China Renewable Energy and Battery Storage Promotion Project

ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

(updated in May 2021)

Huaxia Bank

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Executive Summary

The World Bank approved the Environmental and Social Management System (ESMS) for China Renewable Energy and Battery Storage Promotion Project (hereinafter referred to as "the Project") in April 2019. During the Project implementation, in terms of strengthening the construction of green financial institutions, Huaxia Bank established Green Finance Management Committee following the provisions of Environmental and Social Commitment Plan (ESCP). The Committee is responsible for the overall management and guidance of the operation of the Bank's green finance business. Huaxia Bank also recruited full-time environmental and social experts to conduct the environmental and social management for the Project and carried out the related business training in accordance with the capacity building and training plan specified by ESMS. As for the sub-project management, Huaxia Bank assesses, manages and monitors the environmental and social risks of sub-projects strictly according to the relevant requirements of ESMS. Four energy storage projects that have been reported to the World Bank, the Environmental and Social Risk Screening Sheet and related reports provided to the World Bank have been approved. So far, a consumer side energy storage sub-project has been launched, with the amount of 1.2 million euros.

With the change of domestic policy environment throughout the Project implementation process, the configuration of energy storage in power system also changes. In order to further promote the consumption of new energy, the application scenarios of energy storage are becoming more and more abundant, and its layout position is also expanded from the original load side, grid side and the built new energy stations to various places with network dispatching in power system, including installation and construction of renewable energy storage facilities in the existing power plants, etc. The new utilization of renewable energy has also been expanded. The renewable energy construction policy in northern China stipulates that the heating facilities and biomass gasification should be built into new emerging domains. Such domains are consistent with the Project objectives. To speed up the Project launch, combined with the current market situation and through the communication with the World Bank, the addition of energy storage sub-projects to be synchronously constructed with new wind farms and solar PV power stations, heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations, and energy storage facilities to be constructed in the existing power plants sub-projects, and biomass gasification sub-projects has been proposed in the range of the Project sub-launch. At the Project preparation stage, the World Bank and Huaxia Bank have demonstrated that adding energy storage equipment in generation, grid and consumer sides will help improve the overall consumption level of renewable energy. Therefore, the addition of the above sub-projects is in line with the Project objectives.

With regard to energy storage and heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations and energy storage facilities to be constructed in the existing power plants, the Project still only invests in the energy storage and heating part, and the new wind farms and solar PV power stations will be managed as associated facilities. The screening and assessment of sub-projects and associated facilities have been included in the Environmental and Social Risk Screening Sheet in Annex 3. This ESMS applies to both the sub-project facilities and the identified associated facilities. The survey conducted during the ESMS revision shows that the new RE projects (wind farms and solar PV power stations) tend to be constructed in more remote areas with the possibility involving natural habitats. The site selection of wind farms has considered the ecological protection. The *Technical Specifications for Site Selection of Wind Farms* issued by NDRC made it clear that the nature reserves, rare animal and plant areas, migratory bird reserves and migratory routes should be avoided to protect the birds. The preparation of Wind Farm Feasibility Report and EIA Report shall follow the *Technical Specifications for Site Selection of Wind Farms*. However, considering the possibility of ecological impact, the overall environmental risk is rated as "Substantial". Also, some of the new wind farms and solar PV power plants may have an impact on ethnic minority communities. As a result, the overall social risk could be "Substantial". For the biomass gasification sub-projects, Huaxia Bank conducted a preliminary due diligence on the biomass gas industry. The due diligence report is found in Annex 8. Because the biomass gasification sub-projects may cause some environmental impacts such as odor, flue gas, biogas residue and biogas slurry leakage, the overall environmental risk is rated as "Substantial". These sub-projects are mainly built in the industrial parks, which will be far away from residential areas, schools, hospitals and other social sensitive points, but the storage of flammable straw and production, storage and transportation of combustible natural gas involved in such sub-projects have the deflagration risk, thus their overall social risk is rated as "Substantial".

In order to cope with these changes, Huaxia Bank has carried out many internal trainings and hired experts in the energy storage industry and RE industry to give lectures to improve the risk response ability of Huaxia Bank staff, and recruited full-time environmental and social experts to be responsible for the environmental and social management of the Project as well as employed experienced external environmental and social experts for intellectual support. During the Project implementation, Huaxia Bank will assess the environmental and social risks of sub-projects in strict accordance with the requirements of ESMS to ensure the environmental and social risk management and monitoring of sub-projects.

1. INTRODUCTION

1.1 Project Background

China has experienced fast economic growth, tied to fast growth of energy consumption in the past decades. The serious environmental pollution caused by coal-dominated energy infrastructure has been recognized by the Government of China. Renewable Energy (RE) development has been considered as one major energy source in the government's plans, aiming to reduce the share of coal in its energy mix. Large-scale RE development has been launched since about 2005. By the end of 2017, the installed capacity of wind power and solar PV amounted to 164 million MW and 130.25 GW respectively, ranked the top in the world.

Though China is already a leading country in RE development, efficiency of RE development has raised concerns due to serious curtailment problems. Improving the operational flexibility of the power system, promoting the development of grid-friendly distributed RE, and developing new emerging markets to consume RE generation, are three major types of technical solutions to address the curtailment issue. The Government and related stakeholders in China are already exploring solutions to varying degrees, including with World Bank assistance in certain areas, in particular through the "Second Phase of the Renewable Energy Scale-up Program" (P127033) supported by a Global Environment Fund (GEF) grant. However, more action is needed to unlock the potential of each solution individually and in concert, including in the area of new energy storage solutions.

Under this broader national and sectoral context, the Government of China is cooperating with the World Bank on this proposed China Renewable Energy and Battery Storage Promotion Project (hereafter as "the Project"). The Project will be implemented by Huaxia Bank (HXB), the responsible Financial Intermediary (FI) which will finance renewable energy storage sub-projects through on-lending operations.

Consistent with ESS9, HXB, as the responsible FI, is required to develop and maintain, in the form of an Environmental and Social Management System (ESMS), effective environmental and social systems, procedures, and capacity for assessing, managing, and monitoring risks and impacts of sub-projects, as well as managing overall portfolio risk in a responsible manner.

1.2 Objectives and Application Scope

The objectives of this ESMS are to set out policy, institutional arrangements, and operational procedures to screen, assess and manage the environmental and social risks and impacts of the sub-projects to be identified during the project implementation stage. The ESMS also establishes procedures to continuously monitor environmental and social performance throughout the lifecycle of the sub-projects.

The ESMS is developed in accordance with the objectives and principles of national environmental and social management laws and regulations, as well as

relevant key requirements of the World Bank's ESSs (Annex 1).

The ESMS is designed as a management tool applicable to all on-lending sub-projects under the China Renewable Energy and Battery Storage Promotion Project. It will form part of the Operational Manual (OM) to support the implementation of the Project by HXB Bank (Green Finance Center and other relevant units at headquarter, as well as the client managers and review/approval units at various branches at the local level). Any sub-project identified by local branches is subject to screening for environmental and social risks and impacts as established by this ESMS, and should be classified, assessed and implemented following the procedures and requirements of this ESMS when eligible. Implementation arrangements of the ESMS are also a key element of the Environmental and Social Commitment Plan (ESCP), which is part of the legal agreement between the World Bank and the implementation agency (HXB as the FI).

When appropriate, this ESMS will be further expanded to cover other projects under HXB's portfolio on a progressive basis, subject to necessary review and updates with reference to experience and lessons learned from current project and proportionate to the risks in the portfolio.

1.3 ESMS Implementation

The World Bank approved the Environmental and Social Management System (ESMS) for China Renewable Energy and Battery Storage Promotion Project (hereinafter referred to as "the Project") in April 2019. During the Project implementation, Huaxia Bank shall manage the environmental and social risks of sub-projects in strict accordance with ESMS and carry out the relevant work following the ESCP.

Firstly, in terms of strengthening the construction of green financial institutions, Huaxia Bank established Green Finance Management Committee for the overall management and guidance of the operation of the Bank's green finance business;

Secondly, Huaxia Bank hired full-time employees for environmental and social risk management and post loan management and external environmental and social experts to carry out the environmental and social management for the Project;

Thirdly, Huaxia Bank carried out the relevant business training according to the capacity building and training plan specified by ESMS and ESCP;

Fourthly, Huaxia Bank conducts the environmental and social risks screening for sub-projects following this ESMS and classifies the corresponding risks/impacts according to the relevant procedures and requirements as well as constantly refines the screening criteria and judgment criteria of environmental and social risk elements in energy storage project assessment. The necessary impact evaluation is conducted and the relevant measures are taken. So far, four consumer side energy storage projects reported to the World Bank have passed the review of the World Bank's environmental and social experts and their environmental and social management levels have been recognized by these experts.

To speed up the Project launch, Huaxia Bank intends to modify the investment area of the Project by adding the investment in energy storage of new RE + energy storage sub-projects, heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations and storage facilities to be constructed in the existing power plant sites sub-projects and biomass gasification sub-projects. For these new sub-projects, the impacts of energy storage are the same as before, and the new RE projects involved in the investment not related to the Project will be managed as the associated facilities of sub-projects. Following the requirements of the World Bank Environmental and Social Framework, Huaxia Bank revised ESMS and ESCP.

1.4 Market Changes

1.4.1 Restricted Development of Grid-Side Energy Storage

In 2018, the electrochemical energy storage industry flourished, mainly relying on the blowout development of grid-side energy storage. In June 2019, the National Development and Reform Commission (NDRC) officially issued the *Measures for Transmission and Distribution Pricing Cost Supervision and Examination*, which explicitly excluded the pricing cost of power transmission and distribution for charging and swapping piles and electric energy storage facilities invested by power grid enterprises. Grid-side energy storage is a potential business area that banks give priority to. The introduction of the Measures has brought difficulties for HXB to expand the grid-side energy storage market.

1.4.2 Energy Storage Configuration for RE as a Development Trend

With the rapid growth of installed capacity of RE, the demand for peak shaving is further increased in the "14th Five-Year Plan" period. RE will be evaluated and constrained as a conventional power supply, and the configuration of a certain proportion of energy storage will become the main means of regulation. At present, Tibet, Xinjiang, Qinghai, Inner Mongolia, Jiangsu, Anhui, Zhejiang, Hunan, Shandong and other provinces have successively introduced policies to give priority to grid connection of RE stations with energy storage in proportion and increase the generating hours.

1.4.3 Gradual Promotion of the Use of RE for Heating Facilities

Actively promoting the use of RE for heating is in line with the strategic requirements of China's supply-side structural reform. It is an important part of implementing livelihood projects, controlling air pollution and implementing energy production and consumption revolution. The state attaches great important to clean heating. In the *Opinions on Scale-up of RE for Heating (Draft for Comments)*, the National Energy Administration proposed that by 2020, the national RE for heating area reached about 3.5 billion square meters and the total RE for heating was about 150 million tce. In the Beijing-Tianjin-Hebei region and surrounding areas, the RE for heating area reached 1 billion square meters and the heating (cooling) area in the Yangtze River Delta reached 500 million square meters. In urban and rural areas, the large-scale RE for heating instead of residential raw coal was realized.

To actively promote the prevention and control of atmospheric pollutants and facilitate the sustainable development of economy and society, the Comprehensive Department of National Energy Administration issued the *Notice on the Use of Wind Power for Clean Heating* in 2015. In Inner Mongolia, Liaoning, Jilin, Heilongjiang, Hebei, Xinjiang, Shanxi and other provinces and cities, the government encourages giving priority to the use of wind power for clean heating in new buildings and encourages wind farms and power users to adopt direct transaction mode of power supply.

In 2020, the Comprehensive Department of National Energy Administration issued a notice on matters related to the preparation of the 14th Five-Year Plan for the development of RE. It proposed to attach great importance to the non-electric utilization of RE, promote the non-electric utilization of biomass, geothermal energy and solar energy according to local conditions, significantly increase the proportion of RE in clean heating in the northern China, and promote the non-electric utilization of RE to play a greater role in China's energy transformation.

1.4.4 Construction of Energy Storage Facilities in the Existing Power Plant Sites

With the higher proportion of RE access, the demand for flexible resource regulation in China's power system will be higher, and the installation sites of energy storage are gradually diversified. The installation of energy storage facilities at existing power plant sites has also emerged. It can make full use of power plant supporting transmission facilities to dispatch energy storage, improve the peak shaving and frequency regulation performance of power system, and promote the consumption of RE.

In June 2016, the *Notice on Promoting the Participation of Electric Energy Storage in the Pilot Work of Power Auxiliary Service Compensation (Market) Mechanism in "Three North" Area* issued by the National Energy Administration proposed that in principle, five electric energy storage facilities could be selected in the "Three North" Area to participate in the pilot work of the compensation mechanism for peak shaving and frequency regulation auxiliary services.

In October 2017, the *Guidance on Promoting Energy Storage Technologies and Sector Development* jointly issued by NDRC and the National Energy Administration mentioned that energy storage can provide peak shaving, frequency modulation, reserve, black start, demand response support and other services for power grid operation, which is an important means to improve the flexibility, economy and security of traditional power systems.

In order to improve the regulation performance of Shanxi power system and better absorb clean energy such as wind power and PV, Shanxi has issued the *Operation Rules of Shanxi Power Frequency Modulation Auxiliary Service Market* and *Notice on Encouraging the Engagement of Electric Energy Storage in Peak Shaving and Frequency Regulation Auxiliary Services in Shanxi Province* in 2017.

In August 2018, *Guangdong FM Auxiliary Service Market Trading Rules (Trial)* issued by the South China Energy Regulatory Office of National Energy Administration proposed that energy storage and power generation units should be allowed to provide FM auxiliary service in the form of a consortium.

According to the foregoing, the layout of energy storage facilities in existing power plant sites can be attributed to power generation side or grid side applications. At the Project preparation stage, the World Bank and Huaxia Bank have demonstrated that such energy storage is conducive to improving the overall consumption level of RE, in line with the Project objectives.

1.4.5 Promising Development Prospect of Biomass Gas Market

As the world's largest energy producer and consumer, China's current primary energy structure is still dominated by fossil fuels, which objectively leads to multiple challenges such as energy security, carbon emissions and environmental pollution. Improving energy structures to address energy security and eliminate pollution has been recognized as the best option. Biomass energy, with the characteristics of green, low carbon, clean and renewable, is the fourth largest energy in the world after coal, oil and natural gas. It has become an important force in international energy transformation, plays an important role in the ecological environment, and plays an important part in energy transformation and haze reduction.

In terms of biomass energy conversion into gas, biomass natural gas can not only convert straw, forest waste, edible mushroom residue, livestock manure and all combustible materials as raw materials into high-quality gas, but also make up for the gap of natural gas. By the end of 2017, China's total output of biomass natural gas was just 57.6 million cubic meters, which was significantly different from the target of 8 billion cubic meters in the *13th Five-Year Plan for Biomass Energy Development*.

On December 6, 2019, ten ministries and commissions jointly issued the *Guidance on Promoting the Industrialization of Bio-Natural Gas* (FGNYG [2019] No. 1895). The document pointed out that bio-natural gas was of great significance to build a distributed renewable and clean gas production and consumption system to effectively replace rural scattered coal. It also proposed that by 2025, the annual production of bio-natural gas would exceed 10 billion cubic meters; by 2030, the annual production of bio-natural gas would exceed 20 billion cubic meters, accounting for a certain proportion in domestic natural gas production. The introduction of the document will play a positive role in promoting the start and orderly development of the bio-natural gas industry. The door to state support for the development of the bio-natural gas industry has been opened, with various investors entering this field and more projects landing. The market demand is big, and the future development prospect is promising.

Due to the late start of the development of China's biomass energy industry, the fields involved are not comprehensive enough, and the degree of development is also at a low level. Only the biomass energy power generation industry has begun to develop with industrial scale, and the biomass gas is still in the primary stage of development. From the perspective of capital supply channels, traditional bank credit funds, capital market capital associations and other companies are not willing to intervene in the start-up period of biomass energy enterprises, and the available financing channels are limited. Energy storage project funds can be invested in the field of biomass gas, which will undoubtedly provide timely help for biomass energy enterprises.

In view of the changes in the energy storage market, after discussion with the World Bank Project Team, the following energy storage sub-projects are added: 1. Energy storage sub-projects to be synchronously constructed with new wind farms and solar PV power stations; 2. Heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations; 3. Electric energy storage facilities to be constructed in the existing power plants; 4. Biomass gasification sub-projects.

2. PROJECT DESCRIPTION

2.1 Project Activities

The development objective of the Project is to improve the integration of variable renewable energy and increase the use of renewable energy in China through deployment of sustainable battery storage systems and innovative applications of RE. The proposed project includes a single investment component, funded by an IBRD loan of US$300 million and co-financed by US$450 million from Huaxia Bank.

The proposed project will mainly support the installation of battery storage systems of proven technologies and innovative uses of RE, subject to meeting eligibility criteria defined in the project's Operations Manual (OM). The investment sub-projects will include but are not limited to: (a) installation of battery storage systems, at the generation level, in existing wind farm and solar PV plants; at the grid level in existing substations; and at the end consumer level in industrial and commercial zones; (b) installation of DRE capacity with battery storage and a pilot of heat storage; and (c) scale up of the use of RE for heating and other innovative uses, such as production of hydrogen.

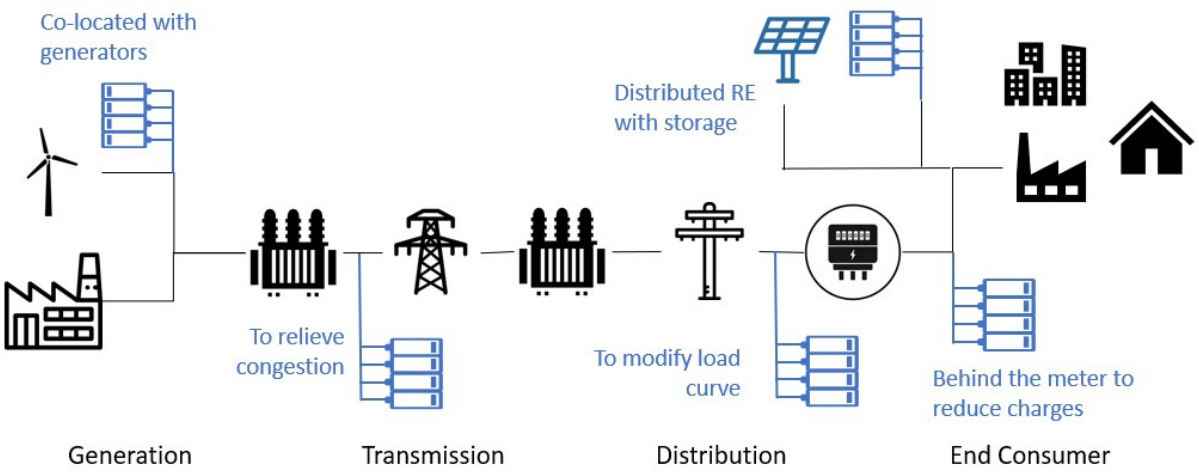
Now the investment sub-projects are adjusted to : (a) installation of battery storage systems, at the generation level, in existing and new wind farm and solar PV plants; at the grid level, in existing substations; and at the end consumer level, in industrial and commercial zones; (b) installation of DRE capacity with battery storage and a pilot of heat storage; and (c) scale up of the use of RE for heating and other innovative uses, such as production of hydrogen and biomass gas; (d) construction of heating sub-projects synchronously with new wind farm and solar PV plants; (e) construction of electric energy storage facilities in existing power plant sites.

The OM has been developed by Huaxia Bank and approved by the World Bank to define the eligibility criteria of sub-projects for financing under the Project, as well as requirements on due diligence, rules and procedures for appraisals of sub-projects in line with the World Bank requirements. These include, but are not limited to, procurement, financial management, safeguard procedures, and monitoring and evaluation (M&E). Sub-projects selection criteria cover: (a) technology and technical standards and soundness; (b) cost effectiveness; (c) contribution to RE integration; and (d) environmental and social requirements.

Sub-borrower selection criteria include creditworthiness, technical competence and track record in the targeted types of project investments.

The major types of application of energy storage in a power system are illustrated in the figure below. The eligibility criteria of sub-projects will put an emphasis on battery technologies that can be scaled up and sustained in grid applications, focusing on battery attributes that are particularly important in grid applications (such as, duration, responsiveness, safety, recyclability, operability, robustness, and low toxicity), and expanding the market for these technologies.

Application of Energy Storage in Power System



Source: World Bank staff.

Technical assistance (TA) and policy and institutional strengthening activities critical for achievement of the project objectives are prepared for, and will be implemented in parallel to, the proposed project.

- **TA to Support Due Diligence of Investment sub-projects and Capacity Building of Huaxia Bank** includes: (a) expert advice on sub-projects appraisal and evaluation with special focus on technical and safeguards issues; and (b) market survey studies, training and expert advice to strengthen Huaxia's technical capabilities. The Project Team of World Bank has initiated the discussion with Energy Sector Management Assistance Program (ESMAP) for potential funding and is preparing a proposal to secure it. If funding is secured, the parallel activities will be supervised together with the proposed project.
- **Policy and Institutional Strengthening for Battery Storage Applications:** These activities aim to create the required enabling

environment for scaling up the deployment of battery storage and DRE, for which the National Energy Administration (NEA) is the implementing agency. The activities include: (a) develop and oversee enforcement of policies and regulations on deployment of battery storage in the power system, including pricing policy, access to grid, and open market to new investors; (b) develop technical and environmental standards on battery safety, reuse, and disposal; (c) develop system operating guidelines with battery storage; and (d) support the pilot of emerging innovative use of battery storage in the power system. The policy and institutional strengthening activities will be funded with about US$2.0 million in GEF grants from the ongoing CRESP II and GEF CDRESP projects. Coordination among the teams involved in the three projects will be closely managed and supervision of the activities will be jointly carried out whenever needed.

2.2 Initial E&S Risk Screening and Classification

Generally, there are two types of activities under the proposed Project: one is physical investment on battery storage and related facilities and their operation; one is non-physical technical assistance activities including study on policies, regulations, standards and capacity building.

The technical assistance type of activities will focus on policy studies and technical advice to promote the healthy and sustainable development of Energy Storage Sector in China. Depending on the specific policy/advice (to be determined during the project implementation stage), these activities may have downstream environmental and social implications (both positive and negative). While, as the overall project objective is to improve the performance of RE with broad environmental protection goals and benefits inherent in the activities, the policy studies and technical advice are unlikely to have substantial or high environmental and social risk implications. The consideration of environmental and social risks and impacts will be built into the Terms of Reference (TOR) for these studies up front, and due analysis of potential environmental and social implications of the policy and technical recommendations as an integral part of the outputs.

As presented in the Section 2.1, the Project's physical investments will focus on the application of various Battery Energy Storage (BES) technologies to improve the performance of installed RE facilities. The main environmental and social risks of the Project are also related to construction and operation of Battery Energy Storage Stations (BESSs) and associated facilities. As battery storage sector is an emerging industrial sector, which is also a new business field for HXB. Therefore, an initial due diligence of the sector has been conducted during the preparation of this ESMS, with particular emphasis on the potential environmental and social risks through the industrial chain (see Annex 7). The

key conclusions and recommendations of the due diligence review include:

- Energy storage sector started in China around 2010 and has been entering a fast track development since 2015. In the past three years, the scale of electrochemical energy storage and production has maintained a high growth rate, with an average annual growth rate of about 69%. As of December 31, 2018, China's energy storage capacity was 33.7 GW. Among them, pumped storage capacity is 32.6 GW, accounting for 96.6%; electrochemical energy storage is 969.2 MW, accounting for 2.9%;

- In 2018, China's electrochemical energy storage capacity was 554.8 MW, with a compound growth rate of 134%. The power supply side and the consumer side energy storage are the main directions for energy storage project investment in 2015-2018. There are fewer energy storage applications on the grid side;

- In terms of geographical distribution, the energy storage projects put into operation in the past three years are mainly distributed in areas with rich RE and areas with high demand load, such as Jiangsu, Qinghai and Tibet. For this Project, it is expected that the power generation side sub-projects will be mainly concentrated in northwestern China (Inner Mongolia, Shanxi, Qinghai, etc.), and grid-side sub-projects will be mainly concentrated in Jiangsu, Henan and other places, while demand-side sub-projects will mainly focus on Jiangsu, Beijing, Pearl River Delta, etc. where the price difference between peak and valley is large;

- In terms of technology types, the number of projects using lithium-ion battery in the past three years was the highest, about 45; the lead-acid battery was the second, about 28; the number of projects such as supercapacitors, cold storage, and other energy storage battery ranks third, about 25; the number of flow battery projects is the least, about 7. HXB's energy storage projects apply the principle of technology neutrality. Mature and reliable technology that meets the requirements of OM can be selected.

- Currently-used battery technologies mainly include lead-acid battery, lithium-ion battery, super capacitors, and flow battery. These technologies are in a mature or fairly mature stage, and have a large number of large-scale production enterprises, which are operated in line with relevant national standards and specifications, including environmental and safety compliance. New technology such as slurry battery is not yet mature, and would need at least three years of pilot;

- As the energy storage industry has just started, recycling and disposal of energy storage battery is yet to achieve a large scale.

  a) For lead-acid battery, due to its long-standing and mature industrial chain,

there are mature recycling technologies and processes. However, about 70% of recycling is through non-standard recycling channels, e.g. small enterprises which may or may not fully comply with standards. In January 2019, Ministry of Ecology and Environment (MEE), National Development and Reform Commission (NDRC), Ministry of Industry and Information Technology (MIIT) and other seven ministries and commissions just jointly issued the *Notice on the Action Plan for Pollution Prevention and Control of Waste Lead Storage Battery,* requiring implementation of the extended producer responsibility (EPR) system and establishment of a standardized recycling system. By 2020, lead storage battery manufacturers will achieve a standard collection rate of waste lead storage batteries of 40%; by 2025, the standard collection rate of waste lead storage batteries will reach 70%; all waste lead storage batteries collected by the standard will be safely disposed of. It is expected that, when the lead-acid storage battery involved in this Project is decommissioned, the possibility and risk of non-standard disposal of the waste lead storage battery are expected to be small;

b) For lithium battery, although the energy storage sector has just started, China's electric vehicle industry is already in an explosive period, and production and sales have already ranked first in the world. At present, the recycling of used power batteries is in the early stage of the sector. There are not many professional recycling companies and government recycling centers for power lithium batteries. There are many small recycling enterprises whose technical and environmental compliance may not be always guaranteed. At the beginning of 2018, MIIT and other seven ministries and commissions jointly issued the *Interim Measures for the Management of Recycling and Utilization of New Energy Vehicles' Power Battery* (effective on August 1, 2018), which promotes cascade use and recycling and innovation of power battery recycling and utilization models. Emphasis is placed on the implementation of the EPR system, which requires automobile production enterprises to bear the main responsibility for the recovery of power batteries. On September 5, 2018, MIIT released the first batch of five enterprises that meet the national *Specifications for the Comprehensive Utilization of Waste Battery of New Energy Vehicles* (MIIT, 2016). In the future, with the explosion of industry scale and huge business opportunities, the improvement of relevant national laws and regulations and technical specifications, and increasingly strong implementation of environmental supervision and law enforcement, it is foreseeable that the lithium battery recycling industry is expected to take shape when the lithium battery involved in this Project is retired, with mature and much improved system of which environmental, social and safety risks are well regulated and managed;

c) For super capacitor and flow battery technologies, a business scale market has not formed yet or the decommissioning time has not come yet. The disposal of retired battery involves hazardous wastes, which can be handled

through the established hazardous waste disposal systems; and those meeting the relevant environmental and safety requirements could be recycled.

d) For new technology of lithium slurry battery, it is still in pilot stage. Its disposal does not involve hazardous wastes, and most of the materials (⩾ 90%) can be readily recycled, with less and manageable environmental and safety risks.

- In terms of current lifecycle management for energy storage batteries, the investigation (including desk review and field visits) found the followings.

a) Battery production is restricted to large scale, highly specialized companies with high quality standards, cutting edge production facilities, good / best practice systems in place for ES management and OHS, and stringent oversight, monitoring and auditing by both the domestic authorities (EPB, DRC, Production Safety Inspection Bureau) and international auditors (e.g. in the course of ISO 14,000 and OSHAS 18,000 certification).

b) Battery installation and operation is highly standardized. Batteries are installed in tamper-proof containers that are accessible only to specialized service personnel. The risks around installation and operation can thus be managed with simple measures, for example, implementation of placement criteria during sub-project screening, and as battery storage keeps growing, these risks will progressively decrease with more technology-specific safety and environmental standards to be developed in the near future.

c) At the end of the lifecycle, the recycling and disposal market is dominated by large, high tech companies that disassemble batteries with cutting edge technologies, reclaim the major part of the components, separated into reusable substances, and work closely with battery producers and users on an efficient circular economy. There are a number of such operations throughout China that have all required permits and licenses by the authorities, as well as international certifications (ISO 14,000, OSHAS 18,000).

Based on the preliminary review of the sector, an initial environmental and social risks screening is conducted following World Bank ESF and Environmental and Social Directive for Investment Project Financing (IPF), as summarized in the table below. In general, the proposed sub-projects (mostly Battery Energy Storage System (BESS)) are not complex with small size of footprint. The environmental risks anticipated are mainly fire and explosion risks during BESS operation and environmental hazards related to the disposal of used batteries containing hazardous waste. The environmental risk is rated substantial considering the needs for further development of battery recycling facilities and

supportive technical standards to enhance safety management and environmental management of the emerging energy storage sector in China. However, the E&S due diligence conducted during project preparation found that these risks are generally manageable with the implementation of new regulations on life cycle management of batteries and other electrical/electronic devices in China. It is likely that most (if not all) sub-projects could fall into Moderate- or Low-risk category during actual implementation, while it is also possible that some sub-projects with Substantial risk may emerge in the portfolio.

For new sub-projects, Huaxia Bank conducted the environmental and social risks screening once again. The analysis conclusions are as follows: (1) With regard to energy storage and heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations, the Project only invests in the energy storage and heating part, and the new wind farms and solar PV power stations not in the investment scope of the Project will be managed as associated facilities. The revision of ESMS investigates and analyzes the environmental and social impacts of new wind farms and PV power plants. The survey shows that although new RE projects tend to be constructed in more remote areas, some of them may affect the keystone species in the natural and critical habitats, while others may have a negative impact on ethnic minority communities. As a result, the overall social risk could be "Substantial". (2) For the biomass gasification sub-projects, Huaxia Bank conducted a preliminary due diligence on the biomass gas industry. The due diligence report is found in Annex 8. Because the biomass gasification sub-projects may cause some environmental impacts such as odor, flue gas, biogas residue and biogas slurry leakage, the overall environmental risk is rated as "Substantial". These sub-projects are mainly built in the industrial parks, which will be far away from residential areas, schools, hospitals and other social sensitive points, but the storage of flammable straw and production, storage and transportation of combustible natural gas involved in such sub-projects have the deflagration risk, thus their overall social risk is rated as "Substantial".

On the other hand, it is worth noting that the risk rating will be kept dynamic throughout the implementation period and could be possibly be upgraded or downgraded subject to the risk rating of sub-projects to be identified under the Project. HXB shall keep the World Bank timely informed of the increase of environmental and social risks of sub-projects and obtain the prior approval of the World Bank at the risk screening stage in case any high-risk sub-project is to be funded under the Project. Meanwhile, the World Bank will upgrade the overall project risk level to "High" and the ESF requirements applicable to high-risk projects shall be implemented.

Table 1 Initial E&S Risk Screening and Classification

	Environmental Risk	Social Risk

	Environmental Risk	Social Risk
Summary of Assessment	Based on current project design and the findings of market investigation conducted during project preparation, most of the anticipated investments will focus on the installation of Battery Energy Storage Systems (BESSs) with the capacity of 1MWH~400MWH. Only mature and commercialized technologies will be accepted for project financing following the screening criteria established in the Operational Manual. Potential negative impacts of the anticipated BESS investments will depend on the type and efficiency of storage technology and be associated with the whole battery lifecycle. The environmental risks anticipated are mainly fire and explosion risks during BESS operation and environmental hazards related to the disposal of used batteries containing hazardous waste. Since the specific sub-project information such as location and scale remain unknown at the appraisal stage, the rating of fire and explosion risk during operation was conducted by reviewing current practice of E&S management for existing BESSs in China. According to the field visits, the design of existing BESSs has followed national design standards with safety considerations, including placement criteria, fire and explosion prevention measures and emergency response requirements; battery installation and operation is highly standardized with batteries installed in tamper-proof containers that are accessible only to specialized service personnel. The risks around installation and operation can thus be managed with simple measures. The responsible FI, HXB, has tracked experiences for successfully implementing World Bank projects. Its institutional arrangements for managing E&S risks have been substantially enhanced since the establishment of Green Finance Center under World Bank funded PforR program in Dec. 2016. HXB has also mainstreamed most of World Bank safeguard requirements into its own lending risk management. Although HXB is among the first to implement ESF requirements in China, the management is highly committed to provide financial resources and mobilize both in-house and external specialists to bridge gaps in terms of E&S management and ensure the project follows both domestic legal regulations and the new ESF (especially ESS9). The sector review conducted during project preparation found that batteries for the proposed BESS sub-projects will be	Social risks and impacts identified for this project include: displacement impact, direct adverse impact on ethnic minorities, social risks associated with labor and workings for contracted workers and primary supply workers, and community safety risk. Most of the proposed BEES sub-projects are to be installed in the footprints or parameters of existing facilities in industrial and developed areas. The spatial demands of the project investments are likely minor, and the project will result in limited new land acquisition. A due diligence review of prior resettlement reasonably close to the sub-projects is required to be carried out to identify complaints, grievances and other outstanding issues and determine mitigation measures. Some BESS may be installed for existing solar/wind farms in northern and western areas with the presence of ethnic minorities around for grazing. Impact and risk related to ethnic minority will be identified and managed on a basis of case-by-case following the requirements of ESMS. Labor and working conditions related risk is considered low in nature for contracted workers and direct workers of BESS. Due diligence during preparation to selective lead-acid and lithium-on battery manufacturers identified that labor and working conditions of primary suppliers is low risk, considering China's sophisticated labor management framework, level of law enforcement and more stringent supervision. During operation, community safety risks are linked to explosion, fire and electric shock, which will be strictly managed under China current regulatory framework and ESSs. A multitude of projects located close to vulnerable communities may give rise to limited degree of social conflict, harm, human security risk associated with perceptions of community endangerment and non-receipt of benefits. HXB is the responsible FI and has enhanced its ESMS in consistency with applicable national regulations and relevant ESSs (particularly ESS9) and proportionate to the risk profile of the project. Useful tools have been developed and annexed to the ESMS to facilitate ESMS implementation. A timebound capacity development plan has been developed as an important and integral part of the ESMS and ESCP,

	Environmental Risk	Social Risk
	manufactured, delivered, installed and recycled by the primary producers. Based on the findings of E&S due diligence conducted during project preparation, major battery manufacturers and battery recycling facilities in China have attached importance to their consistent safety and environmental performance during operation for long-term sustainable development, targeting at the international standards (e.g. ISO standards, EU directives, etc). To support the industry development, Chinese government has promulgated and enforced regulations on the implementation of Extended Producer Responsibility (EPR) and responsible life cycle management for battery products since 2016, pressing large-scale battery makers to establish their own recycling facilities and forcing the polluting backyard recyclers to close. According to the field observations, the stringent standards are being enforced among major producers throughout the battery lifecycle and largely prevent potential environmental and safety risks. However, since the energy storage sector is still at the initial stage in China, more technology-specific policies and standards remain to be developed to enhance regulation enforcement, in particular, among SMEs and individuals involved in the sector. Thus, the overall environmental risk is rated substantial considering the sub-project uncertainty at this stage, plus the needs for further development of battery recycling facilities and supportive technical standards to enhance safety management and environmental management of the emerging energy storage sector in China Energy storage of new wind farms and PV projects This ESMS will add the energy storage sub-projects and heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations. Newly built wind farms and solar PV power plants as associated projects may be built in the areas with natural and critical habitats for keystone species. Wind power project is likely to affect the migration path of keystone species and interfere with them. The implementation of the ecological red line system currently under way varies considerably across provinces, so the overall environmental risk of the project is considered as "Substantial" following the Environmental and Social Directive for Investment Project Financing. The AF screening and assessment shall be conducted according to the Annex 3 Environmental and Social Risk Screening Sheet and AF shall be managed following ESMS.	which will be enforced during project implementation. Based on experience and lessons learned from the preceding World Bank-financed programs, HXB is committed to mobilize adequate human and financial resources to develop and maintain organizational capacity and competency for ESMS implementation. With these measures in place, the social impacts and risks are generally site specific, low probability of serious effects to people, and can be easily mitigated in a predicable manner following the enhanced ESMS. According to the Environmental and Social Directive for Investment Project Financing, the overall social risk for the project is deemed as "Moderate". Energy storage of new wind farms and PV projects This ESMS will add the energy storage sub-projects to be synchronously constructed with new wind farms and solar PV power stations. The impact of energy storage on society is consistent with the ESMS before the revision. The new wind farm and solar photovoltaic power station projects that are not invested in this project will be managed as associated facilities. Referring to the World Bank's ESF and sorting out the relevant policies and combined with the social impacts investigation of wind power and PV projects launched by Huaxia Bank regarding land, labor and working conditions, community safety, ethnic minorities, cultural relics and others, the results show that for new wind power projects, they occupy less arable land or mostly occupy barren land, which is acceptable to the farmers. At present, most of the farmers' income comes from off-farm work and business, with a small proportion of agricultural planting income. Even if wind power projects occupy more arable land, it has minor impacts on the income of the occupied land owners. Even if the project may occupy more land of some families who rely on land for their livelihood, the implementation of national and local land acquisition compensation laws and regulations and policies and the social security policies of landless farmers are sufficient to restore and improve the current livelihood of affected farmers, and their future endowment is also

	Environmental Risk	Social Risk
	For the energy storage sub-projects to be built in existing power plants, the environmental risk of such sub-projects is consistent with that of other generation-side energy storage sub-projects. Power plants in China are currently required to meet very strict emission standards and have established a relatively complete environmental monitoring system including online pollutant emission monitoring. Their impacts on the environment are controllable. **Biomass gas** New biomass gasification sub-projects use dry straw and kitchen waste as raw materials. The supply of these two raw materials is sufficient, and no deforestation will occur, which have been added to the exclusion list. The main wastes produced by biomass gasification sub-projects are biogas residue and biogas slurry. The biogas residue will be composted, and the biogas slurry will be recycled without discharge. The environmental risks and impacts of biomass gas industry are analyzed from the aspects of waste gas, waste water, solid waste, noise and management during the construction and operation. Through effective protection measures, biogas residue and biogas slurry with large environmental impacts can be effectively disposed. For example, composting technology is adopted for the disposal of biogas residue in which the multiphase organic matter is decomposed in a specific environment by mixed microbial communities and the organic solid waste is improved into stable humus for fertilizer or soil improvement. Part of biogas slurry is used to produce liquid water-soluble fertilizer, and other part is temporarily stored in the pool. Biogas slurry needs to be stored effectively and safely. If it is not treated effectively, secondary pollution will occur. The mitigation measures of "Flotation + Aerobic Bioremediation + Precipitation" should be adopted to make the biogas slurry return completely. However, these sub-projects may cause some environmental impacts such as odor, flue gas, biogas residue and biogas slurry leakage, the overall environmental risk is rated as "Substantial". Environmental risk analysis is detailed in Annex 8.	guaranteed. For the newly-built photovoltaic power stations, the national policy has clearly made special provisions for the protection of agricultural land including arable land. For the layout of PV array on arable land other than permanent basic farmland, strict requirements should be put forward. In addition to the land for pile foundation, it is strictly forbidden to harden the ground, destroy the plough layer and discontinue farming and let go out of cultivation as well as abandon the land. When the PV array land is withdrawn from the project managed by agricultural land and unused land, the land use unit should restore it to the original state. If it fails to restore it to the original state as required, it should be ordered to make rectification by the energy department in the project location. The investigation and analysis of land for new wind farm and PV power station are found in Chapter 3 and Annex 9. The survey found that under the current land management policy in China, the land risks of new wind power and PV projects can be resolved by strengthening the environmental and social management system. A survey of the impacts of new wind power and PV projects on labor and working conditions, community safety, ethnic minorities and cultural relics shows that, although most of these projects have a very low probability of risks under China's current sound labor management framework, law enforcement level and stricter regulation, given that these projects still have a negative impact on communities and ethnic minorities due to the selection of construction sites, the overall social risk of such sub-projects is deemed as "Substantial" according to the Environmental and Social Directive for Investment Project Financing. For the energy storage sub-projects to be built in existing power plants, the social risk of such sub-projects is consistent with that of other generation-side energy storage sub-projects. The impact of existing power plants on the environment and society is controllable. The overall social risk is considered to be "Moderate".

	Environmental Risk	Social Risk
		Biomass gas For new biomass gasification sub-projects, HXB conducted a social risk and impact analysis of the biomass gas industry from the aspects of site selection, land, labor and working conditions, community safety, ethnic minorities, management and so on. Biomass gasification sub-projects are mainly built in industrial parks, so they may have minor impacts on residential areas, schools, hospitals and other social sensitive points. However, this type of projects involves flammable straw and combustible gas like natural gas, with the risks such as deflagration, so the overall social risk is rated as "Substantial". The analysis of social risks and impacts is detailed in Annex 8.
Risk Rating	Substantial	Substantial
Integrated E&S Risk at Portfolio Level	**Substantial**	

2.3 Application of Environmental and Social Standards

As part of the overall ESMS, HXB will conduct graded and classified management for customers following Annex 2 "HXB Sector and E&S Performance Evaluation Classification". For the loan sub-projects under the Project, HXB will conduct a preliminary screening for each specific sub-project of the loan customer with reference to the exclusion list as defined in Section 2.4 at the pre-loan investigation link. If the potential sub-project is included in the "Exclusion List", it will not be included in the scope of the Project. Preliminary identification and screening of environmental and social risks will be carried out based on Annex 3 "Environmental and Social Risk Screening Sheet".

All the sub-projects must be prepared and implemented in accordance with environmental and social national and local laws and regulations. For sub-projects that involve resettlement (unless the risks or impacts of such resettlement are minor), adverse risks or impacts on ethnic minorities or significant risks or impacts on environment, community health and safety, labor and working conditions, biodiversity or cultural heritage, relevant requirements of the World Bank's ESSs shall apply (The key requirements of ESSs are indicated in Annex 1).

2.4 Exclusion List

The following types of sub-projects are considered as ineligible and shall be

excluded from the project financing of China Renewable Energy and Battery Storage Promotion Project:

- The Project will only support RE related energy storage and other relevant facilities with objective of promoting renewable energy efficiency, increasing consumption of renewable energy and transmission efficiency, and new usage of renewable energy. Any other sectors or projects that are not relevant are not eligible;
- Energy storage system in non-RE power plants (such as coal-fired power plant, nuclear power plant etc.);
- The sub-projects classified as "High" Environmental and Social risk[1];
- New construction of facilities within ecological red line (construction forbidden area), natural habitat, critical habitat (as defined in ESS6) or cultural heritage sites (ancient sites, ancient tombs, ancient buildings, etc.);
- Sub-projects as defined in Article 24 in the World Bank ESS7 for which free, prior and informed consent cannot be ascertained;
- Sub-projects located within unacceptable distance from human settlements according to applicable national regulations;
- Enterprises without commitment to only use battery products from licensed manufacturers without environmental non-compliance;
- Enterprises without commitment to acquire battery collection, recycling and disposal services only from certified and licensed entities;
- Enterprises that have a track record of "Unsatisfactory" environmental and social performance, as assessed by the HXB;
- Biomass gas sub-projects that involve use of wood or harvesting;
- Enterprises/sub-projects that involve forced labor and/or child labor.

