result Indicator 2: Subloans (for eligible EE, RE, and pollution abatement subprojects) disbursed to sub-borrowers		**X**	US$, millions	0	50	150	300	550	800	1,000	Annual	HXB	HXB
Intermediate Result Area I: Reduced coal consumption from increased EE and RE													
Intermediate Result Indicator 3: Coal reduction from eligible EE and RE subprojects[4]		**X**	Thousand tce	0	50	150	300	550	800	1,000	Annual	HXB	HXB
Intermediate Result Area II: Reduced air pollution emissions from pollution abatement measures													
Intermediate Result		**X**	Thousand tons	0	0.5	1.6	3.2	5.9	8.6	10.8	Annual	HXB	HXB

Indicator 4: Reduction of SO_2 emissions from desulfurization subprojects[5]													
Intermediate Result Indicator 5: Reduction of NOx emissions from denitrification subprojects[5]		**X**	Thousand tons	0	0.4	1.1	2.2	4.1	5.9	7.4	Annual	HXB	HXB
Intermediate Result Area III: Strengthened institutional capacity of the HXB													
Intermediate Result Indicator 6: Establishment of a Green Finance Center at the HXB and adoption of internal procedures for the identification, risk assessment, appraisal, and approval of green lending		**X**	–	0	Done						Annual	HXB	HXB

Intermediate Result Indicator 7: Number of different eligible innovative financial products for green financing deployed		**X**	# of products	0	0	1	2	3	3	3	Annual	HXB	HXB
Intermediate Result Indicator 8: Number of different ESCOs receiving subloans (for eligible EE and RE subprojects)		**X**	# of ESCOs	0	0	2	4	6	8	10	Annual	HXB	HXB
Intermediate Result Indicator 9: Number of subprojects financed by syndicated loans[6]			# of projects	0	0	0	1	1	2	2	Annual	HXB	HXB

Note:

1. The particulate emission factor is assumed as 3.6 kilograms (kg)/tce, calculated from the total actual particulate emissions from the industrial and power sectors divided by the total coal consumption in China in 2013. This takes into account particulate removal technology that has already been installed in almost all power plants and some industrial facilities.

2. The SO_2 and NOx emission reductions are the sum of (a) SO_2 and NOx emission reductions from coal reduction resulting from EE and RE subprojects, based on emission factors assumed as 6.0 kg/tce and 5.2 kg/tce, respectively, calculated from the total actual SO_2 and NOx emissions from the industrial and power sectors divided by the total coal consumption in China in 2013 (this takes into account the desulfurization that has already been installed in almost all power plants and some industrial facilities and the denitrification that has already been installed in some power plants and industrial facilities); and (b) SO_2 and NOx emission reductions from desulfurization and denitrification subprojects (intermediate indicators 3 and 4).

3. The CO_2 emission factor is assumed as 2.44 tons/tce.
4. This indicator is a sum of (a) energy savings from eligible EE subprojects in tce and (b) coal reduction from RE electricity generation, with a conversion factor of 0.32 tce/GWh, as the average coal consumption rate for coal-fired power plants was 320 tce/kWh in 2013. The detailed assumptions are listed in table 4.1.
5. The assumption is listed in table 4.1.
6. Syndication refers to a financial product under which the HXB collaborates with one or more other financial institutions to co-finance projects as a leader or a joint financing partner to finance larger subprojects and thereby increase the leveraging of IBRD funds.

Annex 3: Disbursement-Linked Indicators, Disbursement Arrangements, and Verification Protocols

Table 3.1. DLIs and Disbursement Arrangements

(Targets are for each year/period)

DLIs	Total DLI Allocation (US$, millions)	As % of Total Financing Amount	DLI Baseline	Timeline for DLI Achievement					
				CY2016	CY2017	CY2018	CY2019	CY2020	CY2021
DLI-1: Subloans (for eligible EE, RE, and pollution abatement subprojects) disbursed to sub-borrowers (US$, millions)	1,000.00		0.00	50.00	100.00	150.00	250.00	250.00	200.00
Allocated IBRD amount:	*300.00*	*60*	*0.00*	*15.00*	*30.00*	*45.00*	*75.00*	*75.00*	*60.00*
DLI-2: Coal reduction from eligible EE and RE subprojects (thousand tce)	550		0	0	5	50	100	155	240
Allocated IBRD amount:	*125.00*	*25*	*0.00*	*0.00*	*1.00*	*11.00*	*23.00*	*35.00*	*55.00*
DLI-3a: Reduction of SO_2 emissions from desulfurization subprojects (thousand tons)	8.60		0	0	0.50	1.10	1.60	2.70	2.70
Allocated IBRD amount:	*10.00*	*2*	*0.00*	*0.00*	*0.60*	*1.30*	*1.90*	*3.10*	*3.10*
DLI-3b: Reduction of NOx emissions from denitrification subprojects (thousand tons)	5.90		0	0	0.40	0.70	1.10	1.90	1.80

DLIs	Total DLI Allocation (US$, millions)	As % of Total Financing Amount	DLI Baseline	Timeline for DLI Achievement					
				CY2016	CY2017	CY2018	CY2019	CY2020	CY2021
Allocated IBRD amount:	*15.00*	*3*	*0.00*	*0.00*	*0.90*	*1.90*	*2.80*	*4.70*	*4.70*
DLI-4: Establishment of a Green Finance Center and adoption of internal procedures for the identification, risk assessment, appraisal, and approval of green lending	–		0	Prior Result					
Allocated IBRD amount:	*10.75*	*2*	*–*	*10.75*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
DLI-5: Number of different eligible innovative financial products for green financing deployed (# of products)	3		0	0	1	1	1	0	0
Allocated IBRD amount:	*18.00*	*4*	*0.00*	*0.00*	*6.00*	*6.00*	*6.00*	*0.00*	*0.00*
DLI-6: Number of different ESCOs receiving subloans (for eligible EE, RE, and pollution abatement subprojects) (# of ESCOs)	10		0	0	2	2	2	2	2
Allocated IBRD amount:	*20.00*	*4*	*0.00*	*0.00*	*4.00*	*4.00*	*4.00*	*4.00*	*4.00*

DLIs	Total DLI Allocation (US$, millions)	As % of Total Financing Amount	DLI Baseline	Timeline for DLI Achievement					
				CY2016	CY2017	CY2018	CY2019	CY2020	CY2021
Total Financing Allocated[2]:	**498.75**	**100**	**0.00**	**27.00**	**42.70**	**69.30**	**112.40**	**122.10**	**126.50**

Table 3.2. IBRD Disbursement Schedule, Including Advance Payment (in the Data Sheet) (US$, millions)

FY17	FY18	FY19	FY20	FY21	FY22
152	43	69	112	124	0

[2] The total amount of the IBRD loan is US$500 million equivalent, and included a front-end fee of US$1.25 million equivalent to be paid out of the loan proceeds.

Table 3.3. Verification of DLIs

DLI #	Definition/ Description of Achievement	Scalability of Disbursements (Yes/No)	Total DLI Allocation (US$, millions)	Protocol to Evaluate Achievement of the DLI and Data/Results Verification		
				Data Source/ Agency	Verification Entity	Procedure
DLI-1	Subloans (for eligible EE, RE, and pollution abatement subprojects) disbursed to sub-borrowers	Yes	300.00	HXB	IAF	The IAF will be engaged by the HXB and approved by the Bank. The IAF will audit the participating bank loan disbursements of subprojects against the eligibility criteria in the OM.
DLI-2	Coal reduction from eligible EE and RE subprojects	Yes	125.00	HXB	IVA	The IVA will be engaged by the HXB and approved by the Bank. The IVA will verify the energy savings and RE electricity generation for the subprojects using standard protocols on a sampling basis.
DLI-3a	Reduction of SO_2 emissions from desulfurization subprojects	Yes	10.00	HXB	IVA	The IVA will be engaged by the HXB and approved by the Bank. The IVA will use a "deemed reduction" approach that estimates the emission reduction based on verification of the technical assumption and calculation in the feasibility study report and verification of actual installation and operation of desulfurization equipment.
DLI-3b	Reduction of NOx emissions from denitrification subprojects	Yes	15.00	HXB	IVA	The IVA will be engaged by the HXB and approved by the Bank. The IVA will use a "deemed reduction" approach that estimates the emission reduction based on verification of the technical assumption and calculation in the feasibility study report and verification of actual installation and operation of denitrification equipment.
DLI-4	Establishment of a Green Finance Center and adoption of internal procedures for the identification, risk assessment, appraisal, and approval of green lending	No	10.75	HXB	HXB	The HXB will send evidence to the Bank that the Green Finance Center has been established and that the procedures for loan origination, risk assessment, appraisal, and loan approval are developed and adopted.
DLI-5	Number of different eligible innovative financial products for green financing deployed	Yes	18.00	HXB	IAF	The IAF will audit and verify the number of different eligible innovative financial products.
DLI-6	Number of different ESCOs receiving subloans (for	Yes	20.00	HXB	IAF	The IAF will audit the number of different ESCOs receiving subloans against the eligibility criteria in the

DLI #	Definition/ Description of Achievement	Scalability of Disbursements (Yes/No)	Total DLI Allocation (US$, millions)	Protocol to Evaluate Achievement of the DLI and Data/Results Verification		
				Data Source/ Agency	Verification Entity	Procedure
	eligible EE, RE, and pollution abatement subprojects)					OM.
	Front-end fee		1.25			
Total			**500.00**			

Table 3.4. Bank Disbursement Table

#	DLI	Bank Financing Allocated to the DLI (US$, millions)	Of Which Financing Available for		Deadline for DLI Achievement	Minimum DLI Value to Be Achieved to Trigger Disbursements of Bank Financing	Maximum DLI Value(s) Expected to Be Achieved for Bank Disbursements Purposes	Determination of Financing Amount to Be Disbursed against Achieved and Verified DLI Value(s) [4]
			Prior Results	Advances				
DLI-1	Subloans (for eligible EE, RE, and pollution abatement subprojects) disbursed to sub-borrowers	300.00		Yes	12/31/2021	No	US$1,000 million	US$0.3 IBRD per US$1 subloans disbursed
DLI-2	Coal reduction from eligible EE and RE subprojects	125.00		Yes	12/31/2021	No	550 million tce	US$228 IBRD per tce coal reduction
DLI-3a	Reduction of SO_2 emissions from desulfurization subprojects	10.00		Yes	12/31/2021	No	8,600 tons of SO_2 reduction	US$1,157 IBRD per ton of SO_2 reduction
DLI-3b	Reduction of NOx emissions from denitrification subprojects	15.00		Yes	12/31/2021	No	5,900 tons of NOx reduction	US$2,522 IBRD per ton of NOx reduction

#	DLI	Bank Financing	Of Which Financing Available for		Deadline for DLI	Minimum DLI Value to Be	Maximum DLI Value(s)	Determination of Financing Amount to Be
DLI-4	Establishment of a Green Finance Center and adoption of internal procedures for the identification, risk assessment, appraisal, and approval of green lending	10.75	Yes		3/31/2016			n.a.
DLI-5	Number of different eligible innovative financial products for green financing deployed	18.00		Yes	12/31/2021	1 product	3 products	US$6 million IBRD per innovative financial product
DLI-6	Number of different ESCOs receiving subloans (for eligible EE, RE, and pollution abatement subprojects)	20.00		Yes	12/31/2021	1 ESCO	10 ESCOs	US$2 million IBRD per ESCO receiving subloans

Disbursement-Linked Indicators

1. Six DLIs have been developed through discussions with the HXB. The DLIs are designed to accommodate the project features and comprise capacity-building results, financing indicators, and reduction in coal and emissions realized throughout the five implementation years.

