

100931 REV

China

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

Environmental and Social System Assessment

January 2016
Prepared by the World Bank

Table of Contents

1. Executive Summary	3
2. Program Description	6
2.1 Background	6
2.2 Government Program Scope.....	6
2.3 Bank-financed PforR Program Scope	7
2.4 Purpose and Methodology of Environmental and Social System Assessment	9
3. Environmental, Health, Safety and Social Effects	11
3.1 Environmental Effects.....	11
3.2 Social Effects	15
4. Assessment of Relevant Government Environmental, Health and Safety and Social Management System.....	18
4.1 Legal Framework for Management of Environmental, Health and Safety Impacts.....	18
4.2 Legal Framework for the Management of Social Impacts.....	21
4.3 Assessment of Existing Legal Framework against PforR principles	23
4.4 Mitigation Measures for Main Effects of the PforR.....	27
5. Hua Xia Bank Capacity and Performance of the Program Environmental and Social Management System.....	30
5.1 Existing Institutional Mandates, Responsibilities and Performance.....	30
5.2 Performance on EHS Management System.....	31
5.3 Performance on Land Acquisition and Compensation.....	32
5.4 Implementing Agency's Capacity and Performance	32
6. Recommendations for the Program Environmental and Social Systems.....	36
7. Consultation and Disclosure	37
8. Environmental and Social Risk Rating	39
Annex 1 Environmental and Social Initial Screening	40
Annex 2 (1) Screening for Potential EHS Effects.....	46
Annex 2 (2) Screening for Potential Social Effects	49
Annex 3 Supplemental Environmental and Social Risk Screening Worksheet.....	51
Annex 4 Subproject Eligibility Criteria for PforR	54

1. Executive Summary

1.1 Introduction

The World Bank is working with the Government of China to prepare the China Innovative Financing for Air Pollution Control in Jing-Jin-Ji, which will use the Program-for-Results (PforR) financing instrument. The PforR instrument innovatively links the disbursement of funds directly to the delivery of defined results and strengthens government program systems. The proposed operation will support the Air Pollution Prevention and Control Action Plan (APPCAP) adopted by the Government of China, which mandates that the Jing-Jin-Ji region reduce ambient air annual average PM_{2.5} concentrations by 25 percent from 2012 to 2017. The proposed PforR Program will finance activities through three key result areas, aligned with the first three priority areas in the APPCAP: (i) reduced coal consumption from increased energy efficiency (EE) and renewable energy (RE); (ii) reduced air pollution emissions from pollution abatement measures; and (iii) strengthened institutional capacity of Hua Xia Bank (HXB).

For each proposed PforR operation, the World Bank assesses—at the Program level—the borrower’s authority and organizational capacity to achieve environmental and social objectives against the range of environmental and social impacts that may be associated with the Program. This Environmental and Social Management System Assessment (ESSA) examines the existing legal, regulatory, and institutional framework for environmental and social management systems used by the government for the implementation of the PforR Program; assesses the implementing agency’s institutional capacity including performance to date to manage the likely environmental and social effects in accordance with China’s own requirements under the program; and recommends specific actions for improving the management system in place and counterpart capacity during implementation.

The ESSA is a World Bank document requirement for PforR operations. It is prepared by Bank staff with consultant support as necessary through a combination of reviews of existing program materials and available technical literature, interviews with government staff, and consultations with key stakeholders and experts. The findings, conclusions, and opinions expressed in the ESSA are those of the World Bank. The recommendations contained in the analysis will be discussed and finalized with the Government of China counterparts.

1.2 Methodology

The development of the ESSA was based on (i) a desk review of existing national and regional environmental and social laws and regulations; (ii) meetings and interviews with a range of stakeholders, including HXB, developers of different types of energy efficiency and renewable energy projects, to government officials and individuals; and (iii) visits to a number of renewable energy projects funded by HXB including biomass power plants, windfarms, and distributed and centralized solar power projects in Beijing and Hebei Province. Observation and discussions during these visits provided a greater understanding of the potential environment and social impacts associated with these types of projects and relevant measures currently adopted to mitigate such impacts in accordance with relevant laws and regulations.

1.3 Consultation and Disclosure

The ESSA report considers consultation, stakeholder involvement and disclosure of information from two perspectives. First, the report examines the requirements of the country with respect to individual subprojects, evaluates the extent to which current practices are effective and consistent with the Policy and Directive on Program for Results Financing, and provides recommendations for improving the performance by the participating bank. Second, consultation on the draft ESSA was

conducted with stakeholders in Beijing on September 21, 2016. The multi-stakeholder consultation workshop solicited feedback on the findings and recommendations of the draft ESSA. Based on the comments, the revised ESSA was approved by the Practice Manager and disclosed at the Bank InfoShop on November 7, 2015, and was disclosed on the China Renewable Energy Scale up Program (CRESP) PMO website in local language on November 13, 2015.

1.4 Findings

In sum, the ESSA review finds the Program environmental and social management system adequate for Program-for-Results financing, as per the World Bank's Policy and Directive on Program for Results Financing provisions. The national and regional legal framework is comprehensive and the implementing agency, HXB has demonstrated a track record of following applicable Chinese laws and regulations. This review provides a summary of the findings.

China has established a comprehensive system for the management of environment, occupational health and safety (EHS) issues, which consists of laws, regulations, guidelines and specifications and standards. This system provides a reasonable basis for addressing the environmental and social issues that may arise in the proposed investment areas of the PforR Program.

Initial consultations and site visits of EE and RE sub-projects financed by HXB, have demonstrated that projects have obtained all relevant approvals from government departments, and the sponsors of the projects are aware of the approval procedure and documentation required. A review of project documents has found that requirements for the Environmental Assessment (EA) are regularly followed and the mitigation measures recommended in the EA are considered in feasibility studies and design documents.

The PforR Program provides an opportunity to support relevant air pollution control action plans in the Program area through investment in the areas for improving energy efficiency, expanding renewable energy, promoting pollution abatement, and enhancing intuitional capacity. The environmental and social benefits are tremendous, which will help reduce the coal consumption, promote the use of clean energy, and thus reduce the air pollution in the region of Jing-Jin-Ji and the bordering provinces.

The potential negative impacts of the PforR Program will be site-specific, moderate or minimal since subprojects that are likely to have significant adverse impacts have been excluded from the PforR Program during the screening stage. HXB will be responsible for further screening such subprojects based on the eligibility criteria for subprojects. Potential adverse impacts can be avoided, minimized, mitigated or compensated through the early screening, consultation, alternative comparison and mitigation measures that are fostered in the system for environmental and occupational health and safety management in China.

1.5 Specific Environmental and Social Issues and Recommendations

The ESSA concluded that the existing Program environmental and social management procedures of HXB are considered adequate for use under this PforR operation. Nevertheless, the ESSA report identifies potential issues related to land acquisition and occupational safety and provides recommendations to strengthen the environmental and social impact and project management capacity of HXB during implementation.

Land Acquisition. The PforR Program is anticipating limited land acquisition and resettlement impacts as most energy efficiency and emission reduction activities will be confined within the existing premises of enterprises. The amount of land acquisition will be moderate for certain RE projects such as windfarms, biomass power plants, and centralized solar power project. Based on reviews of similar projects in the region and past experiences, construction of certain facilities of

renewable energy projects would involve a limited amount of permanent land acquisition, which include biomass power plant site, windfarm generator base, and substation. For other facilities, such as windfarm generator construction and access roads, and solar panel installation for centralized solar power projects, as well as fuel collection or storage sites for biomass power projects, temporary land leasing may be required during both project construction and operations.

For these types of land acquisition impacts, there is an established system in the country to ensure the subproject is avoiding or minimizing potential social impacts due to land acquisition, and the affected people are provided with proper consultation and compensation as well as rehabilitation. The key indicator of obtaining land areas is for the potential enterprise to demonstrate evidence of receiving local government approval of land preliminary verification, which is the key approval document for beginning the process of land acquisition. Nevertheless, in some cases, the final copy of the land use certificate is not required before the commencement of loan disbursement since the delivery of such certificates is often delayed due to lengthy procedures. In order to address these concerns, HXB has made changes to the Operation Manual (OM) that requires more relevant evidence indicating successful completion of land compensation to the affected parties, as defined in the OM.

Occupational Health and Safety. According to the initial screening, the complexity of the proposed PforR Program may cause diversified effects in construction and operation stages. The effects are expected to include occupational health and safety risks in enterprises where the proposed Program will invest in the replacement of inefficient process lines in sectors of metallurgy, chemical, construction material and iron/steel. There is also a potential for exposure to hazardous levels of ammonia (NH₃) for workers at flue gas de-nitrification projects that utilize liquefied ammonia or concentrated aqueous ammonia. These 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 in line with the design specifications and standards of the EHS system in China. The sub-borrowers are ultimately responsible for complying with the occupational health and safety regulations, but HXB has also agreed to strengthen its supervision of the implementation of subprojects to ensure that the required mitigation measures for health and safety management has been taken and operated satisfactorily.

Strengthening Capacity of Hua Xia Bank. The agreed actions to strengthen environment and social impact management performance are the following: (i) strengthening environment and social impact management within HXB by specifying the requirements and procedures in the OM; and (ii) enhancing capacity of HXB staff through designating staff, allocating resources, specifying operating arrangements, and coordinating with other departments in HXB.

2. Program Description

2.1 Background

The dramatic economic growth of China during the past three decades has led to severe air pollution, particularly in the region of Beijing-Tianjin-Hebei, which is officially recognized as one of the areas in China with the highest levels of air pollution. Trans-boundary 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 actions to reduce air pollution in the Beijing-Tianjin-Hebei and its neighboring region is an important priority for the government. The detailed regulations for the Implementation of the APPCAP was issued for the Beijing-Tianjin-Hebei Region and its Neighboring Regions including Shandong, Shanxi, Inner Mongolia, and Henan provinces (hereinafter referred to as Jing-Jin-Ji, or JJJ region). Studies have also identified coal combustion as the largest single contributor to air pollution and GHG gas emissions in the Jing-Jin-Ji region of China.

2.2 Scope of the Government Program

APPCAP: The Ministry of Environmental Protection (MEP) leads and coordinates the air pollution control efforts. 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 their own implementation structure, with the provincial/municipal Environmental Protection Bureau (EPB) coordinating with relevant line departments to implement the APPCAP, and has also developed their own Implementation Plans to achieve the targets set in the national APPCAP. Since trans-boundary air pollution plays an important role, a JJJ coordination working group has been set up for integrated and coordinated actions to reduce air pollution in the JJJ region, which is headed by a Vice Premier and the secretariat housed in the Beijing EPB.

Specifically, coal cap control is an essential solution in the APPCAP. The National Development Reform Commission's (NDRC) Environmental Protection and Resource Conservation Department (EPRCD) is in charge of the coal cap control, responsible for allocating the targets, issuing supportive policies, providing fiscal support, and monitoring and enforcing the results. NDRC issued a Management Measure for Coal Cap Control in Priority Regions, including the JJJ region. This regulation laid out coal cap control measures through phasing out inefficient and high-polluting industrial projects and boilers, supporting priority EE projects, and replacing coal with natural gas and RE. NDRC has also allocated budget to the JJJ region for coal cap control. The government is responsible for policies while enterprises are responsible for emission reductions. The APPCAP specifies implementation responsibilities of the government and enterprises, where the government is primarily in charge of setting clear targets, issuing supportive policies, providing fiscal support, and strengthening monitoring and enforcement; while the enterprises have the main responsibilities in reducing emissions and investing in clean production and pollution abatement measures.

The central government has allocated RMB 15 billion (roughly US\$2.5 billion) dedicated budget for air pollution control in JJJ region in 2013-2014, with additional budget from the provincial/municipal governments. Based on MEP's estimate, the government's budget of RMB 15 billion is expected to leverage RMB 250 billion from other sources for air pollution control investments. For example, the government's 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 would come from commercial financing.

The implementation of the APPCAP has made good progress. As a result of the massive campaign

for air pollution control in the JJJ region, the annual average PM2.5 concentration declined by 12.5 percent in 2014, and 18.2 percent in the first half of 2015, compared to 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. The 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 renewable energy and natural gas grew rapidly.

However, there is a risk that the JJJ region might not achieve the PM2.5 target by 2017, and strengthening energy efficiency 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 might not achieve the target of 25 percent reduction in PM2.5 concentration from 2012 to 2017, even if they implement all the currently planned air pollution control measures. Based on the analysis from the Innovation Center for Clean Air Solution (ICCAS) and Chinese Academy of Environmental Planning (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 political resistance with increased unemployment and led to slowdown of economic growth. Switching from coal to gas also ran into difficulties with high gas prices and limited gas supply. Therefore, strengthened energy efficiency and clean energy measures are needed to achieve the coal cap and air pollution control targets without compromising economic growth. Furthermore, the government heavily relies on administration measures and subsidies for air pollution control measures. But the enterprises are responsible for implementing air pollution control measures, and the government's subsidies are scarce and can meet only a small percentage of the huge investment needs. Therefore, scale-up commercial financing is critical to help enterprises meet the huge green investment needs.

The PforR Program brings value added contributions to the government's APPCAP by strengthening EE and clean energy through commercial financing channels. The government issues supporting policies, provides financial incentives, and sets EE, RE, and emission reduction targets, which are allocated to priority enterprises; while the proposed PforR Program supports a government-designated commercial bank to provide financing for those obliged enterprises under the APPCAP and their service providers to increase EE and clean energy and reduce emissions, thereby, contributing to achieving the results of the APPCAP. The PforR Program will closely involve relevant government agencies, including NDRC Foreign Capital Utilization Department (FCUD), MoF, NDRC EPRCD, the National Energy Administration (NEA), MEP, and the local governments in the JJJ region, who will provide overall guidance to ensure the investments made under the PforR Program directly support the government priorities of the APPCAP program, and recommend potential sub-borrowers and their sub-projects obliged to achieve the government targets. Furthermore, this Program also contributes to the People's Bank of China's (PBOC) green financing framework.