3. ENVIRONMENTAL AND SOCIAL REGULATORY FRAMEWORK

In general, the management of environmental and social risks of the project involves three regulatory systems, i.e. industrial pollution control, environmental and social impacts of construction projects and work safety management. There

[1] Huaxia Bank shall keep the World Bank timely informed of the increase of environmental and social risks of subprojects and obtain the prior approval of the Bank at the risk screening stage in case any high-risk subproject is to be funded under the project. Meanwhile, the Bank will upgrade the overall project risk level to "High" and the ESF requirements applicable to high-risk projects shall be implemented.

are established regulatory frameworks in these three aspects in China, which include comprehensive laws and regulations, institutional arrangement, operational procedures and monitoring and enforcement mechanisms.

3.1 Industrial Pollution Control

Brief Overview of General Legal Framework

Since the promulgation of its first Environmental Protection Law in 1979, China has gradually established a comprehensive environmental management legal framework, includes more than 80 laws and statues, over 100 regulations and over 1000 standards and technical guidelines at national level primarily addressing pollution control, natural resource conservation and management of the environment. Industrial pollution control is a key component of environmental protection in China. Comprehensive legal framework has been established and evolving over the decades.

The *Environmental Protection Law* (amended in 2014) is regarded as the "most stringent" environmental law ever promulgated in China. It lays out general principles for environmental protection and describes key instruments for environmental management. It requires enterprises, public institutions and any other producers/business operators, to prevent and reduce environmental pollution and ecological destruction, and bear the liability for the damage caused by them (Article 6). The EPL states that the state adopts regulatory instruments such as environmental protection target accountability and performance evaluation system (Article 26), establish ecological protection compensation mechanism (Article 31), "Three Simultaneousness" system[3] (Article 41), total emission control system for key pollutants (Article 44), and pollution permit system (Article 45) etc. The new EPL authorizes environmental departments with power to stop or shut down non-compliant producers and enterprises and enforces cumulative non-compliance penalty on daily basis without cap limit. It also provides provision on personal detention for those responsible for violation, and criminal charges for serious violation as crimes.

A series of laws and regulations have been promulgated addressing industrial pollution control, including *Air Pollution Control Law, Solid Waste Pollution Control Law, Water Pollution Control Law, Noise Pollution Control Law, Soil Pollution Control Law, Ocean Environmental Protection Law, Cleaner Production Promotion Law, Renewable Energy Law, Energy Saving Law, Water and Soil Conservation Law* etc. These laws are supported by a large number of regulations, technical guidelines and standards, e.g. there are over 50 standards for air pollution emission from various specific industrial sectors, over 130 standards

[3] Pollution control facilities must be designed, constructed and operated as the same time with the main project.

for waste water pollution discharge from industrial sectors, over 40 standards for solid wastes and chemical pollution/hazardous wastes control from various sources, over 100 pollution control technical guidelines for various sectors etc.

Industrial pollution is enforced through Ministry of Ecology and Environment and its local bureaus at provincial, municipal and county/district levels. With the amendment of new EPL, enforcement of environmental compliance has been significantly strengthened during past few years. For example, within the first year of new EPL effectiveness, EPBs at various levels have issued over 97,000 administrative penalty decisions with over fine of RMB 4.25 billion and 12,000 people were arrested for environmental pollution crimes. A number of institutional reforms have been put in place to enhance the environmental enforcement, e.g. vertical management of environmental monitoring and supervision under provincial environmental protection bureau (EPB) [4]. Meanwhile, MEE also launched a national environmental enforcement supervision campaign since 2015 by sending central supervision teams to various regions to supervise the environmental compliance and enforcement of local governments every year. By October 2018, MEE supervision teams have resolved 37,640 cases reported by public, issued correction orders to 28,407 enterprises and penalty orders to 7,357 enterprises, detained 610 persons under administrative punishment and criminal charges, and penalized 6,219 government officials under the governmental official accountability system.

Energy Storage Sector

Energy storage is considered as an emerging sector with new technologies and significant potentials for future energy market in the world. NDRC issued a *Guidance on Promoting Energy Storage Technologies and Sector Development* in 2017 as a national strategy to promote the sector. It calls for two stages of development in ten years, i.e. transition from R&D to commercialization, and scale-up of commercialization. The key tasks include promoting pilots of R&D of energy storage technologies, RE application efficiency, flexibility and stability of grid, smart level of application, and diversified applications of energy storage to support energy Internet application demonstration. It requires to strengthen the construction of energy storage safety and environmental protection policies/ regulations and standards, and establish a system for EPR of energy storage products.

Based on pilot experiences in the electronics sector, the State Council issued an *Implementation Arrangement of Extended Producer Responsibility System* in 2016,

[4] Environmental monitoring and compliance supervision are moved from municipal and county level EPBs to directly under the provincial EPB's mandate, therefore the interference from local (municipal and county) governments on accuracy of environmental quality monitoring and environmental law enforcement can be effectively minimized.

which aims to further promote life-cycle management of products from environmental and resource perspective. Its objective is to establish preliminary EPR system by 2020 with standard-compliance collection and recycling of wastes from key products to 40%; and generally established EPR system by 2025, with full and orderly operation of EPR system in producers of key sectors, wide application of eco-design of products, proportion of reused material in key products up to 20%, and average 50% of formal collection and recycling of used products. The priority fields of pilot include electronic products, vehicles, lead-acid battery and packaging material.

For lead battery sector, in January 2019, the *Notice on the Action Plan for Pollution Prevention and Control of Waste Lead Storage Battery* was issued jointly by several key ministries, requiring implementation of the extended producer responsibility (EPR) system and establishment of a standardized recycling system for lead battery sector. It sets out the objectives, i.e. by 2020, lead storage battery manufacturers will achieve a standard collection rate of waste lead storage batteries of 40%; by 2025, the standard collection rate of waste lead storage batteries will reach 70%; all waste lead storage batteries collected by the standard will be safely disposed of.

For lithium battery, China has issued several policies to regulate the recycling of used batteries, including *Interim Measures for the Management of Recycling and Utilization of New Energy Vehicles' Power Battery, Pilot Implementation Arrangement for Power Battery Recycling, Interim Measures for Source-tracing Management of Battery Recycling for New Energy Vehicles*. These policies also emphasize the implementation of the EPR system, which requires automobile production enterprises to bear the main responsibility for the recovery of power batteries. A *Technical Specifications for the Comprehensive Utilization of Waste Battery of New Energy Vehicles* has been issued by MIIT in 2016 to set environmental and safety standards for lithium battery recycling enterprises. On September 5, 2018, MIIT released a list of first batch of five enterprises that are fully in compliance with this specification (through enterprise application and expert panel inspection and verification).

Among general pollution control standards (e.g. for wastewater, air emission, noise, solid waste disposal etc.), a number of technical specifications and standards related to energy storage sector are in place, including:

- Energy storage station: *Design Code for Electrochemical Energy Storage Station, Performance Indicators for Electrochemical Energy Storage Station, Code of Operation and Maintenance of Electrochemical Energy Storage Station, Code of Inspection of Electrochemical Energy Storage Station, Code of Emergency Response of Electrochemical Energy Storage Station;*
- Energy storage system: *General Technical Specifications for Electrochemical*

Energy Storage System;

- Grid connection: *Technical Standard for Electrochemical Energy Storage System Connected to Power Grid, Test Specifications for Electrochemical Energy Storage System Connected to Power Grid;*
- Battery: *Standard for Lithium Battery for Power Storage, Technical Standard for Lithium Battery Management System in Electrochemical Energy Storage Station, Standards for Lead-acid Battery Used for Energy Storage, Standard for Lead-carbon Battery for Power Storage;*
- Energy storage converter: *Technical Specifications for Power Conversion System of Electrochemical Energy Storage System, Test Specifications for Power Conversion System of Electrochemical Energy Storage System;*
- Decommissioned battery recycling and disposal: *Specifications for the Comprehensive Utilization of Waste Battery of New Energy Vehicles, Technical Specifications of Pollution Control for Treatment of Used Lead-acid Battery, Specifications of Dismantlement and Recycling of Used Battery, Residue Energy Test for Recycling of Used Battery etc.*

These regulations/policies, standards and specification set a generally sound framework for environment and safety management of development of energy storage sector. However, there are still gaps and challenges, especially in the actual implementation practice. For instance, about 70% of lead-acid recycling is through non-standard recycling channels, e.g. small enterprises which may or may not fully comply with standards. There are only a few professional and compliance companies for lithium battery recycling, while most lithium battery recycling is conducted by small and non-professional enterprises. These challenges will be given due considerations during the sub-project screening, loan approval and post-loan supervision processes, through proper arrangement of loan agreement with enterprises.

The GEF-funded technical assistance activities in parallel to this Project will include studies of policy, regulation and technical standards of battery storage sector to further improve the general national regulatory framework. The proposed TA activities will also support due diligence review of the investment sub-projects to better understand the potential upstream and downstream environmental and social risks and impacts related to specific investment project.

Biomass Gas Sector

Biomass gas is considered as an emerging sector with evolving laws and regulations. *Standard for Quality of Biomethane* (NB/T 10136-2019) has been issued on product quality. This standard is applicable to bio-natural gas produced from biomass by anaerobic fermentation or pyrolysis gasification.

The laws and regulations and standards of biogas sector and natural gas sector can be consulted for the engineering design and construction.

Biogas Sector:

- *Technical Code for Biogas Engineering Part 1: Process Design* (NY/T1220.1-2006)
- *Technical Code for Biogas Engineering Part 2: Design of Biogas Supply* (NY/T1220.2-2006)
- *Technical Specification for Biogas Engineering-Part 3: Construction and Acceptance* (NY/T1220.3-2006)
- *Technical Code for Biogas Engineering Part 4: Operation and Maintenance* (NY/T1220.4-2006)
- *Technical Specification for Biogas Engineering-Part 5: Evaluation of Quality* (NY/T1220.5-2006)

Natural Gas Sector:

- *Natural Gas* (GB17820-2018)
- *Code for Design Compressed Natural Gas (CNG) Supply Station* (GB51102-2016)

In terms of technological process, considering that green straw and livestock manure are prone to produce a large number of biogas slurry besides biogas, resulting in secondary pollution, so the raw materials of sub-project are limited to dry straw and processed kitchen waste. The supply of dry straw and kitchen waste is sufficient, and no deforestation will occur. The main wastes produced by biomass gasification sub-projects are biogas slurry and biogas residue. The biogas slurry is processed by "Flotation + Aerobic Bioremediation + Precipitation" and then returned to the biogas production section fully. The biogas residue is processed into solid organic fertilizer in the organic fertilizer workshop.

Technical Specification for Operation Maintenance and Safety of Biogas Plant in Scale Animal and Poultry Farms, *Technical Code for Fire Protection Water Supply and Hydrant Systems* and other safety and fire regulations and standards can be referred to for operation and management. Since the straw used for biomass gas is flammable and the finished natural gas is also flammable and explosive, the possible safety and fire risks should be minimized by enhancing safety and fire protection management.

While, it is also noted that China is making serious efforts in pollution control through continuous improvement of regulations/policies/standards, EPR system, and stronger enforcement practice. These progresses will help create a generally adequate framework to manage the environmental risks of the sub-projects' implementation under the Project.

3.2 Environmental and Social Risks Assessment of Construction Projects

3.2.1 Environmental Impact Assessment (EIA) System in China

Construction and installation of energy storage system and other related facilities are considered as construction projects under the China's environmental regulatory system, and are subject to environmental and social impact assessment requirements depending upon the scale and sensitivity of

project locations.

China has established a comprehensive environmental impact assessment (EIA) system. The *Environmental Impact Assessment Law* provides an overall framework for environmental impact assessment for development plans[5] and construction projects, including category classification, EIA contents, qualification licensing system of EIA consultants, public consultation, review and approval responsibilities, and accountability provisions. There are a number of supporting regulations set up the operational framework for environmental management of construction projects, and a series of technical guidelines which articulate methodologies and technical details for assessment of various types of impacts and for key sectors of projects.

The EIA system is managed by MEE and its EPBs at provincial, municipal and district/county levels. A national *Categorized Directory for Environmental Management of Construction Projects*[6] is in place and regularly updated by MEE to provide clear and quantitative guidance on the project classification. Construction projects are classified as: A (significant environmental impacts, requiring a full-scale EIA), or B (limited adverse environmental impacts in scope and severity, requiring a simplified EIA report known as EIA Form), or C (likely to have negligible adverse environmental impacts, requiring filling an online EIA registration form). The latest version of 2018 specifies classifications for 192 types of projects in 50 sectors with consideration of project type, scale and sensitivity of locations. According to the directory, the energy storage system and related facilities under the Project are most likely be classified as B[7]. According to *Categorized Directory for Environmental Management of Construction Projects*, the biomass gas project is subject to Item 94 "Urban Gas Supply Project" in Article 32 Gas Production and Supply Sector, Item 90 "Biogas Power Generation" in Article 31 Electricity and Heat Production and Supply Sector, and Item 37 "Other Types of Fertilizer Manufacturing" in Article 15 Chemical Raw Materials and Chemical Products, so it is classified as B, and an EIA Form is required. For new RE projects, following Article 41, the ground PV power station less than 6,000kW is classified as C, and an EIA registration form is required. The onshore wind power generation facilities with total installed capacity of 50,000kW and above in environmentally sensitive areas are classified as A, and an EIA Report is required.

[5] This refers to special plans developed by state council and/or government departments at municipal level (or above), including industrial, agricultural, livestock, forestry, energy, water resources, transport, urban construction, tourism and natural resources development plans.

[6] The Directory provide detailed criteria for EIA category classification for various sectors. The latest version of 2021 specifies classifications for 173 types of projects in 55 sectors, i.e. provide detailed thresholds for three categories, i.e. EIA Report, EIA Form and EIA Registration (roughly equivalent to category A, B and C of the World Bank OP4.01).

[7] The relevant requirement is under the project type "power transmission and transformation", which is classified as: category A if the voltage is above 500KV or 330KV when located in sensitive areas; or category B for others (except the voltage is under 100KV); and category C for projects with voltage under 100KV.

Other onshore geothermal and solar power generation stations and ground centralized PV power plants (capacity greater than 6,000kW, and access voltage level not less than 10kV); and wind power generation projects are classified as B, and an EIA Form is required. For the new marine energy development and utilization projects, following Article 54, the tidal power generation, wave power generation, thermoelectric generation, marine biomass energy and other marine energy development and utilization, energy transmission facilities and network engineering with the installed capacity of more than 20MW, offshore wind power project, transmission facilities and network engineering with the installed capacity of more than 50,000kW, and marine energy development and utilization projects involving environmentally sensitive areas are classified as A, and an EIA Report is required. Other projects are classified as B, and an EIA Form is required.

EIA documents are reviewed at different levels depending on thresholds of investment, level of approval for the project proposals as well as environmental sensitivities. During construction, the mitigation measures are implemented by contractors and supervised by the project proponent and supervision engineers, as well as routine and/or random on-site supervision from local EPBs (through their supervision and enforcement teams, normally known as Environmental Enforcement Squad). Upon project completion, a mandatory environmental acceptance examination is required to be conducted by third party consultant engaged and reported to EPB.

Public consultation is required under the *Public Consultation Method of EIA (*MEE, *amended in 2018)*, which provides clear definition of consultation scope and prescriptive instruction on disclosure and consultation methods in details. This regulation requires three rounds of information disclosure (project information, draft EIA report, final EIA and Statement of Public Consultation), which are considered as adequate consultation unless there are many concerns and questions received. Further in-depth consultations (meetings, hearings etc.) are only required if many public comments are received. Public consultation is mandatory for category A (equivalent to World Bank high risk) projects, but not mandatorily required for category B (substantial and moderate risk) projects. However, in practice, many local EPBs do require public consultations for category B projects if there are project-affected communities are present. In any case, EIA documents are disclosed by local EPBs to public for comments prior to approval.

In addition to EIA system, there are several other safeguards related systems that may be applied to construction projects if relevant. These mainly include:

- **Water and soil conservation:** A project is required to develop a water and

soil conservation plan[8] if it causes potential water and soil loss. This plan is to be approved by a relevant water resources bureau (WRB), and such an approval is the prerequisite for the EIA and later a feasibility approval. The WRB is also involved in the final acceptance inspection upon project completion.

- **Flood control assessment.** When a project is located in an area prone to flood risk, a flood control assessment must to be prepared by a licensed institute. The report is to be approved by the relevant water resources authorities, which is a prerequisite for approval of the feasibility study.
- **Geo-hazard assessment.** When a project is located in areas prone to geological hazards, a geo-hazard assessment shall be conducted as a mandatory part of the feasibility study. The institutions conducting such assessment are regulated under a qualification licensing system managed by the Ministry of Land and Resources and provincial land resource bureaus.
- **Protected areas**. When environmental protected area (nature reserves, forest/wetland parks, scenic areas, cultural heritage sites etc.) is affected by the project, relevant management authorities are required to be consulted and provide approval as part of EIA process. When cultural heritage is discovered during the implementation of the sub-projects, the sub-borrowers shall be according with relevant national laws and regulations.
- **Ecological red line:** As an important measure to protect biodiversity, China is currently expanding the scope of natural protected areas through the ecological red line system from 18% to 30%. It includes extremely important ecological function region with important water conservation, biodiversity conservation, soil and water conservation, wind-breaking and sand-fixing and coast protection functions, and extremely sensitive and fragile ecological function region with soil and water loss, desertification, rocky desertification and coastal erosion; as well as other areas with potential important ecological values which are not certain currently; and natural protected areas that have been evaluated and adjusted. The boundary of current ecological protection red line has been basically delimited, but the specific management measures have not been introduced. The classified management of EIA has regarded the ecological red line as a basis for risk classification. At the project EIA level, the assessment of the project for touching the red line is basically conducted. In some regions, RE projects involving the red line have been suspended, and whether to touch the red line in the future will also be judged by the Ministry of Land and Resources and provincial land resource bureaus. A series of compliance procedures such as project land license shall be reviewed again.
- **Energy saving assessment.** There is an energy saving assessment system for

[8] A Water and Soil Conservation Plan Report for a project that requires land acquisition of more than 1 ha or soil/stone excavation over 10,000 m^3, or a Water and Soil Conservation Plan Form for projects with less land acquisition and excavation amount

investment projects under the regulation of development and reform committee (DRCs) at various levels[9]. Such assessment document shall be submitted to DRCs for review and approval, as a prerequisite for project approval.

- **Social stability risk assessment.** For major fixed assets investment projects with potential social stability risks, a social stability risk assessment is to be prepared, and submitted to local government (DRCs or other relevant departments) for approval.
- **Safety assessment system. (described in the next section)**.

In summary, the environmental impact assessment for construction projects is managed with an established institutional system which has been evolving over decades. It is generally in line with the environmental and social risks and impacts management approach adopted by the World Bank in terms of core principles and key requirements. This system would provide reasonably sound EIA regulatory framework for types of sub-projects to be funded under this Project.

3.2.2 Regulations and Policies on Biodiversity in China

In 2010, the Chinese government issued and implemented *National Main Functional Area Planning* and *China National Biodiversity Conservation Strategy and Action Plan* (2011-2030). This is the first action plan for biodiversity conservation at the national level, and clearly lists the prohibited development areas with detailed locations, areas and protected objects. The national nature reserves, world cultural and natural heritages, national scenic spots, national forest parks and national geological parks listed in the Directory are prohibited from development at the national level. Local governments have also made clear the different levels of protected areas through planning. During the EIA process, first of all, the site selection and compliance with planning should be demonstrated, giving the first barrier to biodiversity conservation.

To further expand the scope of protected areas and protect the biodiversity value, China has gradually begun to explore the ecological red line system in recent years. Article 29 of the *Environmental Protection Law* (amended in 2014) added the term that "the ecological red line is set up for key ecological function areas, eco-environmental sensitive areas and vulnerable areas to implement strict protection." At the end of January of the same year, the Ministry of Ministry of Environmental Protection (MEP) issued the *National Ecological Red Line---Technical Guide for Delineating Ecological Function Baseline (Trial)*, which announced that the provincial administrative area was the implementation unit

[9] Investment projects with annual energy consumption over 3000 tons coal equivalent, or electricity consumption over 5000MWH, or petroleum consumption over 1000 tons, or natural gas over 1 million m^3, shall prepare an Energy Saving Assessment Report. Projects with consumption of 1000-3000 ton coal, 2000-5000 MWH, 500-1000 ton petroleum or 0.5-1 million m^3 shall prepare an Energy Saving Assessment Form. Other projects shall fill in an Energy Saving Registration Form.

to carry out the delineation of the ecological protection red line across the country. At present, the basic demarcation of ecological red lines in all regions has been completed.

Prohibited Development Area with Ecological Red Line System Boundary Widened

Prohibited development areas specified by *National Main Functional Area Planning* issued by the State Council in 2010	National and provincial prohibited development areas delineated by the new Ecological Red Line Plan[10]
National nature reserves	National parks
World cultural heritages	Nature reserves
National scenic spots	Ecological conservation areas and core landscape areas of forest parks
National forest parks	Core scenic areas of scenic spots
National geological parks	Geological protected zone of geopark
	Core areas and buffer zones of world natural heritages
	Conservation areas and restoration and reconstruction areas of wetland parks
	First-grade protected areas of drinking water sources
	Core areas of aquatic germplasm reserves
	Core protected areas of other types of prohibited development areas

On November 7, 2019, General Office of the CPC Central Committee and General Office of the State Council issued the *Guidance on the Integrated Delineation and Implementation of the Three Control Lines in Territorial Spatial Planning* (hereinafter referred to as "Guidance"), clarifying the overall priority of the three control lines, i.e. ecological protection red line, permanent basic farmland and urban development boundary (hereinafter referred to as "three red lines") in the

[10] According to the *Guidelines for Delineating Ecological Protection Red Line* issued by the MEP and NDRC in May 2017

land use. The *Guidance* further clarifies that the following areas should be included in the ecological protection red line: (1) extremely important ecological function region with important water conservation, biodiversity conservation, soil and water conservation, wind-breaking and sand-fixing and coast protection functions, and extremely sensitive and fragile ecological function region with soil and water loss, desertification, rocky desertification and coastal erosion; (2) other areas with potential important ecological values which are not certain currently; (3) natural protected areas that have been evaluated and adjusted. If the natural protected areas are adjusted, the ecological protection red line should be adjusted accordingly.

The State Council clarifies the ecological red line at the level of territorial spatial planning, and provides cross-sectoral guidance for further broadening the connotation of prohibited development areas in *National Main Functional Area Planning* issued in 2010. By 2020, ecological protection redline protected areas have been identified for protection by all levels of governments at provinces, municipalities and counties. In February 2019, National Forestry and Grassland Administration promulgated the *Notice on Regulating Forest Land for Wind Farm Project Construction*, which clearly states that the use of key forest lands for wind power projects is strictly prohibited.

By 2015, the existing centralized wind energy/PV projects have a good balance with ecological protection. 71% of the centralized wind energy projects and 86% of the centralized PV projects are located in areas with low ecological risk. Some projects in North China, Northwest China and Northeast China are built in the experimental zones[11] of national nature reserves where non-pollution emission facilities are allowed.

In summary, the nature reserve protection area system, together with the recently implemented ecological protection redline system, provide a full cover of important habitats that are in line with the critical habitats as defined in the World Bank ESF. All development activities with adverse environmental impacts are strictly forbidden within such habitats. The comprehensive EIA system covers full spectrum of environmental impacts, with ecological impacts assessment and mitigation as a core element. The specific EIA Technical Guidelines for Ecological Impact (HJ19-2011) provides detailed guidance and methodology requirement for ecological and biodiversity impact assessment (including direct, indirect, cumulative) for all types of habitats (ordinary habitats, important habitats, and special habitats). It also requires the development of mitigation measures following the hierarchy of avoidance, mitigation, compensation and restoration. In principle, these are in line with the World Bank ESF requirements. During the implementation, HXB will conduct due diligence on environmental impacts assessment for all subprojects, with particularly emphasis on ecological and biodiversity impacts. Greenfield subprojects (including associated facilities) will be required to prepare comprehensive ESIA as per requirements of ESF and national regulations and guidelines. The brownfield subprojects will be required to conduct thorough environmental and

[11] A nature reserve includes three zones, i.e. core zone, buffer zone and experimental zone. Where no production facilities are allowed in core zone and buffer zone, and production facilities with pollution discharges are not allowed in experimental zone.

social audit as per requirements of ESF (ESS1). When screening or audit of the existing facilities suggest significant impact on natural /critical habitat, a biodiversity management plan as per ESS6 requirements shall be prepared.

3.2.3 Laws and Regulations of Land Acquisition and Resettlement in China

For project related land acquisition and resettlement, based on national laws and implementation regulations, there is well established land acquisition system in China with adequate compensations, and approving and implementing procedures. Under such system, land acquisition impact will be minimized, affected people will be consulted for land loss impacts and compensation policies, and their basic interests and entitlements will be protected.

For any land acquisition and resettlement activities in China, they will follow a set of national laws and regulations, which include: (1) Land Administration Law of the People's Republic of China (issued in 1986 and amended in 1998); (2) Circular of the Ministry of Land and Resources Concerning the Issuance of the Guiding Opinions on Improving the System of Compensation for Requisition of Land (Circular No. 238, issued by MLR in 2004), and (3) provincial and local implementation regulations. These laws and regulations form the legal basis for providing compensation and rehabilitation to those affected by land acquisition and resettlement activities. Key provisions of Land Administration Law and Circular No. 238 are described in the Annex 5 Resettlement Framework.
On August 26, 2019, the 12th Meeting of the Standing Committee of the Thirteenth National People's Congress considered and adopted the Amendment of Land Administration Law of the People's Republic of China, effective from January 1, 2020. The Amendment adheres to the public ownership of land, protection of farmers' interests and the most stringent farmland protection system and economical and intensive land use system, and reforms the land acquisition system as well as strengthens the land compensation and public participation.

For the land for wind power projects and PV projects, China has issued the *Land Indicators for Electric Power Project Construction (Wind Farm)* and *Opinions on the Land Use for Supporting the Development of New Industries and New Formats to Promote Mass Entrepreneurship and Innovation* (GTZG (2015) No. 5, hereinafter referred to as "Document No. 5"). The State Forestry Administration issued the *Notice on Issues Related to Forest Land Use in PV Power Station Construction* (LZF [2015] No. 153) in November 2015. The Ministry of Land and Resources issued the *Land Use Control Indicators for PV Power Station Project* in December 2015, and *Letter from the General Office of the Ministry of Land and Resources on Land Use for PV Power Generation* (GTZTH [2016] No. 1638, hereinafter referred to as Letter No. 1638) in October 2016. In September 2017, the Ministry of Land and Resources, Office of Poverty Alleviation and Development under the State Council and National Energy Administration jointly

issued the *Opinions on Supporting PV Poverty Alleviation and Regulating Land Use for PV Power Generation Industry* (GTZG [2017] No. 8, hereinafter referred to as "Document No. 8"). Some local governments have also introduced relevant policies to regulate and define the land use for PV projects. See Annex 5 Resettlement Framework.

3.2.4 Laws and Regulations of Ethnic Minorities in China

There are more than 400 laws and regulations addressing the legal requirements and stipulations for ethnic minorities in China with key legislations include *Constitution* (1982) *Law of Ethnic Minority Regional Autonomy* (October 1, 1984), and *Ethnic Minority Township Administration Ordinance* (September 15, 1993). This specific legal framework promotes preferential treatment for minority nationalities in some contexts and equitable treatment of all groups in others. The current legal framework supports the lawful rights and interests of the ethnic minorities and also requires that the affected minority communities like other local communities will be consulted and their support obtained, during the project planning and land acquisition process. The state and different provinces have formulated a series of policies on ethnic minority development, including respecting for minority views, safeguarding the political equality of ethnic minorities, respecting the customs of ethnic minorities, supporting the development of ethnic minorities, and planning the economic and social development of ethnic communities. Under such policies, the minority concentrated areas in different parts of China enjoy the same development opportunities, and for those vulnerable groups in these communities such as welfare recipients and low income people, same entitlements and assistances programs have been provided.

In summary, there are established systems for environmental and social risk and impact assessment in China. These systems provide a generally adequate environmental and social regulatory framework for the types of sub-projects in this Project, which are most likely Moderate or Low risk sub-projects as per World Bank ESF (or category B or C by Chinese EIA classification system). For sub-projects with Substantial risks, the relevant World Bank ESSs requirements are to be followed, as specified in the later part of this document.

Gap Analysis and Gap Filling: In most aspects, the national legal framework on environmental and social management is consistent with ESF of the World Bank by sharing the same objectives and same principles of the World Bank ESF. However, there are some noticeable differences on both land acquisition and ethnic minority aspects.

On land acquisition, resettlement plan is normally not required under Chinese legal framework except for large reservoir projects. The main focus of the existing legal framework is providing cash compensation rather than livelihood restoration. And the monitoring mechanism needs to be improved and no

evaluation mechanism has been established during implementation of land acquisition and resettlement.

Compared with the original one, the new Land Administration Law implemented in 2020 mainly improves the following aspects: (1) Clearly defining the scope of public interest in land acquisition. The *Constitution* provides that the State may levy or expropriate the land and make compensations for the public interest. However, the original Land Administration Law does not clearly define the scope of public interest for land acquisition, and collective construction land cannot enter the market directly, so that land acquisition has become the only channel for the use of land by various construction projects, resulting in the continuous expansion of land acquisition. The legitimate rights and interests of landless farmers and long-term livelihoods are not effectively guaranteed, affecting the social stability. Article 45 added to the new one defines the public interest for the first time. It stipulates by enumeration that: Land acquisition can be conducted according to the law in case of military affairs and diplomacy, infrastructure organized and implemented by the government, public utilities, poverty alleviation and relocation, construction of low-income housing project and full-scale development and construction. This provision will help narrow the scope of land acquisition and limit government abuse of land acquisition right.

(2) Clearly specifying the basic principle of compensation. The compensation is to ensure that the living standards of the landless farmers will not be lowered, and their long-term livelihoods will be guaranteed. The original Land Administration Law stipulates that the compensation should be made according to the original use of the land expropriated, and the land compensation and resettlement subsidy should be determined by the multiple method of annual output value. The compensation standard was low, and the compensation mechanism was not perfect. The new Land Administration Law raised the compensation principle of "ensuring that the living standards of the landless farmers will not be lowered, and their long-term livelihoods will be guaranteed" proposed by the State Council in Document No. 28 in 2004 to the legal provisions, and replaced the original multiple method of annual output value with the comprehensive prices of farmland. On the basis of the land compensation, resettlement subsidy, compensation for ground attachments and young crops, the housing compensation for rural villagers and social security fees for the landless farmers were added, so as to build a more perfect safeguard mechanism for the landless farmers in law.

(3) Reform of land acquisition procedures. The post-approval announcement of land acquisition is changed to pre-approval announcement. Where most members of the rural collective economic organization whose land was requisitioned have objections to the compensation and resettlement arrangement, a hearing should be convened to modify the arrangement so as to further enforce the rights of the rural collective economic organizations and farmers to know, participate and supervise the whole process of land acquisition. The new Land Administration Law also advocates harmonious land acquisition.

Before the application of land acquisition for approval, the local governments at or above the county level must sign agreements on compensation and resettlement with the owners and users of the land to be requisitioned.
The new Land Administration Law adheres to the public ownership of land, protection of farmers' interests and the most stringent farmland protection system and economical and intensive land use system, and reforms the land acquisition system as well as strengthens the land compensation and public participation. These gaps are becoming smaller with various efforts of government in addressing the issues in land acquisition and resettlement.

On the issue of lack of resettlement plan requirement, in order to bridge the gap, following ESF of the World Bank, the project has developed a RPF for all sub-projects might require moderate or substantial land acquisition and resettlement. According to RPF (included as Annex 5), resettlement plan is required for sub-projects with moderate or substantial amount of land acquisition and resettlement, which will include detailed impact survey, analysis of compensation policies and rehabilitation measures, documentation of consultation with affected people, and arrangement of monitoring and evaluation. The resettlement plan will be reviewed and approved by the World Bank before implementation. For sub-projects with minor land acquisition and resettlement, they will be carried out based on the same national procedures and policies, which include obtaining relevant land acquisition approval, conducting detailed impact survey, consulting with affected people, and making proper compensations with affected people, and the outcome will be confirmed in external monitoring report.

On the issue of ethnic minorities, gaps exist in various aspects between the World Bank and China polices of indigenous people, including policy objectives, criteria of identification, participation and consultation, policy instruments addressing the issues of identical needs and benefits of ethnic groups as well as broad community support. No any government policy requires any development intervention to prepare Ethnic Minority Development Plan, to carry out prior, free and informed consultation with minority communities, and to obtain broad community support. In China, the official list of minority nationalities makes no distinctions regarding the widely varying degrees of acculturation and economic integration among groups and sometimes within the same group. Some groups live and behave in ways virtually identical to their Han Chinese neighbors, and hence are usually not vulnerable to ethnicity-specific community hardship. Other groups are almost fully acculturated and economically integrated into the Chinese mainstream in lowland areas, while their co-ethnics maintain very different customs or economic activities in more isolated areas. Under these circumstances, the official list of minority nationalities should be treated as indicative rather than authoritative. Determining whether ESS7 applies in a given project context will require judgment as to: (i) whether an officially designated minority community maintains distinctive customs or economic

activities that make it potentially vulnerable to hardship; and (ii) if a community is deemed vulnerable to hardship, whether the project affects them as a community. The special rights and protections provided under Chinese law generally are manifested in administratively autonomous regions, prefectures, counties, and townships. The presence of any such autonomous area within the project should routinely trigger screening for ESS7-related issues. Reliance on geographically and administratively defined autonomous areas has advantages. Still lacking, however, are reliable approaches to situations in which an affected group may reside outside of administratively autonomous areas. In such cases, more detailed screening, social analysis and consultations are needed.

In order to bridge the gap, an EMDF is developed for the Project, which requires EMDP to be developed for any sub-project to be located at present with ethnic minority groups particularly those ethnic minorities considered as vulnerable and will be subject with negative impacts. To ensure that local ethnic minority communities will benefit from development projects, it is recommended conducting up stream policy dialogue to advocate integration of development plan into decision making procedures of large scale investment program in minority areas. The detailed requirement of conducting social screening and preparation of EMDP is included in EMDF as part of Annex 6.

3.3 Work Safety Management

Work safety is under a separate management system regulated by Ministry of Emergency Management (MEM). This system is even more comprehensive than the EIA system, which includes a large number of laws and regulations, supported by management rules, implementation procedures, technical guidelines, and standards, all of which form a comprehensive health and safety management system. These requirements are fully built into feasibility study, design review, construction supervision and operational inspection. The implementation responsibility rests with enterprise and project proponents and supervised by MEM and its local administration of work safety (AWS) at the provincial, municipal and county/district levels, as well as relevant sectoral management authorities.

Typically, the construction of sub-projects under the Project would be subject to safety assessment which will be reviewed and approved by local safety authority. A “Three Simultaneousness” system for safety facility is mandatory, which requires safety facilities must be designed, constructed and operated simultaneously with the main project.

For enterprises, work safety is one of the most important issues regulated by government. Under the requirement of the *Work Safety Law*, enterprises bear the main responsibilities for work safety. All production and operational enterprises

are required to establish safety management system, with a dedicated safety department to take care of environmental, health and safety issues at the enterprise level. It is a common approach that each enterprise has its own work safety leading group (or committee), chaired by the head of the enterprise and comprised by senior management staff of relevant departments, and established dedicated safety department (typically named as Environment and Safety Department), with dedicated staff assigned at various levels of management. All production and operation enterprises must develop their work safety emergency response plans and conduct periodic drills. Such plans are renewed periodically (normally every three years) and must be reported to local AWSs.

Therefore, it can be concluded that there is a generally well-established system in place for the management of work safety issues in industrial enterprises in China. This system would provide reasonably sound regulatory framework for types of sub-projects to be funded under this Project.

4. ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

4.1 Environment and Social Policies of HXB

HXB complies with relevant national and local laws and regulations concerning environment, health, safety and social management during the entire process of loan application and loan disbursement. For long time, HXB follows the development concept of "innovation, synergy, green, open and sharing". Under the guidance of "Guideline of Green Financing" and "Opinions on Establishing Green Financing System" issued by central bank and banking supervision committee, HXB established green financing system and provided efficient and convenient financing services for energy saving, clean production and clean energy customers using its advantage of international cooperation and multi types of products and made great achievements. A series of policies and management rules such as *Guidelines on Green Financing of HXB* and *Green Financing Management Regulation of HXB* have been developed by HXB, which incorporate environmental and social risks and impacts management into the whole process of lending to its sub-projects. *Guidelines on Green Financing of HXB* applies to all kinds of credit and investment and financing activities carried out by HXB's various business lines. It standardizes the environmental and social risks and impacts management of **sub-project investigation, loan review, loan agreement signing, loan disbursement and post-loan management** of credit business. *Green Financing Management Regulation of HXB*, formulated earlier, focuses on credit service and standardizes various business links of loan projects. Some of the main regulations include:

4.1.1 Green *Financing Management Regulation of HXB (issued in 2012, and revised in 2016)*

In 2012, HXB formulated *Green Financing Management Regulation* based on *Green Financing Guideline* and *Key Evaluation Indicators of Green Financing* issued by China Banking Supervision Commission. This regulation is developed to promote green financing of HXB, strengthen support to green, low-carbon and circular economy, prevent and reduce environmental and social risks, improve environmental and social performance, and achieve healthy and sustainable development of business of HXB. The risks it addresses refer to potential environmental and social risks related to the construction, production and operation of HXB clients and associated parties, including environmental and social concerns related to energy consumption, pollution, land, health, safety, resettlement, ecological protection and climate changes etc.

This regulation establishes management structure for environmental and social

risks, specifies the responsibilities on the part of board, senior management and various units of loan approval, risk management, compliance management etc. Meanwhile, it also requires green financing concept be incorporated into every step of loan management and strengthen environmental and social risks prevention and control through process control. Specific requirements include:

- At the stage of sub-project investigation, HXB shall conduct thorough and detailed investigation on environmental and social risks related to energy consumption, pollution, health, safety, land acquisition and resettlement of the client, taking into account the client's sector, location and regional context. Evidence shall be collected as baseline for later loan review and post-loan management;
- At the loan review stage, HXB conducts risk analysis for energy consumption, pollution, health, safety, land acquisition and resettlement issues, and ensures the compliance, validity and completeness of client's documents and legal approvals. The review process aims to make sure the client has adequate attention and effective measures to manage relevant risks and complies with relevant legal requirements. Client that has unsatisfactory environmental and social performance will not be approved for loan financing. For client that has potential environmental and social risks, improvement actions and management measures are to be proposed;
- At the loan agreement signing stage, for client that has potential environmental and social risks, HXB will include in the contract the requirement of environmental and social risks report from the client, commitment provisions for the client to strengthen environmental and social risks management, and provisions for HXB to take remedial actions in case of client's default of contract compliance;
- At the loan disbursement stage, client's environmental and social management situation will be considered as one of the bases. Loan will be suspended in case significant risks are identified;
- At the post-loan management stage, HXB will conduct dynamic monitoring and analysis of client's environmental and social risks and provide timely warning for client with significant risks identified and take remedial actions when necessary.

4.1.2 Financing *Operation Appraisal Regulation of HXB (2013)*

This regulation requires thorough appraisal on the project contents, legal compliance, investment, market outlook and loan repayment ability during the appraisal of project financing loan. These include review of status and process of the key government approvals, including project approval from relevant government department, land use approval from land resource department, environmental impact assessment from environmental authority.

4.1.3 Loan Investigation *Management Regulation of HXB (revised in 2016)*

This regulation specifies the process requirement on client screening, data collection and verification, investigation report preparation and verification to be conducted by at least two persons. It explicitly requires that the borrower's environmental and social performance to be included in the data collection, analysis and verification to be conducted with combined field visit and indirect investigation, including information from government and other social organizations.

4.1.4 Post-loan Management Regulation of HXB (revised in 2016)

This regulation clarifies the scope of post-loan management, relevant units and staff responsibilities, and specific working contents and principles. It explicitly specifies the key contents of post-loan supervision, including environmental and social risks of the client. It requires the client manager to conduct continuous monitoring on all factors that may affect the repayment of the loan, which include environmental and safety compliance performance.

4.1.5 Guidelines *on Green Financing of HXB (2017)*

These Guidelines aim to strengthen environmental and social risks control throughout the whole process in the credit operations, avoid providing financing to enterprises and sub-projects that have serious environmental and social problems and direct funding to those with good environmental and social performance.

These Guidelines establish an environmental and social risk classification system for the sectors that the enterprise belongs, i.e. three categories of A, B and C. In addition, they also establish a performance evaluation system for the clients, which includes three levels of "Satisfactory", "Attention needed" and "Unsatisfactory". Based on the classification, HXB implements a differentiated loan management strategy for different clients, depending upon their sector classification and performance evaluation (for details please see Annex 2).

Principles of Classification

First, HXB divides its clients into A, B, and C three categories based on different sectors with consideration of different environment and social risks.

- Category A: It refers to those sectors and clients, where their construction, production and operation will significantly change the current environment and social status and the resulted impacts are difficult to mitigate or restore.

- Category B: It refers to those clients and sectors, where their construction, production and operation will not significantly change the current environment and social status and the resulted impacts are relatively easy to mitigate or restore.
- Category C: It refers to those clients and sectors where their construction, production and operation will not cause any negative environment and social impacts.

Secondly, for individual clients, based on review of their past records, their performance on environment and social management will be further divided into "Satisfactory", "Attention needed", and "Unsatisfactory" three categories. The detailed explanation of these three categories is provided in the following:

- Satisfactory: The performance of client on environment and social management meet the national law and regulations and sector policy requirements. Specifically, the clients obtained all required certificates and basic equipment and facilities are in compliance with national environment requirements. In addition, the client has outstanding performance on energy saving, environment, safe production, and quality control, and labor management, and no visible environment and social risks.
- Attention needed: The performance of client on environment and social management has not fully met national requirements and sector policy requirements. But they have not yet caused serious environment and social impacts. And the client is committed to make mitigating changes so that long term sustainable operation will not be affected.
- Unsatisfactory: The performance of client on environment and social management did not meet national laws and regulations. Due to its violation on environment and social management has been seriously punished and required for correction. Such correction has not yet been implemented or completed. In some cases, although the client has not been fined due to its violations, they already caused serious impacts. Due to lack of commitment for correction, there is high risk for continue sustainable operation.

Differentiated Management Approaches

According to different potential environmental and social risks degrees that the different sectors belong to, and different environmental and social performances of individual clients, HXB will adopt different lending management and approaches:

(1) Differentiated Management according to ABC Categories

Since the clients with categories A and B will involve potential environment and social issues concerned with energy consumption, pollution, land acquisition, health, and safety during construction, production and operation and face potential environment and social risks with regard to sector policies, legal framework and public opinions, the lending permitting process should be more stringent in terms of environment and social risk review. During the lending implementation process, the environment and social risk examination should be carried out, and the clients' environment and social management performances

should be comprehensively evaluated and managed accordingly. For those clients with C category, under the condition of sufficient risk control, the environment and social risk review process could be simplified, and could selectively carry out differentiated management based on environment and social management performances.

(2) Differentiated Management according to Environment and Social Performance

For those clients "Attention needed" and "Unsatisfactory", measures for mitigation and correction should be formulated so that potential environment and social risks could be avoided. For those "Satisfactory" clients, HXB will assist them to further improve and enhance environment and social management performances.