2. DLI-1 is an important intermediate output indicator—subloans (for eligible EE, RE, and pollution control subprojects) disbursed to sub-borrowers. This DLI demonstrates the scale of green financing provided to support the implementation of the APPCAP and will directly result in substantial emission reductions. The eligibility criteria of subprojects have been agreed with the Bank, and are included in the OM and listed in Annex 4, Box 1. This DLI will be verified by an IAF appointed by the HXB and approved by the Bank, against the subloan eligibility criteria in the OM. When the HXB meets the specified DLI targets, the IBRD loans will be disbursed. The DLI is scalable, with the scaling factor at US$0.3 IBRD disbursement for every US$1 eligible EE, RE and pollution control subloan disbursed by the HXB.

3. DLI-2 is an outcome indicator under Result Area I—coal reduction from eligible EE and RE subprojects, measured in tce. This is the sum of energy savings from eligible EE subprojects and RE electricity generation from eligible RE subprojects that is converted to coal reduction with an agreed-upon conversion factor. It directly contributes to the coal cap target.

4. However, given the unpredictable market demand, there is uncertainty about the investment portfolio regarding the share of each EE and RE technology. Due to the wide variation in costs among different EE and RE technologies, this uncertainty increases the risk of not achieving this DLI. The achievement of this DLI also depends on factors beyond the HXB's control, for example, reduced industrial production from economic slowdown will lead to less energy savings than expected in the feasibility study, and the difficulties or delay in obtaining access to the grid will affect RE electricity generation. Therefore, the IBRD allocation for this DLI is modest.

5. Since the EE subproject construction usually takes two years, the disbursement of this DLI against energy savings from EE subprojects made in years 1–3 is expected to be in years 3–5. For RE subprojects, most of the solar PV subprojects take only a year to build. The IBRD disbursements for this DLI against RE electricity generation from solar PV subprojects made in year 1 are triggered in year 2 after verification of the year 1 results. Due to the longer time taken for implementation of wind and biomass subprojects, the disbursements are triggered for wind subprojects in year 3 and for biomass subprojects in year 4. Therefore, investments made in the final 1–2 years will not be able to generate verifiable results within the program implementation period, and thus are not included in this DLI. This DLI is scalable, with the scaling factor at US$228 IBRD disbursement for every tce of coal reduction.

6. This DLI will be verified by an IVA appointed by the HXB and approved by the Bank. The HXB will engage an IVA selected from one of the 26 accredited verification agencies by the MoF and the NDRC. The verification of industrial and building EE savings will adopt generally accepted national standards in China. The verification will be undertaken on a sampling basis. The detailed verification protocol and procedure are listed in the OM.

7. From 2007 to early 2015, the MoF and the NDRC implemented the Technical Innovation Project Financial Subsidy Management Measures to provide subsidy to five categories of energy conservation projects specified in the Ten Key Energy Conservation Programs under the 11th and 12th FYPs. This output-based reward fund provides subsidies for EE investments to both industrial enterprises and ESCOs based on per tce of energy savings. Eligible enterprises must have their energy savings verified by one of the 26 independent third-party verifiers approved and authorized by the MoF and the NDRC.

8. The MoF and the NDRC issued a series of basic policies and regulations, such as the Measures of Energy Saving Calculation and Monitoring and the Guidelines of Energy Saving Verification. The above two policies were published in 2008 and can be considered as China's initial energy saving measurement, reporting, and verification guidelines. To operationalize these policies, the China National Institute of Standardization developed many national standards with its supporting organizations (for example, industry associations, ESCOs, and research institutes), such as the Calculation Methods of Energy Saving for Enterprises (GB/T 13234-2009) and the Guidelines of Energy Saving Measurement and Verification (GB/T 28750-2012), which provided general guidance to calculate energy savings.

9. The verification of energy savings in buildings will adopt the accepted national methodologies defined in the Chinese Technical Guidelines for Public Building Retrofit. For building EE subprojects, when a retrofit subproject does not involve improving comfort levels or expanding utilities/functions, energy savings and emission reductions are calculated following the methodology defined in the Chinese Technical Guidelines for Building Retrofit (JCJ 176-2009). When a retrofit subproject involves improving comfort levels or expanding utilities/functions, particularly building envelopes, a building simulation approach applying the U.S. Department of Energy DOE2 eQuest model will be used to estimate energy savings and emission reductions. The sub-borrower will calculate the difference in energy consumption and emissions between two building simulations: (a) design A—without EE/RE measures and (b) design B—with EE/RE measures.

10. The amount of RE electricity generation (GWh) from wind, solar PV, and biomass subprojects will be verified by the IVA using metered data on a sampling basis, and then will be converted to coal reduction in tce based on the conversion factor of 0.32 tce/GWh. It should be noted that RE heating applications (for example, solar water heaters and geothermal pumps) are not included in this DLI, given the difficulties of forecasting the amount of loans in these areas and measuring and verifying the results.

11. DLI-3a and DLI-3b are outcome indicators under Result Area II—reduction of SO_2 and NOx emissions from desulfurization and denitrification subprojects, respectively. These DLIs are selected as the most appropriate indicators to measure the results under Result Area II, because of the importance of desulfurization and denitrification technologies to emission reductions, the significant contribution of these DLIs to emission reduction objectives, and the strong demand for investments in desulfurization and denitrification. The emission reductions from replacing coal with gas and replacing diesel vehicles with electric or CNG vehicles are not included in this DLI, given the difficulties of forecasting the amount of loans in these areas. Disbursements for both are triggered at the end of the first year. These two indicators are scalable, with the scaling factors being (a) US$1,157 IBRD disbursement for each ton of SO_2 reduction from

desulfurization subprojects and (b) US$2,522 IBRD disbursement for each ton of NOx reduction from denitrification subprojects.

12. Since the actual measurement of emission reductions is very difficult and unreliable, DLI-3a and DLI-3b will be verified by IVAs engaged by the HXB, which will (a) use a "deemed reduction" approach to confirm the emission reduction based on verification of the technical assumptions and calculations in the feasibility study reports of desulfurization and denitrification investments, and (b) verify the actual installation and operation of desulfurization and denitrification equipment.

13. DLI-3a and DLI-3b are designed as subsets of DLI-3 in one disbursement category to allow for maximum flexibility during implementation, given the uncertainty about the market demand for each type of subprojects.

14. DLI-4, DLI-5, and DLI-6 are capacity-building activities of the HXB. They are designed as follows:

- DLI-4 is a prior result triggered upon the HXB's action to establish a Green Finance Center that leads, coordinates, and provides guidance on the HXB's green finance business and adopts internal procedures for the identification, risk assessment, appraisal, and approval of green lending. The most important lesson learned from the ongoing CHEEF program demonstrated that the participating banks' internal structure—including their management commitment, dedicated teams, internal organization, and coordination between HQ and branches—and deal origination, risk assessment, appraisal and approval, incentive schemes, and so on, is essential to green credit lending. Therefore, this DLI is critical to be completed as a prior result, so that the HXB is ready to implement the operation. This DLI is not scalable.

- DLI-5 is the number of different eligible innovative financial products for green financing. Another major lesson learned from the ongoing CHEEF program is that most energy-inefficient end users and EE project developers, such as ESCOs, face difficulties in obtaining access to financing because of their inherent low creditworthiness resulting from a weak balance sheet and limited collateral. Most local banks usually rely on balance sheet financing, which requires that borrowers have either good credit ratings or high levels of collateral, which, in turn, favors large-scale borrowers. The concept of project-based financing, which focuses on the cash flows from energy savings, has not yet been widely accepted by financial institutions. The result is that the most creditworthy potential clients do not necessarily need financing for EE/RE, while the customers most in need of financing are typically not creditworthy. In addition, EE/RE investments tend to be small, with high transaction costs. Therefore, innovative financial products and models tailored to EE and RE financing required for this DLI are critical to scale up green lending in these areas. The eligible innovative financial products for this DLI include (a) project-based lending in which the loan is collateralized by the cash flows resulting from energy cost savings and/or revenues from RE power generation; (b) securitization of project assets; (c) aggregation (bundling) of small-scale projects to increase the loan size and reduce transaction costs; (d) green bonds; and (e) other

innovative products proposed by the HXB and approved by the Bank. This DLI is scalable, with the scaling factor being US$6 million IBRD disbursement for every pilot project financed by the HXB using an innovative financing product. The HXB will provide information on the innovative financing products for approval by the Bank. The IAF will audit and verify the number of projects financed with eligible innovative products.

- DLI-6 is the number of different ESCOs receiving subloans (for eligible EE, RE, and pollution abatement subprojects). An ESCO is a sub-borrower that provides EE and RE services to a host enterprise and is paid by energy performance. This operation intends to encourage the HXB to expand its client base to the underserved market of ESCOs. This DLI is scalable, with the scaling factor being US$2 million IBRD disbursement for every ESCO-received subloan. The verification of this DLI will be conducted by the IAF.

Disbursement Arrangement and Schedule

15. **The program expenditure** occurs when the HXB releases the subloans to sub-borrowers. The Bank loan will be disbursed directly into HXB's accounts upon realizing the DLIs and will be pooled with the HXB's own contributions to become HXB's funds. The program funds will be on-lent to sub-borrowers, based on the HXB's commercial practices and eligibility models addressed in the OM agreed with the Bank.

16. **Prior results** will be adopted under the program based on discussions with the HXB. The Bank agreed to disburse up to US$50 million and US$10.75 million of the PforR financing proceeds against DLI-1 and DLI-4 respectively, between January 21, 2016, and the date of signing the Legal Agreement.

17. **Advances** are agreed by the Bank with 25 percent of PforR financing for one or more specific DLIs that have not yet been met. When the DLIs are achieved, the amount of the advance is deducted (recovered) from the amount due to be disbursed under the DLI and documented by the Bank. The Bank may replenish the recovered amount to the HXB as requested, for additional advances to keep the advances at the level as needed.

Annex 4: Summary of Technical Assessment

1. **Strategic relevance**. Improving EE, increasing clean energy, and reducing air pollutants and carbon emissions are the top priorities of the GoC, particularly given the severe air pollution in the JJJ Region. The proposed program is thus strategically relevant and aligned with the GoC's priorities.

2. **Technology soundness**. The PforR program will finance technically proven and commercially viable EE, clean energy, and pollution abatement investments with substantial field experience. These technologies include (a) industrial EE retrofits, (b) building EE retrofits, (c) PV energy systems, (d) wind energy systems, (e) biomass energy systems, (f) desulphurization technologies, (g) denitrification technologies, (h) replacement of coal with gas, and (i) replacement of diesel vehicles with electric or CNG vehicles. The HXB has demonstrated experience and a proven track record to evaluate and appraise the technical aspects of these investments. In fact, the HXB has prior experience in financing all of these technologies. The implementing agency will ensure that the investments comply with Chinese technical policies and regulations.

3. The assumptions of the technical assessment of these subprojects are based on prior experience of the HXB, other actual project experience provided by a technical consulting firm, and the Bank team, as summarized in table 4.1.