2.3 Bank-financed PforR Program Scope

The proposed PforR Program is a results-based program supported by the World Bank aimed at improving EE, increasing clean energy, and reducing emissions, contributing to the government's APPCAP. The PforR Program covers seven provinces and municipalities in the JJJ and its neighboring regions, specifically, Beijing, Tianjin, Hebei, Shandong, Shanxi, Inner Mongolia, and Henan. The duration of the Program will be five and half years, with a start date of July 2016, and targeted completion in December 2021.

The PforR Program will finance activities through three key result areas, aligned with the first three priority areas 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 Hua Xia Bank.

Activities Within Result Area 1 – Reduced Coal Consumption from Increased EE and RE: Result Area 1 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 ones, 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) recovery and utilization of by-product gas, waste heat, and pressure for electricity generation or co-generation; (d) industrial system optimization to reduce energy use; (e) green building energy efficiency (commercial and government public buildings), including efficient lighting such as light-emitting diodes (LED), HVAC (heating, ventilation, and air conditioning, and heat pumps); and building envelope (insulation for roof, walls, windows, doors); (f) co-generation for power and heat; and (g) efficiency improvement and loss reduction in district heating systems. RE activities include but are not limited to: (a) centralized solar photovoltaic (PV), wind and biomass systems; (b) distributed solar PV and other renewable energy systems; and (c) roof-top solar system; (d) solar water heating; and (e) geothermal and water source heat pumps. EE and RE activities would account for approximately 40 and 50 percent of the total program expenditure respectively. The subproject eligibility criteria are listed in Annex 4.

Activities Within Result Area 2 – Reduced Air Pollution Emissions from Pollution Abatement Measures: To achieve Result Area 2, activities will focus on air pollution abatement measures that will lead to significant reduction in local air pollutants emissions, including but not limited to: (a) installing end-of-pipe equipment for particulates 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 natural gas (CNG) vehicles and charging stations. The government issued premium tariffs for end-of-pipe measures in the power plants, specifically 0.2 fen/kWh for particulates removal, 1.5 fen/kWh for desulfurization and 0.8 fen/kWh for denitrification to make these investments installed in the power plants commercially viable. Almost all the power plants have installed particulates removal and FGD, while denitrification is a new government's 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.

Activities Within Result Area 3 – Strengthened Institutional Capacity of Hua Xia Bank: Hua Xia Bank will: (a) set up internal institutional arrangements for green credit. Hua Xia Bank plans to establish a green credit center with a dedicated team to lead and coordinate all bank-wide green financing activities, primarily clean energy lending; (b) set up internal green lending procedures for deal origination, risk assessment and appraisal, and project approval; and provide incentives for staff to undertake green financing projects; (c) provide training to staff on EE and clean energy financing, particularly those 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, and market aggregation for small-scale projects; (f) scale up lending to SMEs and ESCOs; and (g) strengthen the capacity for measurement and verification (M&V) of operation results. The Global Environment Facility (GEF) support under the ongoing China Energy Efficiency Financing (CHEEF) and CRESF programs can provide technical assistance and capacity building to Hua Xia Bank. This will contribute to expanding green financing in the APPCAP, and support the Energy Efficiency Credit Guideline recently issued by the CBRC and NDRC, as well as the green finance agenda laid out by PBOC.

Program Limits/Exclusions

As required by the Policy and Directive on Program for Results Financing, the PforR Program will exclude programs or activities that are likely to have significant adverse impacts that are sensitive, diverse, or unprecedented on the environment and/or affected people. A preliminary screening exercise has been carried out jointly by the World Bank and Hua Xia Bank on the potential investment areas to identify and exclude as early as possible such areas or activities in the scoping

stage of the Program while ensuring the remaining eligible investment activities can provide measurable results and there is sufficient market demand.

For example, HXB proposed municipal solid waste and small hydro power subprojects, which are excluded from the Program scope, given their potential significant adverse environmental impacts as subprojects. In addition investments in new, or major expansion of, large-scale infrastructure or other investment activities that would normally be considered Category A-type under World Bank Investment Project Financing policies, have also been excluded. In addition, for investments that result in closing down existing production lines and causing unemployment of large number of workers will not be eligible for this Program.

During the follow-up screening process, the potential environmental and social effects of eligible sub-project investment areas have been assessed in environmental, occupational health and safety, as well as social aspects, as shown in Annex 1. Although the areas/activities eligible for lending under the Program have been identified, the screening of the Program in current stage cannot necessarily ensure that all activities likely to have significant adverse impacts have been identified and excluded. The environmental and social eligibility criteria thus have been developed jointly by the HXB and the World Bank and included in the Operation Manual to ensure the consistency with the Policy and Directive on Program for Results Financing, as given in Annex 4.

Scope of the ESSA

The scope of the ESSA is to define the environmental, health and safety, as well as social management system within the PforR Program boundary, which is the US\$1 billion lending portfolio in EE, RE, and pollution abatement, implemented by HXB. The team reviewed EHS and social management systems of China at national and local levels, and the emphasis of the ESSA is placed on occupational health and safety as most of the investments are aimed to support the EE, RE and pollution control in industrial sector. The assessment of the capacity and performance of the implementing agency is limited to HXB, based on its experience, operational procedure, and institutional capacity on EHS and social aspects in its lending operations.

Implementing Agency

The government designated Hua Xia Bank as the implementing agency for this proposed operation. HXB will be responsible for identifying, appraising, and financing eligible subprojects that meet the criteria in the Operational Manual (OM), measuring and verifying results, and bearing the full default risks. The detailed eligibility criteria and appraisal guidelines has been outlined in the OM. The government is responsible for laying out priority investment areas, issuing policies and regulations, and providing financial incentives, under the context of the government's APPCAP and clean energy and emission reduction programs.

HXB is a leader in green financing in China, with a proven track record and experience in EE and clean energy financing. Furthermore, HXB has demonstrated its interests, capacity, and expertise in EE and green energy financing under the ongoing IBRD/GEF CHEEF program and AFD-funded EE and RE financing project. HXB is fully committed to green financing from the top management; has established a dedicated team at the HQ and branches, internal system and procedures for green energy financing; and developed innovative financing products.

2.4 Purpose and Methodology of Environmental and Social System Assessment

Purpose

The purpose of the Environmental and Social Systems Assessment (ESSA) is to: (i) review the environmental and social management rules and procedures and institutional responsibilities that are being used by the government for the implementation of the PforR Program; (ii) assess the implementing agency's (Hua Xia Bank) institutional capacity and performance to date to manage

potential adverse environmental and social issues under the PforR Program; and (iii) recommend specific actions for improving the capacity of HXB in regard to effective management of environmental, health and safety and social issues during implementation.

The ESSA is a World Bank document requirement for PforR investment operations. It is prepared by Bank staff with consultant support as necessary through a combination of reviews of existing program materials and available technical literature, interviews with government and HXB staff, and consultations with key stakeholders and experts. The findings, conclusions, and opinions expressed in the ESSA document are those of the World Bank. Recommendations contained in the analysis have been discussed with the counterparts.

Methodology

The preparation of the ESSA involved an assessment of the Chinese system for EHS and social management; a review of the effectiveness of the system in addressing the EHS and social issues associated with the PforR Program, and an evaluation of the institutional capacity of implementation agency. The methodology involved: (i) a desk review of the laws, regulations, requirements, and guidelines on the EHS and social management; (ii) meetings and interviews with key stakeholders ranging from HXB, developers of different types EE and RE projects, to government officials and individuals; and (iii) visits to a number of renewable energy projects funded by HXB including biomass power plants, windfarms, and distributed and centralized solar power projects in Beijing and Hebei Province.

3. Environmental, Health, Safety and Social Effects

Potential environmental and social effects for investments to be financed under the PforR Program are not expected to be significant since subprojects with high environment and social risks will not be included in the Program based on initial screening. As a result, all investments to be covered by the Program will have potential EHS issues that are: (a) small or modest in intensity, (b) of limited duration and extent, (c) mostly to completely reversible, and (d) readily mitigated to acceptable levels with standard cost effective measures commercially available in the PRC. In general, proposed investments are minor modifications on existing facilities where the incremental effects are clearly identified to be small and are readily known. Potential investments will not encroach or degrade sensitive habitats, be located in sensitive areas of biodiversity value, or located in areas protected for physical cultural resources.

3.1 Environmental Effects

Environmental effects are initially screened based on the experience of similar projects financed by the World Bank and the EHS guidelines of the IFC/WBG (www.ifc.org/EHSguidelines). Investments in areas defined under the Program are expected to cause diversified effects covering environmental, health and safety which are site-specific, moderate or minimal, and readily mitigated.

Environment Effects. During the construction and operation stage of the Program, investments may cause regular environmental impacts, including dust, noise, non-hazardous solid waste, and wastewater. These are envisaged to be minimal and site-specific and readily mitigated for all types of construction projects. Table 3-1 provides a summary of key environmental effects for potential investments under the Program. In addition, the particular types of subprojects may cause special environmental impacts. For example, soil erosion, ecological concern and visual and landscape impact for wind energy and concentrated PV subprojects; and flue gas emission for pollution abatement subprojects.

Table 3-1: Potential Environment Effects for the Program

Environmental Issues	Investment Activities	Level of Concern
Soil erosion:	RE Area: This effect often occurs when a subproject is located in the area where the existing soil structure will be disturbed. The wind energy subprojects and concentrated PV subprojects, are typically located in hilly areas which are prone to soil erosion by site clearing and construction of new access roads during the construction phase.	Minor level of concern: Given the limited footprint of such projects eligible for the Program, and the experience of previous projects financed by the World Bank the impact of soil erosion is limited and can be effectively mitigated or compensated.
Flue gas emission: This effect is caused by the burning of fuels.	RE and Pollution Abatement Areas: This effect is to be caused by the biomass subprojects and the subprojects using gas to replace coal respectively.	Moderate level of concern: The experience of similar projects financed by the World Bank demonstrates that the flue gas emissions can be mitigated effectively by low-NOx burner, Flue gas desulfurization (FGD) technology and dust removal process to meet Chinese standards. Flue gas emission control technologies are state of the art and widely available commercially in China.
Ecology:	RE Area: This effect may be a primary concern of wind energy subprojects if they are located in the migratory route of animals, birds or bats. Operational turbines may result	Moderate level of concern: Such impact is usually directly related to the site selection process for wind energy investments, and will be a primary concern if the site is located in or near important migration routes, wetlands, staging, foraging, or

	in barrier to migratory patterns and other wildlife movements.	breeding areas, or the bat hibernation areas and roosts. Given the nature of the Program that exclude projects to be located in natural habitats, such impact on biodiversity by wind energy projects can be avoided by early screening in EA process.
Visual and landscape impacts:	RE Area: Such effects may be related to wind energy and concentrated PV subprojects, which are normally located in rural or undeveloped areas. Impacts include shadow flickering on residential buildings near operational turbines, or landscape impact and visual impact near wind energy and PV facilities, particularly cumulative landscape impact, on residential and recreational areas.	Minor level of concern: Such impacts can be easily avoided by early screening and site selection to exclude-sites sensitive to landscape and visual impacts.
Special wastewater and solid waste:	RE Area: Geothermal fluid may contain toxic metals and a variety of other pollutants which may make them unsafe and even toxic to agriculture, and aquatic species. EE Area: Operation of higher efficiency process units with some EE investments which replaced existing inefficient processes units may produce industrial liquid and solid waste, e.g., displaced equipment and hazardous wastes.	Moderate level of concern: 1) The geothermal wastewater can either be collected and treated to the effluent quality standards applicable before discharge to the receiving water bodies or reinjected underground into the geothermal field from which it originated. 2) As this Program limits investments to existing facilities that will not cause any expansion in capacity. Therefore, the nature and quantity of the liquid and solid industrial wastes are expected to be the same or less compared with the quantities of wastes generated with the original inefficient unit process. In addition, the disposal of the replaced inefficient equipment will be carried out by licensed companies according to the recycling law of China. Such companies are capable of management of EHS issues associated with the disposal of the displaced equipment.
Linkage Issues	Program Area	Level of Concern
Availability of gas or biomass materials:	EE and Pollution Abatement Areas: Biomass projects and gas utilization projects as a replacement for coal. Through discussions with Hua Xia Bank and project developers, as well as review of government documents, there may be a concern about the adequate availability of biomass or gas in the region of a subproject. Experiences from similar biomass projects financed by Hua Xia Bank have shown that there is often a competing demand for the biomass materials in the project area as the current policy for energy development is encouraging the development of biomass projects. As a result, even within the same supply radius of 20 km (specified by government for biomass projects) there are often several biomass projects under preparation. In addition, if gas is in short supply in the subproject region and there is also	Moderate level of concern: These issues can be addressed by the careful investigation of the local biomass development plan and gas supply plan to ensure that the biomass is available.

	a competing demand for gas for residential use (cooking/heating), residential use is given top priority in gas allocation. Adequate gas supply for an industrial sector investment therefore becomes a major concern.	
--	---	--

Occupational Health and Safety Effects. Since the Program will involve large amounts of investment in the industrial sector in EE, RE and pollution abatement areas, occupational health and safety issues become a primary concern. The main occupational health and safety effects from potential investments from the Program include effects from exposure to elevated levels of ammonia, which may cause erosion of skin, chemical pharyngitis, and chemical pneumonitis of workers. Hyper levels of ammonia could cause airway damage resulting in respiratory distress or failure, or heart arrest. Ammonia exposure can be mitigated by provision of protective gear, training and medical treatment, or avoided by use of urea instead of pure liquefied ammonia and aqueous ammonia. Potential safety effects are mainly from activities that would cause the risk of fire and explosion, which include the bio-gas system, utilization of gas to replace coal as well as the flue gas de-nitrification using ammonia which in addition to being toxic is also a flammable and explosive gas. Table 3-2 provides a summary of key occupational health and safety effects for potential investments under the Program.