Table 2: HXB Environment and Social Classification and Management Strategies

<table>
<tr><th>Sector
Clients</th><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Satisfactory</td><td colspan="2">1. Strengthen environment and social risk review, strengthen lending approval management, formulate concrete measures for risk prevention, and closely follow relevant national law and regulations on environment protection, product quality, and safety production as well as changing sector policies on the business operation of the clients;
2. Actively monitor clients' lending needs during product upgrading and explore credit needs during the process of energy saving, pollution reduction, product upgrading and strategic development of new sectors;
3. Strengthen the management of newly added projects by excluding those projects clearly identified to be abandoned on the list of sector readjustment, avoid those projects causing public concerns, ensure potential projects as in compliance with relevant laws and regulations, and seek professional opinions on those projects with potential environment and social risks;
4. Strengthen dynamic management on potential environmental and social risks after loan approval, and include performance of clients' environment and social management as part of daily after lending review requirement;</td><td>Timely monitor the performances of clients' environment and social management</td></tr>
<tr><td>Need Attention</td><td colspan="3">1. Strengthen credit approval management, and carefully support new lending;
2. Formulate risk mitigation measures, strengthen after lending management, and actively ensure clients to correct incompliance measures;
3. Under the risk control management, to provide credit to meet the needs of improvement of environment and social management by the clients.</td></tr>
<tr><td>Unsatisfactory</td><td colspan="3">1. Forbid approving new credit for such enterprises;
2. To set up warning system, and formulate special risk mitigation measures for relevant clients, and ensure proper corrected measures will be taken to mitigate impacts of violations. For those clients who failed to implement corrected measures, their outstanding credit should be reduced and removed.</td></tr>
</table>

4.1.6 *Notice on Strengthening Credit Business Environmental and Social Risk Management of HXB* (2020)

To implement national environmental policies and regulatory requirements, strictly control environmental risks and strengthen environmental, safety, health and social risk management of credit business, HXB issued the *Notice on Strengthening Credit Business Environmental and Social Risk Management*. The branch offices are required to strengthen the environmental and social risk management of the whole credit granting, make full use of various information channels to grasp the environmental and social risks of clients in a timely manner, pay close attention to the environmental protection, work safety policies and rectification actions of local governments, focus on verifying the legitimate pollutant discharge of the clients, strengthen the management of environmental and social risk lists, and implement list system management for key clients.

4.1.7 Labor Management System of the HXB

HXB has established comprehensive labor management systems, providing clear documented guidelines and procedures for managing labor and working conditions of direct workers at both headquarter and its branches. The primary labor management policies and procedures are listed and assessed as follows against regulatory requirements and ESS2:

- HXB Labor Contract Management Measures, effective as of 2010;
- HXB Leave and Attendance Management Measures, effective as of 2016;
- Notice Concerning the Regulation of the Payment Base of Social Insurance and Housing Fund, effective as of 2013;
- HXB Employee Training Management Measures, effective as of 2013;
- HXB Employee Congress Management Policy, effective as of 2014; and
- HXB Head Office Staff Hiring Policy, effective as of 2015, HXB Branch Staff Hiring Policy, effective as of 2010.

In order to assess the adequacy of HXB's labor management system, a **Matrix** has been created in **Annex 10** following the structure of *Labor Management Procedures Template* for the purpose of a comparative analysis of HXB's previous labor management system and ESS2. The comparative analysis (details refer to **Annex 10**) concluded that:

- China has a relatively sophisticated framework of laws and regulations governing labor and working conditions, inter alia on preventing child labor and forced labor and regulating workplace health and safety, which apply to all types of labor including direct workers, contracted workers and primary supply workers.
- HXB's labor management system is strictly following PRC's regulations, including the PRC Labor Law (1995) and the Labor Contract Law (2012), which is also generally in conformance with relevant requirements on direct

workers under ESS2;

HXB has put in place multiple well-functioning grievance redress channels which are deemed equally accessible to all workers and adequate to resolute their complaints and grievance.

- This project will reply on HXB's existing labor management system to manage daily operations of HXB's direct workers.
- Labor and working conditions related risk is considered low in nature for direct workers, contracted workers and primary supply workers of sub-projects.
- In the current credit regulations of Huaxia Bank (as demonstrated in *Sections 4.1.1-4.1.5* above) , there is no admittance requirement for workers management of sub-borrowers, contractors and primary suppliers, which is considered as a gap against relevant requirements under the ESS2 and needs to be enhanced as part of the ESMS to avoid, minimize and manage labor and conditions of sub-borrowers direct workers, contracted workers ,and primary supply workers in relation to sub-projects.

The matrix (in **Annex 10**) also spells out enhancement measures adopted as part of this ESMS and ESCP to bring HXB's system under the project to be consistent with relevant requirements of the ESS2, which are summarized as below:

As part of the ESCP, HXB will contractually incorporate labor management requirements consistent with national law and ESS2 in loan agreement for sub-projects.

- A screening check list (see Annex 3) is set up as part of the ESMS to cover labor related risks under the sub-projects for project screening and categorization;
- Sub-project screening will exclude any sub-project involving child labor or forced labor, either in the form of direct workers, contracted workers or primary supply workers in relation to sub-projects (see section 2.4).
- Sub-projects and its contractors are required to have in place a grievance redress mechanism accessible to direct workers and contracted workers (see section 5.4.2).
- HXB will carry out annual E&S monitoring which covers monitoring contractor compliance with their contractual commitments (see section 4.3.3).

4.2 Environment and Social Procedures of HXB

HXB implements its environment and social management through established procedures throughout all the stages of its lending process for sub-projects. The

diagram below indicates the different stages of lending process of HXB. Under the current environmental and social policy, the environment and social risks management are built into each step of the process.

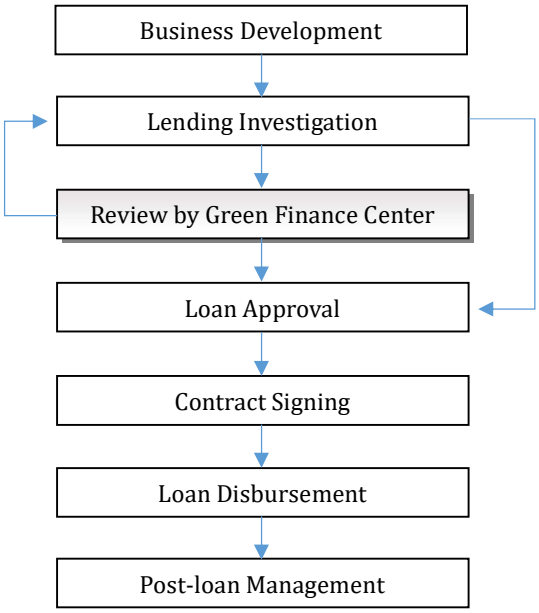


Figure 1 Environmental and Social Management Procedures

4.2.1 Business Development

In the stage of business development, environmental and social risks screening is conducted by client managers or sub-project management teams of HXB, which will identify those sub-projects that meet the basic criteria under the Project.

In terms of environmental and social management, the sub-project teams will first determine whether potential sub-project belongs to those on the list of exclusion with high environmental and social risks. If potential sub-project belongs to the list of exclusion, it will not be qualified. Secondly, the sub-project management teams will investigate and preliminarily determine whether the potential sub-project meets the requirements of HXB environmental and social management system. Along with financial and technical documents for the sub-projects, the clients are also required to provide all relevant certificates or approval documents from environmental protection, land resources, labor and production safety departments. These documents will be further reviewed and investigated or registered in the next steps of loan application process.

4.2.2 Lending Investigation

Environmental and social risk data collection of potential client and project is very important for HXB in making decisions on lending approval process. After

identifying eligible sub-project candidates in the business development stage, sub-project management teams of HXB will carry out detailed investigation on potential client for their performance on environment and social management based on their unique situation and from various aspects, such as energy consumption, pollution, land acquisition, health, safety and resettlement.

In the process of investigation, HXB staff will rely on both primary (field visit to the enterprises and sub-projects) and secondary information and utilize the information from government sources, credit system, and different environmental protection information systems. After collection of relevant information, the loan officer provides environment and social risk rating for the client based on sector sensitivity and actual performance in accordance with HXB's classification system, and proceeds with differentiated management approaches accordingly.

For the implementation of the Project in line with requirements of the World Bank ESF, the following additional procedures are to be adopted by HXB at this stage:

- In addition to the client classification by HXB's screening system, HXB client manager or sub-project management team will carry out environmental and social risks assessment for the sub-project following the requirements of the World Bank's ESF. A screening tool (***Preliminary Environmental and Social Risk Screening Form,*** See Annex 3) is to be filled by client manager or sub-project management team for each candidate sub-project.

4.2.3 Preliminary Review and Categorization by Green Finance Center

This is a newly added step in the HXB's normal lending process, specifically established for the implementation of the World Bank's loan project.

For sub-projects applying for the World Bank loan finance, HXB requires one more review by HXB Green Finance Center. All operating institutions are required to submit the investigation package for the potential projects to HXB Green Finance Center for preliminary review. The list of data and documents required for preliminary review include the following:

a) Project approval or registration documents issued by in charge government agencies;
b) Land use certificate or land pre-examination approval document issued by land resources departments;
c) For land acquisition, provide evidence of compensation payment to the affected people or relevant documents; for temporary land occupation, provide compensation or lease agreements with affected people; and the affected attachments, provide copies of compensation agreements or evidence of compensation payment. or compensation agreements with affected people;
d) EIA documents and public consultation statement , or EIA record

registration form;

e) EIA approval document by relevant environment protection agencies;
f) Project feasibility report, or preliminary design or detailed design reports;
g) Approval documents, qualification certificate for certain special sector projects.
h) For those chemical battery storage sub-projects, provide specific practices of treatment of waste battery in accordance with relevant national laws and regulations.

The content of preliminary review by Green Finance Center include: sub-project's eligibility; technical assessment; environmental and social impact assessment; anti-corruption assessment etc. At this stage, the staff of Green Finance Center will be responsible to review the following (if it is necessary the external environmental and social experts will be engaged to facilitate the review):

a) ***Preliminary Environmental and Social Risk Screening Form*** filled by the operating units;
b) EIA documents or EIA record registration form for each sub-project;
c) EIA approval documents issued by relevant local environmental authority;
d) Approval documents related to land use approval;
e) Agreement and/or evidence for compensation of land acquisition and resettlement;
f) Sub-project's feasibility study or preliminary design documents;
g) Other approval documents from relevant government authorities;

To facilitate such review, Green Finance Center staff and/or its external environmental and social consultants shall conduct field visits to all the sub-projects that are to be classified as Substantial risks. Based on the review of above-mentioned documents, Green Finance Center staff and/or the experts will provide the following conclusions:

a) Confirmation whether proposed sub-project belongs to "List of Exclusion". If it is, the proposed sub-project will be rejected.
b) Confirmation on the overall environmental and social risk rating for the proposed sub-project (Low, Moderate, Substantial or High). If a sub-project involves acquisition of more than 50 mu of productive land[12], and displacement of individual households more than five, adverse impacts on Indigenous Peoples or significant risks or impacts on environment, community health and safety, labor and working conditions, biodiversity or cultural heritage, then HXB shall classify this sub-project as Substantial or High;
c) Confirmation whether the sub-project complies with environmental and social national and local laws and regulations. For sub-projects that involve resettlement (unless the risks or impacts of such resettlement are

[12] Productive land includes arable land and pasture ground.

minor), adverse risks or impacts on Indigenous Peoples or significant risks or impacts on environment, community health and safety, labor and working conditions, biodiversity or cultural heritage, relevant requirements of the World Bank's ESSs shall be met too. Necessary documents are to be prepared and reviewed/approved by the Green Finance Center. (A resettlement framework and an ethnic minority development framework were developed and included in Annex 5 and 6 to provide guidance on the preparation of relevant resettlement plans or ethnic minority development plans for those sub-projects identified with substantial social risks).

d) If it is found that assessment and/or mitigation measures cannot meet the above-mentioned requirements, then relevant requirements on additional assessment or plan development shall be proposed. These additional documents shall be re-submitted to the Green Finance Center for compliance confirmation. Depending upon specific situations, these additional documents may include environmental and social impact assessment, resettlement plan, and ethnic minority development plan etc. (see indicative outline of such documents, or resettlement policy framework and ethnic minority development framework in **Annex 4-6**.

e) In the process of preliminary review, the Green Finance Center and its external environmental and social experts may keep timely communication with the World Bank in terms of risk screening, risk categorization and requirements of additional safeguards documentations.

f) For the first sub-project classified as Substantial risk, HXB will send the environmental and social safeguards documents package to the World Bank for prior review and approval. The Bank will retain the right of prior review and clearance of sub-projects with substantial risk until HXB can demonstrate its capacity to manage safeguard issues on its own.

4.2.4 Loan Approval

In the loan approval process, the main focus is to ensure potential client has complete and effective environment and social documents indicating the availability of production authorization, operation permit, project approval document, environment impact assessment, equipment acceptance paper, and performance records of environment and social management by potential clients, ensure that investigation staff have a thorough understanding of the clients' performance on environment and social management, which is one of the important factors for approving the loan.

Once the compliance and completeness of environmental and social documentations are confirmed, the loan approval staff at headquarter and/or local branches will take the environmental and social performance as important factor; carefully consider environmental and social risk of potential client; determine the final risk category for differentiated management; decline the loan for those clients that are classified as "Unsatisfactory" performance; and for eligible clients or sub-projects, environmental and social risks will be indicated and necessary requirement of environmental and social management will be

incorporated into the loan approval and conditions for loan disbursement.

4.2.5 Contract Signing

In signing contract for all sub-borrowers, provisions will be included in the contract, which requires sub-project borrowers to have commitment and resources to implement environmental and social management measures as specified in the relevant safeguards documents. The sub-borrowers will commit to ensure environmental and social performance of each sub-project will be in compliance with relevant national laws and regulations, as well as the requirements of the applicable World Bank ESSs, and agree and accept the supervision and monitoring on environment and social management by HXB and the World Bank. Provision on remedial actions will also be included the contract in case serious violation of environmental and social regulations and ESSs are found during the sub-project implementation.

4.2.6 Loan Disbursement

In loan disbursement process, the client manager will regularly monitor the clients' performance on environment and social management against the conditions set in the loan agreement and urge them to make up measures in case they are not yet fully implemented. For those clients who have not yet met the loan disbursement conditions, no disbursement should be made. For those clients found with serious environment and social risk warning, the loan disbursement should be stopped, and HXB should start the risk warning system in accordance with relevant regulations in the bank.

4.2.7 Post-loan Management

After loan approval, continuous monitoring on environment and social management performance will be conducted by client managers at the local branches as an important part of sub-project monitoring. Specific requirements include:

a) For those Category A and B clients, at least every six months, field visit to the project and assessment of actual environment and social performance by the client should be made. For those clients with relative substantial environment and social risks, more frequent monitoring and assessment (at least quarterly) should be carried out in order to manage the risk.
b) For those clients found with actual environment and social impacts, timely warning system will be set up, and concrete mitigation measures will be implemented.
c) Detailed monitoring and reporting will be prepared on the performance of environment and social management for sub-projects after loan approval, and such information should be updated in the lending information system for continuous management of environment and social risks.

For the implementation of the World Bank project, the following specific actions will be conducted by HXB, including:

a) For those sub-projects with substantial category of environmental and social risk, the

client manager or sub-project management team will strengthen supervision and increase of frequency of field visit to the project to at least once every quarter.

b) For those sub-projects to be financed by the World Bank, the post-loan management should include review and assessment of environmental and social performance of the enterprises/sub-projects, including various aspects, such as energy consumption, pollution control, biodiversity, land acquisition, public health, safety, environmental and social management, and comprehensively monitor and analyze clients' environmental and social risk to be included as part of field visit reports. For substantial risk sub-projects, HXB will assess the performance against the requirements of both national laws/regulations and the World Bank ESF requirements applicable to the sub-projects.

c) The Green Finance Center of HXB Headquarter will involve in post-loan review every quarter for those sub-projects financed by the World Bank including effectiveness, completeness and quality of post-loan supervision reports.

d) During project implementation, for those sub-projects identified with increasing environmental and social risks, the Green Finance Center should document the findings and inform the World Bank. Following the Environmental and Social Management System of HXB and requirements of ESSs of the World Bank, mitigation measures will be developed and implemented, which will be documented in the monitoring reports to be submitted to the World Bank.

4.3 Organizational Capacity and Competency

4.3.1 Management Structure of Green Finance in HXB

The management structure of green financing and responsibilities of each relevant unit in HXB are shown in the following Figure 2 and Table 3.

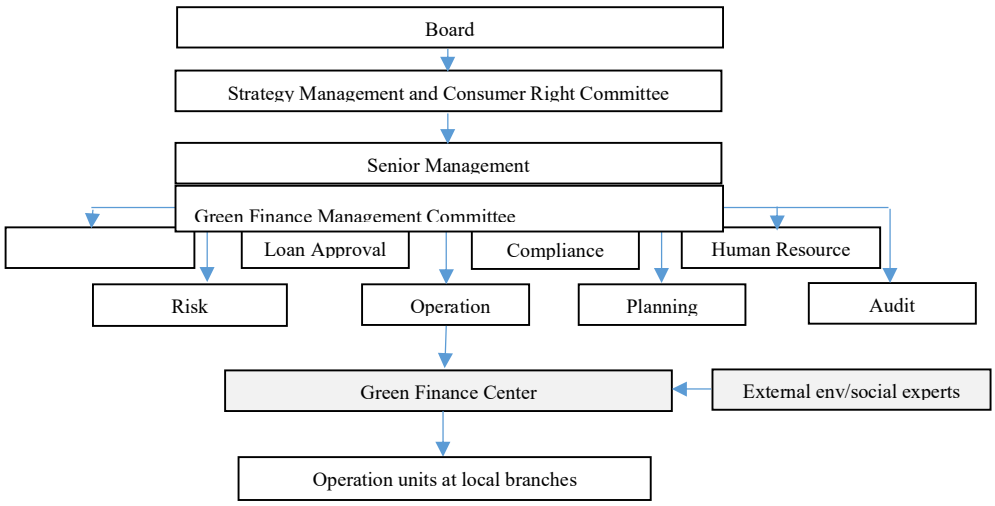


Figure 2 Management Structure of Green Finance in HXB

Table 3 Organizational Responsibilities of Green Finance in HXB

HXB Units	Responsibilities
Board of Directors and its Strategy Management and Consumer Right Protection Committee	Determine the green Finance development strategy following regular work plan and review and approval management proposed green Finance report and supervising the implementation of green Finance .
Senior Management	Formulate the objective of green Finance development, approve and implement the policies and procedures of green Finance , allocate adequate resources to ensure the implementation of green Finance strategy and regularly report the implementation status to the board of directors. One senior manager will be appointed to be responsible for overall environmental and social risk management for HXB, which includes providing guidance in setting up ESMS and supervising implementation of ESMS for the Project.
Green Finance Management Committee	Coordinate the implementation of green Finance strategy; study the green Finance related major issues of HXB; review and approve the green Finance development plan, work plan and promotion programme and the green Finance implementation report submitted to the board of directors; coordinate cooperation on green Finance among the departments of the head office; guide the implementation of internationally cooperative sub-loan projects.
Risk Management Unit	Finalize the lending policy system, including green Finance , identify the key direction and areas for supporting, and determine those sectors with major environment and social risks requiring differentiated and dynamic policies, following relevant national laws, regulations and sector policies and permitting requirements.
Loan Approval Unit	Continuously improve approval details for green Finance , particularly concerning those potential environmental and social risks, and continuous facilitate the lending for the green, low carbon, and circular economy. For those

HXB Units	Responsibilities
	customers with potential environment and social risks, following the green Finance requirement HXB will strictly manage the lending requirement.
Sale Operation Units (Corporate Business Unit, Inclusive Finance Unit, Personal Business Unit, Financial Market Unit,)	Established innovative working mechanism benefiting green Finance . Under the condition of effective risk management, the new mechanism will be instrumental in promoting the process and products as well as innovative services in green Finance .
Internal Compliance Unit	Coordinate all relevant departments and including various compliance review into the scope of internal control regarding implementation of green Finance .
Audit Unit	Regularly carry out internal audit review on green Finance and might conduct special audit if it is necessary.
Planning Unit	Give priority in allocating business and financial resources to green Finance department and include performance of green finance as part of performance review.
Human Resource Unit	Provide relevant support to green Finance on human resources aspect and will include green Finance lending into the performance review system. Under these arrangements, the headquarter of HXB and other departments will implement relevant policy requirements and actively carry out green Finance activities.
Green Finance Center	The Green Finance Center is under the operation department of the headquarter, which is responsible for promoting operation control, market development of green Finance in the entire bank, developing and managing new product, environmental and social risk management and cooperating with international financial agencies and on lending requirements. The main work include: (1) participating in formulation of green Finance policies in the bank based on studying green Finance market and sector policies, and proposing relevant market strategies and implementation measures and organizing the implementation; (2) setting up management details on green Finance business and on-lending operation and organizing implementation; (3) national and regional green Finance sub-projects implementation management; (4) coordinating and guiding on-lending operations to branches, and organizing experience exchange and staff training; (5) Organizing and guiding credit investigation, post-loan management and loan repayment of local branches; internal compliance verification and risk management of green Finance ; etc.
External environmental and social experts	Assist the Green Finance Center to conduct environmental and social screening and due diligence for potential sub-projects, review safeguards documents against the ESMS requirements, monitor the compliance of sub-projects' environmental and social performance during implementation with the provision of necessary supports.
Green Finance teams in local branches	Environmental and social compliance investigation prior to loan agreement, and post-loan monitoring of environmental and social performance.
Sub-project management teams from branch offices	Responsible for environment and social compliance investigation for sub-project during loan application and monitoring and evaluation of environmental and social performances of sub-project after loan approval.

The Green Finance Center is the key implementation unit for managing the World Bank loan project. It includes two divisions with a total of 11 staff:

- Project Management Division is responsible for managing loans and grants from the World Bank and other international financial agencies, including application and implementation of green Finance activities and management of GEF grants, environmental and social risk management, etc.
- Marketing Division is responsible for business management, business planning, promotion and product development and introduction concerning green Finance as well as business development, product management and training and statistics.

The Green Finance Center is staffed with experienced professionals familiar with banking process, sector background, and relevant technical and legal aspects of green Finance . Each staff is fluent in both English and Chinese and able to communicate with staff of the World Bank and other international partners. At the same time, there are designated staff responsible for managing environment and social aspects of the project.

The institutional arrangements provide the basis of the environmental and social management system for HXB. The key objective of the current environmental and social management system is to ensure all lending operations, particularly green Finance , will comply with national laws and regulations on environmental and social management so that potential environmental and social risks could be minimized or mitigated. Such system was assessed by the World Bank team during preparation of Innovative Finance for Pollution Control in Jing-Jin-Ji Project (PforR) and considered as adequate in managing minor and moderate environmental and social risk during the PforR program implementation. Such assessment was confirmed during program implementation based on findings of regular Bank supervision missions and environmental and social monitoring reports in the past two years. By requesting submission of all relevant environmental and social related documents by sub-project sponsors, the current environmental and social management system could ensure all sub-projects are carried out in compliance with national law and regulations.

During the Project implementation, HXB has improved its organizational structure and staffing as well as its ESMS following the ESCP. In November 2019, HXB established Green Finance Management Committee following the requirements of ESCP. Its objectives are to promote the marketing and management of the Project, conduct the coordinated management of green Finance in HXB and provide guidance for green Finance . Its establishment highlights the HXB's emphasis on green Finance , which can facilitate the implementation of the Project and is conducive to the coordination of resources to promote the development of green Finance . In the second half of 2019, HXB conducted the reform of risk system where the green Finance management and environmental and social risk management responsibilities were assigned to

Green Finance Center. The Center then added the corresponding posts and employed qualified workers. In particular, Green Finance Center recruited dedicated environmental and social experts to undertake environmental and social management for the Project and HXB, and they took their office in November 2019. Two external environmental and social experts with at least 10 years of experience were hired in 2020.

4.3.2 Enhancements of ESMS for World Bank Project Implementation

The new requirements of the World Bank ESS9 on Financial Intermediaries, involve a more robust approach by HXB in carrying out consultation with affected people and communities, identifying potential environmental and social impacts and formulating mitigation measures to be included in required safeguard instruments. Huaxia Bank will ensure proper institutional arrangement as specified in the ESMS, which includes (i) assigning a senior manager in charge of environmental and social risk management for the Project; (ii) recruiting at least one directly employed environmental and social risk management specialist at Green Finance Center to manage project-related environmental and social risks during implementation; (iii) hiring at least two qualified external environmental and social experts with at least 10 years of relevant experience; and (iv) carrying out staff capacity training among sub-project management teams in branch offices.

A. Senior Management

HXB will appoint one senior manager at the headquarter to be responsible for overall environmental and social risks management for all lending business, particularly green Finance business. The senior manager shall be kept informed of environmental and social risks management status of all the sub-projects under the World Bank Project and provide guidance and support on fulfilling the environmental and social requirements of both national laws/regulations and applicable World Bank ESSs.

B. Green Finance Center

In order to facilitate implementation of proposed new Project and meet the requirements of ESS of the World Bank and ESMS of HXB, Green Finance Center will recruit at least one directly employed environmental and social risk management specialist at Green Finance Center in order to strengthen project environmental and social management and coordinate HXB loan processing department, loan review and approval department, and sub-project management teams from branch offices to carry out environmental and social risk management in accordance with ESMS during entire lending process, from lending investigation, lending approval, to post loan management.

C. External Environment and Social Experts

To better implement the earlier World Bank and the AFD financed projects, HXB has established a team of external environmental and social experts to review issues related to environmental and social risks and impacts. To support the implementation of the Project and to meet the World Bank's ESF requirements, the external expert penal on environmental and social management will be further developed. The key qualification and responsibilities of appointed external environmental and social experts are elaborated in the table below.

Table 4 Key Qualification and Responsibilities of External Environmental and Social Experts for the Project

	Environmental experts	Social experts
Key Qualification	1) Having strong expertise in environmental impact assessment and environmental management with at least 10 years' experience in this field. 2) Familiar with both the World Bank's and China's environmental policies and legislation, with recent experience of World Bank-financed projects in last three years. 3) Familiar with energy sector.	1) Having strong expertise in social impact assessment and social management with at least 10 years' experience in this field. 2) Familiar with both the World Bank's and China's social policies and legislation, with recent experience of World Bank-financed projects in last three years. 3) Familiar with energy sector.
Key Responsibilities	1. Assist HXB to conduct environmental screening and environmental due diligence for potential sub-projects. 2. Assist HXB to review environmental safeguards documents against the ESMS requirements during sub-project preparation. 3. Assist HXB to monitor environmental compliance of sub-projects during implementation with the provision of supports to improve the performance when needed. 4. Assist the HXB in implementing the approved Environmental and Social Management System (ESMS) for the Project. 5. Assist the HXB to carry out capacity building on environmental management for the sub-borrowers. 6. Assist the HXB to update the ESMS when necessary.	1. Assist HXB to conduct social screening and social due diligence for potential sub-projects. 2. Assist HXB to review social safeguards documents against the ESMS requirements during sub-project preparation. 3. Assist HXB to monitor the compliance of social performance during sub-project implementation with the provision of supports to improve the performance when needed. 4. Assist the HXB in implementing the approved Environmental and Social Management System (ESMS) for the Project. 5. Assist the HXB to carry out capacity building on social management for the sub-borrowers. 6. Assist the HXB to update the ESMS when necessary.

Currently, Chen Hongai, a social expert, was hired by HXB.

Chen Hongai, female, graduated from Shandong University, and now serves as Deputy Director and Research Fellow of Institute of Sociology, Shanxi Academy of Social Sciences. Since 2000, she has presided over 18 loan projects of the World Bank and Asian Development Bank concerning Resettlement Plan (including Due Diligence Report), social evaluation and external testing and evaluation, with rich experience in social management of the World Bank projects.

Zhou Fuqiu, an environmental expert, was hired by HXB.

Zhou Fuqiu, male, graduated from School of Energy Science and Engineering, Harbin Institute of Technology, and obtained the Doctor of Engineering. He is the Director and Research Fellow of Energy System Analysis and Research Center, Energy Research Institute, National Development and Reform Commission, and mainly engaged in the economic evaluation of green intelligent energy technology and research on the market-oriented and industrialized development of integrated energy services.

Next, HXB will hire experts familiar with the operation of international financial institutions, environmental due diligence and external monitoring to carry out relevant work. The technical assistance of the World Bank involves the recruitment matters of experts. The schedule of the re-engagement of environmental experts will be determined by the technical assistance arrangements.

D. Capacity Training

Given the new application of the World Bank ESSs and nature of battery storage as an emerging sector, additional staff capacity training is needed and shall be implemented as part of the project implementation, to strengthen environmental and social risk management capacity and skills at HXB headquarter and local branches for better and effective risks and impacts management. Therefore, a training plan has been developed in Chapter 6 of this ESMS (see Chapter 6 for details).

Upon the approval of ESMS for the Project by the World Bank, HXB has made the corresponding institutional arrangements in accordance with the provisions of ESMS. (1) In the second half of 2019, HXB assigned the environmental and social risk management responsibilities of the credit business to Green Finance Center. Manager of the Project Management Office started to improve HXB's environmental and social management following the management ideas in the World Bank's ESF. (2) HXB recruited dedicated environmental and social experts to be responsible for the environmental and social management for the Project, and they took their office in November 2019. (3) HXB hired two external environmental and social experts with at least 10 years of experience in 2020. (4) HXB organized the training on ESMS for green Finance business personnel in August 2019.

4.3.3 Monitoring and Reporting

During the implementation of sub-projects, HXB headquarter and its branches have established an environmental and social performance monitoring and reporting mechanism. The specific contents include:

a) Client managers at local branches conduct periodic field inspection according to the post-loan management procedures to keep tracking of the environmental and social performance of the client;
b) Client managers/local branches keep records of field inspection, and provide

annual reports on the environmental and social performance to the Green Finance Center at the headquarter of HXB;

c) In case non-compliance is identified during sub-project implementation, HXB will request time-bound remedial action by the client. If the client failed to address the non-compliance by the time required, HXB will adopt necessary remedial actions, including suspending loan disbursement.

For the implementation of the World Bank project, HXB will have the following monitoring and reporting procedures:

a) HXB shall keep the World Bank timely informed of the increase of environmental and social risks of sub-projects, especially when any High risk sub-project(s) is identified and to be funded by the Project. According to the exclusion list, "High" risk sub-projects are not eligible for Finance under the Project, until agreed by the World Bank. In case "High" risk sub-projects are to be funded, HXB shall obtain the prior approval of the World Bank in the risk screening stage. Meanwhile, the World Bank will upgrade the overall project risk level to "High" following the requirement of ESF.

b) If HXB finds that any incidents or accidents happen during the sub-project implementation, it will immediately report to the World Bank on: enterprises/sub-project involved; nature of accident; time and location, known damages and injury/fatality, whether it has been controlled, actions taken by clients/government departments; reason of accidents (or whether investigation has been engaged), preventive measures of the client for future accident prevention etc. The World Bank will follow up with HXB on the tracking of accidents investigation and resolution as necessary;

c) HXB will submit annual environmental and social report on the World Bank portfolio by engaging with external environmental and social experts, including environmental and social management setup and procedures, environmental and social risks of all sub-projects, environmental and social performance of clients, key issues identified and remedial actions, any accidents related information etc.

d) The content of environmental and social report will cover all sub-projects implemented during the monitoring period with more focus on the sub-projects identified with moderate or substantial environmental and social risks. For each sub-project with moderate and substantial environmental and social risk, detailed information should be provided on scope of impacts, mitigation measures provided, assessment of environmental and social performances of clients, and key issues identified as well as remedial actions need to be taken.

e) For those sub-projects identified with substantial social impacts due to land acquisition and resettlement or ethnic minorities, following RPF and EMDF, separate external monitoring reports should be carried out accordingly based on provisions of the resettlement plan and ethnic minority development plan.

5. STAKEHOLDER ENGAGEMENT

5.1 Identification and Analysis of Key Stakeholders

For the project, stakeholders refer to groups and individuals who will be affected by those sub-projects financed by HXB and those groups and individuals who might have interest in the project. The stakeholders cover a wide range of parities. They include staff of HXB from both headquarter and branch offices, potential borrowers from HXB, and various government agencies, contractors, and related enterprises involved in implementation of sub-projects as well as those individuals and groups who might be affected during construction and operation of individual sub-projects to be financed by HXB.

Primary stakeholders identified for the Project would include the responsible FI (HXB), sub-borrowers under this project, entities to be installed with energy storage systems (e.g. grid company, RE developers, etc.), communities located close to the sub-projects, suppliers of batteries and equipment, contractors for construction and equipment transportation, vendors for disposal of waste batteries, project beneficiaries, sector specialists (including Energy Storage Association) and relevant government authorities for approval of sub-projects. Namely, the responsible government bureaus would include, but not limited to Power Bureau (for approval of grid access), Ecological and Environmental Protection Bureau, Fire-fighting Brigade, Administration of Work Safety, Natural Resources Bureau and Ethnic Minority and Religious Bureau (for confirming status of ethnic minorities in sub-project areas). Initial due diligence identified grid companies, big data centers, industrial parks, enterprises and the public will benefit substantially from the Project.

Among these stakeholders and interested parties, the staff of HXB, potential sub-borrowers of HXB and those groups and individuals who might be directly affected during the construction and operation of those sub-projects are key stakeholders as they are most relevant with the implementation of environment and social management system. The potential environment and social impacts of the Project will be directly brought by those potential sub-borrowers of HXB through construction and operation of individual sub-projects.

Based on the project design, the potential sub-borrowers of HXB for the Project will mainly include those enterprises involved in development renewable energy storage system in order to improve efficiency of renewable energy usage and reduce renewable energy curtailment. On the generation side, they would involve a range of enterprises in renewable energy power generation by investing on installation of battery storage systems in existing wind farm and solar power plants and deployment of advanced wind/solar power forecast systems, which provide additional capability and flexibility to power systems to dispatch RE and avoid curtailments. On the grid side, regional and local grid companies could also be potential borrower by investing on installation of battery storage systems in existing substations in order to provide additional capability to power systems to better integrate wind and solar power and reduce RE curtailment; improve the

connections of the existing distribution network or grid to improve the transmission efficiency of renewable energy; and construct the mircogrid and energy Internet construction projects mainly consuming clean energy. On the demand, various enterprises of RE energy users including big data centers and industrial park could be potential borrowers by investing on installation of battery storage systems in existing industrial zones or commercial consumers to meet the peak demand. In addition, potential borrowers also include those enterprises involved in development of distributed RE with storage and installation of battery storage systems in microgrids and 'behind the meter' at consumer sites to complement distributed renewable energy generation and other services. The storage systems could enable the distributed VRE more dispatchable and grid-friendly. The potential borrowers also include some enterprises piloting and scaling up of RE for heating. This is an emerging use of RE in China and the world. In China, it would consist of using VRE electricity to displace coal consumption for heating. Additional commercial arrangements or investments will be made to increase the VRE generation to meet this additional electricity consumption. Commercial arrangements include direct contracting, purchasing of green certificates, or administrative measures to increase the utilization hours of RE. Other innovative use of VRE that can be proved to reduce RE curtailment or increase RE use efficiently, such as integrated PV (iPV), hydrogen, heating pump.

Most of these potential sub-borrowers from HXB are state owned or privately-owned enterprises involved in renewable energy development, electricity generation, transmission, and distribution, as well as micro grid development for renewable energy utilization. Most investment activities by these enterprises to be financed by HXB will be concentrated on installation of storage battery facilities in order to improve efficiency use of renewable energy and reduce curtailment which appear to have limited potential environment and social impacts. Based on visit to a range of such facilities and consultant with similar enterprises, it seems that most of battery storage construction would involve low to moderate environment and social impacts. That is because most invested battery storage facilities could be accommodated within existing power plant site or substation site with little or no land acquisition. Only in the case of installation of battery storage in new renewable energy plants, where entire new renewable energy plant is identified as an associated facility, more substantial social and environment impacts due to construction of new renewable energy plant could be expected. If new renewable energy plants, especially wind power plants, are close to natural habitats, key biodiversity regions and important species migration paths, they need to fully communicate and cooperate with NGOs for natural conservation. Most such impacts associated with some renewable energy plants such as new windfarms and concentrated solar power would be moderate, including permanent and temporary land acquisition in rural areas, normal construction impacts, as well as potential environment impacts during operation of these plants. If they are located in western provinces with high concentration of ethnic minority population, sub-projects with presence or impacts on ethnic minority communities could not be ruled out.

With regard to energy storage sub-projects to be synchronously constructed with

new wind farms and solar PV power stations, heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations, and energy storage sub-projects to be constructed in the existing power plants, the Project still only invests in the energy storage part, and the new wind farms and solar PV power stations will be managed as associated facilities. Their stakeholders remain unchanged after analysis, including responsible financial intermediary (i.e. Huaxia Bank), sub-borrowers under the Project, entities to be installed with energy storage systems (e.g. grid company, RE developers, owners or contractors of existing power plants, etc.), communities near the sub-projects, suppliers of batteries and equipment, contractors for construction and equipment transportation, vendors for disposal of waste battery, project beneficiaries, sector specialists (including Energy Storage Association) and relevant government authorities for the approval of sub-projects. Grid companies, enterprises and the public will benefit substantially from the Project.

As for biomass gasification sub-projects, the identified main stakeholders include responsible financial intermediary (i.e. Huaxia Bank), sub-borrowers under the Project, communities near the sub-projects and equipment suppliers, contractors for construction and equipment transportation, project beneficiaries, sector specialists and relevant government authorities for the approval of sub-projects. Most of the potential borrowers are state owned or privately owned enterprises involved in the production of natural gas with biomass energy. The government departments in charge include but are not limited to national project approval department, ecology and environment department, work safety administration, natural resources department and ethnic and religious affairs administration (for confirming the situation of ethnic minorities in the sub-project location). Preliminary due diligence found that the rural areas and farms that provide biomass raw materials, enterprises and the public would benefit substantially from the Project. Among these stakeholders and interested parties, the staff of HXB, potential borrowers of HXB and those communities and individuals who might be directly affected during the construction and operation of those sub-projects are key stakeholders as they are most relevant with the implementation of environment and social management system. The potential environment and social impacts of the Project will be directly brought by those potential borrowers of HXB through construction and operation of individual sub-projects. After the investigation of such facilities and visits to similar enterprises, it is found that the land in the industrial park is used generally with little or no land acquisition. However, these sub-projects may cause some environmental impacts such as odor, flue gas, biogas residue and biogas slurry leakage, so they should be managed strictly.

Huaxia Bank has held relevant meetings with stakeholders to consult their opinions on the Project preparations. The revised ESMS was publicized on December 14, 2020. No feedback and suggestions have been received currently.

In such cases, environment and social issues like land acquisition, indigenous people engagement, labor laws, and community health and safety need to be addressed. In order to ensure that proper mitigation could be developed to address such impacts, and affected people in those sub-project could be

consulted regarding various mitigation measures, HXB established a screening system and a set of procedures under ESMS to ensure for those sub-projects that will involve with potential environment and social impacts, affected people will be consulted and stakeholders will be engaged during the preparation and implementation of individual sub-projects.

5.2 HXB's Requirements on Stakeholder Engagement for Sub-projects

Following the World Bank's requirement of Environment and Social Framework (ESF), HXB has developed an environment and social management system for the proposed Project in order to address potential environment and social impacts. Under the environment and social management system, a screening process has been established which will divide all potential sub-project into different groups based on their potential environment and social impacts. For those sub-projects with low or moderate social and environment impacts, which cover most sub-projects involve in installation of battery storage facilities from renewable energy power generation, grid transmission and distribution, and power utilization, since most of investment activities are installation of battery facilities within the existing power plants, substations or premises of existing enterprises. For those sub-projects with substantial environmental and social risks, stakeholder identification and engagement will be carried out throughout sub-project preparation and implementation. The focus of this engagement will be those people and communities affected by the sub-project.

To ensure the consultation process is effective and meaningful, a stakeholder engagement plan has been developed and included as Annex 7, which include basic principles, timeline and detailed procedures for stakeholder engagement, and disclosure requirement for both HXB and sub-project sponsors. For HXB, the stakeholder engagement refers mainly to consultation and disclosure among potential borrowers in relevant sectors, key government authorities, and professional associations. For sub-project sponsor and HXB branch office, the stakeholder engagement will be concentrated on local government agencies and potential affected communities and individuals as well as interested parties such as contractors and potential beneficiaries. Since the potential environmental and social impacts of the Project will be mainly through implementation of various sub-projects, stakeholder engagement for sub-project sponsor will be more relevant for environmental and social management for the Project.

Such stakeholder engagement plan will be mainly carried out by sub-project sponsors under the requirements and guidelines set out by HXB. Once potential environment and social impacts are identified and considered as moderate, and substantial, a set of safeguard instruments need to be prepared in accordance with environment and social management system and included as part of sub-project loan application package. As agreed in the environment and social management system, for those sub-projects classified as moderate and substantial environment and social risk, in order to develop appropriate measures to minimize such impacts, sub-project sponsor should develop a set of safeguard instruments, including environment and social assessment, resettlement plan or ethnic minority development plan. They will be assisted by

HXB branch office staff and HXB Green Finance Center staff, as well as selected external environment and social experts. In the process of developing relevant safeguard instruments, extensive consultations will be carried out with affected communities and individuals to inform them potential impacts, basic project design and proposed compensation and rehabilitation measures to address such impacts.

5.3 Public Consultation and Information Disclosure for the ESMS

Based on the identification of key stakeholders, public consultation and information disclosure activities have been undertaken during the development of this ESMS, as presented below.

5.3.1 Information Disclosure

According to relevant laws and regulations of China and the ESF of the World Bank, the draft "Environmental and Social Management System" of Huaxia Bank has been disclosed on the official website of Huaxia Bank (http://www.hxb.com.cn/index.shtml).

The first round of information disclosure was carried out for the first draft ESMS from January 21 to February 11 in 2019. No objection was received.

For the new sub-projects, Huaxia Bank has updated the ESMS and ESCP as well as Stakeholder Engagement Plan. The Stakeholder Engagement Plan was attached to the ESMS and published on the official website of Huaxia Bank (https://www.hxb.com.cn/jrhx/khfw/zxgg/2020/12/14/69404.shtml) on

December 14, 2020. No feedback and suggestions have been received currently.

For the new sub-projects, Huaxia Bank has updated the ESMS and ESCP as well as Stakeholder Engagement Plan，three documents have been cleared by the World Bank, and also published on the official website of Huaxia Bank (https://www.hxb.com.cn/jrhx/khfw/zxgg/2021/05/25/74692.shtml) on May 25 2021 No feedback and suggestions have been received currently.

5.3.2 Stakeholder Consultation Meetings

On January 25 and February 15, 2019, HXB held two stakeholder consultation meetings in Beijing regarding draft ESMS.

Summary of the consultation meeting on January 15: HXB first introduced the general content of ESMS and process and method of its preparation. Then comments and suggestions were collected from various stakeholders by HXB, which were mainly concentrated on (1) findings and conclusions of initial screening of environmental and social impacts for the Project; (2) proposed management procedures under ESMS; and (3) proposed stakeholder communication arrangement. The representatives of participating enterprise, research institutes, design institutes and industrial associations expressed support for the draft ESMS by HXB, and believe that: (1) current version of ESMS has a clear structure; (2) additional due diligence on battery manufacturers will be needed; and (3) no changes to ESMS at present.

Summary of the consultation meeting on February 15: Based on the ESMS (February 2019), HXB first introduced to all participants the overview of the project, key aspect of ESMS, relevant existing laws and regulations of China and the gap with the ESF of the World Bank, environmental and social management process of the project of HXB, and the stakeholders engagement plan. For the updated ESMS, HXB focused on consulting the opinions and suggestions of various stakeholders on the following issues: (1) contents and conclusions of the preliminary screening of environmental and social impacts in this ESMS; (2) contents and conclusions of due diligence on the energy storage industry; (3) proposed procedures under ESMS; (4) efforts or measures to be taken to ensure enterprises of sub-projects could meet ESMS requirements; and (5) activities or measures sub-projects could adopt to strengthen the existing management system of environmental and social risk management. Relevant government departments, enterprise representatives, industrial associations, design institutes, research institutes and other stakeholders attending in the meeting all supported the project and stated that the project could help solve the problem of renewable energy consumption, improve the grid dispatching and operation, enhance the energy utilization rate, build a sound smart grid, guarantee the safety of the power system, and bring about positive environmental and social benefits in terms of global climate change. The participants agreed that: (1) the updated ESMS has clear structure, comprehensive consideration, and strong operation likelihood with no objection; (2) The participants discussed extensively the main environmental and social risks and possible impacts of the project, and believed that the preliminary screening of environmental and social impacts of the project in ESMS was informative and clear in conclusion, which reflects the actual situation of the existing pilot project. The participants believed that the main risks of energy storage projects are fire and safety risks. The TA activities in parallel to the Project could provide supports to improve the safety assessment standards of energy storage projects (especially container projects) and promote their application; (3) Participants believed that ESMS shall fully consider the environmental and social risks that may arise from energy storage projects, which could help encourage enterprises to meet both the requirements of Chinese laws and regulations and the ESF of the World Bank; (4) All participants agreed that no revision is needed on this version of ESMS at present. Detailed meeting minutes of these two consultations were included in Annex 10.

