Environmental Monitoring Report

Semiannual Report
June 2017

PRC: Low-Carbon District Heating Project in Hohhot in Inner Mongolia Autonomous Region

Prepared by Hohhot City Development Investment and Operation Company and Hohhot Chengfa Heating Company for the Government of the People's Republic of China and the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 2 June 2017, from the website of Bank of China)

Currency unit	_	Yuan (CNY)
CNY1.00	=	$ 0.1469
$1.00	=	CNY 6.8090

ABBREVIATIONS

AP	Affected Person
ASL	Above Sea Level
CEMS	Continuous Emissions Monitoring System
CHP	Combined Heat and Power
CNY	Chinese Yuan
CSEMP	Construction Site Environmental Management Plan
EA	Executing Agency
EHS	Environment, Health and Safety
EHSS	Environment, Health and Safety Specialist
EMU	Environment, Health and Safety Unit
EIA	Environmental Impact Assessment
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
EMS	Environmental Monitoring Station
EPB	Environmental Protection Bureau
FGD	Flue-Gas Desulfurization
FSR	Feasibility Study Report
GDP	Gross Domestic Product
GHG	Green House Gas
GIMAR	Government of Inner Mongolia Autonomous Region
GIP	Good International Practice
GRM	Grievance Redress Mechanism
HCDIO	Hohhot City Development Investment and Operation Company
HDPE	High Density Polyethylene
HES	Heat Exchange Station
HH	Household
HSP	Heat Supply Plant
IA	Implementing Agency
IEE	Initial Environmental Examination
IMAR	Inner Mongolia Autonomous Region

IT	Interim Target
LIC	Loan Implementation Consultant
MEP	Ministry of Environmental Protection
MSDS	Material Safety Data Sheet
NG	Natural Gas
OM	Operations Manual, ADB
PCR	Physical Cultural Resources
PPCU	Project Public Complaint Unit
PPE	Personnel Protective Equipment
PPTA	Project Preparatory Technical Assistance
PRC	People's Republic of China
PUR	Polyurethane
RTU	Remote Terminal Unit
SCADA	Supervisory Control and Data Acquisition
SPS	Safeguard Policy Statement, ADB
TA	Technical Assistance
UPS	Uninterrupted Power Supply
WB	World Bank
WHO	World Health Organization
WWTP	Wastewater Treatment Plant

WEIGHTS AND MEASURES

BOD5	Biochemical Oxygen Demand, five days
CaCO3	Calcium Carbonate
cm	Centimeter
CO2	Carbon Dioxide
COD	Chemical Oxygen Demand
dB(A)	A-weighted sound pressure level in decibels
DO	Dissolved Oxygen
GJ	Gigajoules
GWh	Gigawatt Hour
ha	Hectare
kg	Kilogram
km	Kilometer
kV	Kilovolt
kWh	Kilowatt Hour
Leq	Equivalent Continuous Noise Level
m	Meter

m/s	Meters per Second
m^3	Cubic Meters
mg/l	Milligrams per Liter
mg/m3	Milligrams per Cubic Meter
MW	Megawatt
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
°C	Degrees Celsius
pH	A measure of the acidity or alkalinity of a solution
PM_{10}	Particulate Matter smaller than 10 micrometers
$PM_{2.5}$	Particulate Matter smaller than 2.5 micrometers
SO_2	Sulfur Dioxide
t/h	Tons per Hour
TSP	Total Suspended Particulates

NOTE

In this report, "$" refers to US dollars.