Table 3-2: Potential Health and Safety Effects for the Program

Health and Safety Issues	Program Area	Level of Concern
<i>Hazardous wastes:</i>	EE Area: Replacement of inefficient equipment and upgrading of inefficient process, particularly disposal of the displaced equipment, may cause concern for occupational health of workers. Materials such as asbestos or PCBs contained in obsolete equipment may be hazardous to the health of the workers involved with managing these wastes.	Moderate level of concern: Such effects are site-specific and moderate, and can be addressed by early identification, provision of protective gear and training, or engagement of professional team, and the collected hazardous wastes will be transported to local special facilities designed for receiving these wastes. Program investments that do not involve any process changes will not change the nature of the industrial wastes because the investment is limited to the upgrading of existing inefficient equipment with units that produce the same products on new energy efficient equipment (pumps, boilers, motors etc.). The existing management system within the enterprises is expected to be capable of coping with the industrial wastes, as the Hua Xia Bank claimed that the focus of the loan procedure on environmental aspects is on the environmental performance of industrial enterprises in compliance with all Chinese environmental laws, regulations and standards. The Due Diligence review is a useful tool to be used by the Hua Xia Bank to mitigate the risk.
<i>Toxic gases: Ammonia:</i>	Pollution Abatement Area: There is a potential for exposure to hazardous levels of ammonia for workers at flue gas de-nitrification projects that use liquefied ammonia or concentrated aqueous ammonia in SCR/SNCR technology. Health effects from exposure to elevated levels of ammonia may cause erosion of skin, chemical pharyngitis and chemical	Moderate level of concern: Ammonia exposure can be mitigated by the provision of protective gear, training and medical treatment, or avoided by the use of urea instead of pure liquefied ammonia and aqueous ammonia.

	pneumonitis of workers. Hyper levels of ammonia could cause respiratory failure or heart arrest.	
<i>Confined space:</i>	RE Area: Working in a confined space may lead to asphyxiation and difficulty of egress for workers. Construction of the wind energy and geothermal projects may cause the concern of the confined space effect.	Moderate level of concern: Good design of the working space according to the technical specifications of China can effectively address this issue.
<i>Electromagnetic impact:</i>	RE Area: Transformer stations associated with wind energy, concentrated PV, and biomass power plant projects cause concern of electromagnetic effects on the health of operating staff and local public.	Minor level of concern: The voltage is often 110 kV or 220 kV (50 Hz), within a radius of electromagnetic impact ranging between 1.5 m to 3 m. Thus the electromagnetic impact is limited to a small area and can be readily mitigated by careful design to avoid sensitive receptors.
<i>Heat:</i>	EE Area: Recovery of waste heat and pressure, as well as co-generation, would cause the concern where the operating staff be injured by the steam.	Moderate level of concern: The heat impact is limited to a small area and can be mitigated by careful design of operation system, warning signs and protective gear for workers.
<i>Mechanical damage:</i>	EE Area: The investments are concentrated in the industrial enterprises, where the operation of modified process lines would cause potential injury or even death to workers from pumps, air compressors, machines with rotating parts, gear systems, or punching parts of the process lines. Such damages may be due to the lack of worker understanding about operation of the new mechanical equipment, entry into dangerous areas prone to mechanical damage, or lack of protective devices.	High level of concern: While the adverse impacts are a high level of concern, this is a very low probability event and across board to all industrial enterprises not specific to the Program. Mitigation of mechanical damage is complex involving good design of protective devices, training of workers and intensive inspections which are integral parts of the safety operation system in China. Due diligence review should be used to check the existing EHS performance and capacity of the industries requesting the loan under the EE area, so as to mitigate the risks.
<i>Fire and explosion:</i>	RE and Pollution Abatement Areas: Activities that could cause the risk of fire and explosion include the storage of bio-gas, natural gas to replace coal as well as the flue gas de-nitrification (pollution abatement area) using ammonia which, in addition to being toxic, is also a flammable and explosive gas. Storage of large amounts of biomass, biogas or natural gas presents fire and explosion risks. State of the art technologies used for flue gas de-nitrification are SCR (selective catalyst reduction) or SNCR (selective non-catalyst reduction), which is based on the use of pure liquefied ammonia or concentrated aqueous ammonia. Ammonia is categorized as a dangerous material both by China's regulation and international norms.	High level of concern: The key measures for mitigating such explosion and fire risk not only include careful design of the system for bio-gas, natural gas, and the SCR/SNCR by adopting good industrial norms, particularly regarding storage and pipeline, but also the adequate occupational health and safety management system in place, including training and qualification of operating staff and inspection of the integrity of the system on daily basis. The legal system in China for EHS has established comprehensive technical specifications and standards for the design of use, storage, transport and production, and management of the toxic materials. HXB shall intensify its supervision of such sub-project implementation and make sure its sub-borrowers strictly comply with the specifications and standards, as well as monitor the performance of the internal EHS management. This can largely mitigate the risks.

	<p>Under favorable conditions, it can be either explosive or flammable. As the standard for flue gas de-nitrification has been effective in China since July 1, 2014, there is limited information on accidents related to use of ammonia for de-nitrification projects in China. So far the number of installation of the SCR/SNCR in China is not available. However, there are some accidents reported for cooling storage facility caused by leakage of ammonia in China. These accidents are reported directly due to malfunctioning of valves, or lack of proper inspection of the equipment and pipeline.</p>	
--	--	--

3.2 Social Effects

In terms of social effects, the Program through financing energy efficiency and green energy projects will bring general social benefit for the region through air quality improvement, and also bring economic growth and employment opportunities to the local communities. The only negative social impacts or risks are associated with land acquisition for certain types of investment activities. Among the three types of investment activities financed under the Program, limited social impacts are expected for energy efficiency and emission reduction activities since most of them will be confined within the existing premises of the enterprises.

The only potential social impacts are certain land acquisition associated with renewable energy subprojects. They include: (i) solar PV; (ii) solar water heaters; (iii) windfarms; and (iv) biomass combined heat and power (CHP) subprojects. Among them, except for distributed solar PV and solar water heaters, which will be installed on rooftops of existing buildings with no new land acquisitions, all other renewable energy projects will involve a certain amount of permanent land acquisition and temporary land occupation. Based on past experience and review of selected similar projects, the scope of potential permanent land acquisition and temporary land occupation for different types of renewable energy subprojects is presented in Table 3-3.

Since most of these projects would be located in rural areas, a certain amount of permanent land acquisition and temporary land occupation would involve village collectively owned slope land, or low yield farmland, and some of these land areas might be contracted to individual farmers. Because the nature of potential renewable energy projects, the amount of permanent land acquisition is relatively small, and it is unlikely to be involved with house demolition and displacement. The overall impact of land acquisition appears to be limited in scale and moderate in degree.

Table 3-2: Potential Social Effects for the Program

Main social effects	Type of Investment Activities	Level of Concerns
<ul style="list-style-type: none"> For those subprojects to be carried out within the existing premises of the enterprises with no new land acquisition, no social effect is expected. 	<ul style="list-style-type: none"> Subprojects involved energy efficiency and pollution abatement activities. Subproject involved with rooftop PV. 	<ul style="list-style-type: none"> Level of concern is low. No mitigation measures will be required.
<ul style="list-style-type: none"> Permanent acquisition of rural land areas. 	<ul style="list-style-type: none"> Subprojects involved with different types of RE activities, such as wind 	<ul style="list-style-type: none"> Level of concern is moderate. Since most of

<ul style="list-style-type: none"> • For wind farm subproject, generators bases and substations will involve permanent land acquisition. For a 50MW windfarm project, about 2 ha of land area will be required. (If access road need to be built on permanently acquired land, additional 10 to 15 ha of land areas will be required.) • Depending on project context, affected land area is likely on the hill where wind condition is more desirable, and affected land areas are likely to be waste land or slope land. • For concentrated PV subproject, permanent land acquisition is often required for the construction of substation with about 0.33 ha. Depending on the subproject context, affected land area is likely on a hill, and affected land areas are likely to be waste land or low yield farmland. • For biomass CHP subproject, about 10 ha of land areas would be required. Given the function of CHP, it tends to be located in industrial area or new urban area of the county town. 	<p>energy, concentrated PV, and biomass CHP, and all of them will involve certain amount of permanent land acquisition.</p> <ul style="list-style-type: none"> • Most of these projects would be located in rural areas, and permanent land acquisition would involve village collectively owned unutilized land, slope land, or low yield farmland contracting to individual farmers. Because of the nature of potential renewable energy projects, the amount of permanent land acquisition is relatively small, and it is unlikely to be involved with house demolition and displacement. The overall impact of land acquisition appears to be limited in scale and moderate in degree. 	<p>these subprojects are located in rural areas, affected land areas would be village collectively owned slope land, or low yield farmland. Some of them are contracted to individual farmers. Given the nature of RE subprojects, house demolition and displacement will not be involved.</p> <ul style="list-style-type: none"> • The legal system on land acquisition establishes well-defined procedures for providing adequate compensation and rehabilitation measures to affected parties.
<ul style="list-style-type: none"> • Temporary land occupation during project construction, and land lease arrangement for project operation. • For windfarm subproject, temporary land occupation will be required for installing generators and construction of access road. Based on similar projects, up to 20 ha of land area will be required for constructing access road and installing generators. • For concentrated PV subproject, relative large land areas need to be leased for installing solar panels for the power station, averaging 2-2.5 ha per MW. For a 20MW solar power station, up to 50 ha of land area will be needed. Most affected land areas tend to be slope land or low yield farmland. • For biomass CHP subprojects, a certain amount of land areas will also be leased for building fuel storage facilities in the project area. The land area for each fuel storage site ranges from 2 ha to 2.6 ha. 	<ul style="list-style-type: none"> • Subprojects involved with different types of RE activities, such as wind energy, concentrated PV, and biomass CHP, and all of them will involve certain amount of temporary land occupation during construction, or land leasing during plant operation. • The overall impact of land occupation appears to be limited in scale and moderate in degree. 	<ul style="list-style-type: none"> • Level of concern is moderate. • Since most of these subprojects would be located in rural areas, affected land areas would be village collectively owned slope land, or low yield farmland. Some land areas are contracted to individual farmers. Given the nature of RE subprojects, house demolition and displacement will not be involved. • The legal system on land also provides guidance on compensation and restoration requirement for temporary land occupation for the subproject. In addition, regulations on the transfer of rural land areas also allow certain types of activities to be used, which will not change basic farming conditions of rural land area.
<ul style="list-style-type: none"> • Removal of trees and attachment. 	<ul style="list-style-type: none"> • The subprojects involved with 	<ul style="list-style-type: none"> • Level of concern is

	permanent and temporary land occupation might require the removal of trees, crops, and other attachments along with land acquisition and land occupation.	moderate. For the impacts of lost crops and attachments, the current legal system through provincial or local decree provides the legal basis for providing compensation.
--	---	---

4. Assessment of Relevant Government Environmental, Health and Safety and Social Management System

4.1 Legal Framework for Management of Environmental, Health and Safety Impacts

The legal framework for management of Environmental, Health and Safety issues (EHS) in China is comprehensive and is evolving toward international standards. The legal framework consists of laws, regulations, guidelines, policies, and standards. There is little difference between them and the Policy and Directive on Program for Results Financing in terms of principle and substance. The legal framework of EHS, with a full coverage over the environment, health and safety aspects, provides a reasonable basis for addressing the environmental, health and safety issues likely arise in the proposed investment areas of the Program. However, implementation of the legal framework involves various government organizations for a project, which require different types of documents prepared by project developers in the project development process. The types of the documents to be prepared depend on the location, nature, size and magnitude of a project and the mitigation measures, particularly those with physical investments, are scattered among these various documents. However, the approval procedure for decision making is clearly arranged to ensure the concerns on the EHS and the mitigation measures be considered and designed in a consolidated way. In addition, there are variations in the requirements at different levels of governments. For example, the Ministry of Environmental Protection issued the base emission standards of air pollutants for thermal power plants but environmental permits issued by the local (provincial and municipal) EPB can require the use of more stringent standards established by these local EPBs.

The government of China also highlighted the management of the EHS throughout the whole life cycle of projects, and provides examination and monitoring of the performance of EHS management of operating industries. Generally government organizations which approve the document on some elements of EHS are required to conduct the examination and inspection of the performance of this aspect of the enterprises. Recently the government is strengthening the law enforcement, particularly on some sectors such as mining and mechanical sectors. In addition, one action listed in the Action Plan of the government is to strengthen legal framework and enforcement, the management on the EHS of the enterprises is expected to be monitored and inspected by the strengthened law enforcement of government.

4.1.1 Environmental System

The Chinese environmental legal framework provides the coverage on environment, and partial coverage limited to public health and safety. The fundamental legal basis for the environmental management for construction projects is the Environmental Impact Assessment Law and the Environmental Protection Law.

Table4-1 Main Environmental Laws

Main Laws	Summary
Environmental Protection Law	Units constructing projects that cause pollution to the environment must observe state provisions concerning environmental protection. The environmental impact statement on a construction project must assess impact of the project and stipulate preventive and mitigation measures. The EIA statement shall be submitted by specified procedures to the competent department of environmental protection administration for approval.
Environmental Impact Assessment Law	This law is formulated in order to implement the strategy of sustainable development, prevent the adverse impact on environment brought about by the implementation of plans and construction projects, and promote the harmonized development of economy, society and environment. EIA should be conducted in accordance with the Environmental Protection law and public participation is encouraged in an appropriate way.

In addition, there are a number of relevant environmental laws and regulations regarding the protection of the specific environmental elements, including soil, air, solid waste, wildlife, forest, nature reserve, and cultural property, etc. . The brief description of the other laws and regulations is given in Table 4-2 below.

Table 4-2 Summary of Other Relevant Environmental Laws and Regulations

Environmental Laws and Regulations	Summary
Water Conservation and Erosion Control Law (NPC, 2010)	This law is to prevent water pollution and soil erosion from construction projects that may disturb land surface.
Air Pollution Control Law (NPC, 2015)	This law is a fundamental legislation for air pollution control. It requires all air pollution emission entities must comply with national or local emission standards (Article 13).
Solid Waste Pollution Control Law (NPC, 2004)	This law requires the environmental authority to establish solid waste pollution monitoring system.
Wildlife Protection Law (NPC, 1988)	The State protects the wildlife and their natural habitats. Illegal poaching and damaging by any unit or person is strictly forbidden.
Forestry Law (NPC, 1998)	Construction projects should avoid or minimize the occupation of forest land.
Regulations on Nature Reserves (SC, 1994)	Nature reserves shall be established form area with high ecological and scientific value.
Cultural Property Protection Law (NPC, 2002)	For various levels of protected cultural relics, governments at various levels define necessary scope of protection. Alternatives for construction projects shall be explored to avoid immovable cultural relics to the extent possible. Chance-find procedures should be established.
Regulations on Environmental Management of Construction Projects.	The State enforces an environmental impact assessment system for construction projects. EIA shall be conducted by licensed institutes.