Table 4.1. Assumptions of Technical Assessment

Technology	Result Indicator Unit	Assumption for Calculation
Industrial EE subprojects	tce	CNY 4,500/tce
Building EE subprojects	tce	CNY 10,000/tce
Solar PV power plants	GWh	CNY 10,000/kW, 1,100 kWh/yr
Biomass power plants	GWh	CNY 8,000/kW, 4,500 kWh/yr
Wind power plants	GWh	CNY 8,000/kW, 1,600 kWh/yr
Avoided coal consumption from RE power plants	tce	0.32 tce/GWh (0.7 tce/ton coal)
Reduced particulate emissions from EE/RE subprojects	Tons of particulate emissions	3.6 kg/tce
Reduced SO_2 emissions from EE/RE subprojects	Tons of SO_2 reduction	6.0 kg/tce
Reduced NOx emissions from EE/RE subprojects	Tons of NOx reduction	5.2 kg/tce
Reduced CO_2 emissions from EE/RE subprojects	Tons of CO_2 reduction	2.44 ton/tce
Reduced SO_2 emissions from desulfurization subprojects	Tons of SO_2 reduction	CNY 21,000/ton
Reduced NOx emissions from denitrification subprojects	Tons of NOx reduction	CNY 30,500/ton

4. The technical eligibility criteria for eligible EE, RE, and pollution abatement technologies are provided in Box 1.

5. **Institutional capacity.** The HXB has demonstrated extensive experience in financing EE, clean energy, and pollution abatement technologies and also implementing the Bank

operations under the CHEEF program. The HXB has adopted most of the Bank's technical, fiduciary, and environmental and social requirements under the CHEEF program and has mainstreamed them into its own lending procedures. Under the PforR program, one area of concern is the HXB's capacity in results M&E and verification of DLIs. This risk will be mitigated by engaging IVAs.

6. **Expenditure framework.** The proposed program expenditure will be US$1 billion, of which US$500 million will be financed by IBRD and US$500 million will be financed by the HXB. The program expenditure occurs when the participating bank disburses the subloans to the sub-borrowers. All the program funds will be included in the HXB's existing budgeting system.

7. The HXB mobilizes funding mainly from company and household depositors and extends loans and other financing products primarily through its banking offices in more than 30 branches. The bank has put in place a reasonable framework for credit risk control and credit administration. Loans are disbursed based on the progress of projects or repayments of working capital loans. The Bank funds will be managed and disbursed the same way the HXB manages its credit risk. The bank's borrowing of the Bank funds through the MoF and the loans funded by this source will be recorded on the balance sheet, which is subject to annual audits by an external auditor.

8. The HXB's management decides the annual credit guidance and business priority based on the GoC development strategy and target. To ensure the financing made under the operation supports government priority areas and contributes to achieving results in the government program on air pollution control in the JJJ Region, the HXB has made JJJ Region air pollution control one of its business priorities over the next few years. This program, therefore, is included in the HXB's prioritized business plan. To ensure the availability of the program funds, besides the IBRD loan, the HXB plans to earmark the program funds in its annual lending envelope. In addition, the HXB's Blue Sky and Clear Water Fund in the JJJ Region and JJJ Integrated Development Fund support, but are not limited to, the program activities.

9. **Results framework.** Six DLIs have been identified that will provide a balance between providing incentives to achieve key outputs and outcomes under each result area and the feasibility to verify the achievement of the results. The IBRD loan amount of US$500 million will be disbursed against the attainment of the DLIs. The result indicators include both DLIs and core sector indicators. The selection of IVAs is critical for the credibility and operations of the program, and the HXB has agreed to engage IVAs by the end of 2016.

Box 1. Subproject Eligibility Criteria

A. EE Projects

Sub-borrower Eligibility

- Industrial enterprises of all sizes
- ESCOs (including leasing companies), which are companies that provide a wide range of services to implement EE projects with performance-based agreements under which the end users pay for these services from the demonstrated energy savings
- Owners of buildings (including office buildings, shopping centers, multifamily residential complexes, and other commercial and public buildings)
- Public agencies, such as utilities, hospitals, schools, and municipalities

Subproject Technical Eligibility

- The major types of EE subprojects eligible for financing under the project include (a) replacement of inefficient industrial technologies with energy-saving technologies, such as more efficient industrial boilers, kilns, and heat-exchange systems; (b) recovery and utilization of by-product gas, waste heat, and pressure; (c) installation of highly efficient mechanical and electrical equipment, including lighting motors, pumps, and heating and ventilation equipment; (d) industrial system optimization to reduce energy use; (e) building EE (residential, commercial, and government public buildings), including efficient lighting, such as LEDs, HVAC, and building envelope (insulation for roof, walls, windows, and doors); (f) energy-efficient street lighting; (g) cogeneration, which involves production of heat and electricity from a single fuel source; (h) efficiency improvement of and loss reduction in district heating systems; (i) water source heat pumps; and (j) other projects resulting in coal reduction agreed by the Bank.
- Subproject investment must be limited to renovation and rehabilitation (adjustment, replacement, or extension up to 50 percent) of existing physical components and systems, with the objective of achieving higher EE. The cash flow benefit arising only from energy savings[3] associated with the subproject, as estimated using the subproject financial projections prepared by the sub-borrower and reviewed by the HXB, must be adequate to repay the total investment cost of the subproject within a period of 10 years.[4] The OM provided a detailed methodology and illustrative example.

B. RE Projects

Sub-borrower Eligibility

- Enterprises (project developers), including state-owned enterprises (SOEs), and ESCOs developing and implementing RE projects
- Public agencies, such as utilities, hospitals, schools, and municipalities
- Building owners

Subproject Technical Eligibility

The major types of RE technologies include the following:

- Centralized solar PV, wind, and biomass systems (including biogas)
- Distributed PV and other RE systems
- Roof-top solar systems
- Solar water heating
- Geothermal heat pumps

[3] Annual cash flow benefits from the EE improvements associated with the subproject will be calculated as the expected amount of energy saved due to the subproject in any given year, multiplied by the expected average energy sale or purchase price for the sub-borrower during that year for each type of energy saved (electricity, coal use, and so on).

[4] The payback period will be calculated simply as the total investment cost (including interest during construction) divided by the average annual cash flow benefit derived from energy savings associated with the subproject, with the average taken over a period not to exceed the first 10 years of the subproject operations.

- RE for cooking, heating, or cogeneration

C. Pollution Control Projects

Sub-borrower Eligibility

- Industrial enterprises of all sizes
- Building owners and property management companies
- ESCOs (including leasing companies)
- Public agencies, such as power, heat and gas utilities, hospitals, schools, and municipalities
- Public transportation companies

Subproject Technical Eligibility

The major types of pollution control technologies include the following:

- FGD
- Denitrification technologies
- Replacement of coal with gas in industrial boilers, cogeneration systems, heating companies, and thermal power plants
- Replacement of diesel vehicles with electric vehicles and charging stations
- Replacement of diesel vehicles with CNG or liquefied natural gas vehicles

Subproject Social and Environmental Eligibility

- The sub-borrower must obtain all required environmental approvals from the appropriate local, provincial, or state Chinese environmental authorities and must make available to the HXB copies of all necessary approval documents.
- All of the proposed subprojects must be equivalent to the Bank categories B or C.
- Subprojects that are screened by the HXB must have their mitigation measures reviewed and approved by the HXB.
- Subprojects that involve land acquisition must obtain a land-use certificate or evidence of completion of land acquisition procedures and compensation made to the affected parties.
- Subprojects that involve temporary land occupation must obtain a copy of the land lease and evidence of proper compensation to the affected individuals.
- Subprojects that involve resettlement or loss of assets must obtain evidence of proper compensation to the affected individuals.
- Subprojects that involve job losses must be excluded from the program.

Economic and Financial Analysis

10. The economic analysis was conducted for EE and RE investments under Result Area I, which account for approximately 90 percent of the program expenditure. Cost-benefit analysis was used. Considering the variety of different types of investments under the operation, cost-benefit analysis was undertaken for each type of investment subproject and then the results were added together based on the weighted average to evaluate the economic justification of the program. Quantitative analysis was not conducted for Result Area II on pollution abatement measures due to data unavailability. Since this result area represents only 10 percent of the program expenditure, and preliminary analysis demonstrates that pollution abatement measures are likely to have positive economic returns, this exclusion should not affect the overall economic justification of the program.

11. The investment cost of each subproject varies, and the total investments are large and uncertain. Based on the information provided by the HXB, the investments of 23 industrial EE

subprojects financed under the CHEEF program range from CNY 1,510 to CNY 5,989 per tce, with total investments ranging from CNY 30 million to CNY 460 million for each subproject. The same would be true for other types of investments, even though the variation for RE subprojects could be much smaller. So generic subprojects based on average investment and average performance are used to represent the typical subprojects under the program for economic analysis.

12. Following a cost-benefit analysis approach, the costs include both capital investment and operation costs, while the benefits include energy savings for EE subprojects, electricity sales for RE subprojects, and both local and global environmental benefits resulting from avoided coal consumption.

Table 4.2. Summary Results of the Economic Analysis

Type	EIRR (%)		NPV @ 5% (US$, millions)	
	Without Carbon	**With Carbon**	**Without Carbon**	**With Carbon**
Area 1.1 EE				
Industrial EE	46.9	72.4	1,373.2	1,930.9
Building EE	18.0	25.1	117.9	180.6
Area 1.2 RE				
Solar PV	8.6	11.0	78.1	133.3
Biomass power	16.9	29.8	134.1	275.3
Wind power	11.3	15.6	137.9	238.3
Whole program	**22.6**	**31.9**	**1,795.0**	**2,666.9**

Note: CO_2 is valued at US\$30/tCO_2e based on the Guidance Note on Social Value of Carbon in Project Appraisal.

13. As shown in table 4.2, the EIRR of the PforR program was estimated at 22.6 percent without the social value of carbon and 31.9 percent with the social value of carbon. It is higher than the Bank's requirement of 5 percent, so the program is economically justified. The NPV of the program was estimated at US$1,795 million without carbon value and US$2,667 million with carbon value, discounted at a rate of 5 percent. Sensitivity analysis was conducted with different discount rates ranging from 0 percent to 12 percent, and the NPV of the program was positive, ranging from US$4,262.3 to US$574.3 million without carbon value, or from US$5,991.1 to US$1,035.2 million with carbon value.

14. **Financial analysis.** Similar to the economic analysis, the financial analysis was conducted for EE and RE generic investment subprojects under Result Area I. Cash flow analysis was undertaken to estimate the FIRRs for each type of investment subproject, and then the FIRRs were added together based on the weighted average to evaluate the overall financial viability of the program.

15. The FIRRs were estimated at 14.4 percent for the industrial EE subproject, 5.2 percent for the building EE subproject, 8.6 percent for the solar PV subproject, 16.9 percent for the biomass power subproject, and 11.3 percent for the wind power subproject. In addition, the weighted FIRR for the whole program was estimated at 11.5 percent. Considering the interest rate of commercial loan was about 5 percent in China, the program demonstrates its financial viability.

Financial Sector Due Diligence

HXB Profile

16. **The HXB is a commercial bank that has begun to diversify its clientele base and services.** The bank was established in 1992 by the Capital Iron & Steel Corp. (a flagship SOE group under the Beijing municipal government), with the approval of the PBOC, the central bank. Four years later, the bank was transformed into a joint-stock company with several SOE investors, and the official name was changed from Hua Xia Bank to Hua Xia Bank Co, Limited. In 2003, the bank went public on the SSE. In 2005, Deutsche Bank became the HXB's strategic investor. In 2008 and 2011, the HXB twice increased its capital base through private placements. Capital Iron & Steel Corp. remains the largest shareholder (20.3 percent), followed by the State Grid's investment arm, the Yingda International Holding Group (18.2 percent). Deutsche Bank Luxembourg S.A. and Deutsche Bank used to be the third and fourth largest shareholders, respectively. In December 2015, these two large shareholders decided, together with a small foreign shareholder, to transfer their holdings of the HXB (19.9 percent in total) to PICC Property and Casualty Company Limited (the People's Insurance Company of China, P&C), which is the largest property insurance company in China. The deal, if approved by the regulatory authority, would make the PICC P&C the second-largest shareholder. Deutsche Bank's move is due to its global strategy readjustments. Seventy-three percent of the bank's shares are traded on the SSE. The HXB employs more than 27,600 people, and most of whom (78 percent) are operational staff. Almost all the employees have higher-education degrees. The bank's network covers 34 branches throughout the country.