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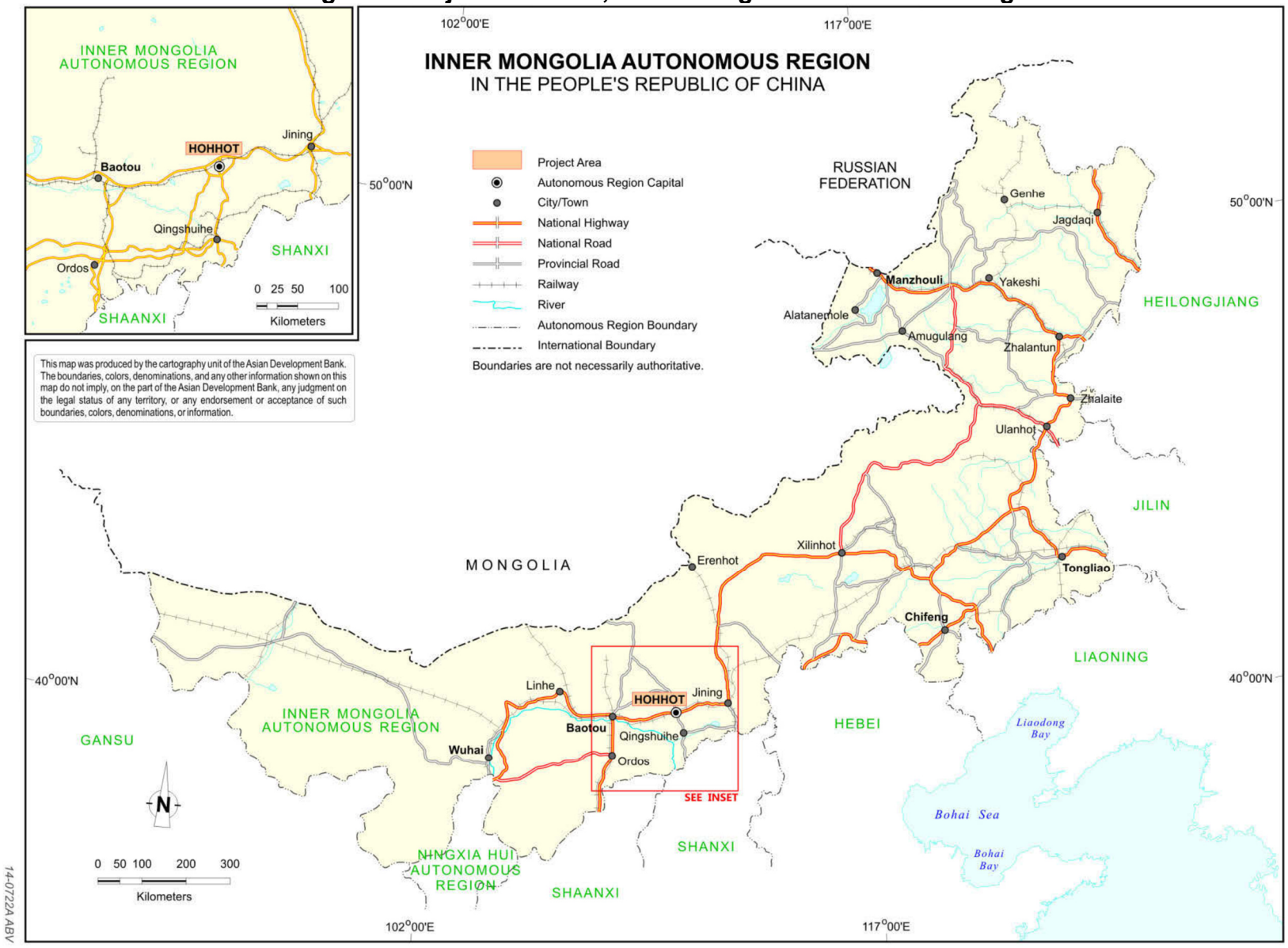
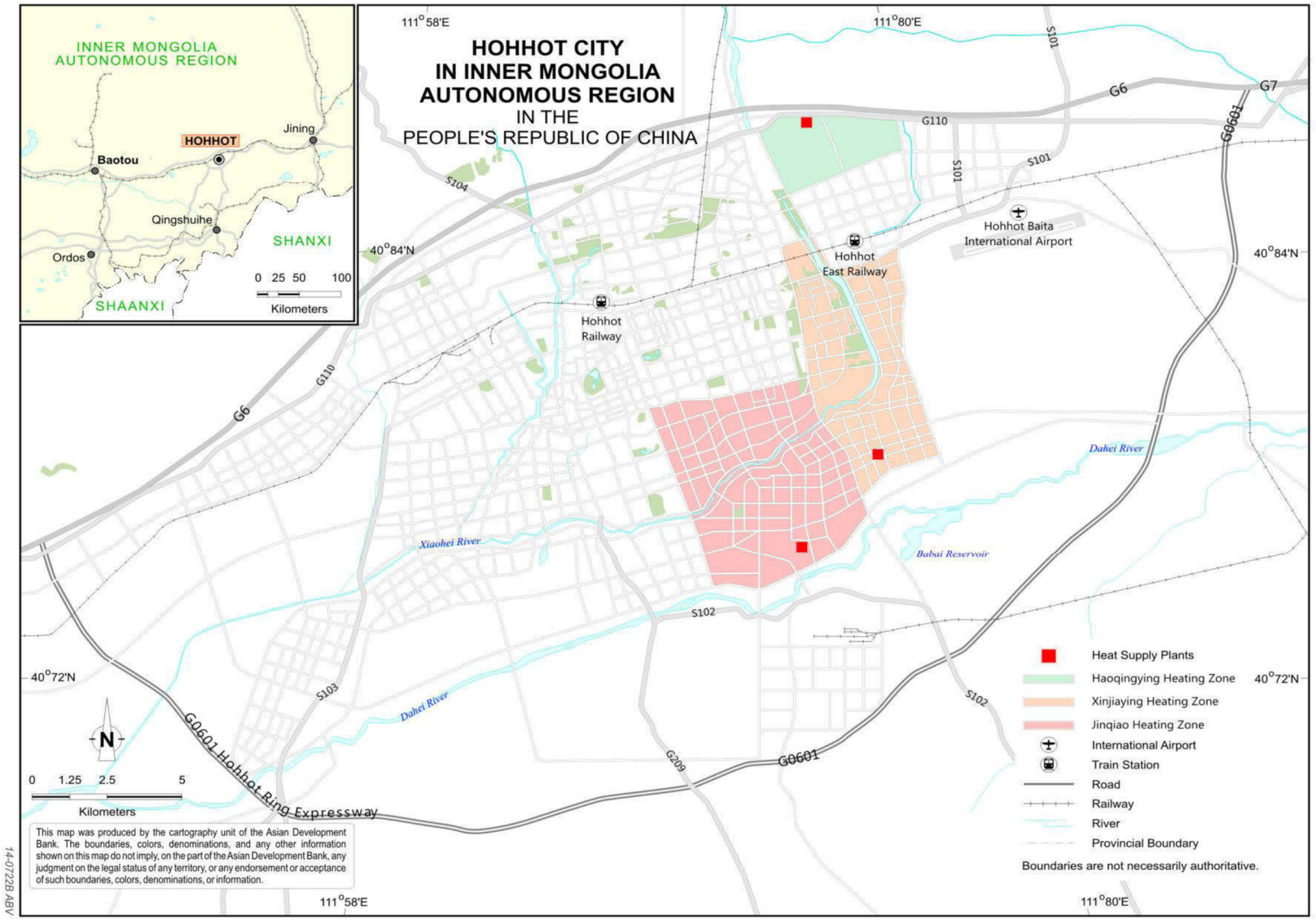