Within the EIA context, there are a number of technical guidelines for various environmental elements or sectors which are used to address specific issues screened and scoped during the EIA preparation. The overriding guideline is the Technical Guideline for EIA, General (HJ/T2.1-2001), which is comprehensive and stipulates the coverage of the EIA on EA principles, screening and scoping of environmental impacts, natural environment and social environment (including magnetic environment and health and safety), public participation, risk assessment, mitigation measures, alternative comparison, environmental management, etc.

4.1.2 Occupation Health and Safety System

Occupational health and safety are closely inter-related, thus the two issues on health and safety are covered by the same legal system in China. This system is very complex and involves a number of government departments during the project preparation and implementation on various aspects of the issues. However, this system designates the overall responsibility for management of occupational health and safety within the boundary of enterprises to the employer, while the workers' union plays an important role in supervising the implementation of the measures for health and safety in the internal system of the enterprise. The umbrella law is the Labor Law and the Safety Operation Law, and the summary of the two laws are presented in Table 4-3 below.

Table 4-3 Main Laws regarding Health and Safety

Main Laws	Summary
Labor Law	This law stipulates the duties and responsibilities of the two parties, employer and employee, in the operation of enterprises: the employer is responsible for establishment of complete system for occupational health and safety and should provide its employees with necessary

	protective tools and equipment, as well as a working environment in compliance with the national requirements, and provide periodic medical examinations for the employees doing jobs with potential occupational health and safety risks; the employee doing special jobs involving occupational health and safety risks should be trained and licensed. The employees should follow instructions for safety operation and have the right to report and refuse any jobs threatening life and health.
Safety Operation Law	The people first principle is applied throughout the law. Industrial development should give top emphasis on safety, make precautionary considerations to avoid accidents and comprehensive measures implemented through institutional structure of duties and responsibilities.

The legal system for management of occupational safety and health consists of about one hundred laws, regulations, specifications and about sixty standards. These specifications and standards are compulsory to use in the design and operation of the health and safety facilities associated with enterprises in different sectors. The laws cover various aspects of the key elements for safety operation, particularly related to the program on management of dangerous chemicals and occupational diseases. Directly related to the Program are the Law of Prevention and Treatment of Occupational Diseases and Regulations for Safety Management of Dangerous Chemicals that address key concerns of health and safety issues related to dangerous chemicals used, stored, manufactured, or transported in the EE area - replacement of low efficiency obsolete process units with high efficiency process units in chemical industries and Pollution Abatement area- flue gas de-nitrification utilizing ammonia. The laws relevant laws and regulations regarding the health and safety are summarized in Table 4-4 below.

Table 4-4 Summary of Laws and regulation on Occupational Health and Safety

Laws and regulations	Summary
Law of Prevention and Treatment of Occupational Diseases	It defines the occupational disease and gives prevention of occupational diseases top priority. It also defines-duties and responsibilities of the relevant organizations, i.e. employer, employee, workers' union, supervision organizations. Under this law, the Categorization and Checklist of Occupational Diseases was issued which defines 132 types of occupational diseases under 10 categories.
Regulations for Safety Management of Dangerous Chemicals:	It covers the whole process of production, storage, use, sale, transportation of dangerous chemicals. These regulations define responsibilities of relevant organizations

4.1.3 Implementation of the Legal System

The design and operation of the associated health and safety measures are legally and procedurally ensured by the Three Simultaneous which is widely applied and practiced in the construction projects required by the laws: Environmental Protection Law, Labor Law, and Safety Operation Law. This Three Simultaneous System is designed to ensure the mitigation measures to be effectively implemented in practice and thus forming the basis for the final examination and acceptance of the relevant health and safety measures by the government organizations.

Preparation of the documents for the investment under the program is required by the legal system, and some of these documents are free-standing, but some are integral parts of other documents. The approval procedure for projects is clearly arranged to ensure that these issues related to EHS be considered in design and the design is required to be reviewed and officially approved. These approvals, including EIA, are a pre-requisite for the approval of projects by DRC at respective levels. In addition, if projects involving the issues of health and safety (both public and worker), the approval of respective documents, i.e. Safety Risk Assessment Report or Geo-Hazard Assessment report prepared by the project sponsor is also required as a pre-requisite for approval of the Feasibility Study by the DRC. Such clear arrangement of approval procedure can ensure that the comments and recommendations of the EA, health and safety assessment and environmental

justification are fully considered in the decision making process for project approval.

During normal operation period of enterprises, examination of the performance of the occupational health and safety system within enterprises is a key focus of local government and the enterprises themselves. Such examination include frequent examination conducted by the management and workers' union of the enterprises, and periodic examination by labor or safety operation supervision departments. Generally, after the periodic examination, government organizations issue a report on the assessment of the HS performance of the enterprises. If any faults in the health and safety management system of enterprises are found or reported, local government organizations have the right to suspend or even stop the operation of the enterprises before the faults are corrected by the enterprises and are accepted by the government organizations.

4.2 Legal Framework for the Management of Social Impacts

4.2.1 Legal Framework on Land Acquisition

On managing potential social impacts caused by land acquisition and resettlement, there are a range of laws and regulations adopted in China. Among them, the Land Administration Law and State Council Decision on Deepening the Reform on Strict Management to land are two key legal basis for defining key aspects of land acquisition system in China. The following is a summary of provisions of key laws and regulations providing clear definitions on different requirements concerning land ownership, property right, procedures of land acquisition, compensations, and income restoration for affected farmers.

Table 4-5 Main Laws and Regulations regarding Land Acquisition

Laws and Regulations	Key Provisions
Land Ownership and Use Right Land Administration Law, Article 2 and 8	The People's Republic of China practices socialist public ownership of land, namely, ownership by the whole people and collective ownership by the working people. Land in the urban areas of cities is owned by the State. Land in rural and suburban areas is owned by rural collectives. House sites and private plots of cropland are owned by rural collectives.
Land Acquisition and resettlement Real Right Law of the People's Republic of China Article 42).	To meet the demands of public interest, it is permissible to requisition lands owned collectively and premises owned by entities and individuals or other realties according to the limit of statutory power and procedures. When requisitioning collectively-owned land, it is required, in accordance with the law and in full amount, to pay land compensation, resettlement subsidies, compensations for green crop and attachments; and cost for arranging social security for land loss farmers to guarantee their livelihood and protect their lawful rights and interests.
Law of PRC on Land Contract in Rural Areas, Article 6, Article 26 and 27.	In undertaking land contracts in rural areas, women shall enjoy equal rights with men. The legitimate rights and interests of women shall be protected in contract. No organizations or individuals may deprive the rights of women to land contractual management to which they are entitled, or to infringe upon such right.
Compensation Policies on Expropriated Land Land Administration Law of the People's Republic of China. Article 47	Compensation shall be made for land expropriated on the basis of its original purpose of use, which shall include compensation for land, resettlement subsidies and compensation for attachments and young crops. Compensation for expropriated cultivated land shall be six to ten times the average annual output value of the expropriated land, calculated on the basis of the three years preceding such requisition. Resettlement subsidies calculated according to the agricultural population needing to be resettled, shall not exceed fifteen times its average annual output value.
Rehabilitation of Affected People Decision of the State Council on Deepening	Local people's governments at or above county level shall take practical measures to protect the land-loss farmers against any decrease in living standards resulting from land acquisition. Land compensation, resettlement subsidies and compensation for young crops shall be paid promptly and at the full amount in accordance with law. The people's governments shall

the Reform on Strict Management to land, Article 12	assent to the increase of resettlement subsidies to the farmers rendered landless due to land acquisitions whose original living standards or social security fee cannot be maintained after being paid land acquisition compensations according to the current laws and regulations.
Regulations on measures to resettle farmers Decision of the State Council on Deepening the Reform on Strict Management to land, Article 13	Local governments at or above county level shall enact specific measures to guarantee the long-term livelihood of the farmers whose land is acquired. For projects with stable benefits, the farmers may buy a share via the lawfully authorized rights of construction land usage. The local government within the city planning districts shall enable the farmers whose land is acquired to participate in the urban employment system and establish a social security system. In acquisition of land owned by farmers collectively outside the city planning districts, the local government shall be obliged to retain the necessary land for the farmers to cultivate or, if this is not possible, arrange corresponding jobs for them.
Regulations on land acquisition information disclosure Decision of the State Council on Deepening the Reform on Strict Management to land, Article 14	Farmers' collective ownership of land and contractual operation right of land shall be guaranteed during the process of land acquisition. Prior to the report of land acquisition being sent to higher authorities for examination and approval, the purpose, location, compensation rates for land acquisition and the resettlement arrangements shall be made public to the farmers whose land is to be acquired. The rural collective economic organizations and farmers must confirm the survey results of the status of the land to be acquired. If necessary, the Ministry of Land and Resources shall organize a public hearing according to relevant regulations.
Decision of the State Council on Deepening the Reform on Strict Management to land, Article 15	The provincial government shall formulate standards for the distribution of land compensation fees within the rural collective organizations based on the principle that the land compensation fees shall be used for the farmer households whose land is acquired. The rural collective organization shall make the information on the revenues and allocation of the land compensation fees available to its members, and receive their supervision.
Decision of the State Council on Deepening the Reform on Strict Management to land, Article 16	The government at various levels shall set up a place for accessing and consulting government information at national archives and public libraries which is equipped with corresponding facilities and equipment for the convenience of citizens, legal persons or other organizations to access such government information. An administrative organ shall provide the government information voluntarily disclosed by it to national archives and public libraries in a timely manner.
Measures for the Administration of Preliminary verification Examination of the Land Used for Construction Projects, Article 5, Article 15	For a construction project that needs to be verified and approved, the entity using the land for construction shall file an application for a preliminary verification at the stage of feasibility study. For a construction project that needs to be ratified and archived, the entity using the land for construction shall file an application for preliminary verification before applying for ratification and archiving. If the construction project has not been preliminarily verified or fails to pass the preliminary verification, the party concerned shall not be approved to convert the land for agricultural use into that for construction use or to have the land requisitioned, nor shall it be permitted or to go through the land supply procedures

4.2.2. Legal Framework on Ethnic Minorities

In China there are more than 400 laws and regulations addressing the legal requirements and stipulations of ethnic minorities. They cover almost every aspect of life from political representation, to cultural integrity, to economic development. All these Chinese legislation promotes preferential treatment for minority nationalities in some contexts and promotes equitable treatment of all groups in others. However, the "Constitution of the People's Republic of China" and the "Law of the People's Republic of China on National Region Autonomy" are essential and sets the framework for all subsequent legislation, which is summarized in the table below.

Table 4-6: Main Laws and Regulations regarding Ethnic Minorities

Laws and Regulation	Key Provisions
Constitution	All nationalities in the People’s Republic of China are equal. The state protects the lawful rights and interests of the minority nationalities and upholds and develops a relationship of equality, unity and mutual assistance among all of China’s nationalities. Discrimination against and oppression of any nationality, and any act undermining the unity of the nationalities is prohibited. The state assists areas inhabited by minority nationalities in accelerating their economic and cultural development according to the characteristics and needs of the various minority nationalities. All national autonomous areas are integral parts of the People’s Republic of China. It also establishes that “all nationalities have the freedom to use and develop their own spoken and written languages and to preserve or reform their own folkways and customs.
The National Regional Autonomy Law	The National Regional Autonomy Law emphasize on indigenous people’s rights and interests in national autonomous regions, among which the most important are as follows: i) The resolutions, decisions, orders and instructions concerning national autonomous areas adopted by the State organs at higher levels should suit the conditions in these areas; ii) While exploiting resources and undertaking construction in national autonomous areas, the State shall give consideration to the interests of these areas, make arrangements favorable to the economic development there and pay proper attention to the productive pursuits and the life of the minority nationalities there. The State shall take measures to give due benefit compensation to the national autonomous areas from which the natural resources are transported out; iii) While exploiting resources and undertaking construction in national autonomous areas, the organizations or individuals shall take effective measures to protect and improve local living and ecological environment and to prevent and control pollution and other public hazards.

Policy Objectives: The objectives vary in different policies, but overall objectives of policies on minority nationalities in China are equality, unity and autonomy of minority nationalities. Besides these three, the following can be found in different policies related to minority nationalities: (i) Respecting minority nationalities' culture and customary; (ii) Guarantee freedom of religion and belief; (iii) Encouraging Development of minority nationality language; (iv) Training and using minority nationality cadres as much as possible; and (v) Promoting economic development

Identification of minority nationalities: The most identification work of minority nationalities in China was done in 1950's. There are 55 minority nationalities officially recognized. There are more than 400 names of nationalities all over China in early 1950s. Based on the results of survey, research and identification, more than 40 names were maintained, some were newly identified based on the following four criteria: (i) common language, (ii) to inhabit in a common territory, (iii) having typical customary and cultural activity, and (iv) with common national diathesis in terms of national culture.

4.3 Assessment of Existing Legal Framework against PforR principles

According to Policy and Directive on Program for Results Financing, assessment and comparison of the principles of Policy and Directive on Program for Results Financing against the country legal system for EHS and social management should be conducted. Based on the review of country legal system for EHS and social management, it is concluded that there are no substantial differences between the principles of the PRC legal framework in dealing with environmental and social effects and Policy and Directive on Program for Results Financing.

The country legal framework for environmental and social management is designed with various laws, regulations, standards, guidelines, and policies with the objectives towards the following general core principles of the Policy and Directive on Program for Results Financing: (i) Promote environmental and social sustainability in the program design; (ii) Avoid, minimize, or mitigate

against adverse impacts; and (iii) Promote informed decision-making relating to a program’s environmental and social effects. Table 4-6 and Table 4.7 presents the comparison of the provisions and requirements under the country legal system with the core principles and planning elements of the Policy and Directive on Program for Results Financing.