17. With total assets of CNY 1,851 billion (about US$300 billion, end-2014 exchange rate), the HXB accounts for about 1 percent of China's banking market. Over the years, the bank has broadened its clientele base to include individual borrowers, but remains mainly a bank for enterprises and quasi-government entities. The product lines have also expanded from mainly working-capital loans and trade finance to include project finance, mortgages, bank cards, electronic banking, wealth management, and trust facilities. The bank's holding company, the HXB Group, also owns three township and village banks in Beijing, Sichuan, and Yunnan provinces, as well as the Hua Xia Financial Leasing Co.

Corporate Governance and Internal Control

18. **The HXB's corporate governance framework is typical of a listed financial institution in China.** The shareholders' assembly is the highest authority, which is represented by a 16-member board of directors (6 of them are independent directors). The board reports to the shareholders' assembly and is supported by several committees, such as those on corporate strategy, risk and compliance management, connected-party transaction control, and audits. Appointed by the board, the president is responsible for the day-to-day operations of the bank, and is supported by a number of committees on credit policy and review, ALM, impaired assets, product development, risk management, and internal control. Parallel to the board of directors is a supervisory board that reports to the shareholders' assembly, and is entrusted by the assembly to supervise the performance of the former board and the senior management in terms of the

bank's financial activities, risk management, and internal control. The HXB has autonomy in decision making. The bank's mission and guiding principles as well as other important matters, such as the organizational structure and financial and accounting systems, are governed by its charter. The rules and procedures of board committees are documented and disclosed on the HXB's external website (http://www.hxb.com.cn). In recent years, the bank's annual reports have provided detailed information on the frequencies and main decisions of the shareholders' assembly, changes in the compositions of the boards, and remunerations of the main executives.

19. As a company listed on the SSE, the HXB publishes its quarterly, semiannual, and annual reports. The bank also discloses annual audited financial statements, internal control reports, social responsibility reports, and reports on lending to large shareholders and other connected parties. The financial statements are prepared and audited in accordance with Chinese standards. Deloitte China was the HXB's auditor for fiscal years 2013 and 2014. The 2012 financial statements were audited by Grant Thornton China, and also received unqualified auditors' opinions.

20. The HXB's internal audits department reports directly to the audits committee of the board of directors and has discretion to deal with noncompliance cases. The audits department follows a three-tier set-up—from headquarters to six regional units to 33 on-site auditing offices. The internal audits are compliance based, while taking risks into consideration. They are mainly conducted on-site according to annual plans, but can also be ad hoc. In recent years, offsite surveillance has been strengthened because of centralized data management. The 2014 internal audits did not find material noncompliances. Deloitte China found that the internal control over financial reporting was effective.

21. The HXB's corporate governance structure has improved significantly. While the improvement is a reflection of the progress made in China's financial markets, it will take time for the corporate governance framework to become more effective.

Business Strategy and ALM

22. **It appears that the HXB's business planning is relevant and its ALM is effective.** The bank formulates business plans every four years. The current plan covers the period from 2013 to 2016, and positions the bank as a banker for medium-size enterprises and middle-income customers. The market positioning is based on the recognition that the bank does not have more advantages compared with large borrowers, given the changed business environment—that is, a slowing-down economy and intensified competition among banks and other financial institutions. The plan also directs the HXB to move into middle-income counties in central and western China, because the market in the eastern regions is seen as having matured. More attention has been paid to improving the quality of assets and financial returns. On the funding side, the strategy is to reduce the share of more costly interbank borrowings by further mobilizing deposits from companies and households. The HXB plans to meet the CBRC's new capital adequacy requirements by 2018 through increased profit retentions and issuance of qualified securities to increase the second-tier capital.

23. The HXB's ALM committee meets every quarter to review ALM positions and adjust relevant strategies on pricings, NPLs, capital injections, and liquidity, as well as investments and

OBS operations (for example, wealth management products). Annual targets are set for branches and sub-branches based on a series of indicators about branches' risk exposure levels and financial performances, including those on risk-weighted capital adequacy and loan-deposit rates. Annual budget allocations are linked to the achievement of the targets.

24. Under the current strategy, the bank has rightly slowed down the growth of the balance sheet and focused more on quality and earnings. The ALM activities have readjusted the balance sheet structure toward higher earnings assets and lower cost liabilities, reduced the cost-to-income ratio, and improved profitability.

Credit Management

25. **The HXB has improved the institutional arrangements for credit risk management.** In 2008, the bank launched a reform of its risk management system with technical assistance from Deutsche Bank. Since then, the bank has undertaken a number of steps to strengthen its risk management arrangements. Credit management was first refined into three different centers, each in charge of credit policies and administration, credit review, and loan workout. In late 2015, the HXB reorganized some of its departments to further centralize the overall risk management function. Credit management is now under the chief risk management officer and the chief review officer, who are also responsible for monitoring and controlling the other risk exposures of the whole bank. At HQ, the new risk management department is responsible for integrated management of credit risk in tandem with management of the other exposures, such as market risk, interest rate risk, operational risk, information technology system risk, and OBS business risk. The three credit management centers have been elevated to the HQ department level and renamed accordingly. The credit operations department is responsible for the whole bank's credit administration, including lending and verification, loan supervision, and assets classification and provisioning. The credit review department monitors and provides guidance on credit reviews and approvals for the whole bank, in addition to reviewing loans subject to HQ examination. The HXB's credit exposures to the same customer who receives different loans from various branches, for example, is now under this department's monitoring. The department is also responsible for reviews of credit to be extended to the other institutions under the HXB Group and to customers that share direct or indirect mutual guarantee relationships with the bank. The loan workout department has also been given similar responsibility for the whole bank. At the provincial branch level, the organization of the credit management function follows the same guiding principles as at HQ, with separate credit review and loan administration departments. Sub-branches are not authorized to approve loans. At that level, client managers conduct on-site investigations and, based on their findings, launch lending processes. In addition, specialized senior staff members, called credit application examiners, are assigned to review loan documents for the adequacy and completeness of loan packages. From time to time, the experts also conduct field visits to verify various features of loan applications. Relevant credit officers at the HQ and branch levels are responsible for credit risk assessments. Finally, the credit committee under the board of directors reviews medium- and long-term credit and other risks and adopts overall policies for the whole bank.

26. Credit policies are formulated in accordance with the bank's four-year business plan and its annual strategies. Loan quotas are allocated to branches according to regional economic situations and the branches' risk mitigation capacities (for example, loan-to-deposit ratio). Quota

allocations also take into consideration the sectoral exposures. For instance, at present, only eight branches are authorized to extend real estate-related loans, given the market risks. In 2015, the bank's sectoral policy supported credits to infrastructure and emerging industries; moderated loan growth in health, medicine, and education sectors; and restricted lending to industries that produce high pollution, consume extensive energy, and suffer from overcapacity. Loans to real estate borrowers and lower-level government financing platforms are also restricted in terms of overall exposure. At present, the HXB targets borrowers that have the majority shares held by the state and are not overleveraged, as the bank believes that it has less information mismatch with regard to this type of borrowers.

27. The HXB uses a 16-grade rating system to evaluate the creditworthiness of commercial borrowers, and the highest credit standing is assigned as grade 1. Normally, those rated higher than grade 7 are not qualified. SMEs must score 11 or a lower grade to be eligible for loans, due to the perceived information mismatch. Due diligence is carried out at the branch and sub-branch levels, to review a borrower's/project's financial status and performance, as well as nonfinancial variables (for example, history and management). Pledges and collaterals are evaluated by certified public evaluators. An early warning system is used to assess external risks. The PBOC Credit Reference Center is routinely visited for credit-rating purposes, and the information provided is considered accurate and timely (updated every day); however, this information is for banking-sector clients. The central bank's system lacks good coverage on credit extended by nonbank financial institutions, private lenders, and shadow banking activities.

Green Finance Business

28. The HXB is dedicated to becoming a green bank during the next strategy period (2017–2020). The bank sees more business opportunities in green finance, particularly in the targeted areas of the proposed operation, since the GoC has been promoting the integration of the economies of Beijing, Tianjin, and Hebei and because the provinces have to meet various environmental indicators for the staging of the Winter Olympics in 2022.

29. The HXB has established specific green finance criteria based on the CBRC guidelines. Projects that fail to meet the criteria are screened out. Green projects are considered as emerging industries, such as those for EE, emission reduction, RE, technological upgrading, sewage management, and public transportation development. In 2015, the bank launched a "Clean Water and Clear Sky Fund" of CNY 5–10 billion to extend loans to (and eventually make equity investments in) environmental protection industries. The bank is also developing new products for green finance. In 2014, the bank prepared guidelines on loans based on borrowers' projected cash inflows/incomes. However, implementation of the guidelines appears to be slow, partly due to some pending legal issues, such as priorities among different parties over the right to collect borrowers' income streams.

Financial Status and Performance

30. **The HXB has readjusted its balance sheet structure toward safer assets and more stable deposits.** The growth of total assets slowed down from almost 20 percent in 2012 to just above 10 percent in 2014. Loans and advances remain the main assets (49 percent of total assets), and more than half of them are short term. More than 85 percent of the HXB's loans are

secured with pledges, collaterals, and guarantees. The bank invests only in financial bonds with AA or higher ratings, which form the second-largest group of the HXB's assets (about 30 percent of total assets).

31. Because they have underperformed, the HXB has reduced the shares of loans to the manufacturing industries (largest sectoral exposure) and the wholesale and retail industries (second-largest exposure). The HXB finds the housing market is a higher risk, and has controlled the growth of loans to the sector. In 2013, loans to leasing and commercial services replaced those to the real estate sector to become the third-largest sectoral exposure. Their relative importance in total sectoral exposures grew by more than 22 percent in 2014. The share of loans to individual borrowers registered double-digit growth in 2013 (24 percent) and continued to grow substantially in 2014 (more than 7 percent).

32. On the liabilities side, customer deposits are the main funding source (more than 74 percent of total liabilities in 2014), of which deposits from enterprises accounted for more than 64 percent. In the last two years, growth in deposits corresponded to that of total liabilities (10–13 percent); however, household deposits rose much faster (18 percent). Internationally, household deposits are generally considered less sensitive to interest rate changes. Time deposits from both companies and households also registered higher growth (15 percent). According to the HXB's estimates, about 20 percent of the deposits are more sensitive to interest rate changes, especially those from customers who did not borrow from the bank. Cost consideration is another driver for pursuing household deposits. The HXB pays 49 base points less for demand deposits compared with the checking account rate the bank offers to its company customers.

33. **The HXB's NPLs remain low, but credit risks have increased.** The "new economic normality" has serious implications for China's banking market. In 2014, the HXB saw its NPLs increase by 21 percent. Among the performing loans, those classified as "special mention" almost doubled. International experience shows that during economic downturns, most of these loans will eventually migrate to the nonperforming categories, which is also the case in China. The worsening of credit quality continued in the first half of 2015, and loan losses rose by close to 13 percent after they were reduced in 2014. The bank has earmarked high provisioning coverages to mitigate the increased credit risk.