5.3.3 Follow-up publicity and disclosure arrangements

The ESMS of HXB will be subsequently disclosed to the public and potential borrowers through the information manual distributed during the publicity and promotional activities of the project and through the official website of Huaxia Bank.

5.3.4 Information disclosure of specific sub-projects

For individual sub-projects, particularly those sub-projects identified as substantial environmental and social risks, information disclosure will be carried out in the local project areas throughout the process of project preparation and implementation. The project sponsor should provide affected communities and individuals with access to the key information in a timely manner that allows meaningful consultations with stakeholders on project design and development of mitigation measures. They include (1) the purpose, nature and scale of the project; (2) duration of project activities; (3) potential risks and impacts to be brought by the project and proposed mitigation measures; (4) the proposed stakeholder engagement process; (5) the time and venue of proposed public consultation meetings; and (6) process and means by which grievance can be raised and will be addressed. The sub-project information will be disclosed in relevant local language and in a manner that is acceptable and culturally appropriate.

5.4 Grievance Mechanism

In order for HXB and sub-project sponsor to respond to concerns and grievance of project affected people related to environmental and social performances of the project in a timely manner, a grievance mechanism to receive and facilitate resolution of such concerns and grievances has been proposed. The grievance mechanism is expected to address concerns promptly and effectively in a transparent manner that is culturally appropriate and readily accessible to all project affected parities at no cost and without retribution.

During implementation of the Project, concerns or complaints may arise related with environmental and social performances. In order to ensure that the affected people can voice their complaints, a grievance mechanism is established within this ESMS and also in relevant safeguard instruments such as RPF and EMDF. The purpose of this grievance redress procedure is to provide a mutually satisfactory means for rapid response to any APs complaint, to avoid any likelihood of a complicated legal procedure. The detailed procedure is as follows:

5.4.1. Grievance Mechanism for Overall Project

For the staff and workers of HXB, a grievance redress mechanism is included in HXB's existing labor management system. Workers can raise their workplace concerns though various in place channels such as worker's organizations, human resources department, headquarter disciplinary supervision committee, etc. Workers are easily and equally accessible to the grievance redress mechanism. Any kind of reasonable grievances raised by the workers will be timely redressed and the complaint will be informed of the resolution. HXB labor

management system does not impede the worker's right to access to arbitration procedure and/or judicial system to seek resolution on the grievances. Currently grievance redress mechanisms are well-functioning and deemed adequate to address the worker's complaints and grievances.

For complaints or concerns directly related to the project during implementation with regards to the eligibility of sub-projects, lending procedures or environmental and social management requirements under the Project will be collected and addressed following the procedures as below:

- The affected person or interested party should firstly voice his or her concern to relevant branch office staff, which will take records and consult with relevant departments and provide an reply or resolution to the affected person or interested party with 15 days.
- If the affected person or interested party still does not accept the proposed resolution, he or she could appeal directly to HXB Green Finance Center by calling HXB headquarter customer center 95577.
- HXB Green Finance Center after receiving appeal through customer center will provide response, reply or a resolution within 15 days.
- If the dispute still cannot be resolved, then the affected person can appeal to HXB management.

The HXB Green Finance Center is responsible for keeping records of all appeals, and the resultant resolutions, which will be reported to the World Bank through the annual environmental and social monitoring mechanism.

5.4.2. Grievance Mechanism for Sub-projects

At sub-project level, two kinds of grievance mechanism will be set up, including one is the main grievance mechanism integrating elements to make it accessible to affected persons and other interested parties and another for sub-project workers.

Grievance mechanism for sub-projects is established under the Project in order to address any complaints directly towards sub-projects in reference to their environmental and social impacts and performances of relevant mitigation measures. The sub-project should adopt this grievance redress mechanism on the ground prior to sub-project implementation or use in place alternative mechanism that can achieve objectives materially consist with this grievance mechanism. Sub-project grievance mechanism should be made accessible to the affected persons (e.g. displaced persons, ethnic minorities) and other interested parties in the project area of influence. Since potential environmental and social impacts of the Project are mainly caused by implementation of individual sub-projects, the grievance mechanism for sub-project is more relevant for addressing potential complaints regarding environmental and social aspects, which is also included in relevant safeguard instruments such as RPF and EMDF. The detailed procedures of GRM are as follow:

- If any affected person does not satisfy with the compensation or mitigation measures related with social and environment impacts caused by the sub-project, he/she can voice their complaint to the local township government, which will take records, consult with the responsible agency and provide a solution to the affected person.
- If the affected person still does not accept the proposed resolution, then they can appeal directly to the sub-project sponsor or local city or county responsible agency, which is the main organization responsible for the whole sub-project. The sub-project sponsor or local city or county responsible agency should make a record of any appeal and provide a resolution.
- If the dispute still cannot be resolved, then the affected person can appeal to relevant HXB branch office or headquarter; The affected party can go through an administrative appeal according to the "Administrative Procedure Law of People's Republic of China"; or go directly to the People's Court. The HXB Green Finance Center is responsible for keeping records of all appeals, and the resultant resolutions.

The sub-project borrower is also required to have in place adequate and culturally appropriate channels accessible to all project workers for reporting workplace related concerns and grievances as follows:

- The sub-project will utilize existing workplace grievance reporting system with the borrower to collect and address the concerns and grievances of directed and contracted workers.
- If there is no existing grievance mechanism or existing grievance mechanism does not work effectively, project specific arrangement will be made as needed to supplement.
- For unsatisfied grievances that are not addressed through above internal channels, the sub-project workers can resort to judicial or administrative remedies available under the law or through existing arbitration procedures.

The affected local population, other interested parties and sub-project workers will be informed of their right to appeal through disclosure of proposed sub-project and grievance mechanism by various mass media in the project area. The project will also publicize information about ESMS and grievance mechanism through Huaxia Bank official website. The sub-project is responsible for keeping records of all grievances and resolutions and report to HXB through the routine monitoring and reporting mechanism.

6. CAPACITY BUILDING AND TRAINING PLAN

HXB has been working with the World Bank for years in the fields of energy efficiency and air pollution control, with multiple projects implemented,

including China Energy Efficiency Finance (I and II), Jing-Jin- Ji Air Pollution Control Program for Results etc. Therefore, HXB has accumulated rich experiences of World Bank's environmental and social safeguards policies, and with satisfactory performance track records.

As the World Bank new ESF applies to this project, which has broader and more detailed requirements based on previous safeguards policies. In addition, this project focuses on energy storage field, which is also an innovative field compared with previous World Bank projects implemented by HXB, thus presents new challenges in terms of technical, economic, safety, environmental and social concerns.

With regard to energy storage sub-projects to be synchronously constructed with new wind farms and solar PV power stations, heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations, and energy storage sub-projects to be constructed in the existing power plants, the Project still only invests in the energy storage part, and the new wind farms and solar PV power stations will be managed as associated facilities. Although biomass gasification sub-project is a new field, HXB has accumulated rich experience in the construction of RE sub-projects such as wind power, PV and biomass utilization in the implementation of Jing-Jin- Ji Air Pollution Control Program for Results. The Project will adopt new ESF of the World Bank during its implementation, and HXB will improve its ability and level of environmental and social risk management.

Therefore, a capacity training plan is developed as part of the project implementation, to strengthen environmental and social risk management capacity and skills at HXB headquarter and local branches for better and effective risks and impacts management and realization of green and sustainable development objectives of the Project

Table 4 Capacity Training Plan

Trainee	Contents	Time	Person-times	Budget (RMB)
HXB senior management, headquarter units related to green Finance review/approval	· National laws and regulations on environmental and social risks and impacts management; · HXB environmental and social management system; · World Bank ESF; · ESMS of the World Bank project	1 day Prior to loan effectiveness	10	10,000
HXB Green Finance Center, external environmental and social experts	· Emphasis on detailed requirements and procedures of ESMS; · Key requirements of World Bank ESSs; · Project monitoring and reporting requirements	2 days Prior to effectiveness of loan	8	20,000
Relevant units at HXB local branches	· National laws and regulations on environmental and social risks and impacts	1day/ once a year	To be determined	100,000

	management; · HXB environmental and social management system; · World Bank ESF; · ESMS of the World Bank project			
Client enterprises applying World Bank loan	· Implementation requirements of ESMS; · Environmental and social management plan, stakeholder engagement, grievance redress system · Key requirements of World Bank ESSs	1 day each time	To be determined	100,000

Upon the approval of the Project by the Board of Executive Directors of the World Bank and under its support, HXB conducted capacity training, with the implementation details as follows:

1. At the President's Office meeting in March 2020, Director of Green Finance Center reported the progress of the Project to the HXB senior management and headquarter units related to green Finance review/approval, and introduced domestic laws, regulations, policies and procedures related to environmental and social risk management; HXB's ESMS and the World Bank ESSs and ESMS of the World Bank project. The first part of the training plan has thus been completed.

2. On June 3-June 5, 2019, HXB Green Finance Center staff and external environmental and social experts participated in the second round of the training for project implementation staff of ESF organized by the World Bank in Hangzhou. The second part of the training plan has thus been completed.

3. In August 2019, HXB Green Finance Center held a green Finance training in Beijing and invited environmental and social experts from the World Bank to train green Finance staff from 42 branches nationwide of HXB on the World Bank ESSs. It also trained the trainees in laws, regulations, policies and procedures related to the environmental and social risk management; HXB's ESMS and key requirements of ESMS for the Project.

4. In May 2020, HXB Green Finance Center held an online green Finance training, and green Finance staff from 42 branches attended the training. The training contents include HXB's ESMS and key requirements of ESMS for the Project.

5. In September 2020, HXB headquarter held a green Finance training in Chengdu. The Deputy General Managers and green Finance staff from 39 branches participated in the training, and sector specialists were invited to conduct in-depth training on energy storage, wind power and PV sector and biomass utilization sector, which improved the understanding and marketing organization ability of branch staff on energy storage and RE sectors. The third part of the training plan has thus been completed.

6. In June 2020, HXB Green Finance Center held a video conference with Nanjing Branch and Jiangsu Baohang Energy Technology Co., Ltd. At the conference, the Green Finance Center introduced the implementation requirements of ESMS of the World Bank project; environmental and social management plan, stakeholder engagement and grievance redress system to Jiangsu Baohang Energy Technology Co., Ltd.

At the training, HXB staff constantly communicated with technical experts and learned from them to deepen their understanding of energy storage sector and improve their ability to grasp the risks of the Project. The ability and level of environmental and social risk management of the headquarter and branch units are enhanced so that they can manage the E&S risks and impacts of sub-projects more effectively. Next, HXB will continue to carry out special training for energy storage projects to improve the staff's capabilities to control the E&S risks.

7. ANNEXES

Annex 1 Key Requirements of World Bank ESSs

ESSs	Key Requirements
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	1. Carry out an environmental and social assessment of the project to assess the environmental and social risks and impacts, at the scale and level of detail appropriate to the potential risks and impacts 2. Evaluate the project's potential environmental and social risks and impacts; including all relevant direct, indirect and cumulative risks and impacts and project alternatives, including the "no project" alternative. 3. Apply appropriate environmental and social impact assessment (ESIA), instruments as may be required, including ESIA; audit, hazard or risk, strategic environment and social assessment (SESA); 4. Prepare an environmental and social management plan or framework to plan, allocate resources. The plan will specify the technical, organizational and human resources and actions to be taken, as well as any necessary training and other capacity enhancement necessary for ensure full compliance with such requirements. 5. Monitor and measure the environmental and social performance of the project against all applicable legal and regulatory requirements of the project. 6. If there are significant changes to the project that result in additional risks and impacts, particularly where these will impact project-affected parties, the proponent will provide information on such risks and impacts and consult with project-affected parties as to how these risks and impacts will be mitigated and will report to relevant authorities in a timely manner all information on any such risks, impacts and consultations. **7.** Ensure that all contractors and subcontractors engaged in the project operate in a manner consistent with these requirements, including those relating to environmental management, monitoring and reporting
ESS2: Labor and Working Conditions	1. The Borrower will develop and implement written labor management procedures applicable to the project. These procedures will set out the way in which project workers will be managed, in accordance with the requirements of national law and this ESS. 2. Provide project workers with information and documentation that is clear and understandable regarding their terms and conditions of employment including their rights at the beginning of the working relationship and when any material changes to the terms or conditions of employment occur. 3. Apply all relevant Occupational, Health and Safety measures to the project, consistent with applicable laws, regulations and industry best practices. 4. Employment of project workers will be based on the principle of equal opportunity and fair treatment, and there will be no discrimination on the basis of personal characteristics unrelated to inherent job requirements.

	5. Provide appropriate measures of protection and assistance to address the vulnerabilities of project workers, including specific groups of workers, such as women, people with disabilities, migrant workers and children of legal working age. 6. No child under the minimum age of 14 will be employed or engaged in connection with the project. No child over the minimum age and under the age of 18 will be employed or engaged in connection with the project in a manner that is likely to be hazardous or interfere with the child's education or be harmful to the child's health or physical, mental, spiritual, moral or social development 7. Forced labor will not be used in connection with the project. **8.** The project will comply with national law with respect to workers' rights to form and to join workers' organizations of their choosing and to bargain collectively without interference. **9.** A grievance mechanism will be provided for all direct workers and contracted workers (and, where relevant, their organizations) to raise workplace concerns.
ESS3: Resources Efficiency and Pollution Prevention and Management	1. Implement technically and financially feasible measures for improving efficient consumption of energy, water and raw materials, as well as other resources. 2. Avoid the release of pollutants, or, when avoidance is not feasible, minimize and control the concentration and mass flow of their release using the performance levels and measures specified in national law and regulation. 3. Where the project involves historical pollution, will establish a process to identify the responsible party. 4. Avoid the generation of hazardous and non-hazardous waste as defined by national law and regulation. 5. Avoid the manufacture, trade and use of chemicals and hazardous materials subject to international bans, restrictions or phase-outs consistent with Borrower government commitments under the applicable international agreements. 6. Where projects involve recourse to pest management measures, give preference to integrated pest management (IPM) or integrated vector management (IVM) approaches using combined or multiple tactics before resorting to synthetic pesticides. 7. The project shall estimate and report on greenhouse gas emissions consistent with national law and regulations issued in compliance with national commitments under international agreements and in accordance with internationally recognized methodologies and good practice.
ESS4: Community Health and Safety	1. Evaluate the risks and impacts of the project on the health and safety of the affected communities during the project life-cycle. Identify risks and impacts and propose mitigation measures in accordance with the mitigation hierarchy. 2. Identify, evaluate and monitor the potential traffic and road safety risks to workers and potentially affected communities throughout the project life-cycle. 3. Conduct a Risk Hazard Assessment (RHA) for projects having the potential to generate emergency events. Identify and implement measures to address emergency events. 4. Document and review the emergency preparedness and response activities, resources, and responsibilities, and disclose appropriate information, as well as any subsequent material changes thereto, to affected communities, relevant government agencies, or other relevant parties. 5. When the direct or contracted workers are retained to provide

	security to safeguard its personnel and property, assess risks posed by these security arrangements to those within and outside the project site. 6. To ensure that government security personnel deployed to provide security services act in a manner that avoids or minimizes risks to the project-affected communities.
ESS5: **Land Acquisition, Restrictions on Land Use and Involuntary Resettlement**	1. For all projects having the potential to require physical or economic displacement of communities or persons, conduct a social, legal and institutional assessment to identify potential risks and impacts. 2. Seek all feasible alternative project designs and measures should to minimize and mitigate adverse economic and social impacts of physical or economic displacement, unless public health or safety would be adversely affected as a result. 3. Assess environmental, social, and financial costs and benefits, and pay particular attention to gender impacts and impacts on the poor and vulnerable. 4. Where land acquisition or restrictions on land use are unavoidable, conduct a census to identify the persons and communities to be affected. Establish an inventory of land and assets to be affected, to determine who should be eligible for compensation and assistance. 5. In the case of physical displacement, design a resettlement plan, proportionate to the risks and impacts associated with the project, to mitigate the negative impacts of displacement and, as warranted, to identify development opportunities. 6. Where the exact nature or magnitude of the land acquisition or restrictions on land use related to a project with potential to cause physical and/or economic displacement is unknown during project preparation, a framework should be prepared to establish general principles and procedures compatible with the World Bank's policies. Once the individual project components are defined and the necessary information becomes available, such a framework should be expanded into a specific plan proportionate to potential risks and impacts. 7. When land acquisition or restrictions on land use, whether permanent or temporary, cannot be avoided, the affected persons should be compensated at replacement cost, and other assistance as may be necessary to help them improve or at least restore their standards of living or livelihoods. 8. In case that relocation is necessary, (a) the displaced persons should be offered choices among feasible resettlement options, including adequate replacement housing or cash compensation; and (b) relocation assistance should be provided suited to the needs of each group of displaced persons. New resettlement sites should offer living conditions at least equivalent to those previously enjoyed, or consistent with prevailing minimum codes or standards, whichever set of standards is higher. If new resettlement sites are to be prepared, host communities should be consulted regarding planning options, and resettlement plans should ensure continued access, at least at existing levels or standards, for host communities to facilities and services. The displaced persons' preferences with respect to relocating in preexisting communities and groups should be respected wherever possible. Existing social and cultural institutions of the displaced persons and any host communities should be respected. 9. In the case of physically displaced persons have formal legal rights to land or assets, or do not have formal legal rights to land

	or assets, but have a claim to land or assets that is recognized or recognizable under national law, they should be offered the choice of replacement property of equal or higher value, with security of tenure, equivalent or better characteristics, and advantages of location, or cash compensation at replacement cost. Where livelihoods of displaced persons are derived primarily from land, compensation in kind should, where possible, be offered in lieu of cash. 10. Where livelihoods of displaced persons are land-based, or where land is collectively owned, the displaced persons should be offered an option for replacement in kind, unless equivalent replacement land is unavailable. Payment of cash compensation for lost land and other assets may be appropriate where: (a) livelihoods are not land-based; (b) livelihoods are land-based but the land taken for the project is a small fraction of the affected asset and the residual land is economically viable; or (c) active markets for land, housing, and labor exist, displaced persons use such markets, there is sufficient supply of land and housing, and the borrower has demonstrated to the satisfaction of the Bank that insufficient replacement land is available. 11. In the case that the displaced persons have no recognizable legal right or claim to the land or assets they occupy or use, they should be provided arrangements to allow them to obtain adequate housing with security of tenure. Where these displaced persons own structures, they should be compensated for the loss of assets other than land, such as dwellings and other improvements to the land, at replacement cost. Based on consultation with such displaced persons, relocation assistance in lieu of compensation for land sufficient for them should be provided to restore their standards of living at an adequate alternative site. 12. The displaced communities and persons should also be provided opportunities to derive appropriate development benefits from the project. In the case that the affected persons have no recognizable legal right or claim to the land or assets they occupy or use, resettlement assistance should be provided in lieu of compensation for land. 13. The displaced persons can be taken possession of acquired land and related assets only after compensation has been made available and, where applicable, resettlement sites and moving allowances have been provided in addition to compensation. 14. Negotiating in situ land development arrangements can be considered as an alternative to displacement, by which the affected persons may accept a partial loss of land or localized relocation in return for improvements that should increase the value of their property after development. Any person not wishing to participate should be allowed to opt instead for full compensation and other assistance. 15. Economically displaced persons who face loss of assets or access to assets should be compensated for such loss at replacement cost. Economically displaced persons should be provided opportunities to improve, or at least restore, their means of income-earning capacity, production levels, and standards of living. 16. When identifying potential economic and social risks and impacts of the project, particular attention should be paid to gender aspects and the needs of the poor and the vulnerable. The consultation process should ensure that women's perspectives are obtained and their interests factored into all aspects of

	resettlement planning and implementation. 17. The affected communities, including host communities, should be engaged in through the process of stakeholder engagement. Decision-making processes related to resettlement and livelihood restoration should include options and alternatives from which affected persons may choose, where applicable. 18. Disclosure of relevant information and participation of affected communities and persons should take place during the consideration of alternative project designs, and thereafter throughout the planning, implementation, monitoring, and evaluation of the compensation process, livelihood restoration activities, and relocation process. 19. A grievance mechanism for the project should be in place as early as possible in project development to address specific concerns about compensation, relocation or livelihood restoration measures raised by displaced persons (or others) in a timely fashion. 20. A monitoring procedure should be established to monitor and evaluate the implementation of the resettlement plan and will take corrective action as necessary during implementation. The extent of monitoring activities will be proportionate to the project's risks and impacts. 21. For projects with significant involuntary resettlement impacts, competent resettlement professionals should be retained to monitor the implementation of resettlement plans, design corrective actions as necessary, provide advice and produce periodic monitoring reports. Affected persons should be consulted during the monitoring process. Periodic monitoring reports should be prepared and affected persons should be informed about monitoring results.
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	1. Avoid adverse impacts on biodiversity and habitats. If such adverse impacts cannot be avoided, they should be ranked following the management and mitigation measures in ESS1 and appropriate measures should be taken under ESS6 to minimize the negative impacts and restore biodiversity. The Borrower will ensure that adequate biodiversity expertise is used for environmental and social assessment and verification of the effectiveness and feasibility of mitigation measures. When major risks and adverse impacts on biodiversity are identified, the Borrower will formulate and implement Biodiversity Management Plan. 2. No project-related activities that may adversely affect natural habitats are implemented unless the following circumstances occur: (a) There are no other technically or economically viable alternatives; (b) The Borrower should formulate appropriate mitigation measures following the priority of management and mitigation measures to achieve no net loss and preferably a net gain of biodiversity. If efforts have been made to avoid, reduce and mitigate impacts, and if residual impacts still exist, mitigation measures may include biodiversity compensation complying with the "similar or better" principle with the support of stakeholders where appropriate. 3. No project-related activities that may adversely affect critical habitats are implemented unless the following circumstances occur: (a) There are no other viable alternatives in the region that allow the project to be developed in habitats with low biodiversity value; (b) All due procedures required by international obligations or national laws are complied with, which is the premise for the state to approve project activities in

	or around the critical habitats; (c) The potential adverse impacts of project-related activities on habitats or this possibility will not lead to measurable net reduction or negative changes in the biodiversity value given to the critical habitats; (d) The project is expected not to result in a net loss of 13 species in any extremely endangered, endangered or limited range within a reasonable period of time; (e) The project will not involve significant changes or degradation of critical habitats. It does not change or degrade any critical habitat where the project involves new or updated woodlands or agricultural plantations; (f) The mitigation strategy for the project should be designed to achieve a net gain in the biodiversity value given to critical habitats; and (g) The Borrower's management plan has been incorporated into a strong, well-designed long-term biodiversity monitoring and assessment plan aimed at assessing critical habitat conditions. 4. Where the project occurs within or has the potential to adversely affect an area that is legally protected, designated for protection, or regionally or internationally recognized, the Borrower will, in addition to efforts of biodiversity conservation: (i) Demonstrate that the proposed development in such areas is legally permitted; (ii) Act in a manner consistent with any government recognized management plans for such areas; (iii) Consult and involve protected area sponsors and managers, project-affected parties including Indigenous Peoples, and other interested parties. 5. All introductions of alien species will be subject to a risk assessment to determine the potential for invasive behavior as part of environmental and social assessment. The Borrower will not intentionally or unintentionally introduce any new alien species (not currently established in the country or region of the project) unless this is carried out in accordance with the existing regulatory framework. Do not deliberately introduce any alien species with a high risk of invasive behavior regardless of whether such introductions are permitted under the existing regulatory framework. 6. The Borrower with projects involving primary production and harvesting of living natural resources will assess the overall sustainability of these activities, especially for forest and aquatic system. 7. Where the project includes land-based commercial agriculture and forestry plantation (particularly projects involving land clearing or afforestation), locate such projects on land that is already converted or highly degraded (excluding any land that has been converted in anticipation of the project). 8. Where a Borrower is purchasing natural resource commodities, including food, timber and fiber, that are known to originate from areas where there is a risk of significant conversion or significant degradation of natural or critical habitats, the Borrower's environmental and social assessment will include an evaluation of the systems and verification practices used by the primary suppliers: (i) identify where the supply is coming from and the habitat type of the source area; (ii) where possible, limit procurement to those suppliers that can demonstrate that they are not contributing to significant conversion or degradation of natural or critical habitats; and (iii) where possible and within reasonable period, require shift the Borrower's primary suppliers to suppliers that can demonstrate that they are not significantly adversely impacting these areas.
ESS7:	1. Screen to determine that Indigenous Peoples present in, or with

Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	collective attachment to, the project area are fully consulted about, and have opportunities to actively participate in, project design and the determination of project implementation arrangements. 2. For projects designed specifically to provide benefits directly to Indigenous Peoples, proactively engage with the relevant Indigenous Peoples to ensure their ownership and participation in project design, implementation, monitoring and evaluation. 3. Design and implement the project in a manner that provides affected Indigenous Peoples with equitable access to project benefits. 4. Undertake Free, Prior, and Informed Consent (FPIC) of the affected Indigenous Peoples when the project will: (a) have impacts on land and natural resources subject to traditional ownership or under customary use or occupation; (b) cause relocation of Indigenous Peoples from land and natural resources subject to traditional ownership or under customary occupation or use; or (c) have significant impacts on Indigenous Peoples' cultural heritage. In these circumstances, the Borrower will engage independent specialists to assist in the identification of the project risks and impacts. 5. Adverse impacts on Indigenous Peoples will be avoided where possible. Where alternatives have been explored and adverse impacts are unavoidable, minimize and/or compensate for these impacts in a culturally appropriate manner commensurate with the nature and scale of such impacts and the form and degree of vulnerability of the affected Indigenous Peoples. 6. Where projects are likely to have significant impacts on land that is traditionally owned or under customary use or occupation by Indigenous Peoples, prepare a plan for legal recognition of their perpetual or long-term renewable custodial or use rights. 7. Given priority to the avoidance of significant adverse on cultural heritage that is relevant to the identity and/or cultural, ceremonial, or spiritual aspects of Indigenous Peoples' lives. Where such impacts are unavoidable, obtain the FPIC of affected Indigenous Peoples. 8. With the participation of affected Indigenous Peoples, identify mitigation measures designed to avoid, or if avoidance is not a possible minimize, mitigate or offset such impacts as designs opportunities for culturally appropriate and sustainable development benefits. Ensure the timely delivery of agreed measures to affected Indigenous Peoples. 9. Establish a grievance mechanism for the project, which is culturally appropriate and accessible to affected Indigenous Peoples, and takes into account the availability of judicial recourse and customary dispute settlement mechanisms among Indigenous Peoples
ESS8: Cultural Heritage	1. Determine whether the proposed activities of the project are likely to affect cultural heritage through the environmental and social assessment, considering direct, indirect and cumulative project-specific risks and impacts on cultural heritage. 2. Avoid impacts on cultural heritage. When avoidance of impacts is not possible, identify and implement measures to address impacts on cultural heritage in accordance with the mitigation hierarchy. As required to law and regulation, develop a Cultural Heritage Management Plan. 3. Implement globally recognized practices for field-based study, documentation and protection of cultural heritage in connection with the project, including by contractors and other third parties.

	4. Include a "chance finds" procedure in all contracts relating to construction of the project 5. Where necessary due to the potential risks and impacts of a project, involve the participation of accredited cultural heritage experts in the environmental and social assessment. 6. Carry out meaningful consultations with stakeholders, including project affected parties and other interested parties (including local or national authorities) in order to identify cultural heritage that may be affected by the potential project. 7. Where a project intends to use cultural heritage (including knowledge, innovations or practices of project affected parties) for commercial purposes, (i) carry out meaningful consultation; (ii) provide for fair and equitable sharing of benefits from commercialization of such cultural heritage, consistent with customs and traditions of the project affected parties; and (iii) identify mitigation measures according to the mitigation hierarchy.
ESS9: Financial Intermediaries	1. FIs will put in place and maintain an ESMS to identify, assess, manage, and monitor the environmental and social risks and impacts of FI subprojects on an ongoing basis. 2. The FI will put in place and maintain clearly defined environmental and social procedures. 3. The FI will have institutional capacity on management of the environmental and social issues of its portfolio. 4. FIs will screen and categorize all FI sub-projects for environmental and social risks and impacts. 5. The FI will review and monitor the environmental and social performance of its portfolio of FI sub-projects in a manner proportionate to the risks and impacts of the portfolio of sub-projects. 6. The FI will provide a safe and healthy working environment
ESS10: Stakeholder Engagement and Information Disclosure	1. Engage with stakeholders throughout the project life-cycle, commencing such engagement as early as possible in the project process. 2. Develop and implement a Stakeholder Engagement Plan (SEP) which describes the timing and methods of engagement with stakeholders throughout the life-cycle of the project. 3. Disclose project information to allow stakeholders to understand the risks and impacts of the project, and potential opportunities. 4. Engage in meaningful consultations with all stakeholders. Provide stakeholders with timely, relevant, understandable and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation. 5. Maintain a documented record of stakeholder engagement, including a description of the stakeholders consulted, a summary of the feedback received and a brief explanation of how the feedback was taken into account, or the reasons why it was not. 6. Propose and implement a grievance mechanism to receive and facilitate resolution of concerns and grievances from project-affected parties

Annex 2 HXB Sector and E&S Performance Evaluation Classification

"ABC" Sectoral Category of HXB

Category	International code	Sector
A	D4413	Nuclear power
	D4412	Hydro power
	E482	Inland waterway and port construction
	G53	Railway transport
	G5412	Urban rail
	G57	Pipeline transport
	B06	Coal exploitation and washing
	B07	Petroleum and natural gas exploitation
	B08	Ferrous metal mining and dressing industry
	B09	Non-ferrous metal mining and dressing
	B10	Non-metallic mining and dressing industry
	B12	Other mining industries
B	C1713	Cotton printing and dyeing
	C1723	Fur dyeing finishing
	C1733	Hemp dyeing finishing
	C1743	Silk dyeing and finishing
	C1752	Chemical fiber dyeing and finishing
	C1762	Knitting dyeing finishing
	C1910	Leather processing
	C1931	Fur processing
	C221	Pulp
	C222	Paper making
	C25	Petroleum processing, coking and nuclear fuel
	C26	Chemical raw materials and chemical manufacturing
	C27	Pharmaceutical manufacturing
	C29	Rubber and plastic products
	C30	Non-metallic minerals
	C31	Ferrous metal smelting and rolling
	C32	Non-ferrous metal smelting and rolling
	D4411	Thermal power
	D4430	Heat production and supply
	D4500	Fuel gas production and supply
	E47	House construction
	E48	Civil engineering construction
	C133	Vegetable oil processing
	C134	Sugar industry
	C146	Condiment, fermented product manufacturing
	C151	Liquor
	C384	Battery manufacturing
C	Other sectors	

Environmental and Social Performance Evaluation and Differentiated Management Approaches

No	Item	Satisfactory Criteria	Unsatisfactory if any one tick applies	"Attention needed" if any one tick applies
1	**Business qualification**	Complete certificates and licenses of pollutants emission permit, hazardous material operation permit, safety production certificate, hygiene certificate, production permit etc. ☐	Important licenses/certificates are suspended cancelled ☐	Important licenses/certificates expired but not yet renewed ☐
2	**Main production equipment or product technology level**	1．Not belong to sectors to be restricted or terminated according to Guidelines of Industrial Restructuring; ☐ 2．Not listed in production capacity to be cut by national government; ☐	1 .Main process, equipment and products are listed by local government to be cut; ☐ 2 .Main process, equipment and products are listed to be phased out by national policy ☐	Main process, equipment and products are listed as to be restricted by national policy ☐
3	**Pollution emission and treatment**	1．Stable operation of environmental facilities ☐ 2．Pollution emission complies with standards ☐ 3．Hazardous wastes properly handled ☐	1．Company owner is determined as an environmental criminal or major suspect ☐ 2．Enterprise has resulted in significant environmental degradation and disturbance of local communities (no matter whether it received administrative punishment) ☐	Evidence on non-compliance of emission ☐
4	**Major construction projects**	1．Project EIA has been approved by environmental authority. ☐ 2．Project siting is rational and won't cause significant ecological impacts and damage. ☐ 3．Project complies with "three simultaneousness" for pollution control facility, safety facility and occupational health prevention. ☐ 4．Land acquisition complies with relevant laws/regulations. ☐ 5．Project has agreement with indigenous peoples. ☐	1．Project has serious violation on environmental protection, safety production, occupational health and land use aspects, and is suspended by relevant authorities, which cause difficulties for sustainable operation of the enterprise. ☐ 2．Major accidents or multiple small accidents happened during project construction, and no improvement measures are put in place. ☐	1．Incomplete approval procedures from project approval, land use, EIA, energy assessment etc. ☐ 2．Incomplete implementation of "three simultaneousness " measures ☐ 3、No agreement on land acquisition compensation for major project. ☐
5	**Project completion acceptance**	Completion acceptance received from relevant authorities on pollution control facilities, safety facilities and occupation health facilities. ☐	Violation of regulations on pollution control facilities, safety facilities and occupation health facilities, and suspended by relevant authorities. ☐	Pollution control facilities, safety facilities and occupation health facilities are yet to be accepted by relevant authorities. ☐
6	**Energy**	1．Energy consumption of major product ☐	1．Energy consumption of major product is ☐	Energy consumption of major product ☐

No	Item	Satisfactory Criteria	Unsatisfactory if any one tick applies	"Attention needed" if any one tick applies
	consumption level of main product	complies with national/local standards. ☐ 2 . Energy consumption of major product is lower than average level of the sector.	significantly higher than national/local standards. 2 . Energy consumption of major product is ☐ significantly higher than average level in the same sector.	could not meet mandatory national standards.
7	**Administrative penalty**	No administrative penalty by environmental protection, safety, food and drug supervision, natural resources authorities etc. ☐	1 . Suspended or shut down by government authorities due to violation of environmental, safety, food safety, labor protection regulations. ☐ 2 . Corrections requested by government authorities on environmental, safety, food and drug supervision, natural resources authorities etc., and not yet completed. ☐	1 . Used to be warned, fined and listed in blacklist by authorities on environmental, safety, food and drug supervision, natural resources etc within six months. ☐ 2 . Correction requested or suspended by government authorities due to environmental and social issues within the past one year. ☐
8	**Media feedbacks**	No negative reporting from major media and communities. ☐	Serious objection by social media on the existing or ongoing projects. ☐	Fairly much negative comments from media ☐
9	**Env and social risk management system**	Strong commitment on env and social management, with complete institutional arrangement and human resource deployment in place. ☐		No strong commitment on env and social management, with incomplete institutional arrangement and human resource deployment in place. ☐
10	**Historical performance**	1 . No major accidents in the past year on pollution, safety, quality, occupational disease, community conflict etc. ☐ 2 . Corrections or remediation has been completed for accidents if any. ☐	1 . Major accidents in the past year on pollution, safety, quality, occupational disease, community conflict etc. ☐ 2 . Corrections or remediation not yet completed for accidents mentioned above. ☐	Major accidents in the past two years on pollution, safety, quality, occupational disease, community conflict etc. ☐
11	**Others**	No other issues affecting sustainable operation of the enterprise. ☐	There is other major legal violation behaviors on environmental and social aspects. ☐	There is other non-compliance issues on environmental and social issues. ☐

Notes:

1 . Item 1-8 are mandatory for evaluation of A and B category clients, others are complementary references.

2 . Each branch may have proper adjustment subject to actual situations.

Annex 3 Environmental and Social Risk Screening Sheet

Name of Sub-project Enterprise:_____

Sector： _____ **Sectoral Category：** _____**Sectoral E&S Performance category：** _____

Sub-project:_____

Huaxia Bank Branch: _____ **Filled by:** _____

Criteria	Yes	No	Risk				Remarks/Actions
			L	M	S	H	
Client's legal compliance							
1. Does the existing enterprise have a valid operating permit, licenses, approvals etc.?							Review of documents and records. No valid permit, licenses and approvals would trigger a High risk, and should not be supported.
2. Does the existing enterprise meet all Chinese environmental regulations regarding air, water and solid waste management?							Review of compliance records (monitoring reports, certificates etc.) and consultation with relevant authority.
3. Does the existing enterprise have any significant outstanding environmental penalties or any other environmental liabilities (e.g. pending legal proceedings involving environmental issues)?							Consultation with relevant authority and desktop study. Significant environmental violation would trigger a High risk, and should not be supported.
4. Have there been any complaints raised by local affected groups or NGOs regarding environmental and social impacts?							Media search and consultations with local groups and NGOs. Presences of complaints should indicate a S or H rating depending on the substance of complaints.
5. Does the proposed sub-project obtain the EIA approval from relevant environmental authority or							Review of approval document and internet check from relevant authority website when

EIA registration form?							applicable
6. Does the proposed sub-project obtain land use right or land use approval from relevant land resource authority or complete compensation for land acquisition and resettlement?							Review of approval document and internet check from relevant authority website when applicable and review of copies of compensation records. For existing operations that completed land acquisition and resettlement prior to the sub-project, Huaxia Bank should carry out a due diligence review to identify any complaints, grievance or other outstanding issues and against related law and regulations and determine the measures to close these issues (if any). The due diligence should review prior resettlement within a time frame of approximately three years close to specific sub-projects but will consider of the context of specific sub-project and significance of the prior resettlement case by case.
7. Does the sub-project require separate approval for safety, water conservation/soil erosion control, flood control, geo-hazard assessment? If yes, please indicate the approval status.							Absence of necessary approval from other government authorities would trigger a High risk, and should not be supported.
Sub-project's environmental and social risks							
8. Is there "associated facilities[13]" involved in the							If Yes, then the same safeguards requirements

[13] "Associated Facilities" means facilities or activities that are not funded as part of the project and, in the judgment of the World Bank, are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for

sub-project?							for the Sub-project will apply to the "Associated facilities".
9. Is the sub-project located in nature reserves (existing or planned), scenic areas, forest parks, protected water sources, or areas with high ecological value?							
10. Is the sub-project area a natural habitat?							If yes, the project will not be supported.
11. Is the sub-project area located in critical habitat? i.e. is there important, fragile or endangered wildlife species in the sub-project area?							If yes, the project will not be supported.
12. Will the sub-project implementation lead to impacts on non-critical natural habitat (such as forests, rivers, wetlands)?							If yes, the project must be rated S or H, and necessary impact assessment and mitigation measures should be included in the EIA document, as well as the Biodiversity Management Plan (BMP) should be prepared.
13. Does the sub-project require new land acquisition? If yes, please indicate how much. (Productive land acquisition less than 50 mu or new land expropriated mostly as non-productive land and with little impact on the livelihood of the affected people is considered to be minor impact)							If new land acquisition exceeds the indicated threshold, the project must be rated S or H and a RP will be prepared.
14. Does the sub-project involve resettlement? If yes, please indicate resettlement area, households and affected people. (Physical							If the resettlement exceeds the indicated threshold yes, the project must be rated S or H and a RP will be prepared following the

the project to be viable and would not have been constructed, expanded or conducted if the project did not exist.

displacement less than 5 households is considered as minor impact.)							requirements of ESS5.
15. Is there known archeological, historical, or cultural heritage site in the area of influence of the sub-project?							
16. Has the local population or any NGOs expressed concern about or opposition to the sub-project?							
17. Will the sub-project bring significant community health and safety risk?							If yes, the project must be rated S or H.
18. Will the sub-project cause significant labor safety and health risks?							If yes the project must be rated S or H
19. Will the sub-project involve forced labor or child labor?							If yes, the sub-project will not be supported
20. Is there presence of ethnic minority communities in the project area?							If yes, the sub-project will require to prepare EMDP following the requirements of ESS7.
21. Will the sub-project cause adverse impacts on ethnic minority communities (including ethnic minority culture, land dependence)?							If yes, the subproject will be rated as S or H and an EMDP will be developed.
22. Will the sub-project potentially give rise to certain degree of social conflict associated with perceptions of community endangerment and non-receipt of benefits?							If yes, the subproject will be rated as S or H.
Overall environmental and social risk: (Overall risk shall be determined based on the highest rating of all above questions. "High" risk sub-projects are not eligible for Finance under the Project, until agreed by the World Bank. In case "High" risk sub-projects are to be funded under the Project, HXB shall obtain the prior approval of the World Bank in the risk screening							List of most stringent actions as filled above.

stage. Meanwhile, the World Bank will upgrade the overall project risk level to "High" following the requirement of ESF.)					

Annex 4 Indicative Outline of Environmental and Social Impact Assessment

Environmental and social impact assessment typically includes the following contents:

（a） *Executive Summary*

- Concisely discusses significant findings and recommended actions.

（b） *Legal and Institutional Framework*

- Analyzes the legal and institutional framework for the project, within which the environmental and social assessment is carried out;
- Relevant requirements of World Bank's ESSs.

（c） *Sub-project Description*

- Concisely describes the proposed sub-project and its geographic, environmental, social, and temporal context, including any offsite investments that may be required (e.g., dedicated pipelines, access roads, power supply, water supply, housing, and raw material and product storage facilities), as well as the sub-project's primary suppliers; Includes a map of sufficient detail, showing the sub-project site and the area that may be affected by the sub-project's direct, indirect, and cumulative impacts.

（d） *Baseline Data*

- Sets out in detail the baseline data that is relevant to decisions about sub-project location, design, operation, or mitigation measures. This should include a discussion of the accuracy, reliability, and sources of the data as well as information about dates surrounding sub-project identification, planning and implementation;
- Identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions;
- Based on current information, assesses the scope of the area to be studied and describes relevant physical, biological, and socioeconomic conditions, including any changes anticipated before the sub-project commences
- Takes into account current and proposed development activities within the sub-project area but not directly connected to the project.

（e） *Environmental and Social Risks and Impacts*

- Takes into account all relevant environmental and social risks and impacts of the sub-project. This will include the environmental and social risks and impacts specifically identified in ESS1–8, and any other environmental and social risks and impacts arising as a consequence of the specific nature and context of the sub-project.

(f) Mitigation Measures

- Identifies mitigation measures and significant residual negative impacts that cannot be mitigated and, to the extent possible, assesses the acceptability of those residual negative impacts;
- Identifies differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable;
- Assesses the feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of proposed; mitigation measures, and their suitability under local conditions; and the institutional, training, and monitoring requirements for the proposed mitigation measures.

(g) Analysis of Alternatives

- Systematically compares feasible alternatives to the proposed sub-project site, technology, design, and operation—including the "without project" situation—in terms of their potential environmental and social impacts;
- Assesses the alternatives' feasibility of mitigating the environmental and social impacts; the capital and recurrent costs of alternative mitigation measures, and their suitability under local conditions; and the institutional, training, and monitoring requirements for the alternative mitigation measures;
- For each of the alternatives, quantifies the environmental and social impacts to the extent possible, and attaches economic values where feasible.

(h) Environmental and Social Management Plan

- Environmental and social management organization setup and staffing;
- Environmental and social management and supervision procedures;
- Environmental and social mitigation measures, indicators;
- Monitoring plan;
- Capacity building and training plan;
- EMSP budget estimation

(i) Annexes

- List of the individuals or organizations that prepared or contributed to the environmental and social assessment;
- References—setting out the written materials both published and unpublished, that have been used;
- Record of meetings, consultations and surveys with stakeholders, including those with affected people and other interested parties. The record specifies the means of such stakeholder engagement that were used to obtain the views of affected people and other interested parties;
- Tables presenting the relevant data referred to or summarized in the main text;
- List of associated reports or plans.

Annex 5 Resettlement Framework

1. Introduction

This document constitutes the Resettlement Framework (RF) for China Renewable Energy and Battery Storage Promotion Project. The Huaxia Bank (FI) has agreed to apply World Bank environmental and social framework in the design and implementation of this project, including ESS5 on Land Acquisition, Restrictions on Land Use and Involuntary Resettlement. For this project, design and scheduling considerations make it impossible to determine the extent of resettlement planning requirements at appraisal. The RF establishes principles and procedures to be followed if subsequent stages of project design or implementation are to cause land acquisition or other involuntary restrictions on access to land or other resources. In such instances, the World Bank will clear the first Resettlement Plan (RP) prepared under this project and will retain the right to review and clear ensuing RPs until the Bank Task Team is convinced that HXB demonstrates adequate capability to screening and managing safeguards issues. The RP ensures that any such potential impacts are minimized, and that any persons affected by such impacts are provided ample opportunity and compensation, through provision of compensation and other forms of assistance, to improve or at least restore their incomes and living standards.