Table 4-6 Environmental System vs. Core Principles/Key Planning Elements

Core Principles	Country System	Findings
Core Principle 1: Promote environmental and social sustainability in the program design	One core principle of the legal system is to ensure sustainable development, both social and environmental, in the design and implementation of plans or construction projects through appropriate institutional arrangements, technical guidelines and standards, and project processing procedure.	Consistency
Core Principle 2: Avoid, minimize, or mitigate against adverse impacts	The legal framework establishes the processes and procedures to avoid or minimize the adverse effects on natural habitats physical cultural resources, and worker health and safety resulting from program activities or investments.	Consistency
Core Principle 3: Promote informed decision-making relating to a program’s environmental and social effects	Although there are many documents need to be prepared for EHS and social aspects for a new investment, the approval of the project design document, i.e. feasibility study and preliminary design by DRC requires the submission of approval of other relevant documents be the pre-condition. Thus the various aspects of EHS and social are considered in a consolidated and informed way.	Consistency
Key Planning Elements		
(1) Early screening of potential effects:	The early screening of potential effects is a mandatory step in the EA process required by the Technical Guideline for EA, General.	Consistency
(2) Consideration of strategic, technical, and site alternatives (including the “no action” alternative):	The EIA Law does not explicitly require an alternative analysis. However, alternative analysis for project scale, siting or alignments, as well as mitigation measures is required.	Consistency
(3) Explicit assessment of potential induced, cumulative, and trans-boundary impacts:	The Technical Guideline for EA, General, explicitly requires screening and identification of potential positive and adverse environmental long-term and short-term impacts, direct and indirect impacts, cumulative and non-cumulative impacts.	Consistency
(4) Identification of measures to mitigate adverse environmental or social impacts that cannot be otherwise avoided or minimized:	This requirement is also one part of the EA process stipulated in the Technical Guideline for EA, General.	Consistency
(5) Clear articulation of institutional responsibilities and resources to support implementation of plans:	The country system has assigned major responsibility for implementing mitigation measures and the monitoring to particular parties. The Technical Guideline for EA, General, also requires that the budget for mitigation measures be listed in the EA.	Consistency
(6) Responsiveness and accountability through stakeholder consultation, timely dissemination of program information, and responsive grievance redress measures:	The Environmental Protection Law and the EIA Law require public participation and information disclosure through a meaningful and responsive way; the project proponents/developers are responsible for disseminating project and EA information to the public and-soliciting public opinions and comments. The mechanism for grievance redress is ensured in laws (the EIA document is required to list contact information for grievance redress).	Consistency
(7) Includes appropriate measures	The Technical Guideline for EA, General requires the	Consistency

for early identification and screening of potentially important biodiversity and cultural resource areas:	step of screening of for sensitive areas, including important habitat biodiversity and cultural resource areas, for a detailed site survey in the EA preparation.	
(8) Supports and promotes conservation, maintenance, and rehabilitation of natural habitats; avoid the significant conversion or degradation of critical natural habitats, and if avoiding the significant conversion of natural habitats is not technically feasible, includes measures to mitigate or offset impacts or program activities:	The Environmental Protection law requires reasonable development of natural resources to protect the biodiversity. Significant degradation or conversion of critical natural habitats is forbidden by the law under the Regulation for Nature Reserve Management. During early screening, natural habitats can be identified and alternatives will be developed and considered to avoid these natural habitats;	Consistency
(9) Takes into account potential adverse impacts on physical cultural property and, as warranted, provides adequate measures to avoid, minimize, or mitigate such effects:	As required by the Technical Guideline for EA, General, early screening will place emphasis on identification of physical cultural properties, and relevant experts and departments will be consulted if significant physical cultural properties are found within the influence area of the project. The Cultural Relics Protection Law states that alternatives for construction projects shall be explored to avoid immovable cultural relics to the extent possible. If not, proper mitigation measures be developed.	Consistency
(10) Promote community, individual and worker safety:	The legal system requires protection for the safety and health of workers through a set of safety design specifications and standards, as well as the Three Simultaneous requirements for various sectors and enterprises.	Consistency
(11) Promotes the use of recognized good practice in the production, management, storage, transport, and disposal of hazardous materials generated through program construction and operations:	regulations and specifications, and standards under the occupational health and safety system stipulates that good practice norms and-sector associations are required to provide training on good practices regarding occupational health and safety.	Consistency
Includes measures to avoid, minimize, or mitigate community, individual, and worker risks when program activities are located within areas prone to natural hazards such as floods, hurricanes, earthquakes, or other severe weather or climate events:	Technical Guideline for EA, General, requires and provides guidance for assessment of environmental risks, and the geological hazards. Assessment results are to be incorporated in the site selection justification process in the feasibility study report required by the Method for Prevention and Control of Geological Hazard issued by the Ministry of Land and resources. These technical guidelines and methods include measures to pre-assess natural hazards with results to be provided for consideration in site selection.	Consistency

Table 4-8: Core Principles and Planning Elements between the National Social System vs. Policy and Directive on Program for Results Financing

Key Planning Elements	Country System	Findings
(1) Avoid or minimize land acquisition and related adverse impacts:	The effort of avoid or minimize land acquisition is achieved through both technical designs and relevant land department review process, including preliminary verification in order to protect primary farmland.	Consistency
(2) Identifies and addresses economic and social impacts caused by land acquisition or	Under the existing land acquisition procedures, the potential social impacts is addressed by engaging affected villages in land impact survey, confirming surveyed	Consistency

loss of access to natural resources, including those affected people who may lack full legal rights to assets or resources they use or occupy:	results, conducting public hearing, adopting unified compensation rates, and providing employment opportunities and social security coverage for land loss farmers. For those lack full legal rights, despite of lacking clear entitlements in current legal framework, certain level of compensation are often provided by negotiation.	
(3) Provides compensation sufficient to purchase replacement assets of equivalent value and to meet any necessary transitional expenses, paid prior to taking of land or restricting access:	Under the current legal framework, particularly No. 28 decree by the state council in 2004, land compensation rates have increased steadily. Many provincial government have issued unified average output value and compensation rates covering all villages in the province. The resulted compensation rates is more than 20 times of annual average output value. Before taking the land, all compensation should be delivered to affected parties.	Consistency
4) Provides supplement livelihood improvement or restoration measures if taking land cause loss of income-generating opportunity (e.g. loss of crop production or employment):	According to No. 28 degree of state council, local authorities are requested to pay special attention to rehabilitation for land loss farmers by offering a range of rehabilitation measures, such as replacement farmland, employment opportunities, skill training, and social security, and providing benefiting sharing from project land.	Consistency
(5) Restores or replaces public infrastructure and community services that may be adversely affected:	Under current land acquisition system, the project sponsor is required to pay compensation for all affected assets including both privately owned attachments and public infrastructure and community services. In most cases, affected public infrastructures and community services will be restored by relevant government agencies.	Consistency
Core Principle: Due consideration is given to cultural appropriateness of, and equitable access to, program benefits giving special attention to rights and interests of Indigenous Peoples and to the needs or concerns of vulnerable groups:	This core principle is consistent with provision in the national Constitution, which stipulated that “all nationalities in China are equal. The state protects the lawful rights and interests of the minority nationalities and upholds and develops a relationship of equality, unity and mutual assistance among all of China’s nationalities. Regional autonomy is practiced in areas where people of minority nationalities live in concentrated communities; in these areas organs of self-government are established to exercise the power of autonomy.	Consistency
Key Planning Elements		
(1) Undertakes free, prior, and informed consultations if Indigenous People are potentially affected (positive or negative) to determine whether there is broad community support for the program.	In comparison with core principles and planning elements, although the current legal framework support the lawful rights and interests of the minority nationalities and upholds and develops a relationship of equality, unity and mutual assistance among all of China’s nationalities, there no specific policy requirement for any development project to carry out prior, free and informed consultation with minority communities, and to obtain broad support. Nevertheless minority communities like other local communities will be consulted and obtained their support during EIA and land acquisition process for planning investment projects. The local government agencies will review and approve relevant investment projects on behalf of local population and communities.	Consistency
(2) Ensures that Indigenous Peoples can participate in devising opportunities to benefit from exploitation of customary resources or indigenous knowledge, the latter (indigenous knowledge) to include the consent of the Indigenous People.		Consistency
(3) Gives attention to groups vulnerable to hardship or disadvantage, including as relevant the poor, the disabled, women and children, the elderly, or marginalized ethnic	On the issue of giving special attention to vulnerable group including the poor, disabled, women, and the elderly, there is established system in China for local government to provide support to urban and rural low income households, including various vulnerable groups. Such support including cash income to meet minimum	Consistency

groups. If necessary special measures are taken to promote equitable access to program benefits. (4) Considers conflict risks, including distributional equity and cultural sensitivities	living allowance for the group, and in kind support on different aspects of daily expenses, such as reduction or waive of electricity tariff, heating cost, and so on. Although the proposed renewable energy projects will benefit general public with clean energy with little risk of distribution equity, the project will bring tax revenue to local areas through tax revenue and generated employment opportunities.	
--	--	--

4.4 Mitigation Measures for Main Effects of the PforR

The legal system for EHS and Social management in China is comprehensive and can provide reasonable basis for addressing the environmental and social concerns of the PforR program. Mitigation measures for the main environmental and social effects are developed for consideration by Hua Xia Bank who, according to the OM will be required to review the EHS and land acquisition approval and documents, and the environmental and social eligibility criteria. Since specific investment proposals and associated project documents for EE, RE and Pollution Abatement were not available during the preparation of this ESSA, generic issues and their normal mitigation measures will be presented. These are based upon extensive experiences with similar investments.

Generally, since potential environmental and social impacts for all potential investments are moderate or minimal, they can be avoided, minimized, mitigated under the existing legal system previously described. Through early screening, alternatives comparison, available mitigation measures, and public consultation, these main potential EHS and social issues can be readily addressed in a cost effective manner in accordance with the corresponding laws, regulations specifications, guidelines or standards of the PRC.

In addition, experiences with projects of a similar nature and scale financed by the WB show that regular environmental issues associated with, i.e. dust, noise, non-hazardous waste and wastewater can be effectively mitigated by the code of environmental practices widely adopted in China.

During initial screening, environmental effects are categorized into three items: 1) occupational health and safety; 2) environmental impacts; and 3) linkage issues such as adequacy and acceptability of material supply. The main mitigation measures address these items as well as those sections of the legal system pertaining to the issue are given in Table 4-9 below.

Table 4-9: Coverage and Mitigation Measures over the main EHS effects

EHS Issue	Mitigation Measures	Corresponding coverage of legal system
Occupational Health and Safety:		
<ul style="list-style-type: none"> Workers may be injured by exposure to steam from recovery of waste heat or co-generation; or by exposure to hazardous wastes during disposal of obsolete equipment; Workers may be injured by exposure to gaseous ammonia; Workers and local residents may experience exposure to elevated levels of 	<ul style="list-style-type: none"> Regularly check pressure vessels and high-pressure pipelines for leaks or wall material weakness; Take adequate ventilation measures in working areas to reduce temperature and humidity; Reduce operating time in high-temperature environment and guarantee drinking water supply; Take preventive measures on surfaces where workers will have close contact with high-temperature equipment, including generating equipment and pipelines; Set warning signs near 	<ul style="list-style-type: none"> Regulations of Management of Dangerous Chemicals; Regulations for use of chemicals in working areas; Regulations on monitoring chemicals; Regulations on safety in areas prone to explosion; Occupational health and safety management system standard; Health Standard for Design of Industrial Enterprises GBZ1-2010; Standard for Occupational Health and Safety Management System

<p>electro-magnetic radiation.</p>	<p>high-temperature surface and offer proper personal protective equipment, including heat-insulating gloves and shoes.</p> <ul style="list-style-type: none"> • Provide staff training on identification of occupational exposure to electromagnetic fields, hazardous wastes, and ammonia and dangers; • Provide trainings to workers on handling hazardous wastes during disposal of displaced equipment; • Limit the time of staff exposure to electromagnetic fields by reasonable rotation; • Increase distance between electromagnetic radiation sources and operating personnel as much as possible. • Include monitoring and alarm systems for ammonia and hydrogen sulfide 	<p>GB/T 28001</p>
<ul style="list-style-type: none"> • Risk of explosion and fire for gas storage on site; Risk of explosion and fire for pure liquefied or aqueous ammonia storage on site for SCR; • 	<ul style="list-style-type: none"> • The amount of gas and ammonia to be stored on site should be avoided or minimized; • Design of the pipeline and storage system should be in compliance with the relevant specifications and standard; • Operational staff should be provided with trainings on operation procedure of valves; • Frequent inspection of the pipelines and flanges; • Safety buffer area should be maintained based on the recommendations of the risk assessment report; • Drillings on firefighting should be conducted on regular basis; • Materials for firefighting should be prepared on site. • Install monitoring and alarm systems for ammonia detection 	
<ul style="list-style-type: none"> • Confined space 	<ul style="list-style-type: none"> • The minimum space should be designed to be adequate and comfortable for the work assignment; • Workers should be provided with properly maintained personal protective equipment; • Workers should be provided with training on operation and rescue procedures in small spaces. 	<ul style="list-style-type: none"> • Occupational health and safety management system standard; • Health Standard for Design of Industrial Enterprises GBZ1-2010; • Standard for Occupational Health and Safety Management System GB/T 28001 • Min. distance for confined space GB12265.3-1997
<ul style="list-style-type: none"> • Mechanical damage 	<ul style="list-style-type: none"> • Protective devises should be included in the design of mechanical equipment; • Workers should be provided with training on the proper equipment maintenance and operation; • Workers should be provided with training on alarm signs and working areas prone to mechanical damage; 	<ul style="list-style-type: none"> • Occupational health and safety management system standard; • Health Standard for Design of Industrial Enterprises GBZ1-2010; • Standard for Occupational Health and Safety Management System GB/T 28001

	<ul style="list-style-type: none"> • Medical treatment should be prepared on site. 	
<ul style="list-style-type: none"> • Environment: 		
<ul style="list-style-type: none"> • Operating wind turbine may result in barrier to migratory patterns and other movements of wildlife, such as birds and bats; • Operating wind turbine may cause shadow flickering on the residential buildings nearby; • Landscape impact and visual impact near the wind energy and PV facilities, particularly cumulative landscape impact, on residential areas, recreational areas etc.; • Geothermal wastewater may be toxic to aquatic species and agriculture. 	<ul style="list-style-type: none"> • Bird map and map of ecological sensitive sites should be used to screen the sites so as to avoid the migratory routes of birds and bats and other ecologically sensitive sites; • The site for the windfarm should be selected to avoid the residential buildings by modeling the flickering impact; • The site of PV facilities and windfarm should be selected so as avoid residential and recreational areas; • Wastewaters from geothermal projects should be reinjected back into the geothermal field. When this is not possible, these wastewaters should be treated to the discharge standard applicable to the intended receiving waters. 	<ul style="list-style-type: none"> • EIA Law; • Technical guideline for EA, General; • Technical guideline for EA, Ecology • Integrated wastewater discharge quality standard GB8978-1996 •
<ul style="list-style-type: none"> • Linkage issue: 		
<ul style="list-style-type: none"> • The supply of materials may not be adequate for plants using biomass. • • Gas supply for boilers may not be adequate due to limited availability locally or competitive priorities; 	<ul style="list-style-type: none"> • Supply of materials should be carefully examined by Hua Xia Bank: whether there is a reasonable justification of the adequate supply of the materials in the feasibility study. 	