34. **The HXB enjoys good liquidity.** The bank is compliant with the CBRC regulations on assets liquidity, loan-to-deposit ratio, and leverage ratio. Nevertheless, it is worth mentioning that the bank's net cash flow dropped by 84 percent in 2014, on top of an almost 15 percent decline in the previous year.

35. **The HXB is profitable, but its profitability is being squeezed.** Most of the Chinese banks have felt increased pressure on profitability after the PBOC liberalized the interest rate management regime. Competition for deposits is expected to intensify in the future, since the market now is populated not only by banks but also by a variety of nonbank financial institutions. Higher earnings expectations have begun to direct enterprise and household savings away from banks. The HXB's net profits increased in recent years, with a reasonable net interest margin (2.69 percent in 2014). However, the growth rate slowed down significantly, from more than 37 percent in 2012 to less than 16 percent in 2014. In addition, the HXB's operational cost

is relatively high due to previous rapid expansions (for example, expansion of the branch network).

36. The HXB's OBS business (also called shadow banking by some observers) has grown rapidly—a common trend in China's banking sector. In 2014, the bank's income from fees and commissions grew by 27 percent after an increase of more than 44 percent in 2013. Under an item called "income from other businesses," the 2014 annual report showed an exponential growth in one year from CNY 5 million in 2013 to almost CNY 1 billion in 2014. The HXB reports that although the type and size of wealth management products, entrusted loans, and other trust facilities have increased rapidly, there has been no default and the bank has implemented the requirements of the regulation on interbank business. Nevertheless, funding mobilized by the OBS activities tend to be short term, while the investments they finance could have much longer maturities. The recent changes in the risk management structure are expected to improve the bank's risk management, including the OBS exposures, the maturity mismatch of these products, and the safety and soundness of their investments.

37. **The tight capital base is another constraint for quality growth.** The need to increase provisioning for growing NPLs and the squeezed profitability has stretched the HXB's capital base. The bank is compliant with the CBRC's 2004 regulation on capital adequacy (similar to Basel II). Currently, it also meets the requirements of the banking regulator's 2012 capital management regulation (close to Basel III), as the regulation allows banks to include unqualified second-tier capital in the calculation for capital adequacy during a transition period of six years. The bank's plan to issue CNY 20 billion preference shares has been approved, and it hopes to float the issue when the stock exchange becomes more stable. The bank has engaged PricewaterhouseCoopers for technical assistance on actions needed to ensure compliance with the CBRC regulation by 2018.

Table 4.3. Prudential Compliance Summary (%)

Compliance Factors	**CBRC Benchmarks**	**January–June 2015**	**2014**	**2013**
Liquidity	≥ 25.00			
Local currency		49.61	46.75	30.59
Foreign currency		38.02	70.50	56.63
Loan-to-deposit ratio	≤ 75.00	72.74	68.52	69.02
Leverage ratio	≥ 4.00	4.71	4.43	n.a.
Loan quality				
Nonperforming		1.35	1.09	0.90
Provisioning coverage	≥ 150.00	185.01	233.13	301.53
Single-borrower exposure	≤ 10.00	4.52	4.68	5.77
Capital adequacy (2012 regulation)				
Tier-1, core	≥ 7.50	8.71	8.49	8.03
Capital adequacy	≥ 10.50	10.72	11.03	9.88

Note: The data for January–June 2015 are from unaudited semiannual financial statements of the HXB, while those for 2014 and 2013 are from audited financial statements. The 2012 capital management regulation allows the inclusion of unqualified second-tier capital in the capital adequacy ratio calculation until 2018.

Annex 5: Summary of Fiduciary Systems Assessment

1. The government has designated the HXB as the implementing agency of the operation, which will on-lend the program funds at market rates to commercial enterprises for the financing of eligible investments, in accordance with the HXB's existing institutional arrangements, procedures and requirements, assessment and appraisal of subprojects, supervision, and oversight arrangements. The institutional arrangements, lending practices, eligibility criteria, and governance and risk controls are included in the OM that has been agreed by the Bank. The HXB will be responsible for repayment of the loan to the GoC, and will assume all financial risks as well. The CBD of the HXB has accumulated extensive experience with the Bank's operations from the CHEEF program. The Green Finance Center, to be established within the CBD, will continue to assume primary responsibility in the marketing and developing pipeline under the program; appraise and approve potential subprojects against eligibility criteria outlined in the OM; conduct day-to-day program-related disbursement and the FM work, including accounting and financial reporting; and coordinate with the Bank.

2. The HXB has demonstrated capacity and experience and has mainstreamed EE and clean energy financing in its current business lines. The HXB has fully disbursed IBRD funds under the CHEEF program, and its fiduciary performance on procurement and FM under the ongoing CHEEF program has been satisfactory. The HXB has adequate systems in place for oversight, appraisal, and supervision of subprojects, to avoid misuse of the loan and to reduce the risk of NPLs. For subproject loan appraisal, the HXB assesses the reasonableness of cost estimates, and the capacity of the beneficiary to implement the subproject, including its FM and procurement capacity. With the exception of the requirements for accounting, financial reporting, auditing, and introduction of DLIs and the associated protocols for verification under PforR policy, the program fiduciary systems for the HXB will largely be the same as the existing systems in place within the bank. Therefore, the procurement and FM assessment found that the HXB's fiduciary system can meet the Bank's requirements under the Bank Policy on Program for Results Financing, and the fiduciary risk is Moderate.

Procurement Assessment

3. The fiduciary assessment aims to identify procurement and FM risks under the program and recommend mitigation measures to reduce the fiduciary risks and ensure that the operation will be implemented to achieve the PDO. An assessment was conducted on the HXB's governance and institutional arrangements and its systems, processes, and controls for screening, appraising, approving subprojects, and supervising procurement and implementation under the subprojects. Field visits were made to some entities having subprojects financed under the CHEEF program.

4. Overall, the assessment concluded that the institutional arrangements, staffing, commercial practices procurement, and governance and control systems established in the HXB are acceptable to the Bank. The HXB's OM has been agreed with the Bank. The assessment also identified gaps and recommended relevant mitigation measures.

5. It is envisaged that the bulk of potential sub-borrowers would be the SOEs that would be subject to mandatory open competitive bidding under the Tendering and Bidding Law of the

People's Republic of China (TBL). The TBL has all the elements of a good procurement system, including (a) requirement to use open bidding for contracts estimated to cost more than CNY 1 million, (b) justification and clearance from an oversight body that is required for the use of less competitive methods for large contracts, (c) public advertisement of bidding opportunities, (d) sufficient time for bid preparation, (e) use of standard bidding/contract documents, (f) disclosure of evaluation and qualification criteria in bidding documents, (g) public opening of bids simultaneously as the bid opens, (h) use of expert panels for bid evaluation, (i) award of contract to the most advantageous offer, (j) standstill period before contract award, (k) complaints mechanism, and (l) publication of details of contract award. Overall, the framework for procurement by the SOEs under the program is considered transparent and adequate to achieve economy and efficiency. The rest of the potential sub-borrowers will be from the private sector. Procurement will be undertaken by these subloan beneficiaries in accordance with well-established commercial practices in China. The commercial sector procedures and practices for procurement are much simpler than those for the public sector and require less documentation. However, given the industry's profit-driven nature and the highly competitive local market for works, goods, and consulting and nonconsulting services, the procurement methods used in the commercial sector are efficient, fit for the purpose, and achieve value for money. The general rule for enterprises is to carry out a market analysis of available product and/or technology providers and then through a series of negotiations, try to establish long-term mutually beneficial relationships with the providers. The review shows that many enterprises have purchasing departments that are subject to corporate internal control. Audit and supervision departments in the enterprises also monitor expenditures. Given the market situation of providers and the corporate controls, the procurement fiduciary risk is well managed.

6. The assessment covered two aspects: institutional arrangements and procurement management. In addition, the gaps have been identified with recommended mitigation measures.

7. **Institutional arrangements.** Within the HXB, the CBD is specifically responsible for implementing green financing investments, and the branches in the JJJ Region will be responsible for identifying and appraising potential subprojects, supervising implementation, and verifying the results. The process and management of subprojects in the HXB—from identification, appraisal, lending, implementation, and supervision, including procurement activities—are well established.

8. Four qualified staff members who are able to carry out the fiduciary functions with adequate energy sector experience have been assigned within the CBD of the HXB. They have obtained the appropriate experience from the CHEEF program and other green financing investments that can be used for this operation. With regard to this PforR operation, these staff members have been closely involved throughout the preparation stage, so they are familiar with the sector as well as the fiduciary requirements. In addition, they developed the OM, which is the key document for procurement management for program implementation.

9. **Procurement management.** Procurement under the program would mostly include (a) goods; nonconsulting services; and design, supply, and installation of plant and equipment for rehabilitation, renovation, retrofitting, and reconfiguration of production lines and facilities in enterprises for energy conservation; and (b) small and medium-size civil works and associated

design and consulting services for such works. There are no large contracts valued at or above Operational Procurement Review Committee thresholds under the program.

10. The HXB will monitor and supervise the procurement activities of sub-borrower(s) during subproject implementation. The HXB conducts field visits to subprojects at least twice a year.

11. **OM.** The HXB has developed an OM that has been agreed with the Bank. The OM includes governance arrangements and the implementation regulations for this PforR program, to ensure that the program expenditures are used to achieve program objectives and to reduce the risk of corruption and fraud. During implementation, the OM may be updated to reflect implementation needs.

12. **Governance and risk control.** Internal controls, external auditing, procurement record-keeping for monitoring, a complaint handling system, and anticorruption regulations are the tools to guarantee transparent and fair procurement transactions.

- Internal control—Official documents to guide the internal control of the HXB are issued by HQ for all levels covering various areas of operation. The internal control unit's responsibility is to ensure that the loan is used for the intended purposes and to reduce its risk.

- External auditing—An independent external auditor engaged by the HXB conducts auditing once a year. The findings of the auditor are followed up by the HXB to improve its performance. This auditor may cover the program procurement audits in line with the OM during the program implementation.

- Procurement records—The HXB requests sub-borrowers to keep all procurement records for monitoring and supervision purposes. In addition, the external auditor and the Bank may ask to examine procurement records for program supervision, audit, or an inquiry, if needed.

- Complaint handling—The HXB requires all sub-borrowers to have a complaint handling mechanism.

- Anticorruption and fraud—These issues are addressed extensively in the OM. Provisions on anticorruption and fraud must also be included in all contracts financed under the program.

- The Bank's Anti-Corruption Guidelines for PforR Financing must apply to the program.

13. Potential sub-borrowers will follow HXB's requirements:

- Procurement Plan—As part of the subproject proposal, the sub-borrower must prepare a procurement plan, including (a) a brief description of goods, works, and/or nonconsulting services required for the subproject; (b) the proposed procurement

procedure or methods; and (c) cost estimates and the time schedule. The procurement plan should be agreed by the HXB before the procurement starts.

- Methods and procedures—The potential sub-borrower will follow procurement methods: open bidding, comparison of quotations, reverse auction, and direct contracting. The procedures are in accordance with well-established private sector/commercial practices in China.

- Payment review—The payment from the HXB to the subproject must be in line with the signed contracts and invoice with delivery evidence, and the disbursement procedures must follow the existing requirements in the HXB.

- An anticorruption due diligence system and complaint handling mechanism must be established by sub-borrowers in accordance with the subloan agreement.