Figure 2 Three Heating Zones under the Project in Hohhot City



I. INTRODUCTION

A. General Introduction

1. This Report is the first semi-annual environmental monitoring report for the Low-Carbon District Heating Project in Hohhot (the Project) for the period from 1 July to 31 December 2016. It is prepared by the HCHC with the assistance of the independent loan implementation environmental monitoring consultant (LIEC). The LIEC has been providing project implementation consulting services to HCHC who is the Implementation Agency (IA) for the Project.

2. ADB funded civil work contracts have progressively been awarded since November 2015, and construction of the first awarded contract started in July 2016. This report describes the activities undertaken in the period from the beginning of July till end of December 2016 with respect to the implementation of the environmental management plan (EMP) of the project components. This report mainly contains the following activities and topics: (i) the environmental institutional strengthening and capacity building; (ii) mitigation measures undertaken to minimize adverse environmental impacts arising from the construction of the Project facilities; and (iii) conclusions and suggestions.

B. Description of the Project

3. The Project scope includes: (i) 21 boilers with a heating capacity of 1,610 MW, comprising 19 low NOx natural gas-fired boilers and two 25 MW wind powered demonstration 10 kV electrode boilers; (ii) 73.76 km of primary heating network; (iii) 180 Heat Exchange Stations (HESs), 11 of which will be building-level HESs; and (iv) SCADA systems installed in all three heating zones. In addition, once the Project is operational, 50 inefficient and polluting small coal-fired boilers in the Jinqiao heating zonewill be decommissioned by the Hohhot municipal government[1].

4. The Government of IMAR (GIMAR) will be the executing agency (EA) and the Hohhot City Development Investment and Operation Company (HCDIO) will be the implementing agency (IA). HCDIO has appointed three Branches which will have direct responsibility for each heating zone.

5. The Project cost is estimated at 2.389 billion CNY ($391.86 million). The ADB loan will finance 38.3% (914.54 million CNY or $150 million) from ordinary capital resources, while the IA will finance 20.3% (484.600 million CNY or $79.482 million), and the China Everbright Bank will finance 41.4% (990.700 million CNY or $162.377 million). The total construction period for the Project will be approximately 5 years.

C. Description of the Environment

Location and Topography

6. The Project consists of three heating zones located in the eastern part of Hohhot City:
   - The Haoqingying heating zone is located in Xincheng District in northeastern Hohhot. This is a relatively undeveloped district, which was previously farmland, and is the main area for Hohhot's future urban development.
   - The Xinjiaying heating zone is located in Saihan District in central eastern Hohhot, adjacent to the site of the existing HSP owned by HCDIO. This area was also previously farmland, and is also designated for future urban expansion.
   - The Jinqiao heating zone is located in the Jinqiao in Saihan District in southeastern Hohhot. The site consists of an abandoned brick and tile factory and unused land, and is considered waste land.

7. Hohhot is on the northern edge of the Hetao Plateau (upper reaches of the Yellow River) and the southern

[1] No data on small coal-fired boilers is available in this reporting period. However, HCHC informed that the Hohhot City Government plan to decommission small coal-fired boilers by phases.

edge of the Gobi Desert. It has an elevation of 1,065 masl. The urban topography is flat, though the Daqing Shan Mountains are immediately to the north and the Man Han range is to the southeast. All three heating zones have flat topography.

Meteorology and Climate

8. Hohhot has a temperate continental monsoon climate with long cold dry winters, short hot summers, and dry windy springs. The annual average temperature is 8.7°C, the maximum temperature in July is 38.5°C, and the minimum temperature in December is -27.6°C. Annual average precipitation is 393.2 mm, with April to October accounting for about 94% of the total rainfall throughout the year. The area receives an annual average of 2,662.7 hours sunlight. All three HSPs have been sited to take into account the predominant NW wind direction during the heating season, with sparsely populated areas to the SE.

Water Resources

9. Rivers in the Hohhot area belong to the Yellow, Daheihe and Hunhe river systems. However, there are no rivers, creeks or streams on any of three HSPs. There are a series of fish ponds to the northwest of the Jinqiao HSP site, and care will need to be taken during construction to avoid pond contamination.

Ecological and Sensitive Resources

10. Hohhot is located in a mid-temperate semi-arid climatic zone. The surrounding area includes forest (limited), shrubs, grasslands and steppe meadows. However, the three heating zones are all located within urban or semi-rural environments within the city limits, and are either ex-farmland in areas slated for urban development, or disturbed and unused "waste" land. Existing vegetation cover is typically grass or shrubs, or disturbed soil with little or no vegetation cover. There are no known rare or endangered flora or fauna, parks, nature reserves or areas with special ecological significance within or adjacent to any of the sites. The project sites are considered as modified habitat under ADB's SPS (2009) definition.

Socioeconomic Conditions

11. Hohhot has a total area of 17,224 km^2. The land area of the rural portion of Hohhot is 15,170 km^2 (88.1% of the total land area), while the urban area is 2,054.0 km^2 (11.9% of the total land area). The urban area includes a built-up (city) area of 79.2 km^2. Hohhot has a population of 2.9488 million (2012), including the urban area with a population of 1.9233 million and the rural area with a population of 1.0255 million.