For potential social effects under the Program, based on initial screening and consultation, they include limited amount of permanent land acquisition for certain facilities of green energy investments, and temporary land occupation during project construction, and long term land leasing arrangement during operation of RE investments, as well as attachments removal along with land acquisition and land occupation. The main mitigation measures address these impacts as well as those sections of the legal system pertaining to the issue are given in Table 4-10 below.

Table 4-10: Coverage over main social effects

Main social effects	Corresponding coverage of legal system
Permanent land acquisition	The Land Administration and relevant regulations established a legal system on land acquisition, which has a full coverage on potential social impacts caused by land acquisition.
Temporary land occupation during project construction, and land lease arrangement for project operation	The current legal system on land acquisition also provides guidance on compensation and restoration requirement for temporary land occupation for the investment projects. In addition, regulation on transfer of rural land areas also allow certain types of activities to be used, which will not change basic farming conditions of rural land area.
Removal of trees and attachment	For the impacts of lost crop and attachments, the current legal system through provincial or local decrees provide the legal basis for providing compensation for the lost assets.

5. Hua Xia Bank Capacity and Performance of the Program Environmental and Social Management System

The performance assessment under current EHS and social management is based on a review a number of similar projects financed by the Hua Xia Bank in the Program region. During operation preparation, under the assistance of HXB, the World Bank task team met sponsors of different types of renewable energy projects and visited actual project sites. They included Taida Biomass Power Company and Taida Biomass Power Project in Hengshui City in Hebei Province, China Clean Energy Oasis New Energy Company and related Solar Power Project in Beijing Huairou Conference Center; Beijing Wendexingye New Energy Technique Company responsible for developing Shanxi Yin County Windfarm Project; and Lightway Green New Energy Company and related Lightway Distributed Solar Power Project and Longhua Centralized Solar Power Project. Based on discussions and field visits to the above projects and based on experience of similar projects in the same region, the task team was able to draw conclusions on the performance of the current environmental and social management system in dealing with various environmental and land acquisition impacts.

5.1 Existing Institutional Mandates, Responsibilities and Performance

The legal framework, which defines the responsible government organizations in the project processing procedure, does not permit the implementation of a development activity or project without approval of the respective documents, if required. The technical capacity of the government organizations relies largely on their expert panel accredited to review the technical details of the document and provide initial comments to the perspective government organizations for decision making. In some cases, the government organizations can delegate the review and approval of the documents to their lower level organizations. The relevant government organizations involved in review and approval and documents to be prepared to address key EHS concerns are summarized in Table 5.1 below.

Table 5.1 Relevant Organizations and Documents to Address Key EHS Concerns

Documents to be prepared and reviewed	Institutions
EIA (including environmental risk assessment)	Environmental protection department is responsible for review and approval of the EIA document prepared by the project proponents
Water and Soil Erosion Control Report	Water department is responsible for review and approval of the report prepared by the project proponents, and examination and acceptance
Geological hazards: Geo-hazards pre-assessment report for projects in areas prone to geological hazards	Land resource department is responsible for review and approval of the report;
Natural habitats: Special Report for projects affecting Nature Reserves	Forestry Department is responsible for review and approval of the report; The main findings and suggestions of the special report will be incorporated into the EIA.
Physical cultural property: 1) projects within the protection zone of physical cultural property: 2) projects within the construction control zone of physical cultural properties:	(1) project should be approved by the government which recognized the protection of the property, after the agreement of the cultural relics department of the State Council; (2) project design document should be reviewed and approved by cultural departments before review and approval by urban planning department
Occupational health and safety: Safety Assessment(for particular industries or enterprises involving manufacturing,	Safety Operation Supervision and Management Bureau is responsible for review and approval of the document

transportation, storage and use of dangerous chemicals)	
Occupational diseases: Chapter for design of facilities for prevention of occupational diseases in feasibility study, preliminary design and construction design	Safety Operation Supervision and Management Bureau is responsible for review and approval of the document
Occupational health and safety: Occupational health and safety (except for occupational diseases) chapter in the preliminary design	Labor Bureau is responsible for review and approval of the chapter.
Feasibility Study Report: including the justification of the project in terms of relevant planning, site selection, comparison of other alternatives; environmental management and occupational health and safety, design of the environmental, health and safety facilities required, if any.	Development and Reform Committee (DRC) is responsible for review and approval of the Feasibility Study Report

On the potential social impacts caused by land acquisition, the current legal framework, has set up a clear procedure for obtaining approval of land acquisition for investment projects, and managing the land acquisition process. Any project without approval of land acquisition should not be allowed to proceed. One key requirement is to obtain approval of land preliminary verification issued by provincial land department or Ministry of Land Resources, which should be completed before the ratification and approval of a construction project. If the construction project has not been preliminarily verified, the party concerned shall not be approved to convert the land from agricultural use into that for construction use. Once the approval of land preliminary verification is obtained, the actual land acquisition could begin. To manage potential social impacts, the current legal system specifies key steps involving with land acquisition, which include informing the affected people about the purpose, location, compensation rates, and rehabilitation measures for the land to be acquired, having affected parties to confirm the outcome of land survey, and holding public hearing on the land to be acquired.

Following the confirmation, the local land resources bureau will begin the process of compiling land acquisition application documents, and submit them to higher level of government for approval. Once it is approved, land acquisition decree should be published in the affected villages within 10 days of the approval. After the decree, the affected rural collectives and individuals should bring relevant certificates and go the required place to register the land acquisition. Based on land acquisition scheme and registered data, local land resources bureau should prepare “land acquisition compensation and rehabilitation scheme” and disclose such scheme to affected villages. When all compensation for all items paid, the affected rural collectives and individuals should release the acquired land areas to local land resources bureau.

5.2 Performance on EHS Management System

As a result of site visits, discussion and consultation with clients of the HXB, who are developers of RE projects for activities similar to those anticipated under the Program, and review of EIA documents, feasibility study reports, and approval documents, the World Bank task team found that the clients are aware of the procedural requirements and documents required by the relevant government organizations.

Clients contracted qualified institutes to prepare each of the documents required and have obtained the approval documents/permits necessary to commence project construction. The developers of these projects included qualified technical staff that were not only well-versed with the procedural requirements of the necessary documents but also the technical details, including EIA, Safety Assessment Report, et cetera. The developers appeared to pay great attention to EHS issues and preferred to contract highly experienced institutes prepare these documents since the government

organizations are very stringent on the document review, final examination and acceptance of the project facilities, and associated environmental and safety works. Otherwise clients would receive heavy fines if there were any faults in the examination and acceptance process.

The review of the EIA and the approval documents found that the key environmental effects identified in this ESSA are considered in the screening, impact analysis, and mitigation measures for prospective projects proposed by developers. Approval documents of local EPBs are also designed to highlight the key concerns and the implementation of the mitigation measures of proposed projects.

5.3 Performance on Land Acquisition and Compensation

Among different types of renewable energy projects, regardless of the amount of land acquisition and type of land acquisition, all project sponsors have obtained relevant approval during the project feasibility study stage, which included an approved project proposal from the local reform and development commission, a land preliminary verification from the land resources department, and a land use planning permit from the local planning department. All project sponsors were able to obtain the land areas for the projects following the established land acquisition process. Under the land acquisition process, the local land resources bureau is responsible for supplying the land area to the project sponsor following the completion of land acquisition from rural collectives to the state. The project sponsor will be given a land use certificate for the acquired land area after paying the land lease price plus various taxes and fees to the local government. Since the actual process of land acquisition, which includes conducting survey, public hearing, registration, and providing compensation to affected parties, is handled by the local land resources bureau with assistance of the township government, the project sponsor might not be fully aware of the details regarding compensation policies for the affected villages and delivery of compensation and rehabilitation.

The discussions with project sponsors and visits to project sites confirmed that such 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 the provincial decree. Based on these visits and past experience with similar land acquisition procedures in the region, as long as the procedure is followed, the basic interests of affected people were protected. The findings also showed adherence to the core principle of avoiding or minimizing displacement and demonstrated that affected people are assisted in improving or at least restoring their livelihood and living standards.

For the required temporary land areas during project construction, instead of relying on local land resources bureaus, project sponsor often negotiated directly with local villages. The compensation rates for temporary land occupation are often set following annual crop value plus the cost of restoring affected land to original conditions. For land areas requiring a long-term lease, compensation is often agreed upon through negotiation. Taking the Longhua Solar Power Project as an example, the compensation of leased land areas is set at CNY800 per mu per year, which is based on the calculation of average yield and sale price of corn in 2013 (CNY2.1 per kg). In the lease agreement, it was agreed the lease payment will be made every five years. If corn prices increase, the land compensation will be raised accordingly, increased by CNY100 per mu per year if corn price increase CNY0.2 per kg. However, if corn price decrease, the compensation will be the same or CNY800 per mu. For land areas owned by village collective, the compensation will be paid directly to affected village. For land areas contracted to individual households, compensation will be paid directly to affected households.

5.4 Implementing Agency's Capacity and Performance

The Hua Xia Bank is officially designated to implement the PforR Program. HXB was involved in the China Energy Efficiency Financing Project, which has been supporting the mainstreaming of energy efficiency lending in the Chinese banking sector through EE credit lines.

5.4.1 Institutional arrangement and experience

The management of environment and social impacts of proposed subprojects by HXB is through the normal loan application review and approval process. When the business operation department of HXB receives loan application package, it often consists of project approval documents, including relevant environmental and land acquisition approval documents. Although there are no special units or staff dedicated in the business operation department to manage EHS and social issues for each loan application, the designated loan officer often requires the borrower to provide evidence of approval of relevant EHS documents, and securing the land area for proposed project, such as copy of approval land preliminary verification by provincial land resources department, and copy of land use certificate following completion of land acquisition procedures. According to officials from HXB, in order to ensure that proposed project is in compliance with national and local procedures and reduce potential risks, evidence of availability of land or permit to acquire land is one of the key documents requested by the bank. For the land areas to be leased during project implementation, copy of lease agreement is also required. Due to the fact that copy of land use certificate for the acquired land area might not be available during project construction, it is often not required as condition for disbursement of the loan.

Such loan application package will be passed on to risk management and control department in the HXB HQ and its subsidiary departments in local branches to review and approval. The risk management and control department is independent of the business operation departments even within the same branch. Therefore, the risk department can provide independent suggestions and comments on the environmental and social risks for each loan application. So far, the capacity of the risk department on environment and social management is obtained largely from the experience in loan processing activities. For the Program results area, the risk department has some experience and knowledge on the risk of health and safety management from energy efficiency and renewable energy operations. But pollution abatement activity is quite new to them. The business operation departments rely on the risk department on the management of environmental and social risks, and they have the power to reject the loan requests if there are significant environmental and social risks. The record of its performance on the on-going CHEEF project where the HXB engaged an environmental expert to help review and manage the environmental risks is acceptable to the World Bank.

5.4.2 Loan management procedure

Review of loan management procedures indicated HXB largely relies on evidence of approvals for EIA and Feasibility Study Reports to manage the environmental risk of a loan. When a loan request is obtained, the project manager of HXB first checks project documents related to project validity, such as approval of EA, approval of project proposal or feasibility study, and approval of preliminary land verification. The loan reviewers in the risk management department are responsible to check the completeness and compliance of the approval documents. After the loan request is approved, the post-loan management department is involved to urge the project manager pay site visit on periodical basis to ensure the project is constructed as schedule and operated as expected to assure the repayment of the loan. The project manager will prepare and submit an on-site inspection report focusing on the progress of the project in construction stage and operation status in operation stage respectively. Such on-site inspection will end once the last repayment of loan is completed.

The post-loan management department has neither established a monitoring and reporting system to determine if enterprises have established and operated an internal system for managing the EHS issues nor reviewed external monitoring reports conducted by relevant local government departments (e.g., environmental monitoring station, safety operation bureau, and so forth) on the performance of the internal system and the EHS measures during the normal operation of the enterprises.

While the current system of HXB meets the basic requirement of managing loan applications, it does not provide any evidence whether the mitigation measures for specific investments are satisfactorily implemented and internal system for managing the health and safety issues established and operated satisfactorily within the enterprises during operating stage or whether actual land acquisition procedures are completed satisfactorily for the acquired land areas; and whether the compensation for the affected villagers have been delivered.

5.4.3 Institutional Strengthening for the Program

China Banking Regulatory Commission (CBRC) is promoting Green Credit. The system of Green Credit thus becomes compulsory for financial organizations in China. This Guidance requires financial organizations to effectively identify, measure, monitor, and control environmental and social risks in their loan business, establish an environmental and social risk management system, and strengthen their loan policy, loan system, and procedural management. The guidance also stipulates the environmental and social risks include the assessment of energy consumption, pollution, land, health, safety and resettlement, ecological protection, and climate change. Following this Guidance, HXB is making efforts to establish the Green Credit system internally. To strengthen its quality control and efficiency of the loan request evaluation and management, HXB has issued a set of documents, including the Method for Management of Evaluation of Loan Business of Hua Xia Bank (HuaYinZhi No. 2013 121), Standard for Review of Completeness and Compliance of Lending Business of Hua Xia Bank (Hua YinZhi No. 2011 237), and Temporary Method for Management of Green Credit Business (HuaYinZhi No. 2012 285). These documents highlight the importance of effective management of environmental and social risks during the loan operation and explicitly established the steps for management of environmental and social risks throughout the cycle of loan operation.