14. The following gaps were identified at the operation preparation stage, and will be addressed through appropriate actions in the PAP, which has been agreed with the HXB: (a) award of contracts by beneficiaries to their parent or affiliate companies; (b) nonapplication of Bank debarment/suspension lists, which may result in unacceptable contract awards to Bank-debarred/-suspended firms or individuals; (c) a need to strengthen the complaint mechanism; and (d) while HXB staff have adequate experience in banking, financing, and project management, additional expertise is required for the assessment of the procurement strategy and planning for subprojects, market analysis, fiduciary risk analysis and mitigation, and subproject supervision, to ensure efficiency and effectiveness.

15. The proposed mitigation measures are as follows:

(a) The subproject application and the subloan agreement with beneficiaries must include a mandatory provision that the beneficiaries must not award contracts to their parent or affiliate companies, unless there is an established arms-length arrangement, with the exception for ESCOs on the basis they are providers and are sourced by their clients through commercial practices to provide EE services under performance-based contracts. The procurement plan accompanying the application for the ESCOs should identify contracts that will be procured directly from parent or affiliated companies and HXB, as part of the application review process should satisfy itself that the products offer value for money.

(b) The HXB must set up a complaints handling mechanism, the details of which will be included in the subproject application package and on the HXB website.

(c) Beneficiaries must confirm, as part of the subloan agreement, that they will not award contracts to firms and individuals on temporary suspension or debarment by the Bank and other MDBs.

(d) The HXB must strengthen its capacity to assess the capacity of beneficiaries to carry out procurement and contract management efficiently as part of subproject appraisal and provide guidance to beneficiaries with weak procurement capacity. The HXB

and beneficiary enterprises will hire expertise as needed for better procurement and contract management.

Financial Management

On-lending Arrangements and Budgeting

16. The Bank loan will be signed by the Bank and the People's Republic of China through its MoF. On-lending arrangements for the Bank loan will be signed by the People's Republic of China through its MoF and the HXB, which will be the final debtor.

17. The proposed program budget will be US$1 billion, of which US$500 million will be the IBRD loan and US$500 million will be from the HXB. The program expenditure occurs when the HXB releases the subloans to the sub-borrowers. All the program funds will be included in the HXB's existing budgeting system. The HXB's scale of loan delivery should first follow the bank loan ratio required by the central bank for risk control. Meanwhile, the HXB's management decides the annual credit guidance and business priority based on the GoC development strategy and target. Therefore, to ensure that the investments made under the operation support government priority areas and contribute to achieving the results in the government program on air pollution control in the JJJ Region, the HXB made the JJJ Region's air pollution control one of its business priorities for the next few years. This program therefore is included in the HXB's prioritized business plan. To ensure the availability of the program funds, besides the IBRD loan, the HXB plans to earmark the program funds in its annual lending envelope. In addition, the HXB's Blue Sky and Clear Water Fund in the JJJ Region and JJJ Integrated Development Specialized Fund support, but are not limited to, the program activities. Based on the HXB's current business plan for the JJJ Region's air pollution control, it is capable of having sufficient funds to support this program and to ensure the amount of the PforR financing to be equal to or less than the total program expenditures.

Program Accounting and Financial Reporting

18. The HXB will maintain all copies of the program accounting records. Program financial reporting is required to meet the program oversight needs. As such, the financial report, as part of the program report, including the program expenditures and withdrawal status of IBRD loan, should be furnished to the Bank by the HXB no later than three months after its calendar year.

19. The HXB developed the computerized integrated credit control and accounting system, which links the HXB's HQ and branches. The system covers the credit application, review, approval, release, and disbursement procedures and process records. In addition, the subloan is automatically recorded in the accounting system upon release from the credit control system. The system can provide reasonable assurance on the appropriate use of the HXB's credit funds and environmental and social requirements on its assets. However, the program funds and expenditures cannot be easily tracked and separately reported in the HXB's existing corporate accounting system because a separate accounting profile cannot be specifically set up for the program.

20. To meet the reporting requirements for the program, the HXB has agreed to take the following mitigating measures: (a) the CBD of the HXB sets up the memorandum records for the

program to record each subloan released and related reference information for ease of tracking the record in the corporate accounting system and the original supporting documents, (b) reconciliation is made between the CBD and the accounting division on a quarterly basis, and (c) every semester the CBD prepares the program-specific financial report according to the format specifically tailored and agreed with the Bank for the program and submits it to the Bank.

External Auditing

21. The HXB accepts an annual financial audit conducted by Deloitte Touche Tohmatsu, one of the "Big Four" accounting firms. Based on the auditor's background and experience, and the Bank's due diligence conducted of the auditor, the Bank deemed Deloitte Touche Tohmatsu as an acceptable auditor. As the HXB is a listed company in the domestic stock market, the unaudited quarterly and semiannual financial statements and annual audit report need to be made publicly available. The program expenditures and source of funds have been included in the annual financial audit scope, but are not specified in the current financial audit report. The HXB and the Bank agree that a program-specific paragraph will be added as a note in the audited financial statement to address the program implementation status, total program expenditures incurred, whether the program funds are used for the intended purposes, as well as issues noted under the program or in audit opinion, if needed. The annual financial audit report must be furnished to the Bank by June 30 of the next calendar year.

FM Risks and Mitigation Measures

22. The FM performance of the HXB has improved considerably over the past few years and is satisfactory to the Bank for now. However, there are still a few FM-related fiduciary risks under the PforR operation: (a) branches of the HXB and sub-borrowers are not familiar with the Bank's requirements and procedures, and (b) the HXB's lack of experience with the PforR arrangements, especially the innovative result-based disbursement arrangements, may result in improper accounting and financial reporting and inefficient disbursement processing.

23. **Lessons learned from the CHEEF program.** During the first two years of the CHEEF program's implementation, the China National Auditing Office (CNAO) has identified two issues: (a) the approval and disbursement of subloans lagged behind the subproject construction progress, and (b) the branches of HXB and sub-borrowers were not familiar with and not strictly following the Bank's procedures or domestic regulations on lending management of fixed-asset investment. To mitigate the fiduciary risks, the HXB not only took strict remedial actions to have the sub-borrowers pay back all the ineligible expenditures identified by the CNAO, but also has been working closely with the Bank and the HXB's relevant internal departments to centralize prior review of subproject applications at the HQ level, speed up the internal approval procedures, strengthen training of branches and sub-borrowers, intensify supervision of the subprojects implemented by branches, incorporate retroactive financing arrangements in the subloan agreement, and hire a third-party engineering supervisor to verify the construction progress of the subprojects. All the measures were agreed with the Bank and documented in the OM as a mechanism to complement existing credit control procedures in the HXB. As a result, the CNAO's audit reports from 2012 to 2014 for the CHEEF program were unqualified.

24. Mitigation measures to address the above risks have been agreed as follows: (a) the OM prepared by the HXB, reviewed and agreed by the Bank, has addressed the program scope, eligibility criteria, procedures and mechanisms for credit control, oversight, and capacity building subject to subloans, procurement, FM, and disbursement-related arrangements and requirements; and (b) the Bank will follow up on the HXB's enforcement of the OM on a regular basis during the implementation.

Fraud and Corruption Risks

25. As part of the fiduciary assessment, the degree to which the program systems handle the F&C risk, including complaint mechanisms, has been analyzed. Patterns of unethical practices in the portfolio of Bank-financed projects in China include (a) misrepresentation by some providers of their experience, financial capability, and resources; (b) submission of fraudulent documents by some providers, such as securities, test results, licenses and certificates, financial statements, contract documents, and performance certificates; (c) over-invoicing; (d) collusion; and (e) negotiations with complainants to withdraw their complaints. To mitigate these risks, subloan beneficiaries should conduct adequate due diligence on the authenticity of documents provided by providers and the qualifications of providers recommended for the award of contracts. The subloan beneficiaries must report any F&C to the relevant supervision authority of the government and the HXB for the matter to be handled in accordance with national regulations. The HXB must undertake preliminary investigation of an F&C case and report to the Bank in its program report. The subloan agreements between the HXB and sub-borrowers under the program must also include provisions on anticorruption. The Bank's Guidelines on Preventing and Combating Fraud and Corruption in Program-for-Results Financing, dated February 1, 2012, and revised July 10, 2015, will apply to the program. In particular, (a) no person or entity debarred or suspended by the Bank will be awarded a contract under or otherwise allowed to participate in the program during the period of such debarment or suspension; (b) the HXB must inform the Bank in its program report of any allegations or complaints regarding F&C under the program, and keep the Bank informed on the actions taken to address the specific allegation and environmental and social program funds; and (c) the HXB and the subloan beneficiaries must cooperate fully with representatives of the Bank in any inquiry conducted by the Bank into allegations or other indications of F&C in connection with the program. The procedures for recording complaints, handling complaints, aggregating information from the HXB's complaints system, and reporting to the Bank are included in the PAP and the OM.

Annex 6: Summary Environmental and Social Systems Assessment

Introduction

1. Following the principles outlined in Policy and Directive on Program for Results Financing, an assessment on the EHS and social system for the program was prepared. The ESSA is based on (a) a review of existing laws and regulations; (b) meetings and interviews with key stakeholders, ranging from the participating bank and developers of different types of EE and RE projects to government officials and individuals; (c) assessment of the existing environmental and social management system and the capacity and performance of the participating bank; (d) identification of measures to enhance environmental and social management capacity and performance; and (e) recommendations for performance monitoring and support during implementation.

EHS and Social Impacts

2. Initial screening of the EHS effects has been made largely based on the nature and location of the investment areas and the EHS guidelines of the Bank Group. According to the initial screening, the proposed program may cause diversified effects in the construction and operation stages. The effects are expected to include (a) potential environmental impacts—that is, dust, noise, solid waste, wastewater, soil erosion, emissions from biomass power plants, and impacts on ecology and visual aesthetics by windfarms; (b) health and safety risks, including the occupational health impact where the workers may be injured by exposure to steam from recovery of waste heat or cogeneration or by exposure to hazardous wastes during disposal of wasted equipment under the area of EE; and (c) explosion and fire risks from the flue gas denitrification if the pure liquefied ammonia or aqueous ammonia of high concentration is used under the pollution abatement area, but the risk of explosion and fire is largely decided by the amount of the ammonia stored on-site. During the initial period of the investment area screening, the category A-type activities have been screened and excluded from the program, and the resulting environmental effects are anticipated to be site specific, moderate, or minimal and can be avoided, minimized, and mitigated through the early screening, alternatives comparison, consultation, and mitigation measures that can be readily designed.

3. The proposed program is anticipating limited land acquisition impacts, as most EE and emission reduction activities will be confined within the existing premises of enterprises, and the amount of land acquisition will be moderate for different types of green energy projects, including a windfarm, biomass power plant, centralized solar power project, and geothermal power project. Based on a review of similar projects and experience, construction of certain facilities of RE projects will involve a limited amount of permanent land acquisition, which includes a biomass power plant site, windfarm generator base, and substation. For other facilities, such as land for building windfarm generators and access roads, land for installing solar panels for centralized solar power project, and fuel storage sites for biomass power plants, temporary land leasing will be required during both project construction and project operations. The PforR program will exclude any subprojects with potential job losses.