2. Project Description

Project activities will promote and undertake target investments of both measures of reducing curtailment and new emerging use of RE in order to improve the efficiency of RE development. This is an integral part of a holistic program of World Bank engagement with China. The proposed implementation period is 2019 to 2025.

Target investments may cover a range of technologies and use cases in generation, grid and demand sides, subject to certain eligibility criteria, in line with the objective to improve efficiency of RE development. As such, project types could include: Installation of battery storage systems in existing wind farm and solar power plants. It would improve the performance of both wind and solar power from “intermitted power” to “dispatchable power”, and store the electricity when it needs to be curtailed. Installation of advanced wind/solar power forecast system. It would improve the accuracy of wind and solar power projection, so the dispatch centers can optimize its dispatch of these REs. Installation of heat/battery storage in existing non-coal power plants to increase its flexibility of dispatch. It would provide additional capability to the power systems to dispatch more RE. On the grid side: Installation of battery storage systems in existing substations. It would provide additional capability to the power systems to balance wind and solar power, then reduce RE curtailment. Grid side battery systems in substations, as part of the transmission and distribution networks, can also provide peaking load control and system backup to help mitigate the impact of the integration of PV and wind energy. Installation of advanced energy management systems to improve dispatch of RE. Examples of this type of investment could be joint dispatch of both hydropower and intermitted REs for better use of the intermitted REs. Improving existing distribution network or grid connection to allow more REs to be dispatched. On the demand side: Development of distributed RE with storage. Installation of battery storage systems in micro-grid and ‘behind the meter’ at consumer sites (e.g. distribution network in development zones and commercial buildings) to complement distributed renewable energy generation and other services. The storage systems could enable the distributed RE more dispatchable and grid-friendly. Pilot and scaling up RE for heating. This is an emerging use of RE in China. It uses electricity to replace the coal consumption for heating, while additional commercial arrangement will be made to increase the RE

generation to meet this additional electricity consumption. The commercial arrangement include direct contracting, purchasing of green certificates, or administration measures to increase the utilization hours of RE.

Four types of sub-projects were added in this adjustment. They include the energy storage of new RE + energy storage sub-projects, heating sub-projects to be synchronously constructed with new wind farms and solar PV power stations, electric energy storage sub-projects to be constructed in the existing power plant sites and biomass gasification sub-projects.

3. Project Impacts

Most of these potential sub-borrowers from HXB are state owned or privately owned enterprises involved in renewable energy development, electricity generation, transmission, and distribution, as well as micro grid development for renewable energy utilization. Most investment activities by these enterprises to be financed by HXB will be concentrated on installation of storage battery facilities in order to improve efficiency use of renewable energy and reduce curtailment which appear to have limited potential environment and social impacts. Based on visit to a range of such facilities and consultant with similar enterprises, it seems that most of battery storage construction would involve minimum environment and social impacts. That is because most invested battery storage facilities could be accommodated within existing power plant site or substation site with little land acquisition. Only in the case of installation of battery storage in new renewable energy plants, where entire new renewable energy plant becomes linked activity, the moderate social and environment impacts due to construction of new renewable energy plant could be expected. Most such impacts associated with some renewable energy plants such as windfarm and concentrated solar power would be moderate, including permanent and temporary land acquisition in rural areas, normal construction impacts, as well as potential environment impacts during operation of these plants. If they are located in western provinces with high concentration of ethnic minority population, potential impacts on ethnic minority communities could not be ruled out. In such cases, environment and social issues like land acquisition, indigenous people, labor laws, and community health and safety need to be addressed. In order to ensure that proper mitigation could be developed to address such impacts, and affected people in those subproject could be consulted regarding various mitigation measures, HXB established a screening system and a set of procedures under ESMS to ensure for those sub-projects that will involve with potential environment and social impacts, affected people will be consulted and stakeholders will be engaged during the preparation and implementation of individual sub-projects.

Two types of sub-projects were added in this adjustment. They include the installation of battery storage facilities synchronously with new RE power plants and installation of heating facilities synchronously with new RE power plants. HXB conducted due diligence on land acquisition for new RE projects by sorting out land policies and combined with the RE projects launched. The results are shown in Annex 10.

4. Preparation and Approval Procedures for Resettlement Plan

4.1 Preparation for Resettlement Plan

For those sub-projects identified as moderate or substantial social impacts where certain land acquisition and resettlement is necessitated, individual resettlement plans must be prepared and implemented according to the policies confirmed in this RF. HXB staff and relevant sub-project sponsor need to organize, prior to implementation, a detailed resettlement impact survey. For the sub-projects that involve more than 50 mu of productive land acquisition or more than 5 households' displacement, such sub-project will be classified as "Substantial" or "High" risk, and a Resettlement Plan should be prepared according to this RF, which will be reviewed by HXB Green Finance

Center before being submitted to the World Bank for review prior to implementation. HXB Green Finance Center, branch office of HXB, and external monitoring agency and the World Bank will supervise and monitor the resettlement implementation for individual sub-projects.

The land acquisition screening determines whether a RP needs to be prepared. When the land acquisition is more than 50 mu or resettlement is more than 5 households, the resettlement impact is considered as substantial. Under such condition, a RP needs to be prepared by following RF and ESMS. The basic outline of RP is presented in the following. Where impacts of land acquisition and resettlement are relatively minor, with less than 50 mu of farmland acquisition and less than 5 households' displacement, or non-productive land occupied mostly with minor impacts on farmers' livelihoods, no RP is required, and land acquisition and resettlement will be carried out in accordance with country system and provisions of RF and ESMS.

a) description of the activity causing land acquisition;
b) range and scope of potential adverse impacts;
c) socioeconomic survey and baseline census survey information;
d) review of relevant laws and regulations relating to land acquisition and resettlement;
e) specific compensation rates (or alternative measures) for all categories of affected assets;
f) other measures, if any, necessary to provide opportunities for economic rehabilitation of displaced persons;
g) eligibility criteria for compensation and all other forms of assistance;
h) relocation arrangements, if necessary, including transitional support;
i) site selection and site preparation, if necessary;
j) restoration or replacement of community infrastructure and services;
k) organizational arrangements for implementation;
l) consultation and disclosure arrangements;
m) resettlement implementation schedule;
n) costs and budget;
o) monitoring arrangements;
p) grievance procedures;
q) summary entitlements matrix

4.2 RP APPROVING

Once it is determined that land acquisition or any associated impacts is essential to complete any project activities, resettlement planning should begin. The overall responsibility for preparation and implementation of any necessary RPs rests with sponsors of individual sub-projects. The sub-project owner will carry out, or cause to be carried out, a census survey to identify and enumerate all displaced persons, and a socioeconomic survey to determine the range and scope of adverse impacts in the affected area. The census survey must cover 100% of the persons to be displaced; the socioeconomic survey may be undertaken on a sample basis. Based on accurate baseline census survey and social economic survey, the RP will be prepared in accordance with the policy principles and planning and implementation arrangements set forth in this RPF and established appropriate mitigation measures as appropriate for all categories of adverse impacts.

HXB Green Finance Center and branch office will actively involve in RP preparation in order to ensure satisfactory RPs are prepared for sub-projects involved with any potential land acquisition and resettlement. The World Bank will clear the first

Resettlement Plan (RP) prepared under this project and will retain the right to review and clear ensuing RPs until the Bank Task Team is convinced that HXB demonstrates adequate capability to screening and managing safeguards issues. Clearance of RP will be managed by HXB in-house safeguard specialist, subject to spot check by the World Bank as needed. The RP should be disclosed locally and on Bank's website and revised in accordance with feedbacks for the disclosure.

Any RPs prepared in accordance with this RF must be reviewed and approved by HXB prior to awarding of contracts for the civil works causing the displacement.

5. Objectives and Legal Framework

5.1 Objective and Principles

According to the principles of the ***Environment and Social Framework*** and ***ESS5 on Involuntary Resettlement***, resettlement and land acquisition should be avoided or minimized wherever possible, but where such impacts cannot be avoided, then each sub-project that involves land acquisition and involuntary resettlement will have to comply with the general principles of this RF. Once specific land acquisition and resettlement impacts are confirmed, a short or full RP must be developed based on the policies and procedures set forth in this RF.

The objective of this RF is to ensure that all the affected people (permanent and temporary) whose business or employment place or farmland are acquired, or whose houses are demolished, or whose production operations are affected, or whose crops, trees and property are affected, whether in part or in full, will be given reasonable compensation for their losses and/or all necessary assistance so that they may improve or at least keep or re-attain their original production facilities or capacity and their living standards..

For the preparation of this RF, the key principles of ESS5 of the World Bank has been adopted. Therefore, the following general principles are applicable to achieve these objectives.

1. For all projects having the potential to require physical or economic displacement of communities or persons conduct a social, legal and institutional assessment to identify potential risks and impacts.
2. Seek all feasible alternative project designs and measures should to minimize and mitigate adverse economic and social impacts of physical or economic displacement, unless public health or safety would be adversely affected as a result.
3. Assess environmental, social, and financial costs and benefits, and pay particular attention to gender impacts and impacts on the poor and vulnerable.
4. Where land acquisition or restrictions on land use are unavoidable, conduct a census to identify the persons and communities to be affected. Establish an inventory of land and assets to be affected, to determine who should be eligible for compensation and assistance.
5. In the case of physical displacement, design a resettlement plan, proportionate to the risks and impacts associated with the project, to mitigate the negative impacts of displacement and, as warranted, to identify development opportunities.
6. Where the exact nature or magnitude of the land acquisition or restrictions on land use related to a project with potential to cause physical and/or economic displacement is unknown during project preparation, a framework should be prepared to establish general principles and procedures compatible with the

World Bank's policies. Once the individual project components are defined and the necessary information becomes available, such a framework should be expanded into a specific plan proportionate to potential risks and impacts.

7. When land acquisition or restrictions on land use, whether permanent or temporary, cannot be avoided, the affected persons should be compensated at replacement cost, and other assistance as may be necessary to help them improve or at least restore their standards of living or livelihoods.
8. In case that relocation is necessary, (a) the displaced persons should be offered choices among feasible resettlement options, including adequate replacement housing or cash compensation; and (b) relocation assistance should be provided suited to the needs of each group of displaced persons. New resettlement sites should offer living conditions at least equivalent to those previously enjoyed, or consistent with prevailing minimum codes or standards, whichever set of standards is higher. If new resettlement sites are to be prepared, host communities should be consulted regarding planning options, and resettlement plans should ensure continued access, at least at existing levels or standards, for host communities to facilities and services. The displaced persons' preferences with respect to relocating in preexisting communities and groups should be respected wherever possible. Existing social and cultural institutions of the displaced persons and any host communities should be respected.
9. In the case of physically displaced persons have formal legal rights to land or assets, or do not have formal legal rights to land or assets, but have a claim to land or assets that is recognized or recognizable under national law, they should be offered the choice of replacement property of equal or higher value, with security of tenure, equivalent or better characteristics, and advantages of location, or cash compensation at replacement cost. Where livelihoods of displaced persons are derived primarily from land, compensation in kind should, where possible, be offered in lieu of cash.
10. Where livelihoods of displaced persons are land-based, or where land is collectively owned, the displaced persons should be offered an option for replacement in kind, unless equivalent replacement land is unavailable. Payment of cash compensation for lost land and other assets may be appropriate where: (a) livelihoods are not land-based; (b) livelihoods are land-based but the land taken for the project is a small fraction of the affected asset and the residual land is economically viable; or (c) active markets for land, housing, and labor exist, displaced persons use such markets, there is sufficient supply of land and housing, and the borrower has demonstrated to the satisfaction of the Bank that insufficient replacement land is available.
11. In the case that the displaced persons have no recognizable legal right or claim to the land or assets they occupy or use, they should be provided arrangements to allow them to obtain adequate housing with security of tenure. Where these displaced persons own structures, they should be compensated for the loss of assets other than land, such as dwellings and other improvements to the land, at replacement cost. Based on consultation with such displaced persons, relocation assistance in lieu of compensation for land sufficient for them should be provided to restore their standards of living at an adequate alternative site.
12. The displaced communities and persons should also be provided opportunities to derive appropriate development benefits from the project. In the case that the affected persons have no recognizable legal right or claim to the land or assets they occupy or use, resettlement assistance should be provided in lieu of compensation for land.
13. The displaced persons can be taken possession of acquired land and related assets only after compensation has been made available and, where applicable, resettlement sites and moving allowances have been provided in addition to

compensation.

14. Negotiating in situ land development arrangements can be considered as an alternative to displacement, by which the affected persons may accept a partial loss of land or localized relocation in return for improvements that should increase the value of their property after development. Any person not wishing to participate should be allowed to opt instead for full compensation and other assistance.
15. Economically displaced persons who face loss of assets or access to assets should be compensated for such loss at replacement cost. Economically displaced persons should be provided opportunities to improve, or at least restore, their means of income-earning capacity, production levels, and standards of living.
16. When identifying potential economic and social risks and impacts of the project, particular attention should be paid to gender aspects and the needs of the poor and the vulnerable. The consultation process should ensure that women's perspectives are obtained and their interests factored into all aspects of resettlement planning and implementation.
17. The affected communities, including host communities, should be engaged in through the process of stakeholder engagement. Decision-making processes related to resettlement and livelihood restoration should include options and alternatives from which affected persons may choose, where applicable.
18. Disclosure of relevant information and participation of affected communities and persons should take place during the consideration of alternative project designs, and thereafter throughout the planning, implementation, monitoring, and evaluation of the compensation process, livelihood restoration activities, and relocation process.
19. A grievance mechanism for the project should be in place as early as possible in project development to address specific concerns about compensation, relocation or livelihood restoration measures raised by displaced persons (or others) in a timely fashion.
20. A monitoring procedure should be established to monitor and evaluate the implementation of the resettlement plan and will take corrective action as necessary during implementation. The extent of monitoring activities will be proportionate to the project's risks and impacts.
21. For projects with significant involuntary resettlement impacts, competent resettlement professionals should be retained to monitor the implementation of resettlement plans, design corrective actions as necessary, provide advice and produce periodic monitoring reports. Affected persons should be consulted during the monitoring process. Periodic monitoring reports should be prepared and affected persons should be informed about monitoring results.

5.2 National Laws and Regulations

For any land acquisition and resettlement activities in China, they will follow a set of national laws and regulations, which include: (1) Land Administration Law of the People's Republic of China (issued in 1986 and amended in 1998);

On August 26, 2019, the 12th Meeting of the Standing Committee of the Thirteenth National People's Congress considered and adopted the Amendment of Land Administration Law of the People's Republic of China, effective from January 1, 2020.

The new Land Administration Law adheres to the public ownership of land, protection of farmers' interests and the most stringent farmland protection system and economical and intensive land use system and reforms the land acquisition system.

The revised Land Administration Law implemented in 2020 mainly improves the

following aspects: (1) Clearly defining the scope of public interest in land acquisition. The *Constitution* provides that the State may levy or expropriate the land and make compensations for the public interest. However, the original Land Administration Law does not clearly define the scope of public interest for land acquisition, and collective construction land cannot enter the market directly, so that land acquisition has become the only channel for the use of land by various construction projects, resulting in the continuous expansion of land acquisition. The legitimate rights and interests of landless farmers and long-term livelihoods are not effectively guaranteed, affecting the social stability. Article 45 added to the new one defines the public interest for the first time. It stipulates by enumeration that: Land acquisition can be conducted according to the law in case of military affairs and diplomacy, infrastructure organized and implemented by the government, public utilities, poverty alleviation and relocation, construction of low-income housing project and full-scale development and construction. This provision will help narrow the scope of land acquisition and limit government abuse of land acquisition right.

(2) Clearly specifying the basic principle of compensation. The compensation is to ensure that the living standards of the landless farmers will not be lowered, and their long-term livelihoods will be guaranteed. The original Land Administration Law stipulates that the compensation should be made according to the original use of the land expropriated, and the land compensation and resettlement subsidy should be determined by the multiple method of annual output value. The compensation standard was low, and the compensation mechanism was not perfect. The new Land Administration Law raised the compensation principle of "ensuring that the living standards of the landless farmers will not be lowered, and their long-term livelihoods will be guaranteed" proposed by the State Council in Document No. 28 in 2004 to the legal provisions, and replaced the original multiple method of annual output value with the comprehensive prices of farmland. On the basis of the land compensation, resettlement subsidy, compensation for ground attachments and young crops, the housing compensation for rural villagers and social security fees for the landless farmers were added, so as to build a more perfect safeguard mechanism for the landless farmers in law.

(3) Reform of land acquisition procedures. The post-approval announcement of land acquisition is changed to pre-approval announcement. Where most members of the rural collective economic organization whose land was requisitioned have objections to the compensation and resettlement arrangement, a hearing should be convened to modify the arrangement so as to further enforce the rights of the rural collective economic organizations and farmers to know, participate and supervise the whole process of land acquisition. The new Land Administration Law also advocates harmonious land acquisition. Before the application of land acquisition for approval, the local governments at or above the county level must sign agreements on compensation and resettlement with the owners and users of the land to be requisitioned.

(2) Circular of the Ministry of Land and Resources Concerning the Issuance of the Guiding Opinions on Improving the System of Compensation for Requisition of Land (Circular No. 238, issued by MLR in 2004), and (3) provincial and local implementation regulations. These laws and regulations form the legal basis for providing compensation and rehabilitation to those affected by land acquisition and resettlement activities. The followings are key provisions of Land Administration Law and Circular No. 238.

5.2.1 Key Provisions of the Land Administration Law

Article 2: The state may, out of necessity of public interest, requisition land collectively owned in accordance with law.

Article 46: Where land is to be requisitioned by the State, the requisition shall, after approval is obtained through legal procedure, be announced by people's governments at or above the county level, which shall help execute the requisition.

Where the local people's government at or above the county level intends to apply for land acquisition, it shall investigate the status of the land to be requisitioned and assess the social stability risk, and announce the scope of requisition, the status quo of the land, objectives, compensation standards, resettlement plan and social security arrangements to the township (town), village and villagers' group where the land to be requisitioned is located for at least 30 days and listen to the opinions of the rural collective economic organization and its members, villagers' committee and other stakeholders of the land to be requisitioned.

If most of the members of rural collective economic organization believe that the compensation and resettlement plans do not conform to the provisions of laws and regulations, the local people's government at or above the county level shall organize hearings and modify the plans according to the laws and regulations as well as the hearing results.

Units and individuals that own or have the right to the use of the land under requisition shall, within the time limit fixed in the announcement, register for compensation with the land administration department of the local people's government by presenting their certificates of land ownership or land-use right. The local people's government at or above the county level shall organize the relevant departments to calculate and grant the relevant compensations to ensure the full amount in place, and sign agreements with units and individuals that own or have the right to the use of the land under requisition on compensation and resettlement; if an agreement cannot be reached in some cases, such cases shall be truthfully explained when applying for land acquisition.

After the completion of the relevant preliminary work, the local people's government at or above the county level may apply for land acquisition.

Article 47: Where land is to be requisitioned by the State, the requisition shall, after approval is obtained through legal procedure, be announced by people's governments at or above the county level, which shall help execute the requisition.

Where the local people's government at or above the county level intends to apply for land acquisition, it shall investigate the status of the land to be requisitioned and assess the social stability risk, and announce the scope of requisition, the status quo of the land, objectives, compensation standards, resettlement plan and social security arrangements to the township (town), village and villagers' group where the land to be requisitioned is located for at least 30 days and listen to the opinions of the rural collective economic organization and its members, villagers committee and other stakeholders of the land to be requisitioned.

If most of the members of rural collective economic organization believe that the compensation and resettlement plans do not conform to the provisions of laws and regulations, the local people's government at or above the county level shall organize hearings and modify the plans according to the laws and regulations as well as the hearing results.

Units and individuals that own or have the right to the use of the land under requisition shall, within the time limit fixed in the announcement, register for compensation with the land administration department of the local people's government by presenting their certificates of land ownership or land-use right. The local people's government at

or above the county level shall organize the relevant departments to calculate and grant the relevant compensations to ensure the full amount in place, and sign agreements with units and individuals that own or have the right to the use of the land under requisition on compensation and resettlement; if an agreement cannot be reached in some cases, such cases shall be truthfully explained when applying for land acquisition.

After the completion of the relevant preliminary work, the local people's government at or above the county level may apply for land acquisition.

Article 48: Land requisitioned shall be compensated fairly and reasonably to ensure that the living standards of the landless farmers will not be lowered, and their long-term livelihoods will be guaranteed.

The compensation for land, resettlement subsidy, the housing compensation for rural villagers, compensation for ground attachments and young crops, and social security fees for the landless farmers shall be paid timely in full amount.

The standards for compensation for requisitioned cultivated land and resettlement subsidies shall be determined by the provinces, autonomous regions and municipalities directly under the Central Government by formulating and publicizing the comprehensive prices of farmland. The formulation of comprehensive prices of farmland shall take into account the original purpose of use, resource conditions, output value, location, supply and demand relationship, population and economic and social development level of the land requisitioned. It shall be adjusted or reissued at least once every three years.

Standards of compensation for requisition of other types of land, ground attachments and young crops shall be prescribed by provinces, autonomous regions and municipalities directly under the Central Government. For the rural villagers' houses, the principles of compensation first and then relocation and improvement of living conditions shall be followed, and their wishes shall be respected. The fair and reasonable compensation like re-arrangement of homestead for building houses, provision of resettlement houses or monetary compensation shall be made, and the expenses arising from relocation and temporary resettlement due to land acquisition shall be compensated to protect the rights of rural villagers to live and their legitimate housing property rights.

The local people's government at or above the county level shall incorporate the land-expropriated farmers into the corresponding social security system such as pension. The social security expenses are mainly used to pay pension insurance and other social insurances for land-expropriated farmers who meet the conditions. Measures for the collection, management and use of social security expenses for land-expropriated farmers shall be developed by provinces, autonomous regions and municipalities directly under the Central Government.

Article 49: The rural collective economic organization, the land of which is requisitioned, shall accept supervision by making known to its members the income and expenses of the compensation received for land requisition.

The compensation and other charges paid to the unit for its land requisitioned is forbidden to be embezzled or misappropriated.

Article 57: Where land owned by the State or by peasant collectives needs to be used temporarily for construction of projects or for geologic prospecting, the matter shall be subject to approval by the land administration departments of people's governments at or above the county level. However, if the land to be temporarily used is located in the area covered by urban planning, the matter shall be subject to agreement by the urban planning administration department concerned before it is submitted for approval. The

land user shall, depending on who owns the land and who has the land-use right, enter into a contract for the temporary use of the land with the land administration department concerned, or the rural collective economic organization, or the villagers committee and pay compensation for it in accordance with the provisions of the contract.

The temporary land user shall use the land for purposes stipulated in the contract for temporary use of the land and may not build permanent structures on it. Generally, the period for temporary use of land shall not exceed two years.

5.2.2 Key Provisions in the Circular No.238

The Formulation of the Unified Standards of Annual Output Value. The departments of natural resources at the provincial level shall, in conjunction with other departments concerned, work out the unified minimum standards for annual output value, which shall be announced and executed after the examination and approval by the people's governments at the provincial level. Factors such as types and quality of arable land requisitioned, peasants' input, prices of primary products and the categories of farmland shall take into account when deciding the value of average annual output.

The Determination of the Unified Multiple of Annual Output Value. The unified multiple of the value of average annual output for calculating land compensation and resettlement subsidies shall comply with the principle of non-decrease of the standards of living of the peasants whose arable land has been requisitioned and shall be decided within the limits prescribed by laws and regulations; compensation for requisitioned land calculated with reference to the prescribed multiple of the value of average annual output shall increase the multiple upon approval of the people's governments at the provincial level if it is unable to maintain the original living standards of the peasants whose land has been requisitioned and still insufficient to pay social security expenses for peasants who have lost land due to requisition; the total land compensation and resettlement subsidies shall be 30 times the value of the average annual output of arable land, or shall be subsidized by a proportion of proceeds from the sale of State-owned land use rights under the overall planning of a local people's government if they are still insufficient to maintain the original living standards of the peasants whose land has been requisitioned. Compensation for arable land that is authorized to be requisitioned shall be implemented in compliance with the maximum compensation standards announced by the local people's government.

The Formulation of the Comprehensive Prices of Farmland in Resettlement Areas. In the areas where conditions permit, provincial-level departments of natural resources may make comprehensive land prices in counties (or cities) within provincial boundaries together with the administrative departments concerned, which shall go into effect upon approval and promulgation by the people's governments at the provincial level and shall be applied to compensation for land requisitioned. In calculating the comprehensive prices of farmland, the categories and rates of arable land, its production value, location, per capita quantity as well as demand and supply or the local economic development levels and the minimum standards of living should be given full consideration.

The Allocation of Compensation for Land. In accordance with the principle of distributing land compensation funds mainly among peasants whose land has been requisitioned, land compensation funds shall be appropriately allocated within rural collective economic organizations. The people's governments at the provincial level shall guide detailed ways of allocation. In the areas where land is expropriated and rural collective economic organizations are dissolved, all compensation for land shall be applied for the restoration of agricultural production and livelihood of the peasants whose land has been requisitioned.

Rehabilitation by Agricultural Production. During requisitioning of peasants' collective land beyond urban planning areas, first priority shall be given to providing peasants with necessary cultivated land for continuity of agricultural production by utilizing the rural collective land reserves, the contracted land returned voluntarily by the contracting rural households or the newly added arable land after land circulation and land consolidation.

Rehabilitation by Reemployment. Favorable conditions shall be created to provide free technical training and assign corresponding posts to peasants whose land has been requisitioned. Under equal conditions, the land users shall give priority to creating employment opportunities for peasants whose land has been requisitioned. During requisitioning of peasants' collective land within urban planning areas, the peasants losing their arable land due to land acquisition shall be incorporated into urban employment system and a social security system shall also be established.

Rehabilitation by Dividends. Regarding land with long-term stable earnings to be used in any projects, under the premise of rural households' willingness, the rural collective economic organizations, the land of which is requisitioned, shall regard land compensation as stocks or converge the land-use right of the land approved for construction purposes into stocks through consultation with the land users. The rural collective economic organizations and rural households shall receive dividends by means of preference stocks based on the contracted conditions.

Rehabilitation by Resettlement. In the area where peasants losing land due to land acquisition are not provided with basic production and living conditions, the local government shall organize their resettlement into other areas on the basis of fully soliciting opinions from the rural collective economic organizations and rural households whose land has been requisitioned.

Gap Analysis: In most aspects, the Chinese legal framework on land acquisition and resettlement is consistent with ESF of the World Bank. They share the same objectives and principles and focus on restoration of livelihood for the affected people. One noticeable difference is that under Chinese legal framework, there is no requirement of preparing resettlement plan by project sponsor, and no requirement on conducting monitoring and evaluation during implementation of land acquisition and resettlement. In order to fill the gap, detailed documentation requirements have been included in ESMS for those sub-projects considered with substantial social impacts on land acquisition and resettlement. For subprojects with minor land acquisition and resettlement, they will be carried out by following same national procedures and compensation policies, and outcome will be reviewed and conformed by external monitoring and evaluation.

6. ENTITLEMENT POLICY & REHABILITATION MEASURES

6.1 Entitlement Policy

All displaced persons are eligible for compensation and/or other forms of assistance, as relevant to the nature of impacts affecting them. In general, people eligible for compensation would include those affected in the following ways:

Land to be acquired for the project: This refers to (a) members of affected villages who have formal land use rights, and (b) those outsiders who are currently farming the land areas under lease arrangement. Displaced persons in category a) are entitled to compensation at replacement cost. For those in category b) they are entitled to compensation for lost crops and lost structures.

Loss of houses, other structures and fixed assets, including trees and standing crops:

Owners of houses and other assets (regardless of whether they hold land title or building permits for structures erected prior to the cut-off date).

Losses associated with temporary impacts: This includes temporary loss of land, and transitional costs associated with moving, or disturbance to businesses during construction.

Specifically, displaced persons will be entitled to the following types of compensation measures:

1. Displaced persons losing agricultural land:

a) The preferred mechanism for compensation of lost agricultural land will be through provision of replacement land of equal productive capacity and satisfactory to the displaced person. If satisfactory replacement land cannot be identified, compensation at full replacement cost may be provided.

b) Displaced persons will be compensated for the loss of standing crops at market price, for economic trees at net present value, and for other fixed assets (ancillary structures, wells, fences, irrigation improvements) at replacement cost.

c) Compensation will be paid for temporary use of land, at a rate tied to duration of use, and the land or other assets will be restored to prior use conditions at no cost to the owner or user.

2. Displaced persons losing residential land and structures

a) Loss of residential land and structures will be compensated either in-kind (through replacement of house site and garden area of equivalent size, satisfactory to the displaced person, or in cash compensation at replacement cost, plus assistance for relocation.

b) If after partial land acquisition the remaining residential land is not sufficient to rebuild or restore a house of other structures of equivalent size or value, then at the request of the displaced person the entire residential land and structure will be acquired at full replacement cost.

c) Compensation will be paid at replacement cost for fixed assets.

d) Tenants, who have leased a house for residential purposes will be provided with a cash grant of three months rental fee at the prevailing market rate in the area and will be assisted in identifying alternative accommodation.

3. Displaced persons losing business

a) Compensation for loss of business will involve, as relevant: (i) provision of alternative business site of equal size and accessibility to customers, satisfactory to the displaced business operator; (ii) cash compensation for lost business structures: and (iii) transitional support for loss of income (including employee wages) during the transition period.

4. Vulnerable groups

a) The project vulnerable groups - the elderly, disabled, woman headed households should be identified in the census survey. Besides compensations and rehabilitations measures to be adopted for all affected people, additional assistance will be provided to them in order to ensure that their income and livelihood will be restored and improved through project implementation.

5. Infrastructure and access to services

Infrastructure (such as water sources, roads, sewage systems or electrical supply) and community services (such as schools, clinics or community centers) will be restored or

replaced at no cost to the communities affected. If new resettlement sites are established, infrastructure and services consistent with local standards will be provided at no cost to the relocated persons.

6.2 Rehabilitation Measures

Compensation may be sufficient to allow displaced persons to restore incomes if paid at full replacement cost when replacement assets are available. Often, however, land acquisition and resettlement may require rehabilitation measures for displaced persons or persons who loose income from land acquisition in order to obtain new skills required for resuming production in a new environment, or to pursue new sources of income. The RP must assess the impacts resulting from land acquisition and resettlement of displaced persons, and provide adequate rehabilitation measures to assist those affected to restore their livelihoods. Terms for provision of such measures, including training, extension services, or employment, along with responsibility for providing them, should be specified and detailed in the RP.

7. Institutional Arrangements

For the propose Project, Huaxia Bank Green Finance Center will be responsible for environment and social management of the Project. The staff of Green Finance Center will work closely with other relevant departments and staff of branch offices to first screen environment and social risks of all potential sub-projects, and for those sub-projects identified with potential social impacts of land acquisition and resettlement, staff of Green Finance Center, branch office staff and potential sponsors of sub-projects will work together to prepare relevant documents in order to address impacts caused by land acquisition and resettlement. Specifically, following the provision of the framework, a resettlement plan will be prepared for those sub-projects involve with land acquisition and resettlement. The resettlement plan will be prepared based on consultation with affected communities and individuals, which will include details on compensation and rehabilitation following national laws and local regulations, and arrangement for implementation and monitoring. Huaxia Green Finance Center and staff of relevant branch offices will conduct regular monitoring, supervision and reporting of the resettlement implementation as per the requirements of this RF and sub-project RPs. The institutions to be responsible for the planning, management, implementation and monitoring of the resettlement activities include:

1. HXB Green Finance Center
2. Relevant HXB branch office
3. Borrower of sub-project involved with land acquisition and resettlement
4. Resettlement Offices of relevant city or county natural resources bureaus
5. Relevant township government
6. Relevant villages or village group
7. Selected Independent Resettlement Monitoring and Evaluation Institution

In the RP for each sub-project, details should be presented on the responsibility, staff, relationship of these institutions, and detailed training programs that are required. Although the staff of Huaxia Bank Green Finance Center has extensive experience with the implementation of the World Bank funded projects, staff of many branch office of Huaxia Bank have had less exposure to implementing foreign loan funded projects, and with the World Bank resettlement policy requirements. A resettlement workshop on resettlement policy and practice will be conducted for the staff of Huaxia Bank headquarter and branches. Additional training for resettlement staff from each sub-project will be included in the individual resettlement plans.

8. Public Consultation, Information Disclosure and Participation

Prior to implementing the Project, public consultation and information disclosure should be undertaken within the project area. Knowledge and acceptance of the proposed compensation policies and rehabilitation measures for the affected people is a precondition for approval of the resettlement plan. The ESMS of Huaxia Bank for the Project should be disclosed to the public during project preparation. During project implementation, ESMS of Huaxia Bank should also be provided to each sub-project sponsor and made available along with prepared RP in the project affected area, including resettlement information booklets to be distributed to affected persons to provide details on impacts and compensation rates prior to the World Bank approval. During implementation, disclosure of impacts measurements, compensation entitlements and payments will be publicly disclosed in affected villages or communities.

Public participation includes involving the affected communities and project stakeholders in the whole resettlement process. It is important that an activity management mechanism is established that will encourage the affected people to actively participate in the resettlement activities. The project affected people should be encouraged to participate in the overall process of compiling and implementing the resettlement plan. To achieve this, the communities and APs should be invited to consultation meetings during the preparation of resettlement plan, so that they can become fully informed of the RF and the planned developments. The sub-project sponsor or local governments should solicit the opinion of the APs on the resettlement and compensation policies, as well as from the local government and resettlement representatives. Everyone who may be affected by the sub-project and the resettlement plan should be encouraged to participate in discussions and help formulate the decisions for the resettlement and reconstruction work.

9. Grievance Redressal Mechanism

The Resettlement Plan is prepared in accordance with the needs of the whole sub-project. During implementation of the RP, APs complaints may arise because there has been some problems or change to the actual sub-project implementation activities which had not been foreseen when the RP was prepared. In order to ensure that the affected people can voice their complaints when any problem arises for the land acquisition and/or resettlement of the APs, an appeal procedure is defined within this RF and in the Resettlement Plans. The purpose of this appeals procedure is to provide a mutually satisfactory means for rapid response to any APs complaint, to avoid any likelihood of a complicated legal procedure. The detailed procedure is as follows:

If any AP does not agree with the compensation or resettlement plan, he/she can voice their complaint to the village committee (residential committee). The village or residential committee should keep records, consult with the local resettlement office and provide a reply to the affected people.

If the affected person is not satisfied with the reply, they can appeal to the township or sub-district resettlement working group, which will take records, consult with the local resettlement office and provide a solution to the affected person.

If the affected person still does not accept the proposed resolution, then they can appeal directly to the local city or county Project Resettlement Office (PRO), which is the main organization responsible for the whole sub-project. The city resettlement office should make a record of any appeal and provide a resolution.

If the dispute still cannot be resolved, then the affected person can appeal to the HXB branch office or headquarter, go through an administrative appeal according to the "***Administrative Procedure Law of People's Republic of China***", or go directly to the People's Court. Huaxia Bank will make records of all appeals, and the resultant resolutions.

APs will be aware of their right to appeal through the participatory meetings and from the resettlement information booklet by following the new provisions in the land administration law and regulations. The project will also publicize information through the mass media and collect the APs opinions and suggestions, which will then be investigated and resolved through all necessary administrative levels in a timely manner.

10. Monitoring and Evaluation

10.1 Internal Monitoring and Evaluation

Both the Green Finance Center and branch office of Huaxia Bank and sub-project sponsor for each sub-project, as well as sub-project implementation agencies, will be responsible for the internal resettlement monitoring activities. The monitoring work will include reviewing the main implementation milestones, evaluating the resettlement impacts, and if necessary revising the sub-project Resettlement Plans. The Huaxia Bank Green Finance Center and branch office and borrower will be responsible to ensure the effective performance of the resettlement institutions during resettlement implementation, including strengthening the coordination between different institutions. They will prepare quarterly progress reports on the land acquisition and buildings demolition activities; and these reports will be consolidated by the Huaxia Bank into their annual reports for submission to the World Bank as the routine review and monitoring of resettlement implementation issues. The reports would include any suggestions for consideration and future action.

The internal monitoring will include:

- Updates of implementation schedules and progress of the last quarter and works/actions planned in the next quarter.
- The allocation of housing sites, house reconstruction, and relocation activities;
- Assessment of implementation progress and the quality of the replacement facilities for the resettled people and their productive activities;
- Investigation, coordination and the provision of suggestions to deal with any issues that arise (previously or new) for the resettlement institutions and the APs during the resettlement implementation process;
- Oversight on the restoration of family income once relocation and resettlement has been completed;
- Measures taken for vulnerable groups or individuals;
- The allocation, disbursement, and use of resettlement compensation;
- Assessment an support for participation and consultation during the implementation period;
- Progress on training affected people and promoting future options for their future livelihood; and
- Implementation issues and proposed follow-up actions.

The HXB will be responsible for preparing and submitting to the World Bank an annual resettlement summary report and a final comprehensive Resettlement Completion Report once all resettlement activities have been finished.

10.2 External Monitoring and Evaluation

A qualified external resettlement monitoring agency should be retained to undertake independent external resettlement monitoring and evaluation for the whole Project. The monitoring and evaluation agency must be acquainted with the resettlement activities, and able to provide both the evaluation and suggestions for improving the overall resettlement and rehabilitation process that secures the livelihood of the APs. The monitoring team is intended to be an independent communication channel for the APs, so as to ensure the resettlement planning and implementation fulfills the needs of the APs, and that the procedures adopted are also compliant with the national laws and provincial regulations, the RPs and the World Bank ESF Policy. The independent resettlement monitoring and evaluation agency shall conduct field investigations periodically and prepare resettlement monitoring and evaluation reports every six months, to be submitted simultaneously to Huaxia Bank and the World Bank for review.

The specific content of the external monitoring will include:

- Monitoring and evaluation of the resettlement implementation schedule;
- Monitoring and evaluation on the use of the resettlement funds;
- Monitoring and evaluation of the rehabilitation of production facilities in or as related to the APs;
- Monitoring and evaluation of the compensation payments to relocatees' and the re-establishment of productive economic activities.
- Assessment of the affected peoples income levels and living standards, as a basis to ensure they have been adequately compensated and their standard of living and income improved or at least fully restored to pre-project levels.

11. Resettlement Cost and Budget

11.1 Preparation Principles

Costs for a sub-project resettlement program, including economic rehabilitation, demolition and resettlement, and demolition and relocation of special facilities, should be prepared according to the relevant national policies, and included with the cost estimation for the construction works.

Compensation standards for land compensation, resettlement subsidy and young crops compensation will be confirmed according to ***Land Administration Law of the People's Republic of China*** and relevant provincial decree and local regulations.

Compensation standards for structures will be based on an analysis of replacement prices for a typical house in the project affected area. The compensation standard for auxiliary facilities, scattered trees and demolition subsidy will be determined according to the design or compensation standard for a similar project.

Compensation for special facilities, based on the maintenance of their functionality according to the principles of "original scale, original standard and original function", will be determined in accordance with the detailed work that will have to be undertaken. The estimated land acquisition and resettlement cost will be included as part of total project cost.

11.2 Compensation Funds

Each sub-project sponsor, assisted by the relevant local government agencies, should carefully compile a resettlement cost estimate that will be included in the resettlement plan prepared before each sub-project can be evaluated, as per the requirements outline in this RF.

11.3 Funds Arrangement

Compensation for land acquisition, demolition of buildings and other costs for each sub-project should be paid to the affected people and units by the city or county through their resettlement offices. According to the compensation policies and standards defined in the resettlement plan, the payment and usage of compensation funds will be carried out under the supervision of the internal monitoring agencies, with regularly review by the external monitoring agency.

12. Resettlement Implementation

The resettlement plan for each sub-project should include a detailed implementation schedule for the resettlement activity in the sub-project area. The schedule should be closely linked to the construction schedule, and the specific activities to be undertaken. The payment of compensation for land acquisition and demolition; the provision of other livelihood rehabilitation measures (in cash or in kind); and the allocation of subsidies or allowances should be paid in installments according to the planned resettlement implementation activities.

Annex 6 Ethnic Minority Development Framework

1. Introduction

This Ethnic Minorities Development Framework (EMDF) is prepared to ensure equitable sharing of the project benefits and mitigation measures by the concerned minority communities and individuals[14] in the project area of the proposed Project - China Renewable Energy and Battery Storage Promotion Project. The EMDF is prepared based on the requirements of ESF, relevant national laws and regulations, and consultation with key stakeholders, including staff of HXB and some function agencies in different provinces in China. The EMDF includes four main components. The first part is a brief description of project scope. The second part discusses basic rationale for preparing EMDF for the Project, and possible situation where EMDF might be applied so that affected ethnic minority communities could be ensured to have equable share of project benefits and avoid or minimize negative impacts. The third part introduces basic legal framework for EMDF, which includes both national laws and regulation concerning ethnic minority population in China and provisions of the World Bank Environment and Social Framework on Indigenous People. The fourth part summarizes the key provisions to enhance the economic conditions of minority groups based on review of EMDP for selected sub-project. Current government policies and programs for ethnic minorities further help to protect and enhance project benefits to ethnic minority groups.

2. Project Description

Project activities will promote and undertake target investments of both measures of reducing curtailment and new emerging use of RE in order to improve the efficiency of RE development. This is an integral part of a holistic program of World Bank engagement with China. The proposed implementation period is 2019 to 2025.

Target investments may cover a range of technologies and use cases in generation, grid and demand sides, subject to certain eligibility criteria, in line with the objective to improve efficiency of RE development. As such, project types could include: Installation of battery storage systems in existing wind farm and solar power plants. It would improve the performance of both wind and solar power from “intermitted power” to “dispatchable power”, and store the electricity when it needs to be curtailed. Installation of advanced wind/solar power forecast system. It would improve the accuracy of wind and solar power projection, so the dispatch centers can optimize its dispatch of these REs. Installation of heat/battery storage in existing non-coal power plants to increase its flexibility of dispatch. It would provide additional capability to the power systems to dispatch more RE. On the grid side: Installation of battery storage systems in existing substations. It would provide additional capability to the power systems to balance wind and solar power, then reduce RE curtailment. Grid side battery systems in substations, as part of the transmission and distribution networks, can also provide peaking load control and system backup to help mitigate the impact of the integration of PV and wind energy. Installation of advanced energy management systems to improve dispatch of RE. Examples of this type of investment could be joint dispatch of both hydropower and intermitted REs for better use of the intermitted REs. Improving existing distribution network or grid connection to allow more REs to be dispatched. On the demand side: Development of distributed RE with storage. Installation of battery storage systems in micro-grid and ‘behind the meter’ at consumer sites (e.g. distribution network in development zones and commercial buildings) to complement distributed renewable

[14] Ethnic minority groups refer to those groups that are different from the majority ethnic group—the Han.

energy generation and other services. The storage systems could enable the distributed RE more dispatchable and grid-friendly. Pilot and scaling up RE for heating. This is an emerging use of RE in China. It uses electricity to replace the coal consumption for heating, while additional commercial arrangement will be made to increase the RE generation to meet this additional electricity consumption. The commercial arrangement include direct contracting, purchasing of green certificates, or administration measures to increase the utilization hours of RE.