HXB management has made a commitment to strengthen the capacity in EHS and social management for the Program implementation. HXB has developed a plan to establish its green credit center which would be a secondary department managed by a deputy director general of HXB. Under this plan, two or three divisions will be created. One division will be responsible for management of on-lending business on green credits and direct lending on key projects, while it will work together with the post-loan management department for post-loan management of projects to be financed by the Program. Another division will be responsible for providing guidance, conducting policy studies, and assisting branches of HXB with marketing in Jing-Jin-Ji region. HXB will also designate two special reviewers in their HQ office to enhance the quality control and efficiency of loan request processing procedures for the Program. Within the green credit center, there will be staff designated to liaise with the World Bank and government on environmental, worker health and safety, and social issues.

The institutional arrangement for the green credit center is expected to be approved by the end of February 2016. Therefore the loan management capacity of HXB, particularly on EHS and social effects, will be enhanced to a level that ensures satisfactory performance of its duties in the procedure steps of loan request review and approval, as well as the post-loan management on the EHS and social issues.

Under the green credit system, HXB will be responsible for screening and excluding subprojects with programs or activities that are judged to be likely to have significant adverse impacts. The procedure will start with the project manager initial screening of the eligibility of the subprojects against criteria presented in the OM which includes lists of environmental and social criteria. Then the project manager will collect environmental and social evidence of approval documents necessary for review by the risk control department. Subsequently, two special reviewers will work together with the environmental and social specialist contracted by the HXB to further evaluate the environmental and social risks of the proposed investment to ensure that the environmental and social effects are not significant to further insure exclusion. If there is any uncertainty in the risk

evaluation, the staff designated to deal with the liaison in the green credit department will consult the World Bank and the government for advice on requirements and significance of the environmental and social effects. This procedure for the exclusion mechanism has been detailed in the OM.

6. Recommendations for the Program Environmental and Social Systems

In essence, there are no significant differences between the Chinese environmental and social system and the environmental and social requirements under Policy and Directive on Program for Results Financing. HXB currently has some capacity for assessing environmental and social risks associated with potential investments anticipated with the Program. Their capacity will be strengthened under the Program, which includes an EHS and social management training plan for HXB staff. Nonetheless, some further recommendations for strengthening the Program's environmental and social system have been agreed with the Hua Xia Bank and presented below:

- **Strengthening EHS management within Hua Xia Bank:** 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 will 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 also be established by HXB to ensure that the required mitigation measures and internal system for health and safety management is established and operated satisfactorily in the enterprises.
- **Strengthening social impact management within Hua Xia Bank:** Social issue and land acquisition is managed by HXB through the loan review and approval procedures. The main indicator of obtaining land areas for proposed RE projects is for enterprise to provide evidence of receiving approval of land preliminary verification by local government, which is a key approval document for beginning the land acquisition process. But the evidence of completing land acquisition procedures and providing compensation to affected people is not always required by the HXB. To improve such situation, HXB has made changes to the Operation Manual that requires more relevant evidence during loan request process, which include copy of land use certificate, compensation agreement, receipt of land price payment, and land lease agreement with affected parties.
- **Strengthening Capacity of Hua Xia Bank:** In order to perform its responsibilities on EHS and social management, particularly for air pollution abatement activities, risk control and green credit departments in Hua Xia Bank will be strengthened in terms of staffing and financial resources. Hua Xia Bank has made commitment to engaging external relevant professionals and make changes to internal procedures to help manage the potential EHS and social issues under the Program.

7. Consultation and Disclosure

The World Bank assessment team has carried out various consultation with the staff of HXB, their clients who undertook similar projects for EE or renewable energy, and staff of local government agencies. The team made field visits to a few RE projects in Beijing and Hebei Province and met with the project developers. During the meetings, the team discussed relevant government requirements, institutional responsibilities, key environmental and social effects and the performance of the institutions. The feedback and findings of field observation provided the basis for the development of this assessment report. The initial assessment's findings and recommendations have been shared with the relevant agencies, particularly HXB, for their views and comments, and applicable feedbacks have been incorporated into this ESSA report.

In order to obtain feedback and comments on the draft ESSA, a public consultation meeting with key stakeholders was conducted during the mission on September 21, 2015. The participants included officials from both headquarter and branch offices of HXB and relevant government agencies and their technical experts.

Given the expected low to moderate environmental and social risks of the PforR Program and prior successful experience of the CHEEF program, the government did not raise serious concerns over the environmental and social risks of this Program. Despite the World Bank team's effort to reach out and invite a number of officials from relevant government agencies to attend the consultation, technical experts were sent in their stead.

The World Bank team began the consultation by first introducing the Bank Environmental and Social requirements for PforR operations, background on the ESSA preparation, and the key findings in the ESSA. In response to the ESSA introduction, HXB made clarifications on the environmental and social management procedures of HXB.

Hua Xia Bank always places a high value on its reputation in social and environmental management. In terms of loan request review and approval procedure, the HXB has established a stringent management system. After receiving the loan request, the risk control department will initially review the environmental performance of the enterprise which submits the request for loan. The review focuses on the environmental pollution control, i.e. whether the enterprise has satisfactorily performed the mitigation measures to management the environmental impacts. For the enterprises in the sectors categorized as having significant pollution discharge, the HXB will request the enterprise to fulfill all the mitigation measures and the environmental compliance will be a condition for loan approval. An example of HXB's due diligence is illustrated by the following case. When the HXB received a request for lending to the Chemical PX project in Xia Men City, a reviewer conducted a site visit to evaluate the environmental risk. When the reviewer arrived on the site, he identified the air pollution emissions of the project as a major concern. Considering the health and safety risk related to the emission of chemicals, the reviewer evaluated the risk rating to the environment to be significant and denied the request for lending. Then, during the public consultation process, the PX project was rejected by the government.

For the land acquisition and resettlement, HXB has been involved in lending for many urbanization projects which require demolition and rehabilitation of many urban households, with total lending amounting to RMB 370 billion. In dealing with such lending operations with part of the disbursement paid to affected households, the HXB opened a special account for the people to be affected by the land acquisition and resettlement and paid the compensation directly to the affected people. In most cases HXB was allowed to start the lending operation only after 80 percent of the people received the compensation and 50 percent of affected households completed relocation.

About 30 percent of the lending operation is concentrated on the lending review, but 70 percent is on the post-lending management. Because the repayment of the loan is the top priority of the

lending operation, and any faults in the implementation stage (i.e., insolvent of cash flow) may affect the repayment of the loan. During the post-loan management, the project manager of the HXB focused attention on the financial status of the enterprise, but seldom on the environmental and social performance, which would be an important factor affecting the operation of the enterprise. HXB welcomes the training on EHS to be provided by the World Bank.

For the PforR Program, the HXB intends to select projects with good commercial value for lending. The branches of HXB will submit the relevant documents to HXB headquarters through the existing procedure for a new subproject under the green credit system. The Green Credit Center will be responsible for direct marketing on key or large size projects through its own marketing team.

During the consultation, a few questions were raised on the scope of the PforR Program. For the pollution abatement area, a question was asked whether the associated facilities for clean energy vehicles, such as recharge piles, are eligible for the Program. The World Bank team responded that subprojects are eligible as long as they can result in emission reductions. Another question was asked whether high voltage transmission lines are eligible for the Program. The World Bank team responded that high voltage lines are not covered by the scope of the Program. The other stakeholder representatives had no comments or advice on the ESSA, and accepted the conclusions and recommendations of the ESSA.

The draft ESSA was disclosed at the Bank InfoShop on November 7, 2015, and on the CRESPPMO website in the local language on November 13, 2015.

8. Environmental and Social Risk Rating

Program excludes potential investments that may cause significant environmental impacts. The potential environmental and issues screened for this Program are to be moderate or minimal and can be effectively mitigated within the environmental and social system and the safety operation system. Review of the experience of HXB in management of environmental and social risks for these types of projects indicates that the HXB has some capacity for assessing environmental and social risks, and its capacity will be further enhanced by the institutional reform plan that will be effective after February 2016. Under the institutional reform plan, additional resources will be allocated to establish a green credit department and relevant expertise will be engaged in assessing environment, occupational health and safety and social risks associated with lending under PforR. The current Operation Manual of HX B has been modified to improve the compliance of potential project sponsors with environment, worker health and safety and social policies, demand more documentation of compliance records, and measures to mitigate or avoid potential risks. Therefore the rating of environmental and social risk is suggested to be “Moderate” based on the following justification in Annex 3.

Annex 1

CHINA INNOVATIVE FINANCING FOR AIR POLLUTION CONTROL IN JIING-JIN-JI (PforR) **Environmental and Social Initial Screening**

Introduction: Program-for-Results (PforR) Financing is a new lending instrument in China. This proposed operation will adopt the PforR lending instrument, in order to help the Chinese government achieve result-oriented energy and environment targets. Management of environmental and social effects in a PforR operation requires specific actions during preparation and implementation. Following the *Interim Guidance Note to Staff: Environmental and Social System Assessment*, at the early stages of preparation, the task team conducts an environmental and social initial screening, at the Program level, to facilitate better understanding and determination of ranges of associated environmental and social effects.

Purpose of initial screening: (1) to identify potential risks, as well as opportunities, that may be associated with the Program; (2) to ensure programs or activities that are judged to be likely to have significant adverse impacts that are sensitive, diverse, or unprecedented on the environment and/or affected people are excluded; (3) to inform counterparts about all environmental and social aspects involved in PforR preparation and implementation phases; and (4) to determine priority areas for further attention in the environmental and social system assessment.

Key results and findings of the initial screening: Based on the information available, discussions with participating banks and practices and experiences from past and ongoing Bank financed similar projects, results of the initial screening are as follows:

- There were no investments likely to have significant adverse impacts in the Program;
- Positive environmental and social benefits are expected as major results;
- Environmental and social management capacity in implementation should be enhanced, as an action plan;
- Thus far, no reputational and political risks are expected; and
- During preparation, the ESSA will be prepared by the task team in accordance with Bank's policy requirement and the guidance note, in cooperation with participating banks.

PDO	Results Indicators	DLIs	Expenditures	E&S Effects	Risk
To reduce air	• Improving	• Energy	<u>Improving energy</u>	<u>Improving energy efficiency</u>	There were no

<p>pollutants and carbon emissions through improving energy efficiency and expanding green energy, with focus in the Jing-Jin-Ji (Beijing-Tianjin-Hebei) and neighboring regions.</p>	<p>energy efficiency. Key indicator would be energy savings achieved (tons of coal equivalent), and intermediate indicators would be cumulative amount of incremental EE investments supported (US\$ million)</p> <ul style="list-style-type: none"> Expanding green energy. Key indicators would be renewable energy power installed capacity (GW) and electricity 	<p>savings achieved (tons of coal equivalent), and cumulative amount of incremental EE investments supported (US\$ million)</p> <ul style="list-style-type: none"> Renewable energy power installed capacity (GW) and electricity generated (GWh), increased use of natural gas (m3), and cumulative amount of incremental RE and natural gas 	<p>efficiency 40 percent</p> <ol style="list-style-type: none"> Replacing inefficient energy-intensive industrial equipment with highly efficient ones, such as coal-fired boilers (consuming half of coal consumption), motors (consuming half of electricity consumption), pumps, heat exchange systems; Replacing inefficient industrial processes and technologies with highly efficient ones particularly in energy intensive sectors (iron and steel, chemical, building material and metallurgy—about half of industrial energy consumption), such as more efficient 	<ol style="list-style-type: none"> Reduce emission and air pollution from less coal utilized facilities Positive health benefits GHG reduction No resettlement No indigenous people No social conflict Costs of installation and operation Incentives to manage properly Lack of enforcement Lack of monitoring OHS issues Noise impact Wastewater discharge Facility operations issues Worker skills, technical ability to manage the plant Better economic and financial benefit through technology upgrading and renovation Less emission and pollutant discharged Positive health benefit No resettlement 	<p>investments likely to have significant adverse impacts;</p> <p>No decommission of coal mines and coal-fired plants in the Program;</p> <p>No conversion of natural habitats;</p> <p>Geographic area needs to be further determined in preparation to ensure IP issue to be assessed in ESSA;</p> <p>Based on current ongoing Bank financed projects, most project supported facilities are located either in economic development</p>
---	--	--	--	--	--

	<p>generated (GWh), increased use of natural gas (m³), and intermediate indicators would be cumulative amount of incremental RE and natural gas investments supported (US\$ million)</p> <ul style="list-style-type: none"> • Reducing emissions. Key indicators would be PM2.5, SO₂, NO_x, and CO₂ emissions reduced (tons). • Strengthening institutional capacity of the 	<p>investments supported (US\$ million)</p> <ul style="list-style-type: none"> • PM2.5 and SO₂ emissions reduced (tons) • Green credit department or bank-wide green credit leading group established in the participating financial institutions (PFIs); and (b) innovative financing models and products tailored to EE and RE distributed generation 	<p>industrial kilns and chemical production technologies;</p> <ol style="list-style-type: none"> 3. Recovery and utilization of by-product gas, waste heat and pressure for electricity generation or co-generation of power and heat; 4. Co-generation for power and heat; and 5. Green building EE measures, including lighting, HVAC (heating, ventilation, and air conditioning,); and building envelope (insulation for roof, walls, windows, doors). <p><u>Expanding renewable energy 50 percent</u></p> <p>(i) Switching from coal to natural</p>	<p>No indigenous people No social conflict Costs of installation and operation Incentives to manage properly</p> <p>Lack of enforcement Lack of monitoring</p> <p>OHSA issues Noise impact Wastewater discharge Facility operations issues Worker skills, technical ability to manage the plant</p> <p>3. Conveying waste into resources to have better economic and financial benefit</p> <p>Positive health benefit</p> <p>No resettlement No indigenous people No social conflict</p> <p>Costs of installation and operation Incentives to manage properly</p> <p>OHSA issues Noise impact Wastewater discharge</p>	<p>zones or within existing sites, so in most cases, there was no land acquisition and resettlement. During ESSA work, this will be further assessed;</p> <p>Capacity of environmental and social management of the participating banks should be strengthened, according to review of the ESMF implementation, under the ongoing Bank financed projects.</p> <p>Some E&S issues are unclear in screening, e.g., geographic areas of the Program, land issue for</p>
--	--	--	--	--	--

	participating banks.	investments piloted	<p>gas; (ii) Solar PV and solar water heaters; (iii) Wind; (iv) Biomass; (v) Geothermal heat pumps; and (vi) Electric and compressed natural gas (CNG) vehicles to replace diesel and gasoline vehicles.</p> <p><u>Reducing air pollutant emissions from other measures 10 percent</u></p> <p><u>Strengthening institutional capacity of the participating bank</u></p>	<p>Facility operations issues Worker skills, technical ability to manage the plant</p> <p>4. New construction and expansion of co-generation plant: No coal fired plant? Land issue? Construction period: noise, dust, safety, solid waste and wastewater discharge and on-site management issues</p> <p>Positive health benefit Reduce number of smaller boilers Better use resources</p> <p>Operation period: Air pollution from biomass burning if biomass is fuel Noise issue inside boiler house Wastewater discharge</p> <p>5. Green building: Noise and safety issues in construction Interruption to residents in construction</p> <p>Reduction of heating fee Energy saving from new lightening</p>	co-generation plants, etc. So further work is required in the ESSA.
--	----------------------	---------------------	--	--	---