12. The beneficiaries of the Project include both current and potential future heat users. It is estimated that by 2020 the Project will benefit a population of 883,500.

Physical Cultural Resources

13. The heating zones are located within urban landscapes. They are not on or near any tourism sites, and there are no know Physical Cultural Resources (PCRs) within or adjacent to the sites. However, there is a tomb approximately 100 m south of the Jinqiao heating zone boundary near the existing access road, and care will need to be taken during construction to protect the tomb.

II. PROJECT IMPLEMENTATION PROGRESS

14. **Procurement and Consultant Recruitment Activities.** The first National Competitive Bidding (NCB)-package no. 5 completed the procurement procedure and the winning bidder signed the contract on 16 November 2015. Two loan implementation consultant engagements completed and highly qualified technical consultant was engaged on 31 December 2015 and the qualified national environmental consultant was engaged in August 2016. The second NCB – package no. 6 completed the procurement procedure and the winning bidder signed the contract on 30 June 2016. Out of totally 16 contract packages of equipment and materials, 6 contract packages have completed procurement with a total amount of about CNY 657 million; while the other 5 packages have been issued with ICB tender notices.

15. Progress achieved so far.
    - Progress of long distance transmission pipelines. Its design institute was engaged on May 30th of 2016. The procurement of the civil works contractors was completed on July 8th of 2016, CSCs on July 21st of 2016, while the civil works construction started construction on July 20th of 2016. This component will use ADB loan to procure DN 1.5m pipes via five packages, respectively contracts #6, #12, #16, #7 and #9. By the end of 2016, those five packages have completed procurement. Of which, supply of contract #6 (5.75 kilometers) have been finished; 2.7 kilometers pipes of contracts #12 and 16# have been supplied. Therefore, a total of 8.45 kilometers pipes have been installed with a total value of CNY 70.2 million. The remaining contracts #7 and #9 are still under bidding process. Across the whole alignment, a total of 29.31 km trench excavation has been completed, and 8.45 km of pipeline has been installed. The main crossing of Daheihe river pipeline has been laid through. The approvals of crossing Hu-Shuo expressway, Hohhot city outer ring expressway, S102 provincial highway and Beijing-Baotou railway have been obtained. The temporary land occupation agreement is nearing completion. The pipe jacking underneath S102 highway, X004 highway and Horqin expressway are ongoing.
    - Progress of Jinqiao heating plant and Haoqinying heating plant. The design institute has been engaged. The two plants are planned to start construction in 2017, and put into operation by end 2017. Land acquisition is being carried out.

Change in Scope

16. During the loan inception mission in September 2015, the Government of IMAR (GIMAR), the project executing agency; HCDIO; and the HCHC, the project implementing agency informed ADB that the project needs a scope change to address policy changes that affect its financial viability. Due to the new gas policy that indicates the gas price for residential use can no longer be applied for district heating, the project faced difficulty to get approval of its preliminary engineerlng design. ADB acknowledged this challenge and has been supporting HCHC to develop a concrete scope change proposal that does not jeopardize the project objectives.

17. Due to gas policy change by Hohhot city government in 2013 and price escalation in 2015, the project contents were adjusted twice, ie, from coal-fired boiler +wind power peak adjustment, to wind power peak adjustment, then to CHP + gas boiler + wind power peak plus waste incineration as supplement.

18. After adjustment, the total investment is CNY 2.429 billion, of which includes the Asian Development Bank loan of $150 million, for the new Jinqiao peak heat plant and Haoqinying heating plant, expansion of Xinjiaying heating plant and new long distance transmission pipelines from Jingneng Shengle thermal power plant (Helingeer county) to Hohhot. Detailed project contents include: five new 70MW gas boilers; two new 25MW electric boilers; two new pump stations; reconstruction of two 70MW gas boilers; 37.26 km of new long distance transmission pipelines; 79.37 km of heating pipe network; one waste incineration station; and 191 heating exchange stations. The project will add new heating area of 29.7113 million square meters.

19. Progress of domestic and ADB procedures. In March 2016, the updated domestic EIA and energy conservation assessment reports were approved, while the FSR in April 2016. The above change in scopes were preliminarily agreed by ADB in January 2016, and formally approved by ADB in April 2016.

III. IMPLEMENTATION OF THE EMP

A. Objectives

17. The objective of establishing an EMP is not only to propose appropriate mitigation measures, but also to recommend establishment of institutions or mechanisms to monitor and ensure compliance with environmental regulations and implementation of the proposed mitigation measures. Such institutions and mechanisms seek to ensure continuously improving environmental protection activities during pre-construction, construction, and operation in order to prevent, reduce, or mitigate adverse impacts. The EMP drew on the individual EIA reports and on the PPTA discussions and agreements with the relevant government agencies.