Assessment of the Current Environment and Social Management System

4. China has established a comprehensive system for management of EHS issues, which consists of laws, regulations, guidelines, and specifications and standards. There is no difference between them and the Policy and Directive on Program for Results Financing regarding principle and substance. The umbrella laws for environment, health, and safety management are the Environmental Protection Law, Labor Law, and the Safety Operation Law, respectively. Therefore, the system provides a reasonable basis for addressing the EHS issues likely to arise in the proposed investment areas of the PforR program. However, the EHS management system in China is complex, and various government and nongovernment organizations and the project proponents are designated with duties and responsibilities under the system, to ensure the development and operation of a project complies with the legal requirements. During the preparation of a project, various types of documents need to be reviewed and approved by the respective government organizations: for example, an environmental assessment (EA) of all types of construction projects and planning, to be approved by environmental protection departments; a soil erosion conservation plan for the project to be located in areas prone to soil erosion, to be approved by the water conservancy departments; and a safety assessment of projects involving production, use, transportation, and storage of dangerous chemicals, to be approved by safety operation supervision departments. The types of documents to be prepared depend on the nature, location, size, and magnitude of the project. However, the approval procedure of the project has been clearly arranged, to ensure these EHS concerns are considered in a consolidated way in the decision-making process. The most important step of the approval procedure of projects is the approval of the feasibility study by the DRC, which requires the approval of the planning site, preliminary approval of land use, and approval of the EIA. The approval of the EIA for the project also needs the evidence of approval of the soil erosion conservation plan, comments from the local cultural department on physical cultural resources, comments from the local forest department on natural reserves, and so on. In addition, the umbrella laws of EHS in the country stipulate that a "three-simultaneous" mechanism to ensure the mitigation measures, particularly the facilities for EHS, be designed, constructed, and operated effectively and in a timely manner.

5. On the potential social impacts caused by land acquisition, the current legal framework has set up a clear procedure for obtaining approval for land acquisition for investment projects and managing the process of land acquisition. The legal framework defines the government institutions responsible for approving land acquisition for any investment projects, including RE projects. It does not allow the implementation of a development project without approval of the land acquisition requirement.

Assessment of Performance of the Current System

6. Review of similar RE projects indicated that all project sponsors have obtained relevant approvals during the project feasibility study stage, which include project proposal approval from the local reform and development commission, EA approval from the EPB, preliminary verification approval from the land resources department, and a land-use planning permit from the local planning department.

7. All project sponsors are aware of the approval procedures, including the EA and other types of documents required for a particular project. In addition, the site visit confirmed that the sponsors fulfilled the mitigation measures required by the EA, as they prefer to invest in the measures rather than being punished with a heavy fine if the examination and acceptance carried out by the relevant departments find any defaults in the environmental performance of the project. The review of the EA indicates that the core principles of the Bank Policy on Program-for-Results Financing are achieved through early screening, alternative comparisons, public participation, and proper design of mitigation measures. The natural habitats and physical cultural resources have been identified through the consultation with relevant government departments during the screening step of the EA, and the alternatives to avoid or minimize the impacts on these receptors, if they are found within the area of influence of the project, were suggested for further consideration by the design team. In addition, it is found that the approval document issued by the EPB for EA highlighted the impacts of primary concern and the corresponding mitigation measures for examination and acceptance when the project is completed, so that the key environmental effects can be effectively managed.

8. All project sponsors were able to obtain the land for the projects following the established land acquisition process. The discussions with project sponsors and visits to project sites confirmed that specified land acquisition procedures were generally followed in different local areas, and all affected villages were notified about land acquisition, participated in measurement of impacts, and were provided with the compensation indicated in provincial decree. Based on these visits and experience with similar land acquisition in the region, as long as the procedures are followed, the basic interests of the affected people can be protected. In addition, the core principle of avoiding or minimizing displacement and assisting the affected people in improving or at least restoring their livelihoods and living standards could be achieved. For the required temporary land during project construction, instead of relying on local land resource bureaus, project sponsors often negotiated directly with local villages. The compensation rates for temporary land occupation are often set following the annual crop value plus the cost of restoring affected land to original conditions. For areas that require long-term lease, compensation is often agreed upon through negotiation. For land owned by the village collective, the compensation will be paid directly to the affected village. For land contracted to individual households, compensation will be paid directly to affected households.

Assessment of Capacity and Performance of Participating Bank

9. For the HXB, the capacity for and performance on managing EHS and social risks is often reflected in its risk management system, which is handled by the risk control department in the bank's HQ and its subsidiary departments in local branches, independent from business operation departments. They can provide independent suggestions and comments on the EHS and social risks for proposed investments, which could have an impact on approval of the loan application. The capacity of the risk management system is established largely based on the experience and lessons obtained from the CHEEF program and the PV and windfarm projects. So far, the HXB has obtained some experience from the wind energy and PV projects as well as EE; thus, there is likely to be some concern about its capacity in the control of EHS and social risks in other energy projects that are new to the HXB under the proposed program. In addition, the business department needs to improve its knowledge of the EHS and social management system, and usually depends on the evidence of approval of the project proposal, EIA, land

preliminary verification, and feasibility study to ensure the proposed project is eligible for loan. While the current system in the bank meets the basic requirement of managing loan application, it does not provide any evidence whether (a) the mitigation measures are satisfactorily practiced, (b) the internal system for managing the health and safety issues was established and operated satisfactorily within the enterprises during the operating stage, (c) the actual land acquisition procedures are completed satisfactorily for the acquired land, and (d) the compensation for the affected villagers has been delivered. However, the HXB has committed dedicated resources to strengthen its expertise on EHS management, particularly in the implementation stage of subprojects. This commitment follows from the practice taken by the HXB for the CHEEF program, where it engaged environmental experts as needed; such practice is considered acceptable to the Bank.

Consultation and Disclosure

10. Consultation on the draft ESSA was conducted with stakeholders on September 21, 2015. The representatives of the HXB, its branches, and relevant government agencies and their technical experts participated in the consultation and gave comments on the draft ESSA. During the consultation, the representatives of the HXB highlighted the need for the ESSA, highlighted its good reputation on environmental and social management, and agreed to the key findings and recommendations of the ESSA. Before the consultation, the draft ESSA was translated into Chinese and distributed to the stakeholders. The revised ESSA was disclosed at the Bank InfoShop on November 7, 2015, and was disclosed on the CRESP website, in Chinese on November 13, 2015.

Suggestions and Recommendations

11. The ESSA concluded that the overall EHS and social system in China—and the JJJ Region in particular—is considered acceptable for use under this PforR operation. Nevertheless, the ESSA report makes a number of important recommendations for addressing institutional capacity constraints and gaps across a range of EHS and social management system constraints. These recommendations are summarized briefly below.

12. **Strengthening EHS management within the HXB.** The HXB is responsible for managing EHS issues through its operations procedures. Normally, it only requests the submission of EHS documents required for new investment activities. The evidence of EHS compliance by concerned enterprises for EE activities is often not required. To address such concerns, during the loan request review, a due diligence review of existing EHS management of concerned enterprises should be conducted, and evidence of EHS compliance should be provided so that the concerns about the existing EHS issues in the enterprises can be largely alleviated. In addition, the external monitoring and reporting system for EHS issues should be established by the HXB to ensure that the required mitigation measures and internal system for health and safety management are established and operated satisfactorily in the enterprises.

13. **Strengthening social impact management within the HXB.** Social issues and land acquisition are managed by the HXB through the loan review and approval procedures. The main indicator of obtaining land for the proposed RE projects is for the enterprise to provide evidence of receiving approval of land preliminary verification by the local government, which is a key

approval document for beginning the land acquisition process. However, evidence of completing the land acquisition procedures and providing compensation to the affected people is not always required by the HXB. To improve the situation, the HXB has made changes to the OM that require more relevant evidence during the loan request process, which includes a copy of the land use certificate, compensation agreement, receipt of land price payment, and land lease agreement with affected parties.

14. **Strengthening the capacity of the HXB.** To perform its responsibilities on EHS and social management, particularly for air pollution abatement activities, risk control and the Green Finance Center in the HXB will be strengthened regarding staffing and financial resources. The HXB has committed to engaging external relevant professionals and making changes to internal procedures to help manage the potential EHS and social issues under the program.

Annex 7: Integrated Risk Framework

China: Innovative Financing for Air Pollution Control in Jing-Jin-Ji

Stage: Approval

<table>
<tr><td colspan="5">1. PROGRAM RISKS</td></tr>
<tr><td>1.1 Technical Risk</td><td colspan="4">Rating: Moderate</td></tr>
<tr><td rowspan="2">Description: The proposed EE and clean energy investments are technically proven and commercially viable. EE and clean energy investments may not achieve the expected results. The HXB has limited capability in M&V of results.</td><td colspan="4">Risk Management: This operation will provide capacity building of the HXB, and the design of the DLIs has built-in contingency for the uncertainties.</td></tr>
<tr><td>Resp: Clients</td><td>Stage: Preparation and implementation</td><td>Due Date:</td><td>Status:</td></tr>
<tr><td>1.2 Fiduciary Risk</td><td colspan="4">Rating: Moderate</td></tr>
<tr><td>Description: The assessment during preparation stage identified the following fiduciary risks: (a) award of contracts by beneficiaries to their parent or affiliate companies; (b) non-application of Bank debarment/suspension lists, which may result in unacceptable contract awards to Bank-debarred/-suspended firms or individuals; (c) limited complaint mechanism; (d) while the HXB staff has adequate experience in banking, financing, and project management, additional expertise is required for the assessment of procurement strategy and planning for subprojects; market analysis, fiduciary risk analysis, and mitigation; and subproject supervision to ensure efficiency and effectiveness; and (e) the HXB has difficulty in reporting on the program on time.</td><td colspan="4">Risk Management: The following mitigation measures are proposed:
(a) The subproject application and the subloan agreement with beneficiaries will include a mandatory provision that the beneficiaries may not award contracts to their parent or affiliate companies, unless there is an established arms-length arrangement, with the exception for ESCOs on the basis they are providers and are sourced by their clients through commercial practices to provide EE/RE services under performance-based contracts. The procurement plan accompanying the application for the ESCOs should identify contracts that will be procured directly from parent or affiliated companies, and the HXB, as part of the application review process, should satisfy itself that the products offer value for money.
(b) The HXB sets up a complaints-handling mechanism, the details of which will be included in the subproject application package and on the HXB website.
(c) Beneficiaries are to confirm, as part of the subloan agreement, that they will not award contracts to firms and individuals on temporary suspension or debarment by the Bank and other MDBs.
(d) The HXB strengthens its capacity to assess the capacity of beneficiaries to carry out procurement and contract management efficiently as part of subproject appraisal and provide guidance to beneficiaries with weak procurement capacity. The HXB and beneficiary enterprises should hire expertise as needed for improved procurement and contract management.
(e) The CBD of the HXB sets up the memorandum records for the program to record each subloan released and related reference information for ease of tracking the record in the corporate accounting system and the original supporting documents.
(f) Reconciliation is to be made between the CBD and the accounting division on a quarterly basis.
(g) Every semester, the CBD prepares the program-specific financial report according to the specifically tailored format agreed with the Bank for the program and submits it to the Bank.</td></tr>
</table>