				<p>system</p> <p>Technical renovation: improvement of energy efficiency and cost reduction, GHG emission reduction,</p> <p>Replacing industrial boiler: Coal?</p> <p><u>Expanding renewable energy</u> Biomass: land issue; emission in operation; waste disposal; reduction of air pollution; income increase;</p> <p>Wind: Land issue; environmental sensitive areas; nature reserve;</p> <p><u>Strengthening institutional capacity of the participating banks</u> Weak management and implementation capacity and low awareness Improving E&S risk assessment and supervision capacity-in participating banks in implementation Increasing E&S awareness</p>	
--	--	--	--	--	--

Annex 2 (1) Screening for Potential EHS Effects

PforR activities	Screening of Environmental Effects		Description of Primary Impacts
	Construction stage	Operation stage	
Energy Efficiency			
<ol style="list-style-type: none"> 1. Recovery of waste heat and pressure 2. Equipment replacement 3. Process modification 4. Co-generation 5. Buildings 	<p>Regular impacts: dust, noise, wastewater, solid waste; Special impacts: disposal of obsolete equipment, hazardous waste (e.g. asbestos, PCBs, etc.)</p>	<p>Regular impacts: noise, air emission, impacts of primary concern: occupational health and safety</p>	<ul style="list-style-type: none"> • The workers may be injured by the exposure to steam from recovery of waste heat or co-generation; or by exposure to hazardous wastes during disposal of wasted equipment in operation stage of the program. • The workers may be injured by the mechanical movement of equipment and machines; • The process modification may involve the chemical sector that may involve the use, storage or production of dangerous chemicals, or include pressure vessels, which may pose effect on the occupational health and safety of workers.
Renewable Energy			
<ol style="list-style-type: none"> 1. PV 2. Solar Water Heating 3. Wind energy 4. Biomass: direct burning or conversion into biogas for thermal power plants, 5. Geothermal 	<p>Regular impacts: Dust, solid waste, noise, soil erosion; occupational health and safety (confined space, and exposure to hydrogen sulfide for geothermal projects), management of drilling muds (geothermal)</p>	<p>Regular impacts: Noise, air emission, wastewater, solid waste. Impacts of primary concern: Adequate supply of biomass materials; Impacts on biodiversity, landscape and shadow</p>	<ul style="list-style-type: none"> • The supply of biomass materials may not be adequate for power plants using biomass materials for or anaerobic digestion into biogas; • Operational turbine may result in barrier to migratory patterns and other movements of wildlife, as for birds and bats in operation stage;

		<p>flicker for wind energy projects; Impact on landscape for concentrated PV; Occupational health concern for geothermal projects Management of geothermal waters</p>	<ul style="list-style-type: none"> Operational turbine may cause shadow flickering on the residential buildings nearby in operation stage; Landscape impact and visual impact near the wind energy and PV facilities, particularly cumulative landscape impact, on residential area, recreational areas in operation stage; There is a potential for exposure to hazardous levels of hydrogen sulfide for workers for geothermal projects and confined space for workers for both construction and operation stages. Geothermal waters may contain toxic metals and a variety of other pollutants which may make them unsafe and even toxic to agriculture, and aquatic species in construction stage.
Pollution Abatement			
<ol style="list-style-type: none"> 1. Replacement of coal by gas for industrial sector 2. Transport: replacement of diesel by electricity for buses 3. SO_x and NO_x removal from industrial source 	Regular impacts: Dust, noise, solid waste	<p>Wastewater from use of aqueous ammonia for SCR, solid waste, air emission Impacts of Primary Concern: Fire and explosion risk (from ammonia) Occupational health and risk; toxic gas release (ammonia) Availability of gas for</p>	<ul style="list-style-type: none"> Risk of explosion and fire for gas storage on site in operation stage; Risk of explosion and fire and public health hazard for pure liquefied ammonia or aqueous ammonia storage on site for SCR in operation stage; Gas supply for boilers may not be adequate due to limited availability locally in operation stage; Workers may be injured by exposure to

		replacement of coal by gas projects	gaseous ammonia or fire/explosion of ammonia or gas in operation stage.
--	--	-------------------------------------	---

Annex 2 (2) Screening for Potential Social Effects

PforR activities	Screening of Social Effects		Description of Primary Impacts
	Construction stage	Operation stage	
Energy Efficiency			
6. Recovery of waste heat and pressure 7. Equipment 8. Process 9. Co-generation 10. Buildings	<p>No new land acquisition will be involved since all these activities will be carried out within the premises of existing enterprises or buildings.</p> <p>The improvement will not lead to closed down of production facilities causing layoff of workers.</p>		<ul style="list-style-type: none">
Renewable Energy			
6. PV 7. Solar Water Heating 8. Wind energy 9. Biomass: direct burning or conversion into biogas for thermal power plants, 10. Geothermal	<p>Permanent land acquisition is required for plant site of biomass, geothermal, generator bases and substation of windfarm, and substation of centralized solar PV.</p> <p>Temporary land occupation or land lease transfer is required for construction of windfarm generators, access road, fuel storage sites for biomass power, and land areas for installing solar panels for centralized PV project.</p>	<p>Except for permanent land acquisition, land areas will be leased for operation of windfarm, centralized solar power, and biomass power projects.</p>	<ul style="list-style-type: none"> Permanent land acquisition will be handled by local land resources departments through established land acquisition procedures. For temporary land occupation, fair compensation is agreed based on negotiation between project sponsor and affected communities.
Pollution Abatement			

<p>4. replacement of coal by gas for industrial sector</p> <p>5. Transport: replacement of diesel by electricity for buses</p> <p>6. SO_x and NO_x removal from industrial source</p>	<p>No new land acquisition will be involved since all these activities will be carried out within the premises of existing enterprises or buildings.</p> <p>The improvement will not lead to closed down of production facilities causing layoff of workers.</p>	<ul style="list-style-type: none"> • 	
Capacity Building			

Annex 3 Supplemental Environmental and Social Risk Screening Worksheet

Risk	Assessment
Associated or Likely Social and Environmental Effects	<p>This PforR Program investments will not cause potential loss or conversion of natural habitats by early screening to avoid natural habitats, and the Operation Manual of the Program has excluded the investments to cause impact on natural habitats;</p> <p>This PforR Program investments may cause potential pollution or other project externalities, but of moderate or minimal risk. As most proposed works are on existing facilities, the incremental effects are to be moderate or small and can be effectively mitigated by the existing system of the enterprises for environmental management;</p> <p>This PforR Program investments will cause the change of land use by acquisition of small area of land, but will not likely cause house demolition and displacement;</p> <p>This PforR Program investments will not lead to significant changes of access to resources;</p> <p>Indigenous people defined by the Bank are not likely affected by activities under PforR;</p>
Environmental and Social Context	<p>This PforR Program investments will be located in urban or rural environmental settings without posing special challenges to natural environment. This will be assured by early screening of site selection to avoid ecological sensitive areas:</p> <p>The PforR Program will not involve any investment in or near sensitive habitats by early screening to avoid natural habitats, and the Operation Manual of the Program has excluded investments with potentially significant impact on natural habitats;</p> <p>The key effects screened include the cumulative impact by centralized PV projects in terms of visual impact on residential area or scenic area, through early screening, alternative comparison and consultation the potential cumulative impacts can be avoided or minimized or mitigated;</p> <p>The PforR Program investments are not likely to be located in social sensitive areas such as centers of indigenous people, and vulnerable groups, or in conflict zones</p>
Program Strategy and Sustainability	<p>This PforR Program fits well into with the air pollution control plan of China's government which recognizes the air pollution as a top priority for urgent actions and long term efforts;</p> <p>The Plan of China's government include explicit environmental objective for air pollution load reduction and ambient PM 2.5 concentration reduction;</p> <p>The Program will ensure the environmental and social sustainability for future generations under the context of governments' continuous investment on the air pollution control actions. This PforR Program is an important step towards</p>

	<p>supporting the government’s sustainable development goals; There are little roadblocks to ensuring the environmental and social sustainability of the Program after implementation. The government of China is placing more emphasis on environmental protection, improving institutional arrangements, and providing more resources to enhance government institutional capacity.</p>
Institutional Complexity and Capacity	<p>This Program will involve multiple jurisdictions for environmental, ecological, social, and health and safety management. Various documents need to be prepared by the subproject proponents for the various aspects of EHS and social issues. These documents need to be reviewed and approved by different government organizations and enforcement of the laws during the construction and operation of projects also involves different government and non-government organizations. The implementing partner, Hua Xia Bank, has some experience and capacity for assessing environmental risk; HXB has some capacity for supervising sub-borrower compliance with environmental and social regulations and procedures through the procedural and institutional arrangement within the HXB. The supervision capacity for assessing sub-borrower management of EHS and social issues throughout the loan cycle will be enhanced by providing adequate resources for capacity development before the commencement of the Program</p> <p>HXB is experienced in EE and RE projects similar in nature with a track of record of commitment on environmental and social aspects; although the pollution control area is new to HXB, it has made a commitment to allocate adequate resources to enhance its capacity to manage EHS and social issues related to pollution abatement. The Program will provide assistance in the implementation of the air pollution control action plan of the government. The project approval arrangements are clearly established among government organizations. No institutional barriers are anticipated; There is some capacity of the institutions which will be further strengthened by Result Area 3 of the Program;</p>
Reputation and Political Risk Context	<p>The PforR Program does not appear to have high political risk, and the sector is not known to be controversial. As the Program will involve investments in industrial enterprises in energy efficiency, renewable energy, and pollution abatement areas, occupational health and safety issues are expected to present reputational risks to the World Bank, causing some political risk, particularly if there are industrial accidents, such as fire, explosion, or major release of toxic emissions or effluents. However, the EHS and social system of China will assure the early screening of the occupational health and safety issues, and alternatives will be developed to avoid or minimize such risks. Consultations will take into account the experts and stakeholders comments to enhance the avoidance, minimization and mitigation of the risks. In addition, the current EHS and social system, particularly the safety operation system will ensure the effective management of the occupational health and safety effect throughout the stages of design, construction, and operation.</p>

	<p>The institutional capacity of the HXB will be enhanced by the Program to effectively manage the EHS and social risks under the Green Credit system, establishment of which will be completed by February 2016. Thus the reputational and political risk is moderate.</p>
<p>Overall Assessment: The proposed Program suitable for PforR</p>	<p>The environmental risk is moderate and can be effectively managed under the current EHS and social system; The social risk is low and can be effectively managed under current environment and social system.</p>

Annex 4 Subproject Eligibility Criteria for PforR

A. Energy Efficiency 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 energy efficiency projects with performance based agreements under which the end users pay for these services from the demonstrated energy savings; and
- Owners of buildings (including office buildings, shopping centers, multi-family residential complexes, and other commercial and public buildings):
- Public agencies such as utilities, hospitals, schools, municipalities, etc.

Sub-project Technical Eligibility

- The major types of energy efficiency sub-projects 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, heating and ventilation equipment; (d) industrial system optimization to reduce energy use; (e) building energy efficiency (residential, commercial, and government public buildings), including efficient lighting such as LED, HVAC (heating, ventilation, and air conditioning, and heat pumps); and building envelope (insulation for roof, walls, windows, doors) (f) energy efficient street lighting; (g) co-generation, which involves production of heat and electricity from a single fuel source; (h) efficiency improvement and loss reduction in district heating systems; and (i) other projects resulting in coal reduction agreed by the Bank.
- Sub-project investment shall 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 energy efficiency. The cash flow benefit arising only from energy savings¹ associated with the sub-project, as estimated using the sub-project financial projections prepared by the sub-borrower and reviewed by HUA XIA BANK, shall be adequate to repay the total investment cost of the sub-project within a period of ten (10) years². The OM provided detailed methodology and illustrative example.

B. Renewable Energy (RE) Projects

¹ Annual cash flow benefit from the energy efficiency improvements associated with the sub-project will be calculated as the expected amount of energy saved due to the sub-project 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, etc.).

² The payback period will be calculated simply as total investment cost (including interest during construction) divided by the average annual cash flow benefit derived from energy savings associated with the sub-project (see footnote 2 for formula), with the average taken over a period not to exceed the first ten years of the sub-project operations.

Sub-borrower Eligibility

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

Sub-project Technical Eligibility

The major types of RE technologies include:

- Centralized solar photovoltaic (PV), wind and biomass systems (including biogas);
- Distributed PV and other RE systems;
- Roof-top solar systems;
- Solar water heating;
- Geothermal and water source heat pumps;
- RE for cooking, heating, or co-generation

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, municipalities, etc.;
- Public transportation companies.

Sub-project Technical Eligibility

The major types of pollution control technologies include:

- Flue gas desulfurization;

- De-nitrification technologies;
- Replacement of coal to gas in industrial boilers, co-generation systems, heating companies, and thermal power plants;
- Replacement of diesel vehicles with electric vehicles and charging stations
- Replacement of diesel vehicles with CNG or LNG vehicles

Sub-project Social and Environmental Eligibility

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