3. Potential Environment and Social Impacts and Issues Concerning Ethnic Minorities

Most of these potential borrowers from HXB are state owned or privately owned enterprises involved in renewable energy development, electricity generation, transmission, and distribution, as well as micro grid development for renewable energy utilization. Most investment activities by these enterprises to be financed by HXB will be concentrated on installation of storage battery facilities in order to improve efficiency use of renewable energy and reduce curtailment which appear to have limited potential environment and social impacts. Based on visit to a range of such facilities and consultant with similar enterprises, it seems that most of battery storage construction would involve minimum environment and social impacts. That is because most invested battery storage facilities could be accommodated within existing power plant site or substation site with little land acquisition. Only in the case of installation of battery storage in new renewable energy plants, where entire new renewable energy plant becomes linked activity, the moderate social and environment impacts due to construction of new renewable energy plant could be expected. Most such impacts associated with some renewable energy plants such as windfarm and concentrated solar power would be moderate, including permanent and temporary land acquisition in rural areas, normal construction impacts, as well as potential environment impacts during operation of these plants. If they are located in western provinces with high concentration of ethnic minority population, potential impacts on ethnic minority communities could not be ruled out. In such cases, environment and social issues like land acquisition, indigenous people, labor laws, and community health and safety need to be addressed. In order to ensure that proper mitigation could be developed to address such impacts, and affected people in those sub-project could be consulted regarding various mitigation measures, HXB established a screening system and a set of procedures under ESMS to ensure for those subprojects that will involve with potential environment and social impacts, affected people will be consulted and stakeholders will be engaged during the preparation and implementation of individual sub-projects.

In such situation, provisions of ESS7 will be applied to such sub-project through established environment and social risk screening procedures and the ethnic minority development framework (EMDF) as part of ESMS for Huaxia Bank. Once it is determined that proposed sub-project will have negative impacts on ethnic minority communities, an ethnic minority development plan will be prepared based on consultation with affected ethnic minority communities as part of environment and social requirements established under ESMS for HXB. Through EMDP, HXB will ensure the affected minority communities will share the equal benefits of the project, avoid any negative impacts, and meet the requirements of ESS7 of the World Bank.

4. Legal Framework

4.1 Government Policy, Plans and Program

After 1949 the PRC Government adopted a policy of ethnic equality, in which all groups are legally and constitutionally equal. Given the inferior social and economic conditions of most minorities, the government adopted a policy of positive discrimination in favor

of the minority nationalities to help them "catch up" with the mainstream population. To implement this policy, the Government first clarified, enumerated and mapped the identity of ethnic groups. PRC post-1949 policy defines nationalities in very precise terms, based on, inter alia, shared language, territory, economic base, and traditions/culture. Under this definition, the Han constitute the dominant nationality in the PRC. Some minority nationalities (e.g. Hui and Man) have become assimilated into the Han language and cultural traditions - but are still recognized as minority nationalities. Since 1949 there has been a tendency for smaller ethnic groups to fuse and merge in the definition of officially recognized minority nationalities.

The 1954 Constitution specified mechanisms for exercising autonomy in minority areas. The 1974 Constitution reduced the financial autonomy, and other powers, of these areas. Some of these powers were restored in the 1978 Constitution and further extended by the State Council (1980) and the National Law of 1984. Since the early 1980s governments of autonomous areas have been able to decide on economic policy, including what to produce, some latitude in allocating government subsidies, and within set guidelines, education and budgeting. In 1982 the formulation of the one child per family directive by the State Council advocated more flexible approaches to planned parenthood amongst the minority nationalities.

Minority areas have special access to relief funds, loans, subsidies and tax relief, including a lower tax on grain, to assist in economic development. Minority people also benefit from points score system which places them in a higher rank than the main stream Han for university admissions. For the 8 provinces where minorities are concentrated (Guizhou, Yunnan and Qinghai provinces and the five minority autonomous regions of Inner Mongolia, Xinjiang, Guangxi, Ningxia and Tibet) government subsidies in the past have been substantial.

4.2 The World Bank Policy on Indigenous People

The World Bank recognizes that indigenous people have identities and aspirations that are distinct from mainstream groups in national societies and often are disadvantages by traditional models of development. In many instances they are among the most economically marginalized and vulnerable segments of the population. Their economic, social and legal status frequently limits their capacity to participate in and benefit from development projects. In many cases, they do not receive equitable access to project benefits, and they may not adequately consulted about the design or implementation of projects that would profoundly affect their lives or communities. ESS7 sets out the criteria for determining a distinct social and cultural group possessing the following characteristics in varying degree:

a) Indigenous peoples should be regarded as those with self-identification as members of a distinct indigenous social or cultural group and recognition of this identity by others; and
b) Collective attachment to geographically distinct habitats, ancestral territories, or areas of seasonal use or occupation, as well as to the natural resources in these areas; and
c) Customary cultural, economic, social, other political institutions that are distinct or separated from those of the mainstream society or culture; and
d) A distinct language or dialect, often different from the official language or languages of the country or region in which they reside.

A key purpose of ESS7 is to ensure that indigenous people are fully consulted about and have opportunities to actively participate in project design and the determination of

project implementation arrangements. The proposed measures and actions to enhance potential benefits and mitigate potential impacts will be developed in consultation with affected indigenous people and included in a time bound plan, which is called ethnic minority development plan. The EMDP should be prepared if a project 'affects indigenous peoples adversely and significantly'. While fully recognizing the sovereignty of the borrowing country, the World Bank accepts that it has a responsibility for ensuring (i) equality of opportunity for national minorities and (ii) that its operations and assistance to developing member countries do not negatively affect the cultural identity, welfare and interests of national minorities. Where the World Bank assisted projects potentially will adversely affect national minorities, the World Bank requires the borrower (or the private sector project sponsor) to prepare an Ethnic Minority Development Plan (EMDP) that is acceptable to the World Bank.

An EMDP should describe the socio-economic characteristics of minorities affected by the project, identify potential project impacts, both positive and adverse which affect them, including proposals to amend or redesign the project to minimize adverse effects and/or include an acceptable compensation plan. The EMDP should also provide a basis for project implementation and for monitoring and evaluating how the project deals with national minority peoples issues.

The following is some key principles and requirements of ESS7, which need to be considered and included as part of EMDP preparation.

1) Screen to determine that Indigenous Peoples present in, or with collective attachment to, the project area are fully consulted about, and have opportunities to actively participate in, project design and the determination of project implementation arrangements.
2) For projects designed specifically to provide benefits directly to Indigenous Peoples, proactively engage with the relevant Indigenous Peoples to ensure their ownership and participation in project design, implementation, monitoring and evaluation.
3) Design and implement the project in a manner that provides affected Indigenous Peoples with equitable access to project benefits.
4) Ascertain and document the Free, Prior, and Informed Consent (FPIC) of the affected Indigenous Peoples when the project will: (a) have impacts on land and natural resources subject to traditional ownership or under customary use or occupation; (b) cause relocation of Indigenous Peoples from land and natural resources subject to traditional ownership or under customary occupation or use; or (c) have significant impacts on Indigenous Peoples' cultural heritage. In these circumstances, the Borrower will engage independent specialists to assist in the identification of the project risks and impacts.
5) Adverse impacts on Indigenous Peoples will be avoided where possible. Where alternatives have been explored and adverse impacts are unavoidable, minimize and/or compensate for these impacts in a culturally appropriate manner commensurate with the nature and scale of such impacts and the form and degree of vulnerability of the affected Indigenous Peoples.
6) Where projects are likely to have significant impacts on land that is traditionally owned or under customary use or occupation by Indigenous Peoples, prepare a plan for legal recognition of their perpetual or long-term renewable custodial or use rights.
7) Given priority to the avoidance of significant adverse on cultural heritage that is relevant to the identity and/or cultural, ceremonial, or spiritual aspects of Indigenous Peoples' lives. Where such impacts are unavoidable, obtain the FPIC of affected Indigenous Peoples.
8) With the participation of affected Indigenous Peoples, identify mitigation measures

designed to avoid, or if avoidance is not a possible minimize, mitigate or offset such impacts as designs opportunities for culturally appropriate and sustainable development benefits. Ensure the timely delivery of agreed measures to affected Indigenous Peoples.

9) Establish a grievance mechanism for the project, which is culturally appropriate and accessible to affected Indigenous Peoples, and takes into account the availability of judicial recourse and customary dispute settlement mechanisms among Indigenous Peoples

5. Screening Criteria and Preparation Procedures for EMDP

The project is, therefore, committed and has the organizational instruments to ensure that ethnic minorities are (i) consulted in matter relating to each sub-project, (ii) provided opportunities for participation in decision making related to the sub-project, and (iii) provided opportunities for participation in project activities should they so desire. The basic criteria for determining whether an EMDP will be required for any sub-project whether ethnic minorities are concentrated among sub-project beneficiaries and sub-project affected people. And whether they will be negatively affected by the proposed project activities such as land acquisition and resettlement.

5.1. Preliminary Screening

For those sub-projects that are located in counties and provinces with certain proportion of ethnic minorities, HXB staff and sub-project sponsor will follow a number of basic procedures specified in this framework. The first step is for sub-project sponsor to conduct a preliminary social assessment during project feasibility preparation in order to determine whether there are any concentrated minority communities among beneficiary populations or project affected people, and whether they will be negatively affected by the project activities such as land acquisition and resettlement in order to confirm the need to prepare an EMDP for the sub-project. Results of the preliminary screening on ethnic minorities should be confirmed by World Bank.

In the process of preliminary social assessment, sub-project sponsor should carry out consultation among affected ethnic minority groups in the project areas. They will gather both qualitative and quantitative data in the project areas through a range of PRA techniques, which include (1) names of ethnic groups in the affected areas; (2) total number of ethnic minority groups in the affected villages; (3) percentage of ethnic minority population among total project beneficiaries; and (4) number and percentage of ethnic minorities among total persons affected by land acquisition and resettlement.

If the outcome of the social assessment indicates that there are no ethnic minority communities in the project affected areas, there is no need to prepare an independent EMDP for such sub-project. Instead, some clarification and explanation should be provided in the project environment and social assessment. However, if the social assessment confirms the fact that there are considerable minorities and minority communities in the project areas, and they will be negatively affected by the proposed project activities such as land acquisition, then an EMDP will be prepared following the provision of this framework.

5.2 Consultation and Stakeholder Analysis

The EMDP is the final outcome of a social assessment and consultation process which aims to ensure that ethnic minorities are well informed, consulted and mobilized to participate in the sub-projects to be supported by the World Bank. Their participation can either provide them the benefits with more certainty, or protect them from any potential adverse impacts like land acquisition and resettlement. In the social

assessment, the sub-project areas will be visited by staff of HXB branch office and sub-project sponsor, relevant county agencies, particularly agencies in charge of minority and poverty affairs, and experience consultants. Prior to the visit, respective sub-project sponsor will send letters to the communities informing their leaders that they will be visited by the project sponsors and local authorities and consultation will be conducted on the sub-project. The letter will request that the communities invite to the meeting representatives of farmers, women associations and village leaders for discussion on the sub-project. During the visit, the community leaders and other participants will present their views with regards to the sub-project. In addition, social consultant will conduct separate group discussions among male and female participants followed by key informants interviews and sample household survey. The main purpose of such survey is to develop a social economic profile among minority beneficiaries, conduct stakeholder analysis and collect their views on both benefits and potential impacts of the project, as well as mitigation measures.

5.3 Ethnic Minority Development Plan

Based on extensive consultation among different stakeholders an EMDP will be developed for the concerned sub-project. The content of EMDP, following ESMS and ESS7, will consist of introduction of concerned minority groups, their social economic conditions, potential negative impacts and proposed mitigation measures, as well as general enhancement programs and actions to be carried out during project implementation. Specifically, they EMDP should include a range of measures in order to (1) mitigate potential negative impacts; (2) enhance positive benefits for the beneficiaries based on existing policies and programs aiming at minority population; and (3) ensure protect benefits accrue to affected minority population in a preferential or in an equitable manner. Based on proposed measures, detailed budget and implementation arrangement should be developed, which include institutional structure and monitoring and evaluation arrangement. All these will be included in the EMDP. In general, an EMDP will include the following elements:

1. legal Framework
2. baseline data and profile of minority communities;
3. consultation, participation, and disclosure;
4. identification of impacts and mitigation measures;
5. institutional arrangement;
6. grievance procedures;
7. implementation schedule;
8. monitoring and evaluation; and
9. cost and Finance plan.

5.4 Reporting Requirements

The completed EMDP, after being reviewed and endorsed by sub-project sponsor, will be submitted to HXB for approval as part of sub-project preparation documents along with resettlement plans, environment assessments and project feasibility studies.

The World Bank will clear the first EMDP prepared under this project and will retain the right to review and clear ensuing EMDPs until the World Bank Task Team is convinced that HXB demonstrates adequate capacity to screening and managing safeguards issues. Clearance of EMDP will be managed by HXB in-house safeguard specialist, subject to spot check by the Bank as needed. The EMDP should be disclosed locally and on World Bank's website and revised in accordance with feedbacks for the disclosure.

5.5 Budget and Finance Sources

All measures are going to be financed by the sub-project sponsor or local government. Based on types of measures, some of them will be financed by existing government program or funds; and some of them will be financed by the sub-project budget as part of sub-project resettlement program or environment mitigation measures.

6. Implementation Arrangement

For the proposed Project, the HXB through sub-project sponsors will be responsible for management of the overall project implementation, including coordination of implementation of environment and social management measures including RP and EMDP. The local government agencies and sub-project sponsor are the implementing agencies who have the specific responsibility to implement the EMDP in accordance to this EMDF and ESMS. The HXB will coordinate with staff of Huaxia Bank branch office, external monitoring consultant and sub-project sponsor to conduct regular monitoring, supervision and reporting of the implementation of EMDPs as per the requirements of this EMDF.

The sub-project sponsor, through local government agencies and the contractors, will play a leading role in implementing proposed sub-project and related environment and social measures. Specifically, sub-project sponsor will be directly involved in construction of new energy storage facilities, and installation of related energy storage facilities through finance provision and construction supervision.

County governments will take the leading role in implementing the supportive measures concerning land acquisition, resettlement and rehabilitation. The supportive measures concerning land acquisition mitigation measures include cash compensation, land readjustment, technical training, cash crop promotion and micro-credit. These actions and routine work of local governments will undoubtedly be implemented regardless the project. Several government agencies will be involved including minority affairs bureau, natural resources bureau, poverty reduction office, agricultural bureau, women's federation (government organized NGO), township governments, etc.

7. Grievance Redress Mechanism

During implementation of EMDP, complaints may arise because there has been some problems or change to the actual sub-project implementation activities which had not been foreseen when the EMDP is prepared. In order to ensure that the affected people can voice their concerns during EMDP implementation, an appeal procedure is defined within in EMDP. The purpose of this appeals procedure is to provide a mutually satisfactory means for rapid response to any complaint, to avoid any likelihood of a complicated legal procedure. The detailed procedure is as follows:

If any AP has issue or concern with activities under EMDP, he/she can voice their complaint to the village committee. The village committee should keep records, consult with the local resettlement office and provide a reply to the affected people.

If the affected person is not satisfied with the reply, they can appeal to the township working group, which will take records, consult with the local county office and provide a solution to the affected person.

If the affected person still does not accept the proposed resolution, then they can appeal directly to the local county government, which is the main organization responsible for the whole subproject. The county government should make a record of any appeal and provide a resolution.

If the dispute still cannot be resolved, then the affected person can appeal to the HXB branch office or headquarter, go through an administrative appeal according to the "***Administrative Procedure Law of People's Republic of China***", or go directly to the People's Court. Huaxia Bank will make records of all appeals, and the resultant resolutions.

APs will be aware of their right to appeal through the participatory meetings and from the resettlement information booklet by following the new provisions in the land administration law and regulations. The project will also publicize information through the mass media and collect the APs opinions and suggestions, which will then be investigated and resolved through all necessary administrative levels in a timely manner.

8 Monitoring and Evaluation

Monitoring and evaluation (M&E) of the EMDP is required to ensure the plan is implemented properly and meets the objectives specified. The final M&E plan will be formulated shortly before project implementation. The World Bank through Huaxia Bank will provide assistance to staff of branch office, and sub-project sponsor in formulating the M&E plan. Objectives of the M&E plan include:

- Data and information to identify effects and project impact including qualitative information to describe social changes on minority people and their communities;
- Analyze and document the results for future planning of roads construction and poverty reduction interventions;
- Initiate participatory approaches (PA) needed to plan and implement complementary activities; and
- Focus on key-actions and processes learned from the project for replication in other areas.

The collection of data should be kept to a minimum and concentrate on data that is required for key indicators. The following list provides some broad evaluation indicators that are of greatest importance. Specific indicators related to the implementation of the EMDP will be included in the plan. Data collected shall be disaggregated by sex and by ethnic group whenever possible:

- Production output value in target villages
- income per capita
- poverty incidence
- ownership of assets in selected villages.
- new commercial activity along the new river front
- changes in quality of water and health with reasons for selected villages
- new houses built/under construction in selected townships
- frequency of technical and socio-economic advice and training to selected villages on local roads
- school attendance classified by grade, gender and ethnicity and drop out rate for selected townships

Not all the above questions will apply in every case. Some relate only to villages affected by the project. Others are only appropriate once the flood control project has been constructed. Questions in the 'before construction survey' should instead probe into the anticipated benefits from the schemes and other development priorities. Surveys would be carried out in villages located in close proximity to the project.

The sub-borrowers will play a leading role in formulating the M&E plan. Therefore, the World Bank will provide guidance to prepare a feasible M&E plan before project implementation. Concerned sub-project sponsor will coordinate local governments to assist the consultant team to carry out the M&E plan. The budget for monitoring and evaluation activities will be worked out once detail M&E plan is completed, which will be used for hiring international consultant and domestic EMDP monitoring agency.

Annex 7 Initial Environmental and Social Due Diligence of BEES projects and Primary Suppliers and Disposal Services Companies

1. Sectoral Background

Energy storage sector started around 2010, and has been entering a fast track development since 2015. In the past three years, the scale of electrochemical energy storage and production has maintained a high growth rate, with an average annual growth rate of about 69%, and fastest growth in 2018. According to the statistics of Energy Storage Branch of China Chemical and Physical Power Sector Association, by December 31 of 2018, the total energy storage capacity is 33.7GW, including 32.6GW pumped storage capacity (accounting for 96.6%); 969.2 MW electrochemical energy storage (2.9%); compressed air storage is 2 MW, flywheel energy storage is 1.1 MW; molten salt heat storage is 161.7 MW. In 2018, China's electrochemical energy storage capacity was 554.8 MW, with a compound growth rate of 134%. It is mainly used in the scenario of new energy grid-connected and smooth output fluctuations on the power supply side (35 projects have been invested), and the micro-grid on the consumer side (24 projects have been invested). The power supply side and the consumer side energy storage are the main directions for energy storage project investment in 2015-2018. There are fewer energy storage applications on the grid side

In terms of geographical distribution, the energy storage projects put into operation in the past three years are mainly distributed areas with rich RE and areas with high demand load, such as Jiangsu, Qinghai and Tibet. Among them, Jiangsu has the largest proportion of 33.5%. The main application scenarios are basic services of transmission and distribution facilities, distributed and micro-grid, industrial and commercial energy storage, etc.; Qinghai and Tibet are ranked second and third respectively. Main use is in new energy grid-connection, distributed RE and micro-grid scenarios.

In terms of technology types, the number of projects using lithium-ion battery in the past three years was the highest, about 45; the lead-acid battery was the second, about 28; the number of projects such as supercapacitors, cold storage, and other energy storage battery ranks third, about 25; the number of flow battery projects is the least, about 7.

For this Project, it is expected that the power generation side sub-project will be mainly concentrated in northwestern China (Inner Mongolia, Shanxi, Qinghai, etc.), and grid-side sub-projects will be mainly concentrated in Jiangsu, Henan and other places, while demand-side sub-projects will mainly focus on Jiangsu, Beijing, Pearl River Delta, etc. where the price difference between peak and valley is large

2. Sectoral Legal Framework

Energy storage is considered as an emerging sector with new technologies and significant potentials for future energy market in the world. NDRC issued a

Guidance on Promoting Energy Storage Technologies and Sector Development in 2017 as a national strategy to promote the sector. It calls for two stages of development in ten years, i.e. transition from R&D to commercialization, and scale-up of commercialization. The key tasks include promoting pilots of R&D of energy storage technologies, RE application efficiency, flexibility and stability of grid, smart level of application, and diversified applications of energy storage to support energy Internet application demonstration. It requires to strengthen the construction of energy storage safety and environmental protection policies/ regulations and standards and establish a system for EPR of energy storage products.

Based on pilot experiences in the electronics sector, the State Council issued an *Implementation Arrangement of Extended Producer Responsibility System* in 2016, which aims to further promote life-cycle management of products from environmental and resource perspective. Its objective is to establish preliminary EPR system by 2020 with standard-compliance collection and recycling of wastes from key products to 40%; and generally established EPR system by 2025, with full and orderly operation of EPR system in producers of key sectors, wide application of eco-design of products, proportion of reused material in key products up to 20%, and average 50% of formal collection and recycling of used products. The priority fields of pilot include electronic products, vehicles, lead-acid battery and packaging material.

For lead battery sector, in January 2019, the "*Notice on the Action Plan for Pollution Prevention and Control of Waste Lead Storage Battery*" was issued jointly by several key ministries, requiring implementation of the extended producer responsibility (EPR) system and establishment of a standardized recycling system for lead battery sector. It sets out the objectives, i.e. by 2020, lead storage battery manufacturers will achieve a standard collection rate of waste lead storage batteries of 40%; by 2025, the standard collection rate of waste lead storage batteries will reach 70%; all waste lead storage batteries collected by the standard will be safely disposed of.

For lithium battery, China has issued several policies to regulate the recycling of used batteries, including *Interim Measures for the Management of Recycling and Utilization of New Energy Vehicles' Power Battery, Pilot Implementation Arrangement for Power Battery Recycling, Interim Measures for Source-tracing Management of Battery Recycling for New Energy Vehicles*. These policies also emphasize the implementation of the EPR system, which requires automobile production enterprises to bear the main responsibility for the recovery of power batteries. A *Technical Specifications for the Comprehensive Utilization of Waste Battery of New Energy Vehicles* has been issued by MIIT in 2016 to set environmental and safety standards for lithium battery recycling enterprises. On September 5, 2018, MIIT released a list of first batch of five enterprises that are fully in compliance with this specification (through enterprise application and expert panel inspection and verification).

Among general pollution control standards (e.g. for wastewater, air emission, noise, solid waste disposal etc.), a number of technical specifications and standards related to energy storage sector are in place, including:

- Energy storage station: *Design Code for Electrochemical Energy Storage Station, Performance Indicators for Electrochemical Energy Storage Station, Code of Operation and Maintenance of Electrochemical Energy Storage Station, Code of Inspection of Electrochemical Energy Storage Station, Code of Emergency Response of Electrochemical Energy Storage Station;*
- Energy storage system: *General Technical Specifications for Electrochemical Energy Storage System;*
- Grid connection: *Technical Standard for Electrochemical Energy Storage System Connected to Power Grid, Test Specifications for Electrochemical Energy Storage System Connected to Power Grid;*
- Battery: *Standard for Lithium Battery for Power Storage, Technical Standard for Lithium Battery Management System in Electrochemical Energy Storage Station, Standards for Lead-acid Battery Used for Energy Storage, Standard for Lead-carbon Battery for Power Storage;*
- Energy storage converter: *Technical Specifications for Power Conversion System of Electrochemical Energy Storage System, Test Specifications for Power Conversion System of Electrochemical Energy Storage System;*
- Decommissioned battery recycling and disposal: *Specifications for the Comprehensive Utilization of Waste Battery of New Energy Vehicles, Technical Specifications of Pollution Control for Treatment of Used Lead-acid Battery, Specifications of Dismantlement and Recycling of Used Battery, Residue Energy Test for Recycling of Used Battery etc.*

These regulations/policies, standards and specification set a generally sound framework for environment and safety management of development of energy storage sector. However, there are still gaps and challenges, especially in the actual implementation practice. For instance, about 70% of lead-acid recycling is through non-standard recycling channels, e.g. small enterprises which may or may not fully comply with standards. There are only a few professional and compliance companies for lithium battery recycling, while most lithium battery recycling is conducted by small and non-professional enterprises. These challenges will be given due considerations during the sub-project screening, loan approval and post-loan supervision processes, through proper arrangement of loan agreement with enterprises.

At present, for the energy storage industry, the project has basically adopted the project filing system. It mainly needs to prepare safety assessment, social stability risk assessment, and environmental impact assessment, and complete the site selection opinion after approval by the relevant competent authorities (safety supervision, DRC and environmental protection authorities).

<u>Construction stage:</u>

- The construction period of the energy storage power station project mainly depends on the project construction scale and equipment layout (prefabricated or in-situ construction). The construction period of the 10MW prefabricated energy storage power station is about 2 months,

the construction personnel are less than 50 people. For in-situ construction energy storage power station (or the battery is prefabricated, the electrical equipment is placed indoors), because of the civil engineering involved, the construction period is relatively long, depending on the amount of civil works involved.

- Safety requirements during construction and installation are currently implemented with reference to the safety requirements for construction and installation of power transmission and transformation projects. In the prefabricated energy storage system, there is a safety risk of short circuit between the positive and negative terminals of the battery during the installation and wiring. However, this part of the work is generally completed by the supplier in the factory, and the risk is reduced by structural design and strict process control. After the whole system is commissioned, it will be sent to the site. The workload during the construction phase is very small.

Operation stage:

- Daily operation and maintenance personnel requirements: In the initial stage of operation (within 1 month of operation of the energy storage power station), a small number of personnel (but at any time, 2 people on site) on-site operation and maintenance are required, mainly to monitor the operation status of the energy storage power station and equipment status; after normal operation, unattended or few people are required on duty for routine inspection and comprehensive inspection. Routine inspection is conducted once a week. During this period, the energy storage monitoring main station realized 24-hour duty and monitored the operation status of the energy storage power station in real time.

- Safety maintenance requirements (including labor protection) and emergency response procedures: Currently, with reference to the relevant requirements for safety operation and maintenance of substations, e.g. *"Code for Operation and Maintenance of Electrochemical Energy Storage Power Stations", "Management Specifications for Electrochemical Energy Storage Power Stations",* and *"Code for Accident Handling of Energy Storage Power Stations"* as the basis for implementation of operation and maintenance

3. Main Technologies and Initial Environmental and Social Risks Screening

Currently-used battery technologies mainly include lead-acid battery, lithium-ion battery, super capacitors, and flow battery. The main pros and cons and potential environmental and social risks are as follows:

Technologies	Lithium battery	Lead-acid (carbon) battery	Super capacitor	Flow battery	Other new technology that may be applied in five years (lithium slurry battery)
Applicable	KW-500MW	KW-20MW	KW-0.5MW	MW-500MW	KW-500MW

Technologies	Lithium battery	Lead-acid (carbon) battery	Super capacitor	Flow battery	Other new technology that may be applied in five years (lithium slurry battery)
capacity scale					
Maturity	Relatively mature	Mature	Mature	Relative mature	Immature, still needs 3 years of pilot
Pros/Cons	Pros: high energy intensity (90-220Wh/kg), high efficiency (⩾88%), rapid decrease of cost (1.2~1.8yuan/Wh), long life (6~8 years). Mature production chain. Cons: safety risks, immature downstream recycling industries	Pros: Safe and mature, low cost (⩽0.8yuan/Wh). Mature upstream and downstream production chain. Cons: short life (3-5 years); non-standardized recycling practice with heavy metal pollution risks	Pros: high power intensity (⩾1000W/kg), long cycle life (⩾8000times). Cons: low energy intensity (25Wh/kg); high cost	Pros: Safe, long life (8000~15000 times) Cons: Low energy intensity (25-40Wh/kg), low efficiency (70%), high unit construction cost (3~5yuan/Wh); complicated operation and maintenance; immature up/down stream chain	Pros: low cost (⩽1yuan/Wh); long life (⩾10years); safe, easy recycling; Cons: immature scale technology and products
Environmental impacts	Basically, no release of hazardous materials in production and operation; low operation noise; certain safety risks during operation.	Lead and acid treatment in the whole industrial chain; low operation noise; low risks of acid leakage	Basically, no release of hazardous materials in production and operation; low operation noise; certain safety risks during operation.	Treat of toxic element (vanadium) and acid; safe operation; low noise; certain risk of acid leakage	No release of hazardous materials in production and operation; low operation noise; certain safety risks during operation.
Social impact	Small land occupation (30-80m²/MWh). Mostly use existing land within PV or substations. No large amount of land acquisition is needed.	40-70m²/MWh, mostly use empty land within existing facilities	Mainly used in small scale storage scenario or ancillary application to battery storage system. Little demand for land	Large land demand (100-300m²/MWh). Currently, mostly use empty land within existing facilities. Large new project may require large amount of land acquisition	Small land demand (10-40m²/MWh). Can be safely installed in multiple layers with less land occupation
Installation and	There are safety codes	There are safety codes	There are safety codes	There are some safety	There is no safety codes

Technologies	Lithium battery	Lead-acid (carbon) battery	Super capacitor	Flow battery	Other new technology that may be applied in five years (lithium slurry battery)
operation	for installation and operation. Simple operation at early stage, and a bit complicated disposal of retired battery later.	for installation and operation. Short life and simple operation.	for installation and operation. Simple operation and maintenance. Recycling and disposal issue later.	codes for installation and operation. Complicated operation and maintenance. Replacement and maintenance of recycling pump and reactor at later stage	for installation and operation yet. Simple operation and maintenance. Replacement of liquid every three years.
Whether hazardous waste is involved and availability of managemen t measures	**Yes. There are recycling enterprises for battery disposal. Technology not fully mature**	**Yes. There are recycling enterprises. Mature technologies**	**Yes. Currently small scale. Handled as general hazardous wastes. No product specific recycling enterprises.**	**Yes. There is no retired battery yet from this sector. The electrolyte can be recycled.**	**No. Safety treatment of battery before decommissio ning, most material can be recycled （⩾90%）**

4. Batter Suppliers

In 2018, the total production capacity of battery is about 78GW in China, with over 90 production enterprises in various regions (mainly in eastern, middle regions, Yangtze delta and Jing-Jin-Ji area). Among them, there are five major enterprises:

No.	Name	Location	Battery type	Production capacity	Brief description
1	Nandu Power	Zhejia ng	Lead battery/Lithium battery	Lead battery: 12 million KVAH; Lithium battery: 3GWh (Hangzho u and Wuhan: 20 GWh not yet in production)	Established in 1994. National high-tech company. Products include: lead-acid valve control batteries, lead carbon battery lithium batteries, energy storage systems, fuel cells, etc.
2	Sunshine Power	Anhui	Lithium battery	2GWh	Established in 1997. Products include: photovoltaic inverter series, ground power station business, wind energy converter series, energy storage system, new energy vehicle drive system.

3	BYD	Shenzhen	Lithium battery	14GWh (40Gwh in Qinghai not yet in production)	Established in 1995. Products include: new energy vehicles, power batteries, consumer batteries, energy storage batteries, energy storage systems, cloud tracks, etc.
4	Luke Electronics	Shenzhen	Lithium battery	3.2GWh	Established in 1996. Products include: smart meters, energy storage systems, charging piles, new energy vehicle operations, etc.
5	Shengyang Power	Shandong	Lead battery	4M KVAH	Established in 1991. Products include: lead-acid batteries, lithium-ion batteries, new energy system integration, FCP lead carbon batteries.

The environmental and social management of these five enterprises are as follows:

(1) Zhejiang Nandu Power Ltd

In 2017, the total operating income was 8.64 billion yuan, and the net profit in 2017 was 380 million yuan. It has a total of 27 subsidiaries. On the part of stakeholders, the company actively strengthens communication and cooperation with stakeholders to identify the needs of stakeholders. The company communicates with shareholders (employees, communities, the public, customers, suppliers, governments and other stakeholders) through the company's website disclosure of related information, technical exchanges and technical seminars, training sessions, symposia, etc. In terms of environmental protection, Nandu has established an environmental management committee directly responsible for the environmental protection work, and a special environmental protection department is responsible for environmental work. Through the organizational structure, the environmental management network covers all aspects of the company’s operation. It implements the environmental protection responsibility system, with commitment letter signed by each department. Environmental performance has veto power in the performance evaluation system.

In 2017, the environmental protection investment was 10.6 million yuan, and the wastewater, waste gas, solid waste and noise all met the national emission standards. For hazardous chemicals, they are stored, transported and used in accordance with the relevant regulations of national hazardous chemicals management. Nandu has established the management system of hazardous chemicals, dangerous chemicals management accounts and MSDS files, equipped with appropriate emergency materials and equipment, and conducted chemical leakage response drills on a regular basis.

Nandu began to introduce QC080000 non-hazardous substance management system in 2008, systematically managing hazardous substances and

ensuring that products comply with the battery directive. In addition, according to the EU Directive on the Restriction of the Use of Certain Substances in Electrical and Electronic Equipment (R0HS Directive), the entire supply chain is controlled and regularly tested to ensure that the product does not contain harmful substances.

In terms of employees, Nandu strictly abides by labor regulations, does not use child labor and underage employees, and has signed labor contracts with all employees according to law. The company sticks to the principle of equality for various human resources management matters such as salary, training opportunities, promotion of positions, and termination of labor contracts. It does not engage in or support any discrimination such as race, ethnicity, social origin, and social class.

(2) Sunshine Power Ltd.

In 2017, the total operating income was 8.89 billion yuan. In 2017, the net profit attributable to shareholders of listed companies was 1.02 billion yuan.

On the part of stakeholders, the company pays attention to the needs of various stakeholders, actively creates channels and conducts activities to listen to their voices. It communicates with shareholders (employees, communities, the public, customers, suppliers, governments, environmental entities and other stakeholders) through the company's website disclosure of related information, technical exchanges and technical seminars, training sessions, and trade union forums.

Sunshine Power attaches great importance to environmental health and safety (EHS) management system which is critical to its corporate social responsibility. Protecting the environment, employee health and personal safety are the corporate social responsibilities of the company. Under the premise of strictly complying with national and local EHS laws and regulations, efforts have been made in environmental protection, occupational health and safety, energy conservation and consumption reduction, pollution reduction and strengthening of health and safety training, and achieved good results.

In terms of environmental protection, the company attaches great importance to environmental protection. Sewage discharge, atmospheric pollutant emissions, plant boundary noise and industrial waste (general waste & hazardous waste) generated during production and operation must fully comply with all relevant national and local regulations. In addition to the simultaneous construction of pollution control facilities in the initial stage of construction projects, it also requires adequate organizational guarantees and technical guarantees in all aspects of environmental management such as personnel support, operational procedures, monitoring and control, and environmental emergency plans to ensure the sustainable development of enterprises and prevent the occurrence of pollution incidents. In 2017, the emission of pollutants from all member companies of Sunshine Power can meet the standards.

In terms of health and safety, Sunshine Power advocates employees to actively participate in health and safety activities and management, and encourages employees to carry out self-going activities in various forms and rich

content to fully protect employees' rights and interests in health and safety. In 2017, most member companies are equipped with corresponding EHS full-time or part-time staff. Member companies regularly carry out continuous improvement and regularly carry out safety production activities, such as safety production month knowledge contest, safety and rationalization proposals. In 2017, the total training for EHS and social responsibility of the company and its member companies reached 8385.5 hours, and the total number of participants reached 3,473. Among them, the number of training sessions per capita was 2.7, and the number of training hours per person was 3.5 hours, increasing by 9.6% over 2016. Through these trainings, employees' environmental protection, occupational health and safety, sustainable development awareness and management level of management personnel have been effectively improved.

In terms of employees, Sunshine Power has a labor union to provide services and guarantees for all employees. The company promotes fair competition and opposes discrimination. Employees of all the company's operations, employees' salaries are higher than the local minimum wage, in line with local labor laws and regulations. The company always adheres to the principle of fairness, opposes discrimination, achieves the same starting salary for employees of different genders, and abides by the same minimum wage standard and equal pay for equal work.

Through the labor union, the company signs collective labor contracts with all employees. The collective agreement stipulates relevant provisions for consultation and negotiation, and will notify employees and their representatives in advance before implementing major operational changes that may seriously affect employees. The company supports employees to actively participate in the activities of the party work group. Employees have the right to participate in and organize labor unions according to law and write them into the company's rules and regulations and implement them. The company provides necessary facilities and fund.

The company actively cares about employees, regularly arranges medical examinations, holds health consultations or lectures, and actively invests in the health of employees. The company pays attention to the protection of employees' personal information and privacy, and manages the basic information of employees based on strict confidentiality. The company respects employees' rights to hearing and appealing, and provides clear channels for employees' complaints and opinions: including emails, symposiums, etc., and have established corresponding protection measures against confidentiality and retaliation. In the event of employee complaints, in strict accordance with the relevant system rules, under the premise of protecting employee privacy, the company coordinates communication, and gives employees satisfactory answers. The company insists on legal employment and has no illegal use of child labor or forced labor. The percentage of female employees returning to work and retaining jobs after maternity leave is 100%.

(3) BYD Ltd

On the part of stakeholders, the company actively works closely with stakeholders to listen to their needs as an important input to management

optimization. Various stakeholder engagement activities were organized, including organizing meetings, participating or organizing events, surveys, and communicating with stakeholders such as shareholders, employees, communities, the public, consumers, suppliers, governments, and the media.

In terms of environmental protection, BYD has always been a positive responder to environmental protection. It helps the society to reduce energy consumption through green products, while also focusing on reducing the direct impact of its own business activities on the environment. BYD pays attention to water pollution and waste gas prevention and waste management, and has formulated relevant management regulations, and continues to improve it. Each emission indicator has reached national standards, and environmental impact information has been publicly disclosed.

In terms of safety production, BYD has carried out the OHSAS18001 occupational health and safety management standard system and safety standardization construction, and diligently implemented the safety production responsibility system. BYD has organized various forms of safety production training to train employees to operate in compliance with the rules and regulations, and to pre-empt dangerous safety habits. For new recruits, BYD carries out three levels of safety production education for the company, workshops and teams; for the employees in service, the company implements safety production re-education every year; for the main person in charge and safety production management personnel, BYD requires certification. In addition, BYD has completed the training of safety management knowledge for the main person in charge of the factory manager and production manager. At the same time, it takes advantage of the national safety production month and firefighting month to organize employees to watch safety movies and safety evenings at various production bases. It conducts safety consultation days, safety knowledge contests, workshops with safety knowledge, quizzes, and safety board evaluations. BYD standardizes and strengthens the monitoring and management of high-risk operations such as special equipment, dangerous chemicals, hot work, high-altitude operations, and limited space, and conducts regular inspection and rectification of safety hazards. At the same time, BYD's professional team has researched and developed the quality and safety of stamping, welding robots, and sprayer robots to reduce the risk of employee exposure.

In terms of employees, BYD has established the “BYD Human Resource Management” system in accordance with the laws and regulations such as the *Labor Law* and the *Labor Contract Law* and the requirements of ISO9001, ISO14001, OHSAS18001, SA8000 and other standards and systems. BYD adheres to the principle of “equal opportunity, quantity and employment” and eliminates any discrimination based on age, gender, region, ethnicity, customs, social hierarchy, religion, physical disability, political affiliation, etc. during the recruitment process. It prohibits the use of child labor and coercion. labor. BYD fully implements the labor contract system and regulates the performance of labor contracts according to law. In 2017, BYD continued to maintain a 100% contract rate for labor contracts. BYD strictly abides by the laws and regulations regarding the length of work, holidays, etc. in the place of operation. During the

reporting period, BYD's number of labor disputes related to overtime and other related issues was zero. In addition, BYD employees are entitled to annual leave, maternity leave and other welfare leave in accordance with the law. BYD has developed a comprehensive compensation management system. The employee's bonus is closely related to the company's operating status, the performance of the employee's department and its individual performance contribution.

(4) Luke Electronics Ltd

In 2017, the operating income was 4.37 billion yuan, and the net profit attributable to shareholders of listed companies was 459 million yuan. The net profit attributable to shareholders of listed companies after deducting non-recurring gains and losses was - 0.55 billion yuan.

In terms of stakeholders, Luke communicates with stakeholders such as employees, consumers, suppliers, and the public through information disclosure, organization of meetings, and establishment of a comprehensive after-sales service system.

In terms of environment, the company regards environmental protection as an important part of corporate sustainable development. The company attaches great importance to environmental protection work. Since the introduction of ISO14001 environmental management system, environmental protection has been regarded as an important task in the past seven years, and the environment has been fully implemented, focusing on energy conservation and emission reduction, performance indicators and responsibility system. The company deepens the implementation of environmental management system certification through the establishment, operation and maintenance of the system, reduction of environmental pollution, and improvement of the company's own environmental image and product market competitiveness. The company continuously strengthens environmental management in daily management, focuses on monitoring important environmental factors, promotes the use of new energy sources, and strictly implements relevant control procedures for emissions of exhaust gas, wastewater, and noise in production, and improves production processes and processes. In 2017, the company did not have general environmental pollution accidents, large environmental pollution accidents, major environmental pollution accidents and major pollution accidents. All of the "three wastes" achieved discharge standards and achieved good environmental, economic and social benefits.

In terms of safety production, the company pays attention to the protection of employees' safety production and related labor, pays attention to employee safety education and training, and regularly equips employees with necessary labor protection facilities for different positions, and conducts safety inspection from time to time. The company comprehensively investigates and organizes employees to participate in safety production knowledge training and fire safety drills to effectively improve employees' awareness of safety production and self-protection. The company organizes workplace occupational hazard testing every year to create a safe working environment for employees. Through the annual physical examination of all employees and the occupational health examination of key employees, the company continuously pays attention to the

health status of employees, arranges the work of employees more effectively and reasonably, improves the work efficiency of employees, and improves the sense of belonging and enthusiasm of employees. In 2017, the company did not have a safety accident, the fire occurrence parameter was 0, and no occupational disease occurred.

In terms of employees, the company strictly abides by the laws, regulations and rules on labor and social security such as the Labor Law and the Labor Contract Law, and strictly enforces national regulations and standards in labor safety and health systems and social security. The company always adheres to the people-oriented management philosophy, standardizes the relationship between employees and enterprises, strictly follows the principles of openness, fairness, fairness, two-way choice, and merit-based employment. Talent cultivation focuses on ability and quality, balances performance efficiency, and establishes an effective qualification system to build harmonious labor relations, focusing on providing employees with a fair working environment, a positive and dynamic cultural atmosphere, a comprehensive welfare compensation system and a broad career development channel.

(5) Shandong Shengyang Power Ltd.

In 2017, the operating income was 1.71 billion yuan, and the net profit attributable to shareholders of listed companies was 31 million yuan.

In terms of stakeholders, the company communicates with stakeholders such as employees, consumers, suppliers, and the public through information disclosure, organization of meetings, interactive platforms, and establishment of customer service centers.

In the environmental aspect, the environmental management system has been established and implemented in accordance with the requirements of GB/T24001-2016idt ISO 14001:2015. The management system is applicable to the places involved in the design, production and service of valve-regulated sealed lead-acid batteries and related activities.

In terms of safety production, it has an occupational health and safety certification.

In terms of employees, the company values the sustainable development of our employees and the improvement of their professional ability. The company assists employees in improving their job skills and professional qualities by organizing a series of trainings combined with practical work and personal development and plans for future development.

5. Battery Recycling and Disposal Sector

As the energy storage industry has just started, recycling and disposal of energy storage battery is yet to achieve a large scale. Currently, only lead-acid battery and lithium battery (consumption products) have reached scale of recycling.

For lead-acid battery, due to its long-standing and mature industrial chain, there are mature recycling technologies and processes. However, about 70% of recycling is through non-standard recycling channels, e.g. small enterprises

which may or may not fully comply with standards. In January 2019, Ministry of Ecology and Environment (MEE), National Development and Reform Commission (NDRC), Ministry of Industry and Information Technology (MIIT) and other seven ministries and commissions just jointly issued the "*Notice on the Action Plan for Pollution Prevention and Control of Waste Lead Storage Battery",* requiring implementation of the extended producer responsibility (EPR) system and establishment of a standardized recycling system. By 2020, lead storage battery manufacturers will achieve a standard collection rate of waste lead storage batteries of 40%; by 2025, the standard collection rate of waste lead storage batteries will reach 70%; all waste lead storage batteries collected by the standard will be safely disposed of.