18. An evaluation of the implementation of the EMP is summarized in the following sections.

B. Implementation of Mitigation Measures

19. The important aspects of the implementation of mitigation measures are highlighted as follow.

Environmental Clauses in Civil Works Contracts

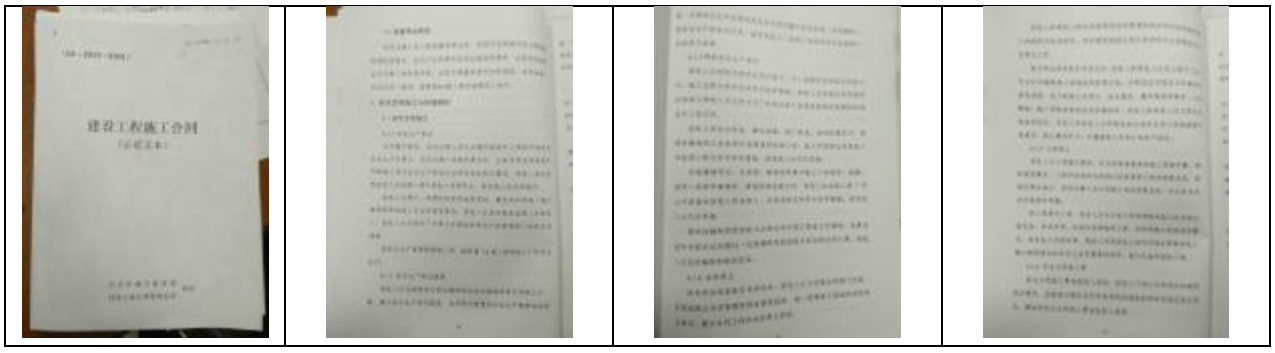
20. All civil works contracts contain provisions on workers' and community safety, environmental protection and protection of physical and cultural relics. The environmental clauses are summarized below.

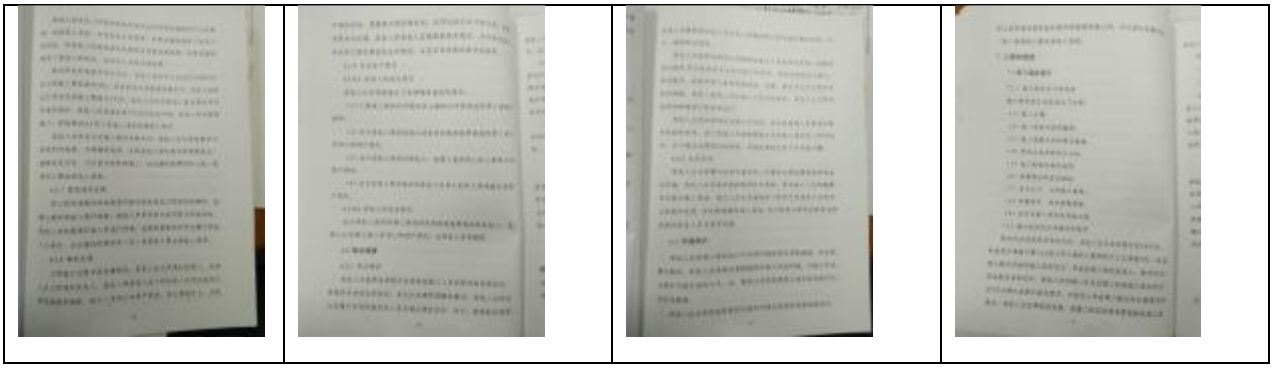
Workers' and Community Safety

21. The contractor takes precautionary measures to ensure workers' safety. Protective equipment is worn atall times for any person entering the construction site. Safety training shall be undertaken for workers and staff. In case of bodily harm to any worker, the contractor has full responsibility for medical care and compensation according to PRC labour law. The contractor is also responsible for any bodily harm and property damage caused by construction activities on site or in the vicinities, including land occupation.

22. The contractor is required to strengthen safety management, especially in regard to the use of flammables, explosives, toxic and corrosive substances. Before the start of construction, the contractor shall submit to the independent construction supervision agency an emergency preparedness and response plan if such substances are used.

Figure 3 Sample Environmental Clauses in Civil Works Contracts





Environmental Protection

23. The contractor is required to comply with all relevant laws and regulations on environmental protection, and take precautionary measures to minimize any potential impact on the environment. It is responsible for restoring and rehabilitating the environment to its original state at its own costs. An environmental management plan (EMP)[2] with mitigation measures shall be prepared and submitted to the construction supervision agency for approval before the commencement of construction.

24. The contractor is required to treat and dispose its construction wastewater, sewage from workers' camps and solid wastes properly so as not to cause any damage to the environment, drinking water sources and public health. The disposal of spoils and solid wastes shall not obstruct flood ways and risk public safety. All slopes shall be protected with retention walls, proper drainage systems and vegetation to avoid geological hazards. Noise, dust, air emissions, wastewater and waste oils are controlled to minimize annoyance to local communities.

Physical Cultural Relics

25. All physical cultural relics discovered at the construction sites are owned by the state. The contractor shall report any such discoveries immediately to the local relics protection authority and in the meantime immediately inform the construction supervision agency. The contractor shall take effective measures to protect the unearthed physical and cultural relics. The contractor is held responsible for any loss of damage to the discovered relics, and prosecuted for any delayed and fraudulent reporting.

Pollution Control Measures

Construction Wastewater

26. The major pollutant in construction wastewater is suspended solids. At the construction sites in the longdistance transmission pipelines, settlement ponds are used to retain the sediments in the construction wastewater before they are discharged into municipal storm sewers or nearby surface water bodies. The settlement ponds are cleaned when they are filled up with sediments. Tires of construction vehicles are cleaned with water sprays before they leave the construction site. Since the construction sites are located in urban or rural areas, the sewage from construction camps is discharged directly into the municipal sewerage network which in turn is sent to the municipal sewage treatment plant (urban area) or nearby surface water bodies after proper pre-treatment (rural area).