	Resp: Clients	**Stage:** Preparation and implementation	**Due Date:**	**Status:**
1.3 Environmental and Social Risks	**Rating:** **Moderate**			
Description: Given the nature of the PforR program, this operation has excluded the investments that will cause significant environmental impacts. The potential environmental and social effects screened for this PforR program in the stage of the ESSA preparation are to be site specific, moderate, or minimal and can be readily mitigated within the EHS and social systems. However, some potential subprojects, such as biomass power plants and denitrification technology, have potential environmental and safety risks. Review of the experience of the HXB in management of environmental and social risks showed that the bank has certain capacity in managing the EHS and social risks, and its capacity will be further enhanced under the PforR program. Some of the potential sub-borrowers may not comply with the EHS and social requirements.	**Risk Management:** The potential adverse environmental and social impacts are limited and widely known. Under the operation, the HXB has assigned dedicated staff responsible for managing environment and social risks associated with lending under PforR. The OM has been modified to enable the HXB to better supervise sub-borrowers to comply with EHS and social policies, request evidence of compliance records, and avoid potential risks. The Bank team has conducted the ESSA, and mitigation measures, institutional arrangements, and management are recommended as part of the PAP.			
	Resp: Clients	**Stage:** Preparation and implementation	**Due Date:**	**Status:**
1.4 Disbursement-Linked Indicator Risks	**Rating:** **Substantial**			
Description: (a) The DLI of EE and clean energy investments may not be achieved on time, since generating sufficient deal flows is not easy. (b) Given the unpredictable market demand, there is uncertainty about the investment portfolio regarding the share of each technology. Due to the wide variation in costs among different EE and RE technologies, this uncertainty will result in risks of not achieving the projected result indicators and DLIs. (c) DLIs may not achieve the expected results due to reduced production and difficulties/delays in obtaining access to the grid. (d) Energy savings from some EE technologies are difficult to verify due to a lack of clear methodology and experienced/skilled verification experts.	**Risk Management:** (a) PforR allows more flexibility in implementation than the input-based approach under the CHEEF program, and the program will use strengthening institutional capacity of the participating banks as DLIs to provide strong financial incentives for the participating banks to align their internal structures and incentives to deal origination. (b) The HXB will work closely with relevant government agencies and key stakeholders to generate deal flows. (c) The design of the DLIs is based on a market survey in the JJJ Region and builds in contingencies for uncertainty. The HXB will require a power purchase agreement as evidence of grid connection before approving the loan. (d) The HXB is undertaking a study on the M&V methodology, protocol, and procedures of the DLIs and will engage independent third-party verifiers from the 26 third-party EE M&V agencies accredited by the MoF and the NDRC.			
	Resp: Bank and client	**Stage:** Preparation and implementation	**Due Date:**	**Status:**
1.5 Other Risks (Optional)	**Rating:**			
Description:	**Risk Management:**			
	Resp:	**Stage:**	**Due Date:**	**Status:**

2. OVERALL RISK RATING: Substantial	
Description: The overall risk **rating of the program is Substantial.** Since this is the first PforR operation in China, it is expected that there will be a learning curve for the government and the implementing agency during the operation implementation. Based on the experience from the CHEEF program, the greatest risk during implementation of the operation will be generating sufficient deal flows in the relatively limited geographic focus of the JJJ Region, particularly given the slowdown of the economy, and the closure of inefficient industrial factories where EE potential is also great. Furthermore, given the unpredictable market demand, there is uncertainty in the investment portfolio regarding the share of each technology. Due to the wide variation in costs among different EE and RE technologies, this uncertainty will result in risks of not achieving the projected result indicators and DLIs. Achieving results may also depend on factors out of the control of the implementing agency—for example, reduced production will lead to lower energy savings and the difficulties in accessing the grid will affect RE generation. Finally, verification of results is new to the HXB.	**Risk management:** (a) The Bank team has provided and will continue to provide training to the GoC and the implementing agency on PforR operations during implementation of the operation. (b) The HXB will work closely with the NDRC, NEA, MEP, local governments in the JJJ Region, industrial associations, ESCOs, and third parties, and will undertake marketing campaigns for deal origination. The overall policy environment is conducive to EE, RE, and pollution abatement investments in the JJJ Region, and the policies for RE grid access have improved substantially in recent years. (c) The HXB will develop and pilot innovative financing products that are tailored to the EE/RE market to reach out to underserved clients. (d) The design of DLIs has been based on a market survey in the JJJ Region and built-in contingencies to factor in the uncertainties to achieve actual results on the ground. (e) The HXB will strengthen its capacity in results M&E and engage IVAs for verification of DLIs. Additional risk mitigation measures are listed in the Program Action Plan section. The PforR instrument allows more flexibility in implementation than the input-based approach under the CHEEF program, and the program will use strengthening institutional capacity of the HXB as DLIs to provide strong financial incentives for the HXB to align its internal structure and incentives to deal origination. Much has been learned during the preparation and implementation of the CHEEF program, and the PforR instrument is expected to accelerate implementation of the capacity building program.

Annex 8: Program Action Plan

Action Description	Due Date	Responsible Party	Completion Measurement
1. Overall			
The planned GEF project Developing Market-Based Energy Efficiency Program in China under preparation and the ongoing CHEEF program and the CRESP to provide GEF funding to the HXB for technical assistance and capacity building.	Ongoing	Bank	Technical assistance provided and capacity built
Provide training to the HXB in technical, results M&V, environmental and social, procurement, and FM areas.	At program kick-off and ongoing	Bank	Training conducted
Provide extensive training to its staff at HQ and branches on technical, results M&V, environmental and social, procurement, and FM areas.	Ongoing	HXB	Training conducted
Designate specific staff to be responsible for technical, fiduciary, and environmental and social aspects.	Ongoing	HXB	Staff assigned in the Green Finance Center
Engage experts for technical, fiduciary, and environmental and social support as needed.	Ongoing	HXB	Program report
Specify the fiduciary and environmental and social requirements and procedures in the OM.	Completed	HXB	OM agreed by the HXB and the Bank
Specify the fiduciary and environmental and social requirements and procedures in the subloan agreements with sub-borrowers.	Ongoing	HXB	Program report
Report to the Bank required actions taken in program reports.	Ongoing	HXB	Program report
2. Technical			
Engage independent third-party IVAs for results M&V.	By the end of 2016	HXB	Contracts with the IVAs signed
Report portfolio composition and quality to the Bank to ensure transparency and quality of the portfolio.	Ongoing	HXB	Program report
3. Procurement			
In line with Article 34 of the Regulation on the Implementation of the Tendering and Bidding Law of the People's Republic of China, include in the subproject application and the subloan agreement with beneficiaries a mandatory provision that the beneficiaries will not award contracts to their parent or affiliate companies, unless there is an established arms-length arrangement, except for ESCOs on the basis they are providers	Ongoing	HXB	Requirements included in OM and subloan agreements

Action Description	Due Date	Responsible Party	Completion Measurement
and are sourced by their clients through commercial practices to provide EE services under performance-based contracts. The procurement plan accompanying the application for the ESCOs should identify contracts that will be procured directly from parent or affiliated companies, and the HXB as part of the application review process should satisfy itself that the products offer value for money.			
Set up a complaints-handling mechanism and reporting procedures, the details of which will be included in the subproject application package and on the HXB's website.	Ongoing	HXB	Complaint mechanism set up; actions reported in program report
The HXB and the subloan beneficiaries will cooperate fully with representatives of the Bank in any inquiry conducted by the Bank into allegations or other indications of F&C in connection with the program.	Ongoing	HXB and sub-borrowers	Requirements included in the OM and subloan agreements
The OM and subloan agreement will specify that sub-borrowers will not award contracts to firms and individuals on temporary suspension or debarment by the Bank and other MDBs.	Ongoing	HXB and sub-borrowers	Requirements included in the OM and subloan agreements
Strengthen the HXB's capacity to assess the capacity of beneficiaries to carry out procurement and contract management efficiently as part of subproject appraisal and provide guidance to beneficiaries with weak procurement capacity.	Ongoing	HXB	Actions reported in program report
Hire expertise as needed to strengthen procurement and contract management.	Ongoing	HXB	Actions reported in program report
4. Financial Management			
Set up the memorandum records for the program to record each subloan released and related reference information for ease of tracking the record in the corporate accounting system and the original supporting documents.	Ongoing	HXB	Actions reported in program report
Conduct reconciliation between the CBD and the accounting division on a quarterly basis.	Ongoing	HXB	Actions reported in program report
Annually, prepare the program-specific financial report according to the specifically tailored format agreed with the Bank for the program and submit report to the Bank.	Ongoing	HXB	Actions reported in program report
5. Environmental and Social			
Strengthen environmental and social impact management within the bank by specifying the requirements and procedures in the OM.	Completed	HXB	OM agreed by the HXB and the Bank

Action Description	Due Date	Responsible Party	Completion Measurement
Enhance capacity of the HXB staff by designating staff, allocating adequate resources, and specifying operating arrangements and coordination with other departments in the bank.	Ongoing	HXB	Staff assigned and relevant arrangements and coordination specified in the OM

Annex 9: Implementation Support Plan

Strategy and Approach for Implementation Support

1. Implementation of this operation will require considerable focused support from the Bank team. This is the first PforR operation in China; it is expected that there will be a learning curve for the GoC and the implementing agency during the implementation period. This annex lays out the key activities that the Bank team will implement to appropriately mitigate the risks identified during implementation of this operation. It will focus on the key risks defined in the Overall Risk Assessment Framework and will strive to provide the client with the most effective implementation support. Under the proposed operation, the key risks are deal origination in the JJJ Region, M&V for the DLIs, and the need for the HXB to strengthen its supervision of sub-borrowers on fiduciary and environmental and social requirements.

2. Bank implementation support will be focused on implementation quality and on making the results-based incentive system work to its full potential. This will include (a) reviewing implementation progress (including that of the PAP) and achievement of program results and DLIs; (b) providing support on resolving emerging program implementation issues and on building institutional capacity; (c) monitoring the adequacy of system performance, and compliance with fiduciary and environmental and social requirements; and (d) providing ongoing technical support. The key to effective implementation support will be providing timely support for planning and for verification of results for payment requests to the Bank.

3. **Technical support.** The Bank team has provided extensive technical expertise during preparation and will continue to provide extensive technical support to the HXB to effectively monitor and implement the operation, particularly on two aspects: (a) review and approval of the eligibility of the subprojects and innovative financial products that are not foreseeable now, but may arise during the implementation, and that are currently not listed in the eligibility criteria, but could be eligible to achieve the PDO; and (b) energy-saving M&V methodologies and IVAs.

4. **Fiduciary support.** The implementation support for procurement and FM will review and monitor the compliance with the OM and PAP by the HXB and its sub-borrowers under the program. The Bank team will provide technical support to the HXB and help with timely resolution of potential fiduciary issues encountered during implementation. The implementation support will review and monitor the program financial reports and audit reports on a regular basis, the disbursement process, on-lending arrangements, and program fund availability and allocations.

5. **Environmental and social support.** The Bank's environmental and social development experts will provide guidance to the HXB on how to best address relevant issues that arise during implementation. They will also help ensure that the planned community and stakeholder consultations have been undertaken during the subproject design stage and will continue during the subproject implementation stage.

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6. Most Bank team members will be based in the China country office, located in Beijing. This will ensure rapid and effective response to borrowers' needs for implementation support. In addition, a few staff based in Washington, DC, and international consultants will be part of the task team to bring global experience to the operation. Formal implementation support missions and field visits covering all aspects of implementation will be carried out semiannually during the early stage of implementation, complemented by occasional visits by small missions on an as-needed basis. Estimated inputs from different specialists at different stages of implementation are outlined in table 9.1.

Table 9.1. Implementation Support Input Requirements

Time	Focus	Skills Needed	Resource Estimate	Partner Role
First 12 months	• Team and program leadership • Program design and technical implementation support • FM and procurement • Environmental and social implementation support • Results M&E and verification of DLIs • Capacity building	• Technical • FM • Procurement • Environmental and social	6–7 staff, 2 trips per staff annually	n.a.
12–48 months	• Implementation support • FM, procurement, and environmental and social support • Results M&E and verification of DLIs	• Technical • Environmental and social • FM • Procurement	6–7 staff, 1–2 trips per staff annually	n.a.