The production and sales of new energy vehicles are already in the "explosive development period", and the recycling of used power batteries is still in early stage. In recent years, under the influence of factors such as policy support, new energy vehicles have developed rapidly, which has promoted the accelerated layout of the power battery market. By the end of 2018, the quantity of new energy vehicles in China was 2.61 million, which is growing continuously, accompanied by lithium battery recycling and echelon use. According to EVTank research data, it is estimated that China's power battery recycling volume will reach 422,000 tons in 2022, and the market size of cascade utilization and recycling will reach 13.1 billion yuan. However, the overall decommissioning of power batteries in 2018 has not yet reached a scale, which has an impact on.

The foreign power battery recovery technologies are comparatively mature with a small variety, mainly including the pyrometallurgy technical route. One of the representative enterprises is Unicore from Belgium, adopting the process which can turn iron in lithium iron phosphate battery into ferroalloy, copper and aluminum into oxide slag, and then continue smelting. The graphite, separator, electrolyte and other organic substances in the lithium battery are burned in the form of reducing agent. However, the process has problems such as high energy consumption, unrealizable recycling of valuable materials, enormous carbon emissions, low economic value, etc.

China used to adopt the lithium iron phosphate battery as the power battery. In the next five years, the batteries require recycling will still be the lithium iron phosphate battery which has little recycling value. At present, the traditional power battery recycling enterprises in China generally adopt the pyrometallurgy technical route. Due to the long treatment process, strong acid, strong alkali, ammonia and other solutions need to be added in the treatment, and the generated sewage shall be treated in an environment-friendly manner. Since lithium iron phosphate battery contains only 2% lithium, according to the report data of "C100 2016 Annual Conference", adopting hydrometallurgy technology to handle the lithium iron phosphate battery is not profitable, with the loss for treatment of 1t lithium iron phosphate battery is RMB 430. In addition, the hydrometallurgy technology cannot be adopted in areas with stringent environmental requirements.

In recent years, new battery technologies and recycling technologies emerged have brought new opportunities for energy storage and power lithium battery recycling. For example, the new lithium slurry battery technology takes into account the innovative structure of the battery convenient for recycling at the end of its service life at the beginning of battery production. After the battery is scrapped, the electrolyte and separators for which recycling by the hydrometallurgy process cannot be realized can be recycled through the physical dismantling technology, and all 7 raw materials (waste anode powder, waste cathode powder, aluminum foil, copper foil powder, electrolyte, separator, battery shell, etc.) in the battery can be automatically and accurately separated and collected. The recovery rate can reach over 90% according to the overall weight of the battery, with the advantages of short process flow, high efficiency, no pollution and so forth. In addition, the material repair technology can repair and recycle the waste positive and negative electrode materials, and the recycled materials can be reused in the battery production, thus greatly improving the recycling utilization rate of the waste power storage batteries. The technology can not only process the ternary battery, but also has high economic efficiency when it is used in treatment of the lithium iron phosphate battery and the lithium manganate battery with low residual values.

In the early stage of the industry explosion, the recycling of used power batteries is still in the primary stage, which requires the gradual improvement and advancement of relevant management regulations. At the beginning of 2018, MIIT and other seven ministries and commissions jointly issued the "*Interim Measures for the Management of Recycling and Utilization of New Energy Vehicles' Power Battery*" (effective on August 1, 2018), which promotes cascade use and recycling and innovation of power battery recycling and utilization models. Emphasis is placed on the implementation of the EPR system, which requires automobile production enterprises to bear the main responsibility for the recovery of power batteries. This method was implemented on August 1, 2018.

On September 5, 2018, MIIT released the first batch of five enterprises that meet the national *"Specifications for the Comprehensive Utilization of Waste Battery of New Energy Vehicles"(MIIT, 2016),* which include Guangdong Guanghua, Jingmen Gelinmei, Hunan Bangpu, Quzhou Huayou, Ganzhou Haopeng etc. So far, there are not many professional recycling companies and government recycling centers for power lithium batteries. There are many small recycling enterprises whose technical and environmental compliance may not be always guaranteed.

Although there are more and more companies in the layout of lithium battery recycling, there is a lack of government system support and policy incentives. In addition, since the size of the decommissioned battery volume has not yet come up, the recycling channels for power lithium batteries for electric vehicles are mainly based on small recycling enterprises. There are fewer professional recycling companies and government recycling centers, and the system needs to be improved. Most of the used power batteries have flowed into small workshops which are backward in process equipment. However, if it is handed over to a formal enterprise that is legally registered with qualifications technologies and

facilities and environmental compliance, the price would be certainly high resulting in a lack of competitiveness. Therefore, it is necessary to improve the policy to ensure the sustainable development of the lithium battery and energy storage lithium battery recycling industry.

In view of the problems existing in energy storage and power battery recycling, the following suggestions for improvement are put forward:

First, as the power battery recycling industry is just starting, the state shall increase policy support for recycling enterprises and follow the advanced ideas of some European countries to provide corresponding financial subsidies to power battery recycling enterprises.

Second, in terms of policy formulation, the competent industry authorities in China shall put forward more targeted management measures to make the policy documents more detailed and operational. For enterprises violating rules, more direct punishments shall be imposed to prevent scrapped power batteries from flowing into the hands of illegal enterprises.

Third, a full life cycle ecosystem shall be established to strongly support the research and development and demonstration application of safe and renewable new battery technologies. A six-in-one comprehensive utilization ecosystem of battery manufacturers, auto manufacturers, recycling enterprises, comprehensive utilization enterprises, comprehensive utilization users and recycling and smelting enterprises shall be established to form a linkage.

Fourth, relevant technical standards and specifications shall be formulated. The responsibilities of relevant subjects in the upstream and downstream of comprehensive utilization shall be detailed, and the construction of relevant standard systems such as the access threshold for power battery echelon use, information traceability management, comprehensive battery management and comprehensive utilization fund shall be strengthened. In this aspect, efforts shall be made to study and formulate technical specifications for dismantling power battery packs, and clearly specify classification, labeling, storage, information entry, tracing and other related work after dismantling batteries.

In the future, with the explosion of industry scale and huge business opportunities, the improvement of relevant national laws and regulations and technical specifications, and increasingly strong implementation of environmental supervision and law enforcement, it is foreseeable that the lithium battery recycling industry is expected to take shape when the lithium battery involved in this Project is retired, with mature and much improved system of which environmental, social and safety risks are well regulated and managed.

Currently, some major battery recycling and disposal enterprises include:

No.	Name	Location	Battery	Disposal	Brief description

			type	capacity	(recycling and disposal methods, environmental management, labor protection, etc.)
1	Jingmen Gelinmei	Jingmen, Hubei province	Lithium battery (lithium iron phosphate battery, ternary lithium battery and consumer lithium battery)	20000t/y	(1) Pretreatment (disassembly, discharge and heat treatment) - physical separation - chemical leaching and purification - material manufacturing; (2) All processes meet the requirements of the EIA. After the wastewater is treated by the company's wastewater treatment plant, it meets the urban sewage comprehensive discharge standard, and then processed by the industrial wastewater treatment plant operated by the company to meet the urban sewage comprehensive discharge standard level A discharge to the river. The wastewater discharge port is equipped with an online monitoring system, and the wastewater discharge data is uploaded to the provincial environmental protection department in real time. Exhaust gas is discharged through environmental protection facilities and discharged to the standard. Third-party testing agencies are required to routinely inspect the exhaust gas and groundwater, and report it to the provincial environmental protection department. The waste residue is first identified for hazard, and the hazardous waste is recycled (for bricks production), safe landfill disposal for general solid waste (subsidiary company is responsible for landfill); other hazardous wastes that cannot be used during production are strictly entrusted to third parties for treatment according to hazardous waste management methods. (3) All employees are equipped with corresponding dustproof and acid-proof protection facilities, and insurances.
2	Hunan Bangpu	Hunan Changsha	Lithium battery (lithium iron phosphate battery, ternary lithium battery and consumer lithium battery)	20000t/y	The power battery modules and equipment for automatic disassembly of individual batteries have been developed. We have developed a process of “constant circulation and reverse product positioning” to produce NCM and battery-grade cobaltosic oxide.

3	Ganzhou Haopeng	Jiangxi Ganzhou	Lithium battery, nickel battery		The lithium battery recycling project has been put into operation. It has complete equipment and process for harmless treatment of waste batteries and adopts advanced environmental protection technology and equipment for recycling of waste batteries.
4	Quzhou Huayou	Zhejiang Quzhou	Lithium battery,		A production line for recycling and reuse of used lithium batteries was built, adopting processes such as battery pack dismantling, monomer crushing and grading and wet purification.
5	Guangdon g Guanghua	Guangdong Shantou	Lithium battery,		A recycling production line has been built, with a full life cycle service program of echelon use-disassembly and classification for utilization-material repair-valuable metal recycling-material manufacturing. In addition, technologies such as “multistage series coordination complexation extraction purification” and “bipolar membrane electroosmosis” have been developed, and environmentally friendly treatment processes have been adopted to realize the recycling of various valuable metal elements. The Company has acquired ISO 9001:2008 quality management system certificate, ISO 14001:2004 environmental management system certificate and OHSAS 18001:1999 occupational health and safety management system certificate.

The environmental and social management of these enterprises are briefly described as follows:

(1) Jingmen GEM

The company was founded in 2003 with a registered capital of 4.458 billion yuan. It is a wholly-owned subsidiary of GEM Corporation (SZ002340), a company listed on the Shenzhen Stock Exchange and a global leader in circular economy.

Jingmen GEM is mainly engaged in the recycling and recycling of waste resources such as used batteries, waste cobalt-nickel resources and electronic waste, recycling and recycling cobalt, nickel, copper, tungsten, gold, silver, palladium, rhodium, iridium, indium, rare earth, etc. 30 scarce resources, annual recycling of small waste batteries accounted for more than 10% of China's total. Recycled cobalt and nickel materials become the mainstream raw material for power batteries. Jingmen GEM has more than 550 patents and core technologies

in the field of resource recycling, and has led the formulation of more than 100 national/industry standards. It has won the first prize of China Nonferrous Metals Industry Science and Technology Progress Award in 2009, the second prize of National Science and Technology Progress Award in 2010, 2017. The first prize of Hubei Science and Technology Progress Award. It has a public technology platform - National Electronic Waste Recycling Engineering Technology Research Center and Hubei Province Urban Mineral Resources Recycling Engineering Technology Research Center.

In terms of stakeholders, the projects implemented by the company are publicized on the official website of the company in accordance with the Provisional Measures for Public Participation in Environmental Impact Assessment (Huanfa 2006 [28]), and the project disclosure is carried out online and in writing, including content of the project, the site selection of the project, the impact on the surrounding residents and the environmental impact, to fully seek the opinions of stakeholders. The public can make comments and suggestions on the environmental impact of the construction of the implementation project and the work to be done in environmental protection through the network and in writing.

In terms of environmental protection, the company attaches great importance to environmental protection. Sewage discharge, atmospheric pollutant emissions, plant boundary noise and industrial waste (general waste & hazardous waste) generated during production and operation must fully comply with all relevant national and local regulations. In addition to the simultaneous construction of pollution control devices and facilities in the initial stage of construction projects, it also requires adequate organizational guarantees and technical guarantees in all aspects of environmental management such as personnel support, operational procedures, monitoring and control, and environmental emergency plans to ensure the sustainable development of enterprises and prevent the occurrence of pollution incidents. Every year, the company publicizes the company's greenhouse gas emission verification report to the public.

In terms of employee management, GEM has built a harmonious culture system centered on the interests of employees, and regularly conducts corresponding safety production training, on-the-job training, corporate culture training, ideological education and training for employees. The company seeks a win-win situation between the company and its employees through employee participation management, reasonable employee performance evaluation and respect and care for employees and other means.

(2) **Hunan Bangpu Tech Ltd**

Founded in 2008, Hunan Bangpu is currently the largest waste battery recycling demonstration base in China and a waste battery resource clean production model factory. Bangpu gathers government, media, schools, communities and other social resources to jointly establish a recycling system for used batteries, build a recycling network for used batteries, and build three systems for small battery recycling, large-scale power battery recycling, and

decommissioned automobile recycling. The company seeks to improve the national environmental awareness, and guide people to choose a healthy, green and environmentally friendly lifestyle through public welfare activities, production and promotion of environmental protection manuals, environmental protection and publicity into the classroom, etc.

In terms of environment, the company has passed ISO9001 quality management system, ISO14001 environmental management system, OHSAS18001 occupational health and safety management system certification. The company has not experienced any production accidents, equipment accidents, and has not received any environmental complaints. For the ammonia nitrogen wastewater and heavy metal wastewater generated during the recycling process, the company adopts environmentally friendly wastewater treatment technology to realize the management and recycling of harmless wastewater. The reuse rate after wastewater treatment reaches 85%, and the remaining wastewater reaches the Integrated Emission Standards. In the process of battery disassembly and heat treatment, the company uses environmental protection equipment for concentration, absorption, oxidation, secondary absorption and other processes to achieve secondary comprehensive recycling.

In terms of stakeholders, the company set up a science base platform and actively promoted environmental knowledge to the public.

In terms of safety production, the company establishes a sound safety production system, and carries out various forms of safety activities such as fire drills, organization of emergency drills, safety knowledge lectures, safety training, etc., and implements HSE (health, safety and environment) management system. It attaches great importance to labor protection, actively provides labor protection measures and conditions for employees, and ensures safely throughout the year.

In terms of employee management, the company strictly abides by the Labor Law, and the labor contract signing rate is 100%, which protects employees' rights and interests. The company strictly enforces labor laws and regulations, fully protects all employees' rights to paid vacations, family visits, etc., regularly organizes employee physical examinations, and pays attention to employees' life and health. A social security system covering all employees has been established, and various social insurance expenses and housing accumulation funds for pension, unemployment, medical care, work injury, and childbirth have been paid in full, and employee rights and interests have been guaranteed. The company has established a multi-level training system.

(3) **Ganzhou Haopeng Tech Ltd**

The company was established on September 21, 2010. Its main business is waste battery recycling and ladder utilization of waste new energy vehicles, waste battery decontamination and resource recycling. It is one of the first enterprises in China to recycle and process used secondary batteries, and was recognized as the first batch of state-level green factories by the Ministry of Industry and Information Technology in August 2017. The company has more than 40 patented technologies developed independently, of which 10 are

invention patents (five authorized) and more than 20 are patents for power battery recycling. The company has participated in the formulation of 17 standards, and has released 3 national standards and 1 industry standard.

In terms of stakeholders, the projects implemented by the company are publicized on the official website of the company in accordance with the Provisional Measures for Public Participation in Environmental Impact Assessment (Huanfa 2006 [28]), and the project disclosure is carried out online and in writing, including content of the project, the site selection of the project, the impact on the surrounding residents and the environmental impact, to seek the opinions of stakeholders. Public can make comments and suggestions on the environmental impact of the construction of the implementation project and the work to be done in environmental protection through the network and in writing.

In terms of environmental and safety production, the company passed environmental protection acceptance, quality management system certification, environmental management system certification, occupational health and safety management system certification, and clean production audit.

In the future, with the explosion of industry scale and huge business opportunities, the improvement of relevant national laws and regulations and technical specifications, and increasingly strong implementation of environmental supervision and law enforcement, it is foreseeable that the lithium battery recycling industry is expected to take shape when the lithium battery involved in this Project is retired, with mature and much improved system of which environmental, social and safety risks are well regulated and managed.

Quzhou Huayou and Guangdong Huaguang do not give more information because of confidentiality.

Annex 8: Preliminary Due Diligence Report on Biomass Gas Sector

1. Sectoral Background

Biomass gas is a kind of green, low-carbon, clean and renewable natural gas produced by anaerobic fermentation and purification with crop straw, livestock and poultry manure, kitchen waste, agricultural and sideline products processing wastewater as raw materials. The energy-oriented, industrial and sustainable utilization of urban and rural organic wastes can be realized by disposing urban and rural organic wastes in an industrial, large-scale and professional manner, accelerating the resource utilization of livestock and poultry manure and solving the problems of environmental pollution caused by manure, straw burning and so on.

From the perspective of geographical distribution, biomass gas projects are mostly distributed in crop planting areas where natural gas sources are scarce, such as Henan, Hunan, Hubei, Guangxi, Shanxi, Gansu, Inner Mongolia, etc.

From a technical point of view, biomass gas projects mostly use green straw and livestock manure as raw materials to produce natural gas. This method is prone to produce a large amount of biogas slurry, which cannot be disposed in the farmers' leisure season and is prone to secondary pollution.

For the anticipated sub-projects under the Project, they will be mainly implemented on agricultural areas with scarce gas sources in central and western China and adopt biogas slurry recycling technologies.

2. Legal Framework

2.1 Sectoral Laws and Regulations

Biomass gas is considered as an emerging sector with imperfect laws and regulations. *Standard for Quality of Biomethane* (NB/T 10136-2019) has been issued on product quality. This standard is applicable to bio-natural gas produced from biomass by anaerobic fermentation or pyrolysis gasification.

The laws and regulations and standards of biogas sector and natural gas sector can be consulted for the engineering design and construction.

Biogas Sector:

- *Technical Code for Biogas Engineering Part 1: Process Design* (NY/T1220.1-2006)
- *Technical Code for Biogas Engineering Part 2: Design of Biogas Supply* (NY/T1220.2-2006)
- *Technical Specification for Biogas Engineering-Part 3: Construction and Acceptance* (NY/T1220.3-2006)
- *Technical Code for Biogas Engineering Part 4: Operation and Maintenance* (NY/T1220.4-2006)
- *Technical Specification for Biogas Engineering-Part 5: Evaluation of Quality* (NY/T1220.5-2006)

Natural Gas Sector:

- *Natural Gas* (GB17820-2018)
- *Code for Design Compressed Natural Gas (CNG) Supply Station* (GB51102-2016)

Technical Specification for Operation Maintenance and Safety of Biogas Plant in Scale Animal and Poultry Farms, *Technical Code for Fire Protection Water Supply and Hydrant Systems* and other safety and fire regulations and standards can be referred to for

operation and management. Since the straw used for biomass gas is flammable and the finished natural gas is also flammable and explosive, the possible safety and fire risks should be minimized by enhancing safety and fire protection management.

2.2 Environmental and Social Laws and Regulations

Biomass gas also follows the requirements of "Legal Framework on Environmental and Social Risk Management" in the third part of ESMS.

Industrial pollution prevention and control shall follow the *Environmental Protection Law*, *Air Pollution Control Law, Solid Waste Pollution Control Law, Water Pollution Control Law, Noise Pollution Control Law, Soil Pollution Control Law, Cleaner Production Promotion Law, Energy Saving Law, Water and Soil Conservation Law* etc.

Environmental and social risk assessment of construction projects shall conform to *Environmental Impact Assessment Law*, *Categorized Directory for Environmental Management of Construction Projects*, *Land Administration Law*, *Law of Ethnic Minority Regional Autonomy*, *Ethnic Minority Township Administration Ordinance*, and related environmental impact assessment systems, laws and regulations on land acquisition and demolition and laws and regulations of ethnic minorities.

The management system for work safety shall comply with the *Work Safety Law*. The safety evaluation is needed, and the work safety facilities should meet the requirements of "Three Simultaneousness", that is, the safety facilities and main projects are designed, constructed and operated simultaneously.

2.3 Project Development Rules

The main technological process is to use biomass as the raw material to produce biogas through collection, pre-processing and anaerobic reaction and then purify the biogas into natural gas.

From the process point of view, considering that green straw and livestock manure are prone to produce a large number of biogas slurry, resulting in secondary pollution, the raw materials of sub-projects are limited to dry straw and processed kitchen waste. The supply of dry straw and kitchen waste is sufficient, and no deforestation will occur. The main wastes produced by biomass gasification sub-projects are biogas slurry and biogas residue. The biogas slurry needs to be treated by "Flotation + Aerobic Bioremediation + Precipitation" and then returned to the biogas production section fully. The biogas residue is processed into solid organic fertilizer in the organic fertilizer workshop.

From the perspective of project development, according to the *Categorized Directory for Environmental Management of Construction Projects*, such projects are subject to Item 94 "Urban Gas Supply Project" in Article 32 Gas Production and Supply Sector, Item 90 "Biogas Power Generation" in Article 31 Electricity and Heat Production and Supply Sector, and Item 37 "Other Types of Fertilizer Manufacturing" in Article 15 Chemical Raw Materials and Chemical Products, so an EIA Form is required. In addition, safety impact assessment report and social stability risk assessment report are required to be prepared and documented/approved by relevant authorities (DRCs, ecology and environment departments, and emergency management departments, etc.).

3. Methods

3.1 Data Collection

To comprehensively collect the supportive policies and materials on environment and social fields as well as development plans for biomass gas sector in recent years to know the national and provincial policy support for biomass recycling.

3.2 Interviews

To invite relevant government departments, sector associations, representatives of key enterprises, technical units, stakeholders and other organizations to discuss the development and impacts of biomass gas sector.

3.3 Field Investigation

To conduct field investigation on government departments on environmental protection, development and reform, agriculture, industry and emergency, sector associations and key enterprises to exchange and investigate the generation mechanism of biomass gas, disposal methods of wastes and their impacts on the surrounding environment and residents.

4. Case Analysis and Process Comparison

Case Study A

An Ecological Recycling Project of Bio-natural Gas and Organic Fertilizer in Shanxi Province

This project consumes 100,000-200,000 mu of crop straw or disposes 100,000-150,000 tons of livestock and poultry wastes to produce 14 million m^3 of biogas, more than 7 million m^3 of high-quality natural gas and over 40,000 tons of efficient organic fertilizer every year.

The main wastes from this project are biogas residue and biogas slurry. Composting technology is adopted for the disposal of biogas residue in which the multiphase organic matter is decomposed in a specific environment by mixed microbial communities and the organic solid waste is improved into stable humus for fertilizer or soil improvement. Part of biogas slurry is used to produce liquid water-soluble fertilizer, and other part is temporarily stored in the pool, which is prone to secondary pollution.

This project is built in a modern agricultural industrial park, without land acquisition. The employment meets the policy requirements, and there are no sensitive points around such as hospitals and schools.

Case Study B

An Ecological Recycling Project of Bio-natural Gas and Organic Fertilizer in Inner Mongolia

This project produces 21.9 million m^3 of biogas per year and 10.95 million m^3 of purified bio-natural gas (i.e. 60,000 m^3 of biogas per day and 30,000 m^3 of purified bio-natural gas), and 50,000 tons of organic fertilizer per year.

Composting technology is adopted for the disposal of biogas residue for fertilizer or soil improvement. The biogas slurry needs to be treated by "Flotation + Aerobic Bioremediation + Precipitation" and then returned to the biogas production section fully to reduce pollution.

This project is built in the industrial park, without land acquisition. The employment meets the policy requirements, and there are no sensitive points around such as hospitals and schools.

5. Initial Environmental and Social Risks Screening for Sub-projects

5.1 Sub-project Size and Process

The sub-project size is the daily production of more than 10,000 m^3 of bio-natural gas

(suggested daily production of 20000-30000m^3), with a volumetric gas production rate of 1:1 (1m^3 biogas produced by 1m^3 reactor). The raw materials of sub-projects are limited to dry straw and processed kitchen waste. The biogas slurry needs to be treated by "Flotation + Aerobic Bioremediation + Precipitation" and then returned to the biogas production section fully. The biogas residue is processed into solid organic fertilizer in the organic fertilizer workshop.

The construction contents of sub-projects include weighing system, straw storage pit, raw material pretreatment system, anaerobic fermentation gas storage, biogas purification and compression, bio-natural gas, solid-liquid separation, bio-organic fertilizer, emergency torch, deodorization and fire protection and other supporting works.

The sub-project mainly adopts the medium temperature anaerobic fermentation technology. After 45 days, biogas is generated and then enters the biogas purification and compression system after desulfurization. After purification, bio-natural gas with methane content greater than 97% is stored in the tank car by CNG compression system and then transported to the users.

5.2 Pros and Cons of Technical Economy

Pros: Biomass gas is a clean and renewable energy to reduce straw burning and replace coal for heating so as to reduce the air pollutant emissions.

Cons: Biomass gas development has not yet formed a scale, with few investment subjects and few projects put into production. Biogas residue and biogas slurry are prone to secondary pollution. No complete industry standard system has been established.

Technology maturity: Biomass gas sector depends on large-scale biogas technologies which are more mature.

5.3 Environmental Risks and Impacts

The environmental risks and impacts of biomass gas sector will be analyzed from the aspects of waste gas, waste water, solid waste, noise and management during construction and operation.

5.3.1 Environmental Impact Analysis during Construction

Node	Pollutants	Control Measures
Construction fugitive dust	Fugitive dust caused by earthwork excavation, stacking, backfilling and transportation; by transportation, loading and unloading and stacking of construction materials, digging, storage tank area and underground pipe excavation; and by moving of various construction vehicles	Watering and lowering dust and other measures are required
Construction wastewater	Production wastewater, mainly concrete curing	Small quantity in short construction period

	water and aggregate flushing water Domestic sewage	Periodic disposal of domestic sewage
Construction noise	Construction machinery and transport vehicles affecting the acoustic environment around the construction site and on both sides of the road	Put high noise equipment in the center of the plant, do the corresponding anti-noise measures, no construction at night
Construction spoils and backfill	Solid wastes produced during construction, such as broken bricks, cement blocks, iron waste, wood waste, etc.	Iron waste, wood waste, waste metal materials and packaging can be recycled Broken bricks and cement blocks can be used for engineering filling

5.3.2 Environmental Impact Analysis during Operation

Content	Emission source	Pollutant name	Control Measures
Waste gas	Straw crushing Transportation and storage	Straw particles	The top of yellow corn silage area is covered with anti-seepage film to form a closed structure. The straw crushing machine is of a full enclosure structure. The straws are transported with canvas covered; and shelterbelt shall be planted around straws.
	Boiler	SO_2, NO_X	Organized emission through exhaust pipe
	Homogeneous feed pool	NH_3, H_2S	Anaerobic digestion unit adopts a closed structure. The collection tank and homogeneous feed pool adopt a set of

				deodorization system. The odorous gas is discharged through the exhaust cylinder after treatment.
		Biogas processing area	NH_3, H_2S	A closed structure is used and greenbelt is set around; the biogas slurry pond is covered with film and greened around; biochemical deodorizer is sprayed.
		Gas holder	Biogas	Accident exhaust torch is set up and biogas is discharged after combustion.
Waste water		Domestic sewage	CODCr, NH3-N, SS	Backflow in full
		Boiler blow-down water	SS	Backflow in full
		Biogas condensate water		Backflow in full
		Biogas slurry	--	The biogas slurry treated with "Flotation + Aerobic Bioremediation + Precipitation" and then returned to the biogas production section fully.
Solid waste	Hazardous wastes	Mechanical equipment	Used oil	Processed by a third party
	General solid	Homogeneous feed pool	Sediment	Comprehensive utilization

	waste	Anaerobic reactor Discharge buffer pool		
		Desulfurization system	Sulphur mud	
			Activated carbon for desulfurization	
		Biogas residue		Processed into organic fertilizer in the organic fertilizer workshop
	Domestic waste	Workers' life	Domestic waste	Unified disposal by environmental sanitation department
Noise	Sound insulation, shock absorption, noise reduction, soft connection and other measures			

The disposal of biogas residue and biogas slurry in the production process was evaluated through the investigation of the current situation of biomass gas risk management in China. The investigation found that composting technology is adopted for the disposal of biogas residue in which the multiphase organic matter is decomposed in a specific environment by mixed microbial communities and the organic solid waste is improved into stable humus for fertilizer or soil improvement. Part of biogas slurry is used to produce liquid water-soluble fertilizer, and other part is temporarily stored in the pool. Biogas slurry needs to be stored effectively and safely. If it is not treated effectively, secondary pollution will occur. The mitigation measures of "Flotation + Aerobic Bioremediation + Precipitation" should be adopted to make the biogas slurry return completely.

From the perspective of enterprise management, enterprises shall set up special posts for security and environmental protection to be responsible for the management of enterprise environmental safety inspection. In case of violations of company's environment, fire protection, health, risk and safety management regulations, the company will be required to make rectification.

From the perspective of bank management, as a responsible FI, Huaxia Bank has successful experience in implementing the World Bank projects. HXB has integrated many practices of the World Bank on environmental and social management into its day-to-day lending operations to ensure that project implementation meets domestic and the World Bank's new ESF requirements (especially ESS9).

Based on the above analysis, the sub-projects may cause some environmental impacts such as odor, flue gas, biogas residue and biogas slurry leakage, the overall environmental risk is rated as "Substantial".

5.4 Social Risks and Impacts

The social risks and impacts of biomass gas sector will be analyzed from the aspects of

site selection, land, labor and working conditions, community safety, ethnic minorities and management.

Site Selection

Through visits and field investigation, the site for biomass gas project shall be selected in such way that scenic spots, historic sites, cultural heritage and nature reserves; prohibited reclamation area for soil and water conservation, resource protection area; blasting danger zone such as mine operation; sanitary protection zone of drinking water source; areas with special requirements for ethnic and religious customs; areas susceptible to flood landslide, residential areas and other sensitive points are avoided.

Land

Generally, a biomass gas project covers an area of about 100 mu. The construction contents include weighing system, straw storage pit, raw material pretreatment system, anaerobic fermentation gas storage, biogas purification and compression, bio-natural gas, solid-liquid separation, bio-organic fertilizer, emergency torch, deodorization and fire protection and other supporting works. Most of the proposed sub-projects are built in industrial parks, without land acquisition. Where new land requisitions and relocations are concerned, they should be implemented in accordance with *Land Administration Law*, *Guiding Opinions on Improving the System of Compensation for Requisition of Land* (Circular No. 238, issued by MLR in 2004) and provincial and local implementation rules.

Labor and Working Conditions

China has a relatively perfect legal system of labor and working conditions, especially the laws and regulations on the prevention of child labor and forced labor and the regulation of health and safety in the workplace, which are applicable to workers including direct workers, contracted workers and primary supply workers.

On the one hand, China has a relatively strong legal system. On the other hand, China has increased labor-related law enforcement efforts to supervise the workplace and working conditions. In the exclusion list, the Project also explicitly excludes the enterprises and sub-projects that involve illegal use of labor or illegal employment of child labor.

Community Safety

Biomass gas projects are mainly built in industrial parks, so they have a low impact on residents, schools, hospitals and other sensitive points. However, such projects involve combustible gases, and there are risks such as deflagration, which need to be resolved through enterprises to strengthen safety management.

Ethnic Minorities

If ethnic minority issues are involved, they shall be resolved following the requirements of ESMS.

Management

From the perspective of enterprise management, enterprises can actively establish work safety system to ensure the safety in the construction and operation period, especially in the operation period. Enterprises shall install flame arresters on the biogas pipeline in the biogas purification, refinement, biogas boiler, torch and other sections, and set up the methane alarm system, which is linked with axial flow fan, on the buildings and structures with biogas pipelines to prevent the danger caused by biogas leakage. Safety instructions, emergency buttons and alarm buttons shall be set at the entrances of buildings and structures in the project area. In case of an emergency, measures can be

taken at the first time and the alarm can be transmitted to the general control room of the plant in a timely manner, which would comply with the provisions of *Hygienic Standards for the Design of Industrial Enterprises* and *Code for Design Compressed Natural Gas (CNG) Supply Station*.

From the perspective of bank management, as a responsible FI, Huaxia Bank has strengthened its environmental and social management system following the applicable national regulations and the World Bank's ESSs (especially ESS9) as well as the project risk status. To facilitate the ESMS implementation, effective management instruments have been developed and annexed to ESMS. HXB has formulated a time-bound capacity development plan, which will be implemented during the project implementation as an important and integral part of ESMS and ESCP. Based on the experience and lessons of previous projects funded by the World Bank, HXB will mobilize sufficient human and financial resources to develop and maintain the organizational and implementation capabilities of ESMS.

In summary, biomass gas projects are mainly built in industrial parks, so they have a low impact on residents, schools, hospitals and other sensitive points. However, this type of projects involves flammable straw and combustible gas like natural gas, with the risks such as deflagration, so the overall social risk is rated as "Substantial".

5.5 Environmental and Social Risk Rating

Social Risks	
Land	Most of the proposed biomass sub-projects are built in industrial parks, without land acquisition. Where new land requisitions and relocations are concerned, they should be implemented in accordance with *Land Administration Law*, *Guiding Opinions on Improving the System of Compensation for Requisition of Land* (Circular No. 238, issued by MLR in 2004) and provincial and local implementation rules.
Community and safety	Biomass gas projects are mainly built in industrial parks, so they have a low impact on residents, schools, hospitals and other sensitive points. However, this type of projects involves flammable straw and combustible gas like natural gas, with the risks such as deflagration, so they need to be resolved through enterprises to strengthen safety management.
Labor	China has a relatively perfect legal system of labor and working conditions, especially the laws and regulations on the prevention of child labor and forced labor and the regulation of health and safety in the workplace, which are applicable to workers including direct workers, contracted workers and primary supply workers.
Ethnic minorities	If ethnic minority issues are involved, they shall be resolved following the requirements of ESMS.
Summary	Such projects may involve straw burning or natural gas leakage and explosion risks, causing damage to surrounding facilities and personnel.

Substantial

Environmental Risks	
Waste gas	Straw transport produces particulate matter, and sealed transport is required. Straws shall be covered with canvas during storage. Boiler flue gas is discharged through exhaust cylinder in an organized manner. Anaerobic digestion unit adopts a closed structure. The collection tank and homogeneous feed pool adopt a set of deodorization system. The odorous gas is discharged through the exhaust cylinder after treatment. Gas holder is equipped with waste gas torch to prevent explosion.
Waste water	All production and domestic waste water is recycled without discharged. All biogas slurry is fully recycled after treatment process ("Flotation + Aerobic Bioremediation + Precipitation") and returned to the biogas production process. No discharge into the environment.
Solid waste	Comprehensive utilization of sediment in plant area is conducted without discharge. Biogas residue is processed into organic fertilizer in the organic fertilizer workshop.
Noise	Sound insulation, shock absorption, noise reduction, soft connection and other measures are taken.
Summary	Such projects may cause some environmental impacts such as odor, flue gas, biogas residue and biogas slurry leakage.
Substantial	

After the above analysis, the environmental and social risk rating for biomass gas sub-projects is rated as "Substantial".

	Environmental risks	Social risks
Risk rating	Substantial	Substantial
Comprehensive environmental and social	Substantial	

risk rating	

5.6 Enhancement of Environmental and Social Management

The comprehensive environmental and social risk rating for biomass gas sub-projects is rated as "Substantial", so the future E&S management should focus on the disposal of odor, biogas residue and biogas slurry, straw and natural gas storage to prevent leakage and explosion accidents and avoid environmental and social impacts.

During the implementation, all the biogas projects will be required to prepare environmental impact assessment following the requirement of this ESMS.

Annex 9: Investigation and Analysis on Land Use of Newly Built Wind Farm and PV Power Station

1. Investigation and Analysis on Land Use for Wind Farm Projects

No matter where the wind farm project is located in the country, the feasibility study and design for the covering area of the construction project shall be subject to the basic principles and control indicators stipulated in *Land Indicators for Electric Power Project Construction (Wind Farm)* (hereinafter referred to as *Land Indicators*). *Land Indicators* were prepared by the China Renewable Energy Engineering Institute with relevant units under the organization of State Electricity Regulatory Commission in accordance with the requirements of *Land Administration Law of the People's Republic of China*, *The State Council's Decisions on Deepening the Reform and Intensifying Land Management* (GF [2004] No. 28) and *Circular on Promoting Economical and Intensive Utilization of Land by the State Council* (GF [2008] No. 3). In the formulation process, the drafting group investigated and analyzed a large number of construction land data and actual land use situation of wind farm projects that have been built and are under construction. Combined with engineering design requirements, standard atlas and actual construction situations, it carried out relevant case studies on construction land of new wind farm projects and formulated these *Land Indicators*. As such, the total area of used land, land type and others for wind farm projects of comparable size are roughly the same in any region of China.

Through the investigation and analysis of the land occupation of some specific projects that have been completed, the general situation of land use for wind farm projects can be summarized.

1.1 Target Requirements for Construction and Land Area of Wind Farm Project

1. 1.1 Construction works involving land occupation in wind farm project

The construction works involving land occupation in wind farm project mainly include: wind turbines and substations (box transformer substation), booster substation, collecting power lines, operation management center, traffic engineering, etc. In most projects, these construction works generally involve permanent land occupation. During the construction of wind farm projects, a certain amount of land will be occupied by hoisting platform, equipment storage field, material warehouse, construction access roads and collecting power lines construction operation roads, which are generally temporary occupation.

1.1.2 Basis and principle of land area of wind farm project

In December 2011, the Ministry of Housing and Urban-Rural Development of the People's Republic of China, Ministry of Land and Resources and State Electricity Regulatory Commission approved the *Land Indicators for Electric Power Project Construction (Wind Farm)*. The *Land Indicators* are the basis for preparing feasibility study report and determining the land scale for construction works, and for verifying and approving the land area for construction works. It stipulates that wasteland or unused land shall be used for the construction of wind farm projects as far as possible to avoid the use of arable land or woodland. Wind turbine arrangement shall make full use of wind energy resources, topography and geological condition to reach the purposes of safe operation, convenient management, advanced technology and economic rationality with little or no land occupation. Under the reasonable technical and economic conditions, the wind turbine with large unit capacity should be preferred in the construction of wind farm projects to reduce land occupation. The number of temporary land should be strictly controlled, and the temporary land should be set within the scope of permanent land occupation or the wasteland or abandoned land can be used. In

principle, no arable land or basic farmland is allowed to be occupied. The existing roads can be used as construction roads as much as possible or combined with the maintenance roads during operation.

In addition to the general principles for land use of wind farm project, the *Land Indicators* also specify the land area control indicators for specific construction works under different technical standards. For example, the land area for the wind turbine with unit capacity of 2,000KW is 330 m^2, and that for box transformer substation with transformer capacity of 2,350KVA is 26 m^2.

1.2 Cases of Land Occupation of Wind Farm Project

In practical work, the feasibility study and design of each wind farm project are based on *Land Indicators for Electric Power Project Construction (Wind Farm)*. Firstly, the area occupied by each specific construction work is controlled within the scope specified by the *Land Indicators*, generally lower than the control standard in the *Land Indicators*. Secondly, in view of the characteristics of wind power projects, in addition to booster substation and operation management center, wind farms are generally on the mountains where there are more wastelands and grasslands. Therefore, wind turbines and box transformer substations, collecting power lines and other permanently occupied buildings and temporary construction facilities are often built on the wastelands and grasslands, and the maintenance roads during operation are generally composed of widened or renovated existing roads.

Here are the cases of land occupation of several wind farm projects completed or under construction.

1.2.1Wind Farm Project A

This project, with a capacity of 50,000KW, consists of 25 Vestas 2,000W wind turbines located 30 kilometers northeast of the Jingpeng Town in Hexigten Banner, Chifeng City. No new substation is built for the project.

This project covers a permanent and temporary land area of 881.5 mu in total, including 68.5 mu of permanent expropriated land, accounting for 7.77%, and 813 mu of temporary occupied land, accounting for 92.23%.

The construction works involving permanent land acquisition for this project include wind turbine foundation, line erection, maintenance station and site roads. 68.5 mu of permanent expropriated land area includes 34.7 mu of forest land and 33.8 mu of grassland.

The temporary construction facilities mainly include hoisting platform, steel processing yard, material warehouse, cement warehouse, equipment storage yard, concrete mixing station, office and living installations, construction access roads and collecting power lines construction operation roads, etc. 813 mu of temporary occupied land is entirely grassland.

The survey of Changxing Administrative Village in Jingpeng Town, Hexigten Banner, Chifeng City, which is affected by permanent land acquisition and temporary land occupation of this project, shows that Changxing Village is a semi-agricultural and semi-pastoral area, with a total of more than 1,100 households accommodating 2,480 people. There are more cultivated land totaling 23,300 mu with a per capita of 9.40 mu and grassland totaling 139,730 mu with a per capita of 56 mu. This project permanently collected and temporarily occupied 680.5 mu of grassland in Changxing Village, accounting for 0.49% of the Village's collective grassland area. Overall, the land acquisition and temporary land occupation of this project have minor impacts on the Village's land resources. A total of 3.579748 million yuan was paid to the Village as the

compensation for land acquisition and occupation, which was granted to the villagers with the Village household register, with a per capita of 1,443 yuan.

1.2. 2 50MW Wind Power Heating Project B

This project, with a capacity of 50,000KW, consists of 17 wind turbines with a unit capacity of 3,000kW and 1 booster substation. The construction site is located in Qingshuihe County, Hohhot City, Inner Mongolia.

This project covers a permanent and temporary land area of 693.23 mu in total, including 26.45 mu of permanent expropriated land, accounting for 3.82%, and 666.78 mu of temporary occupied land, accounting for 96.18%.

The construction works involving permanent land acquisition for this project include wind turbine and box transformer substation and booster substation. Among them, the booster substation covers an area of 15.30 mu, and a set of wind turbines and box transformer substation covers an area of 0.66 mu. 26.45 mu of permanent expropriated land area includes 15.3 mu of dry land, accounting for 57.4%; 3.28 mu of forest land, accounting for 12.4%; and 7.87 mu of wasteland, accounting for 29.76%.

The construction works involving temporary land occupation include maintenance roads, hoisting platform, collecting power lines tower foundation, temporary roads and yards. 666.78 mu of temporary occupied land area includes 226.71 mu of dry land, accounting for 34%; 173.36 mu of forest land, accounting for 6%; and 266.71 mu of wasteland, accounting for 40%.

There are two forms of compensation for 666.78 mu of temporary occupied land in this project. One is that the compensation for land occupation is paid in accordance with the permanent land acquisition standards, mainly including maintenance roads, hoisting platform and collecting power lines tower foundation, totaling 585.51 mu. The other is that the compensation for land occupation is paid in accordance with the temporary land occupation standards, mainly including temporary roads and yards, totaling 81.27mu.

1.2.3 Wind Farm Project C

This project, with a capacity of 99MW, consists of 38 wind turbines and 1 booster substation. The construction site is located in Xinrong District, Datong City, Shanxi Province.

This project covers a permanent and temporary land area of 364.35 mu in total, including 36.21 mu of permanent expropriated land, accounting for 9.94%, and 328.14 mu of temporary occupied land, accounting for 90.06%.

The construction works involving permanent land acquisition for this project include wind turbine and box transformer substation and booster substation. Among them, the booster substation covers an area of 15 mu, and a wind turbine foundation and box transformer substation cover an area of 0.472 mu. 36.21 mu of permanent expropriated land area includes 34.19 mu of agricultural land, accounting for 94.42%; and 2.02 mu of unused land, accounting for 5.58%.

The construction works involving temporary land occupation include hoisting platform, temporary roads and yards. 328.14 mu of temporary occupied land area includes 76.8 mu of dry land, accounting for 23.4%; 208.68 mu of forest land, accounting for 63.59%; 1.13 mu of construction land, accounting for 0.34%; and 41.53 mu of unused land, accounting for 12.66%. The forest land occupied by this project is mainly the forest land returning from farm.

1.2.4 Wind Farm Project D

This project, with a capacity of 98MW, consists of 49 wind turbines with a unit capacity of 2,000KW and their box transformer substations and 1 220KV booster substation as well as collecting power lines. The construction site is located in Songta Town, Shouyang County, Jinzhong City, Shanxi Province.

This project covers a permanent and temporary land area of 708.6 mu in total, including 34.65 mu of permanent expropriated land, accounting for 4.9%, and 673.95 mu of temporary occupied land, accounting for 95.1%.

The construction works involving permanent land acquisition for this project include wind turbine and box transformer substation and booster substation. Among them, the wind turbine and box transformer substation cover an area of 23.4mu and booster substation covers an area of 11.25 mu. 34.65 mu of permanent expropriated land is entirely construction land.

The construction works involving temporary land occupation include collecting power lines tower foundation, roads and temporary storage and installation sites for facilities. 673.95 mu of temporary occupied land area includes 152.7 mu of 298 tower foundations for collecting power lines, with the occupation type mainly for other woodlands, shrublands and other grasslands; 377.85 mu of access roads and maintenance roads, with the occupation type mainly for shrublands, other grasslands and rural roads; 19.5 mu of land for temporary facilities, with the occupation type for other grasslands; 147 mu of installation site, with the occupation type for unused land; and 0.3 mu of land for direct buried cable, with the occupation type for other grasslands.