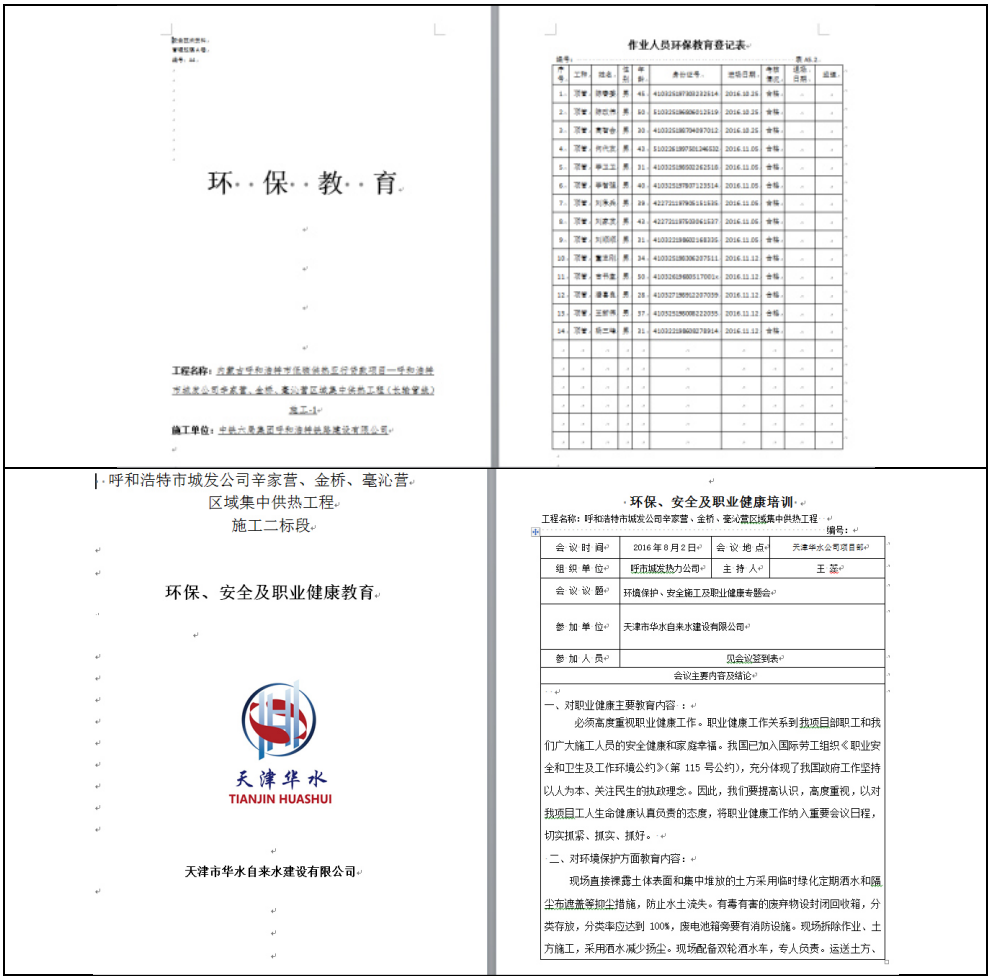
Air Pollution Control

27. The major sources of air emissions are construction equipment and construction vehicles. The vehicles delivering granular and/or fine materials to the sites are covered with tarpaulin sheets. Overloading of these vehicles has been avoided. Vehicle speeds are controlled on construction sites. Construction

[2] Contractor's site specific EMP.

vehicles and machinery are certified to comply with *Limits and Measurement Methods for Emissions from Light-Duty Vehicles (Phase III, IV) (GB18352-2005), Limits and Measurement Methods for Exhaust Pollutants from Compression Ignition and Gas Fuelled Ignition Engines of Vehicles (Phase III, IV and V) (GB17691-2005), Limits and Measurement Methods for Crankcase Pollutants From Heavy-duty Vehicles Equipped with P.I Engines (GB 11340-2005), Limits and Measurement Methods for Exhaust Smoke from C.I.E. (Compression Ignition Engine) and Vehicle Equipped with C.I.E. (GB3847-2005), and Limits and Measurement Methods for Exhaust Pollutants from Vehicles Equipped Ignition Engine under Two-speed Idle Conditions and Simple Driving Mode Conditions (GB18285-2005)*. HCHC environmental management unit (EMU) officers and the LIEC conduct regular inspections to make sure that all construction vehicles and machinery carry valid certifications so that they comply with emission standards. Besides, all vehicle and equipment operators have attended mandatory training (see exhibits below) and carry valid licenses as required by the PRC Safe Production Law (2002). Additional training has been provided by the LIEC on proper maintenance of vehicles and diesel equipment, and avoidance of unnecessary running of vehicle and equipment engines to reduce emissions.

Figure 4 Sample Environmental Training Records



28. All the roads on the construction sites are sprayed by water trucks to suppress dust, according to a daily schedule and taking weather conditions into consideration. These roads are kept clean, solid, smooth, and clear of all dust, mud, or extraneous materials dropped from transportation vehicles. The construction sites are enclosed by the appropriate walls and sprayed with water at least twice a day. Dust suppression equipment has been installed in concrete-batching plants. Materials storage sites are sited more than 300

m from residential areas. The materials in the storage site are organized, such as separate stone and sand materials; store concrete in separate storage place and reduce the on-site storage time of the construction. The transportation distance from the storage site to the construction site has been optimized to minimize disturbance to local communities.