1.2.5 Wind Farm Project E

This project, with a capacity of 100MW, consists of 50 wind turbines with a unit capacity of 2MW and 1 110KV booster substation with a capacity of 1x 100MVA as well as supporting auxiliary facilities.

This project covers a permanent and temporary land area as well as long-term leased land of 865.39 mu in total, including 45 mu of permanent expropriated land, accounting for 5.2%, 286.3 mu of long-term leased land, accounting for 33.08%, and 534.09 mu of temporary occupied land, accounting for 61.72%.

A booster substation and 50 wind turbines permanently requisitioned the land of 45 mu, of which 0.585 mu is collective cultivated land, accounting for 1.3 %; and the remaining is unused land, accounting for 98.7%, including 15.6 mu of state-owned unused land and 28.82 mu of rural collective unused land.

This project temporarily occupied the land of 534.09 mu, including 263.02 mu of rural collective cultivated land and 204.28 mu of state-owned unused land (riverbank).

The access road for this project requires long-term (20 years) lease of 286.3 mu of rural collective land, all of which is cultivated land.

1.2.6 Wind Farm Project F

This project, with a capacity of 90MW, consists of 45 wind turbines with a unit capacity of 2MW and their box transformer substations (with 35kV oil-immersed transformer), 1 220KV booster substation and collecting power lines.

This project covers a permanent and temporary land area of 927 mu in total, including 295.5 mu of permanent expropriated land, accounting for 31.88%, and 631.5 mu of temporary occupied land, accounting for 68.12%.

The construction works involving permanent land acquisition for this project include wind turbine foundation and box transformer substation, roads, and tower foundation of collecting power lines. The construction works involving temporary land occupation include temporary yard for construction materials, temporary residence of construction personnel, temporary storage of equipment, hoisting platform, etc. The land types for this wind farm mainly include forest land, dry land, scrub-grass-land and shrubland.

1.3 Biodiversity Conservation in Wind Farm

China has successively promulgated the *Guidance on the Integrated Delineation and Implementation of the Three Control Lines in Territorial Spatial Planning* and *Notice on Printing and Issuing National Main Functional Area Planning* and other laws and regulations. The key ecological function areas that are restricted to development at the national level are divided into four types: water conservation, soil and water conservation, wind-breaking and sand-fixing and biodiversity conservation. It is forbidden to carry out project construction in the protected areas of rare animal and plant genetic resources. See 3.2.2 for detailed classification.

The National Forestry and Grassland Administration promulgated the *Notice on Regulating Forest Land for Wind Farm Project Construction*, which clearly states that the use of key forest lands for wind power projects is strictly prohibited.

In addition, the *Technical Specifications for Site Selection of Wind Farms* issued by NDRC clearly specifies that the nature reserves, rare animal and plant areas, migratory bird reserves and migratory routes should be avoided in terms of site selection of wind farm.

1.4 Summary of Land Use of Wind Farm Project

According to the above materials regarding land use of wind farm project and combined with the land occupation situations of other similar projects, the land use is summarized as follows:

1. 4.1 A wind farm project generally covers a large area.

The installed capacity of a wind farm project is generally within 100MW, and its construction works mainly include wind turbines and their box transformer substations, booster substation, collecting power lines, roads and so on. Overall, the wind farm project occupies a large area of more than 500 mu.

Since each construction work of a project should be designed according to the control indicators in *Land Indicators for Electric Power Project Construction (Wind Farm)*, regardless of the unit capacity and box transformer capacity, the core construction works including wind turbines and their box transformer substations and booster substation have little difference in land occupation. Generally, a set of wind turbines and box transformer substations cover an area of about 0.6 mu and a booster substation covers an area of about 15 mu as well as a project consists of less than 50 wind turbines and box transformer substations, so the land area occupied by the core construction works is within 50 mu. Also, the temporary stockpiling area for construction materials, temporary residence of construction personnel, temporary storage site for equipment and temporary hoisting area for wind turbines have little difference in land occupation among various projects, about 200 mu. The difference of land area of each project mainly lies in roads and tower foundation of collecting power lines. The projects located in various regions require different lengths of roads, different lengths of collecting power lines and different quantities of tower foundations as well as quite different land area. Therefore, the land area difference between projects is about 300 mu. Overall, due to more construction contents for wind farm projects, the overall land area used is larger.

1.4.2 Although the project occupies more land, it has minor impacts on mountainous

rural area which has more arable land and grassland resources.

Due to the characteristics of wind farm projects, most of them are located in mountainous rural areas. In mountainous rural areas, the village collectives generally have more cultivated land, and the per capita cultivated land is often dozen of mu or even dozens of mu. For instance, the project location of 50,000KW Wind Power Project of Huanggangliang Wind Farm Phase II in Hexigten Banner and that of 99MW Wind Power Project in Baoziwan Township of Guangrui New Energy in Shanxi Province have the per capita cultivated land and grassland of up to dozens of mu. Though a wind farm project covers a large area, the proportion of total land use in local land is low, with minor local impacts.

1.4.3 Wind farm projects occupy less cultivated land, and even the cultivated land is occupied, it is mostly barren land, which is welcomed by farmers.

The land types used in wind farm projects are generally waste grassland, unused land and shrub land, and the access roads or maintenance roads are generally composed of widened or renovated existing roads. According to the information available, wind farm project generally occupies less than a third of the total arable land. Even the cultivated land is occupied, it is mostly dry land with poor farming conditions and low agricultural output. Such land is often ignored by farmers, and some even has been abandoned. If such land is levied or temporarily occupied, the compensation for it is often much higher than the agricultural income obtained by farmers, so it is welcomed by farmers.

1.4.4 At present, most of the farmers' income comes from off-farm work and business, with a small proportion of agricultural planting income. Even if wind power projects occupy more arable land, it has minor impacts on the income of the occupied land owners.

According to a number of survey data, the households in rural areas with labor force gain income mainly from working and business, while agricultural planting income accounts for a small proportion in total household income, about 10%. Even if wind power projects occupy more arable land, it will not affect the source of livelihood for ordinary families. What's more, the compensation for land acquisition has become a source of funds for some families to increase production and operation investment and for children's marriage, housing construction and purchase and pension savings.

1.4.5 Even if the project may occupy more land of some families who rely on land for their livelihood, the implementation of national and local land acquisition compensation laws and regulations and policies and the social security policies of landless farmers are sufficient to restore and improve the current livelihood of affected farmers, and their future endowment is also guaranteed.

In recent years, with the continuous improvement of national laws and regulations on compensation for land acquisition, the rights and interest of farmers affected by land acquisition and occupation of construction projects have been more and more effectively guaranteed. If most of the land of some families in lack of labor force who rely on land for livelihood is levied, the compensation for land acquisition can maintain their livelihood, and their future endowment will also be guaranteed. For example, *Opinions of the General Office of Shanxi Provincial People's Government on the Implementation of Basic Pension Insurance Subsidies for Landless Farmers* stipulate that a Finance mechanism that the unit requisitioning or using the land should take responsibilities for the landless farmers and a deposit system of basic pension insurance subsidies for land-expropriated farmers should be established. Basic pension insurance subsidies should be listed separately in the cost of land acquisition and arranged in full as well as allocated all in one time to land-expropriated farmers. For those losing their land

entirely, the per capita Finance standard is 139 times the previous year's urban minimum living standard of the county (city, district); for those losing their land mostly, the per capita Finance standard is the product of the per capita Finance standard for those losing their land entirely multiplied by the proportion of the land expropriated in total land area. After the approval of the project with land acquisition, the county-level social insurance agency timely and accurately incorporates the basic pension insurance subsidies into the personal account of endowment insurance of the subsidized object. This policy has been formally implemented in the whole province since 2019. The endowment insurance policies for land-expropriated farmers in other provinces and cities are constantly being improved, that is, the relevant documents are being implemented really.

In summary, though wind farm projects occupy more land, they generally occupy less land permanently (including permanent land acquisition, long-term rent and other forms of actual long-term occupation). Because of the characteristics of wind farm projects, most of them are located in mountainous rural areas, and the occupied land is mostly waste grassland, unused land, shrub land and a small amount of arable land. These areas are often rich in agricultural land and unused land resources, so the project construction has minor impacts on their agricultural production. Moreover, the compensation standards for land acquisition formulated by local governments and those for temporary land occupation determined by negotiation are often higher than the actual output value of the affected land. Therefore, the village collectives and farmers support such projects and are willing to accept land acquisition or occupation. The relevant national and local laws and regulations and policies that have been continuously improved and effectively implemented have also developed a more rigorous protection network for landless farmers, so that their sustainable livelihoods can be effectively guaranteed.

2. Investigation and Analysis on Land Use for PV Power Station Projects

Solar photovoltaic power generation mainly includes ground centralized photovoltaic power generation and distributed photovoltaic power generation. The former is realized by installation of PV array components on the ground. At present, large and medium-sized PV power plants in China mostly adopt this type of power generation. The latter is realized by installation of PV materials on the existing building's lighting surface, which is widely used on urban building roof. Water surface fishing-light complementary photovoltaic power generation is also adopted, which is realized by erection of photovoltaic panels on the water surface of ponds. Among the above PV power generation forms, the distributed and water surface fishing-light complementary photovoltaic power generation both use the existing buildings and water surface, without new land supply, while ground centralized photovoltaic power generation involves land occupation.

2.1 National Land Administration Policies for PV Power Generation Projects

PV power generation, an important part of RE development and utilization, is considered as an emerging sector. Its land use has certain particularity compared with traditional power generation projects. In order to support its development and clarify the land administration policies, the Ministry of Land and Resources, State Forestry Administration and other departments have formulated several policy documents. In 2015, the Ministry of Land and Resources and other six ministries and commissions jointly issued the *Opinions on the Land Use for Supporting the Development of New Industries and New Formats to Promote Mass Entrepreneurship and Innovation* (GTZG (2015) No. 5, hereinafter referred to as "Document No. 5"). The State Forestry Administration issued the *Notice on Issues Related to Forest Land Use in PV Power Station Construction* (LZF [2015] No. 153) in November 2015. The Ministry of Land and

Resources issued the *Land Use Control Indicators for PV Power Station Project* in December 2015, and *Letter from the General Office of the Ministry of Land and Resources on Land Use for PV Power Generation* (GTZTH [2016] No. 1638, hereinafter referred to as Letter No. 1638) in October 2016. In September 2017, the Ministry of Land and Resources, Office of Poverty Alleviation and Development under the State Council and National Energy Administration jointly issued the *Opinions on Supporting PV Poverty Alleviation and Regulating Land Use for PV Power Generation Industry* (GTZG [2017] No. 8, hereinafter referred to as "Document No. 8"). Some local governments have also introduced relevant policies to regulate and define the land use for PV projects. Focusing on Document No. 5 and Document No. 8 of the Ministry of Land and Resources, combined with the legal policies on land administration, the specific policies and acquisition methods of land for PV power generation projects are analyzed and summarized as follows.

2.1.1 In order to encourage the support to emerging sector, Document No. 5 provides policy convenience for those PV power generation projects which occupy unused land such as gobi, desert and waste grassland but do not occupy the arable land and change the surface morphology. It stipulates that such land can be obtained by leasing, not subject to the administration of construction land.

2.1.1.1 For the occupation of unused land, separate management shall be divided into the unoccupied arable land portion and the permanent construction land portion.

Document No. 5 stipulates that, firstly, for those PV power generation projects which occupy unused land such as gobi, desert and waste grassland but do not occupy the arable land and change the surface morphology, such land is allowed to be acquired by means such as leasing. The parties concerned shall sign a compensation agreement and submit the land use application to the local county-level department of land and resources for filing. This provision is mainly proposed to the land for PV array. The land administration can be subject to the original use of unused land, and the procedures for converting unused land into construction land are not required. Secondly, for the permanent construction land, the relevant procedures should be handled according to the provisions on construction land. Such land mainly includes land for substation and operation management center, as well as the land for tower foundation of collecting power lines, which should go through the procedures for converting unused land into construction land.

2.1.1.2 For the occupation of agricultural land, all the land use shall be managed as construction land.

Document No. 5 stipulates that all PV power generation projects that occupy agricultural land, whether it is for PV array or substation and operation management center, or collecting power lines, should be subject to the existing land administration laws and regulations on construction land. The procedures for collective land expropriation and agricultural land conversion and those for the supply of state-owned construction land are the same as those for the land use for traditional construction projects.

2.1.2 Letter No. 1638 issued by the General Office of the Ministry of Land and Resources in 2016 further clarifies the support for the use of unused land and stock construction land by PV projects. The PV projects including PV array shall be subject to the existing land administration laws and regulations on construction land if they occupy the agricultural land, and the land planning, layout, acquisition, conversion and supply approval procedures shall be handled.

2.1.3 In order to increase the land use support for PV poverty alleviation projects, Document No. 8 clarifies the new land use regulations for PV poverty alleviation projects

and PV power station projects using agricultural land. Other PV projects should still strictly follow the Document No. 5 for land use.

2.1.3.1 Clearly defining the scope of PV poverty alleviation projects

Document No. 8 clearly stipulates that PV poverty alleviation projects include PV power generation projects constructed for poverty alleviation in deep poverty-stricken areas and those PV power generation projects within the scope of the national village-level PV poverty alleviation power station construction determined by the National Energy Administration and Office of Poverty Alleviation and Development under the State Council.

2.1.3.2 Classified management of the land use for construction works of PV poverty alleviation projects

Firstly, the land for substation and operation management center as well as tower foundation of collecting power lines should be managed as construction land, which should be paid great attention to in the Overall Plan for Land Utilization and Annual Plan for Land Utilization and go through the construction land approval procedures.

Secondly, the land for roads at site shall be managed as rural road land.

Thirdly, if the PV array uses agricultural land other than permanent basic farmland, the original nature of the land might not be changed under the premise of not damaging the agricultural production conditions.

Fourthly, the land for direct burial of collecting power lines shall be managed in the same way as the land for PV array.

2.1.3.3 Classified management of construction land for photovoltaic composite projects

Document No. 8 does not clearly define the specific meaning of "Composite Construction of PV Power Station Project on Agricultural Land", but such project can be considered as an integrated project of agricultural production, fishery production and other agricultural formats and PV power generation.

Document No. 8 requires the provincial energy bureau and the competent department of land and resources and other departments at the same level, under the premise of ensuring the sustainable use of agricultural land, to study and put forward the construction requirements of PV composite projects in the region (including erection height of PV array), and the identification standards, and specify the regulatory measures to avoid affecting agricultural production.

Document No. 8 requires classified management of land use in PV composite project construction. Firstly, the land for the projects that meet the construction requirements and identification standards of PV composite projects in the region, and for the substation, operation management center, and tower foundation of collecting power lines should be managed as construction land and go through the approval procedures according to law. Secondly, the land for roads at site shall be managed as rural road land. Thirdly, if the PV array uses agricultural land other than permanent basic farmland, the original nature of the land might not be changed. Fourthly, the land for direct burial of collecting power lines shall be managed in the same way as the land for PV array.

2.1.3.4 Special provisions for the protection of agricultural land

Document No. 8 also makes special provisions for the protection of agricultural land including arable land. For the layout of PV array on arable land other than permanent basic farmland, strict requirements should be put forward. In addition to the land for pile foundation, it is strictly forbidden to harden the ground, destroy the plough layer

and discontinue farming and let go out of cultivation as well as abandon the land. When the PV array land is withdrawn from the project managed by agricultural land and unused land, the land use unit should restore it to the original state. If it fails to restore it to the original state as required, it should be ordered to make rectification by the energy department in the project location.

2.2 Acquisition Method of Land for PV Power Generation Projects

According to the existing laws and policies, the specific construction works of PV power generation project include PV array, substation and operation management center, collecting power lines and roads at site. The land for such works can be requisitioned by different ways.

2.2.1Collectively owned and state-owned unused land and agricultural land excluding basic farmland can be obtained by leasing.

Obtaining project land through leasing can significantly reduce the pre-project costs, which is conductive to supporting the development of PV industry. Unused land obtained by leasing includes collectively owned land and state-owned land.

2.2.1.1Document No. 5 stipulates that, for those PV power generation projects which occupy unused land such as gobi, desert and waste grassland but do not occupy the arable land and change the surface morphology, such land is allowed to be acquired by means such as leasing. The parties concerned shall sign a compensation agreement. Where the state-owned unused land is used, the land use unit and county-level department of land and resources shall sign the lease contract of state-owned land; where collectively owned unused land is used, the land use unit and collective economic organization shall sign rental compensation agreement and report it to the county-level department of land and resources for record.

2.2.1.2 Where the PV poverty alleviation projects and PV arrays in PV composite projects specified in Document No. 8 need to occupy agricultural land other than basic farmland and involve rural contracted land, a lease contract may be concluded with the rural collective economic organization or farmers to perform the lease formalities of the contracted land; where they involve state-owned arable land and other types of agricultural land, the land use unit shall sign a lease contract with the right holder of state-owned agricultural land to fulfill the internal procedures for leasing management of such land.

2.2.2 State-owned construction land can be obtained by leasing.

Photovoltaic power generation projects using state-owned construction land can acquire such land by leasing.

Document No. 5 clearly stipulates that it encourages the supply of land to small and medium-sized enterprises by various ways such as leasing and actively promotes the way of leasing the land and then granting the land and combination of leasing and granting. If such supply of land involves tender, auction and listing, their procedures can also be handled at the time of leasing. Upon the expiration of lease period, such land can be granted. Article 8 of *Circular of the General Office of the Ministry of Land and Resources on Printing and Issuing Guidelines for the Implementation of Industrial Land Policy* (GTZTF [2016] No. 38) issued in 2016 also stipulates that "all types of industrial land can be acquired and used by long-term lease, the way of leasing the land and then granting the land and combination of leasing and granting" (excluding residential land).

2.2.3 Land acquisition by allocation

2.2.3.1 *Several Opinions of the State Council on Promoting the Healthy Development of PV*

Industry (GF [2013] No. 24) stipulates that if the PV power generation project uses unused land, after the land approval formalities are handled according to law, the land can be allocated. Therefore, the land for permanent constructions in PV power generation project can be acquired by allocation after the approval procedures are completed according to the regulations on construction land.

2.2.3.2 Document No. 5 stipulates that if the land for new industrial project conforms to the *Directory of Allocated Land*, the land can be allocated. The land use section of power facilities in the *Directory* specifies that the land for main plant facilities and supporting warehouse facilities for power generation (transformation), the special transportation facilities for power generation (transformation) plants (stations), the supporting environmental protection and safety protection facilities, the motor of new energy power generation project, the box transformer substation, transmission (including special transmission works), substation facilities and resource observation facilities can be acquired by allocation.

2.2.4 Land acquisition by assignment

Assignment is the main way of the supply of state-owned construction land, mainly including approved selling and assignment by means of tender, auction and listing.

Document No. 5 explicitly stipulates that if the assignment of land is required to be conducted by means of tender, auction and listing in accordance with the law, under the premise of fairness, justice and no exclusion of competition among multiple market players, the type of industry, production technology, industrial standards and product quality requirements proposed by the investment and industrial authorities can be used as prerequisites for land supply. This provision can provide some convenience for PV power generation projects to acquire the land and promote the orderly competition and health development of PV industry.

2.3 Biodiversity Conservation in PV Power Generation Project

The biodiversity conservation in PV power generation project, similar to that in wind farm project, shall comply with the requirements of *Guidance on the Integrated Delineation and Implementation of the Three Control Lines in Territorial Spatial Planning* and *Notice on Printing and Issuing National Main Functional Area Planning*. It is forbidden to carry out project construction in the protected areas of rare animal and plant genetic resources. See 3.2.2 for detailed classification.

2.4 Impacts of PV Power Generation Project on Ethnic Minorities

The solar PV projects in remote areas may occupy the land in which the masses of minority nationalities have their lawful rights and interests. However, on the one hand, the builders will fully negotiate with them through information disclosure and public participation before occupying their general land resources (arable land, grassland, unused land, etc.), obtain their consent, and give reasonable compensation according to law to ensure that the income level of the affected population will not decline or will be improved; on the other hand, the land with special significance for ethnic minorities, such as temples, ancestral graveyards, etc., should be fully investigated before siting and actively avoided. In addition, if the PV project involves land acquisition, as stipulated in the *Land Administration Law of the People's Republic of China*, amended in 2019 and effective from 2020, where the local people's government at or above the county level intends to apply for land acquisition, it should carry out the investigation on the current situation of the land to be acquisitioned and social stability risk assessment. When various construction projects apply to local governments for land use, local governments generally entrust third-party agencies with the first assessment of the social stability risk of the proposed land expropriation. Third-party agencies should conduct social

surveys in-depth on-the-spot, find out the unstable social risks that may be involved in land expropriation and propose corresponding solutions. If the population affected by land expropriation involves vulnerable groups, such as low-income households, poor people (even if they have been out of poverty, their government support policies will continue for a certain period of time), persons with disabilities, etc., the state has corresponding support security policies. In short, the solar PV projects implemented in remote areas will basically not cause damage to the land or other rights of vulnerable minority population.

2.5 Cases and Summary of Land Use of PV Power Generation Project

2.5.1 Cases of land occupation of PV power generation projects

Since 2017, there have been six PV power generation projects transferred from Huaxia Bank to the World Bank, of which only one is the ground centralized PV power generation project, and the remaining five are distributed PV power generation projects. Taking this ground centralized PV power generation project as an example, the specific land occupation of the PV power generation project that has been implemented is described as follows.

PV Power Generation Project A is a large-scale grid-connected PV power generation project with installed capacity of 102.06MW. A 220kV booster substation and 4 sets of main transformers including two with 100MVA capacity and two with 150MVA capacity with the voltage level of 220/35kV are planned to be built in the PV project area. The one-loop 220kV outgoing line of 220kV booster substation is connected with the 220kV side of 500kV substation in Shangyi, of which the distance is about 24km.

This project started construction on June 15, 2016, with a construction period of 6 months and an operation period of 25 years after completion. The total project investment is 750 million yuan and project site is located in Ergongdi Village, Dayingpan Township, Shangyi County, Zhangjiakou City, Hebei Province. It is currently completed for grid-connected power generation.

According to the preliminary review opinions on the land use from the Hebei Provincial Department of Land and Resources, this project covers a total area of 3,609.95 mu, including 52.04 mu of agricultural land (excluding arable land) and 3,557.91 mu of unused land. 3,557.91 mu is for PV arrays and 52.04 mu is for booster substation. In the actual implementation, the booster substation actually acquires the agricultural land of 39.43 mu; and PV arrays rent the unused land of 3,040 mu. The leased land is another type of state-owned unused land to which the company has the right to use.

The above case has shown that due to the large total capacity reaching 100MW, the project covers a large land area, up to 3,079.43 mu, of which 3,040 mu is for PV arrays, accounting for 98.72%; and 39.43 mu is for booster substation, only accounting for 1.28%. The right to use the land for booster substation is obtained by acquisition, while that for PV arrays is obtained by leasing, and the occupied land is unused. The occupied land area, type and acquisition method for this project are fully in line with the Law Administration Law and the relevant departments' policies and regulations on PV projects.

2.5.2Conclusions

PV power generation, an important part of RE development and utilization, is considered as an emerging sector and is strongly supported by the State. Its land use has certain particularity compared with traditional power generation projects. Many PV projects build cell arrays on the arable land, garden, forest land, grassland and water surface, basically without the damage to the original land status and with minor impacts

on the original land use function. Thus, the Ministry of Land and Resources, the State Forestry Administration, the Office of Poverty Alleviation and Development under the State Council and other departments have formulated a number of policy documents to clarify the land administration policies. The basic cores may include the following: For different types of PV power generation projects (general projects, poverty alleviation PV projects, PV composite projects), and for different functional areas in various types of PV power generation projects (PV array, substation and operation management center, roads at site and tower foundation of collecting power lines), the classified management is implemented for land use, that is, the right to use the land for some functional areas can be obtained by leasing, without the request to go through the formalities for converting the land into construction land; while the land for some functional areas is managed as construction land, with the request to go through the approval procedures for construction land. The specific policies on land use for different types of PV projects are summarized as follows:

(I)For general photovoltaic power generation projects, if all the land used in the project is unused (gobi, desert, waste grassland), the right to use the land for PV array functional area can be obtained by leasing, including the leasing of state-owned and collectively-owned unused land, and the procedures for converting the unused land into construction land are not required, while the land for substation and operation management center and tower foundation of collecting power lines should be subject to the procedures for converting unused land into construction land. However, after the approval procedures are completed according to the regulations on construction land, the land can be acquired by allocation. If all the land occupied by the PV project is agricultural land, both the land for PV array and the land for substation and operation management center and tower foundation of collecting power lines should be subject to the procedures for converting agricultural land into construction land.

(II) For PV poverty alleviation projects (including PV power generation projects constructed for poverty alleviation in deep poverty-stricken areas and those PV power generation projects within the scope of the national village-level PV poverty alleviation power station construction determined by the National Energy Administration and Office of Poverty Alleviation and Development under the State Council), if the PV array uses agricultural land other than permanent basic farmland, the original nature of the land might not be changed under the premise of not damaging the agricultural production conditions, that is, the right to use the land can be obtained by leasing; the land for direct burial of collecting power lines shall be managed in the same way as the land for PV array; the land for roads at site shall be managed as rural road land; and the land for substation and operation management center as well as tower foundation of collecting power lines should be managed as construction land, which should be paid great attention to in the Overall Plan for Land Utilization and Annual Plan for Land Utilization.

(III) For PV composite projects (an integrated project of agricultural production, fishery production and other agricultural formats and PV power generation, to be identified by relevant provincial departments), the original nature of the agricultural land for laying PV arrays might not be changed; the land for direct burial of collecting power lines shall be managed in the same way as the land for PV array; the land for roads at site shall be managed as rural road land; and the land for substation and operation management center as well as tower foundation of collecting power lines should be managed as construction land and go through the construction land approval procedures according to the law.

The sub-project added in this adjustment is the energy storage sub-projects to be synchronously constructed with new wind farms and solar PV power stations. Through

the investigation and analysis of their environmental and social risks and impacts, HXB holds that such risks and impacts can be resolved through enhanced ESMS under the current China's land administration policies.

Annex 10: Minutes of Public Participation Consultation Meeting

1. Minutes of Meeting on January 25, 2019

On the morning of January 25, 2019, Huaxia Bank organized a stakeholder consultation meeting on draft Environmental and social Management System (January 2019) for the "China Renewable Energy and Battery Storage Promotion Project" to be financed by the World Bank (hereinafter referred to as the "Project"). Prior to the meeting, draft of ESMS dated in January 2019 had been distributed to all participants for review and on the official website of Huaxia Bank. During the consultation meeting, all participants discussed the draft ESMS for the Project prepared by Huaxia Bank. The meeting minutes are as follows:

1.1 Participating units of the consultation meeting

(1) Enterprise representatives: TÜV SÜD Greater China and Pinggao Group Co., Ltd.;

(2) Research institutes: Institute of Electrical Engineering, Chinese Academy of Sciences;

(3) Design institutes: China Energy Engineering Group Guangdong Electric Power Design Institute Co., Ltd. and China Energy Engineering Group Jiangsu Electric Power Design Institute Co., Ltd.;

(4) Industrial associations: Energy Storage Applications Branch of China Industrial Association of Power Sources.

Relevant personnel from the World Bank and Huaxia Bank attended the meeting.

1.2. The participants had in-depth and extensive exchanges on the potential environmental and social problems of the Project

(1) The discussions focused on development, applicability and overall implementation of domestic laws and regulations for the energy storage sector, and issues related with environmental and social risk control at present.

The industry experts believe that currently China has issued much-needed policies, standards and technical requirements for the energy storage industry in terms of national industry policies, energy storage power station, access to grid, battery, BMS and energy storage converter. These policies, standards and technical requirements can basically support the sound and orderly development of the energy storage industry. However, there are no specific standards for the safety, environmental protection, risk assessment, fire protection requirements and acceptance of electrochemical energy storage systems. It is advisable to improve the construction of electrochemical energy storage standard system as soon as possible.

(2) The project for the new ancillary transmission lines need to go through the approval procedures

For those energy storage projects with new ancillary transmission lines to be built on the vacant land within existing substations or abandoned substations, those projects are required to be filed (approved) with development and reform commissions at different levels, including provision of project feasibility study report, enterprise qualification, project information registration, energy conservation commitment and investment commitment. For those energy storage projects with new ancillary transmission lines to be built by utilizing new plot of land, in addition to list of documents, it is required to submit land use agreements, site selection approval, planning red line maps, pipeline maps and topographic maps. After filing the application, those projects need to go through social stability assessment, environmental impact assessment, safety assessment and water and soil conservation approval. Experts believe that the approval procedures for the energy storage projects for the new ancillary power transmission lines are clear and complete.

(3) Industry supervision

At present, the project approval of the energy storage industry mainly adopts the project filing system. According to relevant domestic environmental and social regulatory requirements, documents involving the safety assessment, social stability assessment and environmental impact assessment need to be prepared for the energy storage projects, and the site selection approval shall be completed after approval by relevant authorities (including safety supervision bureau, development and reform commission, land resources bureau and environmental protection bureau). There are certain differences in environmental and social supervision of energy storage projects in different regions. The project in Henan Province is implemented as the “nuclear power, transmission and transformation project" with reference to the EIA classification management catalogue of China, while the project in Jiangsu Province adopts the filing system. Although the fire brigade participated in the project filing meeting and made opinions, they were not required for project acceptance as current fire control system is not perfect.

(4) Status quo of waste battery recycling and disposal

At present, only lead-acid batteries and lithium ion batteries in China have reached the volume of large-scale recycling. As the energy storage industry is just starting, the large-scale recycling and treatment of energy storage batteries is not a matter of concern yet.

At present, the lead-acid battery recycling technology is relatively mature, but about 70% of the used lead-acid batteries are recycled by non-standard channels. In January 2019, 7 ministries including the Ministry of Ecology and Environment, the National Development and Reform Commission, the Ministry of Industry and Information Technology and so forth jointly issued the Action Plan for the Pollution Prevention and Control of Used Lead-Acid Batteries, requiring the implementation of the extended producer responsibility system and the

establishment of a standardized recycling system. By 2020, the lead-acid battery manufacturers will achieve a standard collection rate of 40% for used lead-acid batteries. By 2025, the standardized collection rate of used lead-acid batteries will reach 70%. All used lead-acid batteries collected in a standardized manner are safely utilized and. According to the experts attending the meeting, the action plan comprehensively applies legal, economic and administrative means to carry out the full life cycle management of batteries and improve the joint reward and punishment mechanism. They believe that the expected goals of the plan can be achieved.

1.3. Introduction to ESMS of the project

Huaxia Bank introduced the general methods and ideas for preparing ESMS for implementation of proposed Project. Huaxia Bank mainly consulted the opinions and suggestions of various stakeholders on the following issues:

(1) Comments and suggestions on the contents and conclusions of the preliminary screening of environmental and social screening and assessment;

(2) Comments on proposed management procedures of ESMS;

(3) Comment and suggestion on arrangement for stakeholders' engagement.

1.4. Comments from stakeholders

During the consultation meeting, all stakeholders expressed support for the Project and proposed ESMS, and they believed that:

(1) The current draft ESMS had a clear structure;

(2) Additional due diligence on battery manufacturers should be added;

(3) There were no changes suggested for draft ESMS at present.

2. Minutes of Consultation Meeting on February 15, 2019

On the afternoon of February 15, 2019, Huaxia Bank organized relevant government departments, enterprise representatives, industrial associations, design institutes, feasibility study institutions and other relevant units to have a consultation meeting on updated ESMS dated in February 2019 for the "China Renewable Energy and Battery Storage Promotion Project" to be financed by the World Bank. Prior to the stakeholder consultation meeting, the updated version of ESMS was sent to all participants. The minutes of meeting are as follows:

2.1. Participating units of the consultation meeting

Stakeholders attending the meeting mainly include:

(1) Relevant government departments: Department of New and Renewable Energy of the National Energy Administration, Department of Energy Conservation and Scientific Equipment of the National Energy Administration, Zhangjiakou Municipal Energy Administration, the Energy Research Institute of

the National Development and Reform Commission, and China National Renewable Energy Centre;

(2) Enterprise representatives: State Grid Corporation of China, China Southern Power Grid, State Power Investment Co., Ltd., Jinfeng Technology Co., Ltd., Beijing Enterprises Clean Energy Group Limited, Envision Energy, Envision Intelligence, Hyper Strong, Sungrow, and GEM Co., Ltd.;

(3) Industrial associations: Energy Storage Applications Branch of China Industrial Association of Power Sources and China Energy Storage Alliance;

(4) Design institutes: Electric Power Planning and Engineering Institute, China Renewable Energy Engineering Institute, China Energy Engineering Group Jiangsu Electric Power Design Institute Co., Ltd.;

(5) Research institutes: Institute of Electrical Engineering, Chinese Academy of Sciences, New Energy Center of CEPRI, State Grid Energy Research Institute Co., Ltd., Institute of Energy Internet Innovation, Tsinghua University and State Grid (Suzhou) City & Energy Research Institute.

Relevant personnel from the World Bank and Huaxia Bank attended the meeting.

2.2. Introduction to ESMS of the project

Based on the updated ESMS of the Project, Peng Ling, Deputy Director of Green Finance Center of Huaxia Bank, provided an overview of the Project, and

introduced key content of the environmental and social management system for the Project, including relevant existing laws and regulations of China, potential gap with ESF of the World Bank, and the environmental and social management process of the project of Huaxia Bank, and proposed participation scheme with different stakeholders. For this ESMS, Huaxia Bank focuses on collecting the opinions and suggestions of various stakeholders on the following issues:

(1) Comments and suggestions on the contents and conclusions of the preliminary screening of environmental and social impacts in this ESMS;

(2) Comments and suggestions on the contents and conclusions of the preliminary due diligence report on the energy storage industry;

(3) Comments and suggestions on ESMS management procedures;

(4) Encourage enterprises to meet ESMS requirements during loan application process;

(5) Identify activities of the subproject that can help strengthening or supplementing the existing management system in terms of environmental and social risk management.

2.3. Comments from stakeholders

During the consultation meeting, all stakeholders supported the project and stated that the project could help solve the problem of renewable energy consumption, improve grid dispatching and operation, enhance energy utilization rate, build a sound smart grid, guarantee the safety of the power system, and bring about positive environmental and social benefits in terms of global climate change. All representatives attending the meeting agreed that:

(1) This ESMS management procedure features clear structure, comprehensive contents and strong operability, with no objection. Liang Zhipeng, Deputy Director of the Department of New and Renewable Energy of the National Energy Administration and the participating representatives confirmed the ESMS of the Project and believed that it could help manage environmental and social impacts and risks for the Project, which will strengthen the comprehensive benefits of the Project;

(2) The participants discussed the key environmental and social risks extensively and believed that the preliminary screening of the environmental and social impacts for the Project by the ESMS was informative and clear in conclusion, which reflected actual situation of the existing pilot projects. The participants indicated that the main risks of energy storage projects are fire and safety risks. The TA activities in parallel to the Project could provide supports to improve the safety assessment standards of energy storage projects (especially the container projects) and promote their application;

(3) The participating representatives believed that the ESMS shall take into full consideration the environmental and social risks that may arise from energy storage projects, which could help enterprises to meet both the requirements of Chinese laws and regulations and the ESF of the World Bank. The participating representatives also suggested considering both the negative environmental and social impacts of the project and the positive impacts on the efficiency improvement and structural reform of the clean energy supply through Project implementation;

(4) All participants agreed that no changes need to be made on the current version of ESMS.

Annex 11 Matrix for Comparative Analysis of HXB's Labor Management System and requirements of ESS2

Aspects	HXB's Existing Labor Management System	Comparisons with ESS2	Enhancement of HXB's ESMS
Responsible Staff	HXB has established designed human resources departments at both headquarter and its branches. Employment related issues are centrally managed by the headquarter HR department inter alia such as formulating labor procedures/policies and managing day-to-day operations (e.g. hiring, training, renumeration, social insurance) and performance appraisal. Grievances redress is a cross-cutting issue with the involvement of several departments within HXB, including the HR departments, the worker's organizations and headquarter disciplinary supervision committee.	HXB has in place well-functioning HR departments with qualified HR staff to manage daily-operations and address grievances with workers.	Not applicable
Policies and Procedures	HXB strictly follow PRC's national labor laws and numerous technical regulations, and their updates. The PRC's laws and regulations on labor management are mainstreamed into the HXB's labor management policies and procedures, which are listed as follows: - HXB Labor Contract Management Measures, effective as of 2010; - HXB Leave and Attendance Management Measures, effective as of 2016; - Notice concerning the regulation of the payment base of social insurance and housing fund, effective as of 2013;	Following PRC's labor law and regulations, HXB has defined its labor management systems through a series of policies and procedures, which are considered generally in alignment with the requirements of ESS2 on direct workers.	Not applicable

Aspects	HXB's Existing Labor Management System	Comparisons with ESS2	Enhancement of HXB's ESMS
	- HXB Employee Training Management Measures, effective as of 2013; - HXB Employee Congress Management Policy, effective as of 2014; and - HXB Head Office Staff Hiring Policy, effective as of 2015. HXB Branch Staff Hiring Policy, effective as of 2010 HXB has established comprehensive labor management systems, providing clear documented guidelines and procedures for managing labor and working conditions of direct workers at both headquarter and its branches. As a publicly listed commercial financial institution, HXB is required to report its labor performance and key achievements on employee development through the Corporate Social Responsibility (CSR) report to the public on an annual basis.		
Age of Employment	China's labor law defines minimum working age at 16, and specific protection is required for juvenile workers from 16 to 18. HXB strictly follow PRC's policy on prohibition of child labor and any form of forced labor. No child labor（less than 16 years）or forced labor is involved by HXB. In consider of job qualifications, candidates of requirements normally finish the education at college or above and the youngest worker is more than 18 years old. Prior to the employment with an employee, HXB requires the	China has comprehensive regulations to prevent child labor and protect juvenile workers, which are mainstreamed in HXB's policy and practice. HXB has in place process to verify the age of workers prior to formal employment with an employee. In consideration of the nature of	Not applicable

Aspects	HXB's Existing Labor Management System	Comparisons with ESS2	Enhancement of HXB's ESMS
	candidate to provide his/her basic personal information (such as age and a copy of identification card, etc.), which will be further verified by the HR department to assure its authenticity and can therefore verify the ages of workers and screen out those who cannot meet job requirements.	job positions, the direct workers of HXB are more than 18 years old and there is no underlying risk of child labor or juvenile worker.	
Terms and Conditions	When signing a labor contract, the basic terms and conditions of labor, including the term of labor, work content and place of work, work time and rest time, labor remuneration and social insurance, labor protection, labor conditions and protection against occupational hazards, and economic compensation shall be specified. During the performance of the labor contract, employees may consult the human resources department of Huaxia Bank for personnel related issues at any time, and both parties may change the content of the labor contract upon consensus. Working hours are in alignment with PRC's regulations and overtime working if happens is compensated following China's policy on overtime payment[15]. HXB worker has authority to enjoy the society that the country and place set is sure and housing accumulation fund. The monthly salary of staff of Huaxia Bank is above standard of local minimum wage. In addition, HXB provides annual heath examination to all employees, which is considered as a good practice beyond the requirement of regulatory requirements.	Terms and working conditions of employment are clearly defined by the policies on hiring, labor contract management and leaves, which were developed under China Labor Law and Labor Contract Law. No specific gaps are identified in terms of terms and conditions with direct workers between HXB's labor management system and ESS2.	Not applicable
Grievance	Grievance redress mechanism for HXB's workers is embedded	HXB has put in place multiple	Not applicable.

[15] . In China, an enterprise is required (a) to pay no less than 150% of normal wages if the extended working hours are arranged on weekdays (b) to pay no less than 200% of the normal wages if extended hours are arranged on days of rest and no deferred rest can be taken; and (c) to pay no less than 300% of the normal wages if the extended hours are arranged on statutory holidays.

Aspects	HXB's Existing Labor Management System	Comparisons with ESS2	Enhancement of HXB's ESMS
Redress	in HXB's existing labor management system. Workers can raise their workplace concerns though various in place channels such as worker's organizations, human resources department, headquarter disciplinary supervision committee, etc. Workers are easily and equally accessible to the grievance redress mechanism. Any kind of reasonable grievances raised by the workers will be timely redressed and the complaint will be informed of the resolution. HXB labor management system does not impede the worker's right to access to arbitration procedure and/or judicial system to seek resolution on the grievances. Currently grievance redress mechanisms are well-functioning and deemed adequate to address the worker's complaints and grievances.	well-functioning internal channels for collecting and addressing workplace grievances. Direct workers are aware of grievance redress systems and understand available labor inspection or judicial system that they can resort to when internal mechanism could not address the grievances appropriately. Current grievance mechanism for direct workers with HXB is considered adequate.	
Contractor Management	China has a relatively sophisticated framework of laws and regulations governing labor and working conditions, inter alia on preventing child labor and forced labor and regulating workplace health and safety, which apply to contracted workers as well. Contractor normally develops a series of management plans and procedures for various aspects of the construction projects, covering quality, environment, safety management, as well as construction site/camp site management, worker management etc. Construction of a typical BESS (10MW/20MWh) will only last 1-2 months with the involvement of very few construction workers. Once entering full operation, the BESS will be monitored through remote control without on-duty staff at the station. The ESMS concluded that labor and working conditions related risk is considered low in nature for contracted workers	HXB's previous ESMS does not apply to contracted workers of sub-projects, which needs be enhanced as part of the ESMS to avoid and manage contactor worker related risks.	Contractor labor management under this project is enhanced in HXB's ESMS and ESCP through adopting the procedures/mechanisms as follows: - HXB will contractually incorporate labor management requirements consistent with national law and ESS2 in loan agreement for sub-projects. Relevant aspects for contractor management of the ESCP will be incorporated into tender documents.

Aspects	HXB's Existing Labor Management System	Comparisons with ESS2	Enhancement of HXB's ESMS
	and direct workers of BESS. Neither HXB's labor management system or its previous ESMS applies to contractor management, which is deemed as a gap against relevant requirements under the ESS2.		- A screening check list is set up as part of the ESMS to cover contacted worker related labor risks; - Sub-project screening will exclude any sub-project involving child labor or forced labor, either in the form of direct workers, contracted workers or primary supply worker. - Sub-projects and its contractors are required to have in place a grievance redress mechanism accessible to contracted workers. - HXB will carry out annual E&S monitoring which covers monitoring contractor compliance with their contractual commitments.
Community Workers	Community workers will not be engaged by sub-projects in consideration of technical nature for constructing and operating BESS.	Not applicable because no community worker is anticipated to be involved.	Not applicable
Primary Supply Workers	China has a relatively sophisticated framework of laws and regulations governing labor and working conditions, inter alia on preventing child labor and forced labor and regulating workplace health and safety, which apply to all types of labor	HXB's current ESMS does not apply to primary supply workers of subprojects, which needs to be enhanced as part the ESMS to avoid	Managing risks in relation to primary supply workers is enhanced in HXB's ESMS and ESCP through adopting the procedures/mechanisms as follows:

Aspects	HXB's Existing Labor Management System	Comparisons with ESS2	Enhancement of HXB's ESMS
	including primary supply workers. All enterprises and employment relationships, including in the informal sector, must comply with the PRC laws and regulations on labor. Under current context, supervision to factories by local labor and work safety authorities are enforced more stringently. Due diligence during Preparation to selective lead-acid and lithium-on battery manufacturers identified that labor and working conditions of primary suppliers is low risk, which was extensively assessed in the Initial E&S Due Diligence of Battery Primary Suppliers (see **Annex 8** of the ESMS). Neither HXB's labor management system or its previous ESMS applies to primary supply workers, which is deemed as a gap against relevant requirements under the ESS2.	and manage primary supply worker related risks.	- A screening check list is set up as part of the ESMS to cover primary supply worker related labor risks; - Sub-project screening will exclude any sub-project involving child labor or forced labor, either in the form of direct workers, contracted workers or primary supply worker; - HXB will contractually require the sub-borrowers to procure goods from the primary suppliers that respect China labor laws and working conditions.