29. When construction takes places during dry and windy days, water is sprayed on earth piles and exposed surfaces to suppress dust. Construction will be stopped during strong winds and the stockpile is covered.

Noise Control

30. Construction facilities and equipment include bulldozers, air picks, air compressors, excavators, graders, stabilizers, concrete mixers, drills, stone-crushing and screening, rollers, poker vibrations, concrete pumps, loading machines, and other heavy machineries. The noise intensity levels of these machines are listed below.

Table 1 Noise Intensity of Heavy Machines on the Construction Site

Machinery	Noise Level	Machinery	Noise Level
Bulldozer	78~96		
Concrete-mixer	75~88		
Air hammer	80~98	(≥ten tons)	85~94
Concrete-crushing machine	80~90	Excavator	80~93

Unit: dB(A).

31. It is estimated that noise intensity from these activities are in the range of 75~105 dB (A). The noise levels can be calculated according to the noise source intensity and distance from the noise source. The results are shown below.

Table 2 Projected Results of Noise Attenuation of the Main Point Source

Noise Source		Distance From Noise Intensity (m)					Limit	
Machine	Noise Intensity	10	50	100	200	300	Day	Night
Bulldozer	78~96	58~76	44~62	38~56	32~50	28.5~46.5	75	55
Concrete-mixer	75~88	55~68	41~54	35~48	29~42	25.5~38.5	75	55
Air hammer	80~98	60~78	46~64	40~58	34~52	30.5~38.5	65	55
Concrete-crushing machine	80~90	60~70	46~56	40~50	34~44	30.5~40.5	75	55
	95~105	75~95	61~71	55~65	49~59	45.5~55.5	75	55
	75~88	55~68	41~54	35~48	29~42	25.5~38.5	70	55
	85~94	65~74	51~60	45~54	39~48	35.5~44.5	75	55
Excavator	80~93	60~73	46~59	40~53	34~47	30.5~43.5	65	55

Note: i) The data in the table represents situation that the noise level of the outdoor work with no hoardings around the construction site. The sound reduction function of the hoardings is not considered in the calculation; ii) limit refers to the Noise Limits for Construction Site (GB12523-2011); and iii) unit is dB(A).

32. The contractors have undertaken a series of measures to reduce noise levels. Equipment that generates low levels of noise has been selected, and all machinery is properly maintained to minimize noise. Noise reduction devices or methods (e.g., hoarding) have been applied where piling equipment is operating within 500 m of sensitive sites such as schools. Concrete-mixing plants and similar activities are located at least 300 m away from sensitive areas such as residences, schools, and hospitals. To reduce noise at night, the operation of machinery generating high levels of noise, such as piling, is restricted to between

6:00 a.m. and 10:00 p.m. in accordance with PRC regulations. The movement of heavy vehicles along urban and village roads has also been restricted to between 6:00 a.m. and 10:00 p.m.

Solid Waste Management

33. Small quantities of garbage from construction camps is collected by the municipal sanitation bureau and disposed of in the municipal sanitary landfill.

Soil Erosion Control

34. The civil works contractors have taken measures to control soil erosion. Soil erosion measures during construction include minimizing land surface disturbance and exposure and use of settlement ponds. Upon completion of construction, all the construction sites will be re-vegetated with trees and grasses.

35. The implementation status of the mitigation measures, as proposed in the EIA, is presented in the right column of the **Table 4** (this table and the tables for this chapter thereafter are placed at the end of this chapter). In summary, the mitigation measures have to date been implemented effectively.

C. Implementation of Environmental Monitoring Program

36. Environmental monitoring consists of two types. The first type requires field sampling and lab analysis that is undertaken by a licensed local environmental monitoring agency, for such environmental parameters such water quality, air quality and noise levels. The second type refers to visual inspections of such things as soil erosion, restoration of vegetation, solid waste disposal and so on. The field sampling and lab analysis shall be conducted, according to the environmental monitoring program as stipulated in the EIA, by the local environmental monitoring agency under contract to the IA. Field inspections have been undertaken by the on-site environmental engineer (OEE) of the contractor, EMU officers and HCHC officers on a regular basis.

37. Environmental monitoring is undertaken by the environmental safeguard specialist of the loan implementation consultancy (LIEC). The LIEC is responsible for advising the HCHC, IA, local environmental monitoring agency and construction contractors on the environmental monitoring requirements, reviewing the monitoring activities and results, and assisting the HCHC and IA to meet the environmental reporting requirements.

38. The implementation status of the environmental monitoring program, as proposed in the EIA, is presented in the right column of the **Table 5**. HCHC has conducted several rounds of discussion with local finance bureaus, Hohhot City Environmental Monitoring Station and related private environmental monitoring service companies on the issues of external environmental monitoring (EEM), but no agreement has been reached. In this reporting period, the independent environmental monitoring consultant (LIEC) assisted with HCHC in formulating a comprehensive environmental monitoring program including budgets based on detailed discussions. HCHC informed that the environmental monitoring agency is expected to be engaged by March 2017 through formal bidding procurement.

D. Implementation of Disclosure, Consultation and Grievance

Redress

1) Information Disclosure

39. A project information bulletin board has been erected at each construction site. The bulletin board contains a description about the project, layout map, construction safety, labour standards, environmental and health standards, name of HCHC/the contractor/CSC(s) and and contact information of the on-site managers.

2) Public Consultation and Grievance Redress

40. The PMO confirmed that the public consultation program has to date been implemented properly.

41. **ADB's GRM Requirements.** The ADB's Safeguard Policy Statement (2009) requires the HCHC to establish a GRM to receive and facilitate resolution of affected person's concerns and complaints about the project's environmental performance during construction as well as operation phase of the project. The GRM should be scaled to the risks and adverse impacts of the project; should address affected people's concerns and complaints promptly, using an understandable and transparent process; should be readily accessible to all sections of the community at no cost and without retribution; and, should not impede access to the PRC's judicial or administrative remedies.

42. **Current Practice in the PRC.** At the national level a framework to address grievance has been established. State Council Decree No. 431 "Regulations on Letters and Visits" (January 2005) codifies a complaint mechanism at all levels of government, and safeguards the complainants from any retaliation. The Ministry of Environmental Protection "Decree No. 34 Environmental Letters and Visits System" (effective from July 2006) provides specific guidelines to establish a system and address environmental complaints.

43. Currently, when affected persons are negatively affected by project activities, such as noise, dust or safety issues caused by construction activities, they may complain to the contractors and HCHC by themselves or through their community organizations, or complain directly to local EPBs. If the issue is not resolved they may take legal action, though that is typically considered as a last option.

44. In the case of issues occurring during the construction period, an affected person can complain to the contractors first if the construction activities are the source of the problem. If the contractors do not respond to the complaint or their responses cannot resolve the issue, the affected person may contact municipal EPBs or the district/county EPBs, who will record the complaints and then visit the sites to investigate and obtain the contractors' side of the story. Sometimes, the two sides might contradict, each defending its own argument. In such cases, the local EPBs will need to consult with the contractor or the supervising engineer to acquire relevant project information and collect data. This kind of fact-finding or site investigation is usually time-consuming, thus delaying the implementation of appropriate mediation measures.

45. Weaknesses of the current practice includes: (i) lack of specialized units to address grievances at the project level; and (ii) lack of specific timeframes for actions and responses to be undertaken to resolve the complaints. These weaknesses have been addressed in the project GRM.

46. **Project GRM.** At the beginning of project implementation, a grievance redress mechanism (GRM) was established. The HCHC established a Project Public Complaints Unit (PPCU). The PPCU are coordinated by three staff members, as indicated in the below **Table 3**. The contact persons for the different GRM entry points (local authorities, district EPB, contractors and CSCs) are defined prior to construction. Organizational charts of the GRM, including the contact persons of the entry points are disclosed at each heating zone construction site.

47. Public grievances will most likely relate to environmental issues encountered during the construction phase. Grievances may include vehicle operation and transportation of heavy equipment and materials; fugitive dust emissions and construction noise; soil erosion and haphazard disposal of waste materials in inappropriate places; and safety measures for the protection of the general public and construction workers. Construction-related grievances can be numerous, and managing them is the contractor's responsibility under its contract with the HCHC.

48. All complaints will be recorded in a systematic fashion by the PPCU. Effective tracking and documentation will promote timely resolution; assist in keeping concerned parties (the complainant and appropriate project personnel) informed about the status of the case and progress being made toward resolution; record responses and outcome(s) so as to promote fairness and consistency; provide a record of settlements; and assist when assessing the effectiveness of the process and action(s) to resolve complaints.

49. Once a complaint has been appropriately recorded, the PPCU will identify if the complaint is eligible. Eligible complaints include those where (i) the complaint pertains to the project, and (ii) the complaint falls within the scope of environmental issues that the GRM is authorized to address. Ineligible complaints include those where (i) the complaint is clearly not project-related; (ii) the nature of the issue is outside the mandate of the environment GRM (such as issues related to resettlement, allegations of fraud or corruption); and (iii) other company or community procedures are more appropriate to address the issue. If the complaint is rejected, the complainant will be informed of the decision and the reasons for the rejection.

GRM Steps and Timeframe

50. The GRM consists of 5 escalating steps. A key goal of the GRM is to solve problems early at the lowest step. A diagram of the GRM is presented in **Figure 5** and each step is described below:

Step 1: If a concern arises, the affected person should try to resolve the issue of concern directly with the contractor/operator and/or the HCHC project manager. If the concern is resolved successfully, no further follow-up is required. Nonetheless, the contractor/operator and/or the project manager shall record any complaint and actions taken to resolve the issues and report the results to the PPCU. If no solution is found within 15 working days or if the complainant is not satisfied with the suggested solution under Step 1, proceed to Step 2.

Step 2: The affected person will submit the grievance to the PPCU, either directly or via other entry points such as District EPBs or community leaders. The PPCU must assess the eligibility of the complaint, identify a solution, and give a clear reply within 15 working days to the complainant and to HCDIO and the contractor (if relevant) with the suggested solution. The contractor, during construction, and HCDIO, during operation, shall implement the redress solution and convey the outcome to the PPCU within 7 working days.

Step 3: If no solution is identified by the PPCU or if the complainant is not satisfied with the suggested solution under Step 2, the PPCU will organize, within 2 weeks, a multi-stakeholder meeting where all relevant stakeholders, including the complainant, HCDIO, the contractor/operator, and local District EPB will be invited. The meeting will aim to find a solution acceptable to all, and identify responsibilities and an action plan. The contractor during construction and HCDIO during operation will implement the agreed-upon redress solution and convey the outcome to the PPCU within 7 working days.

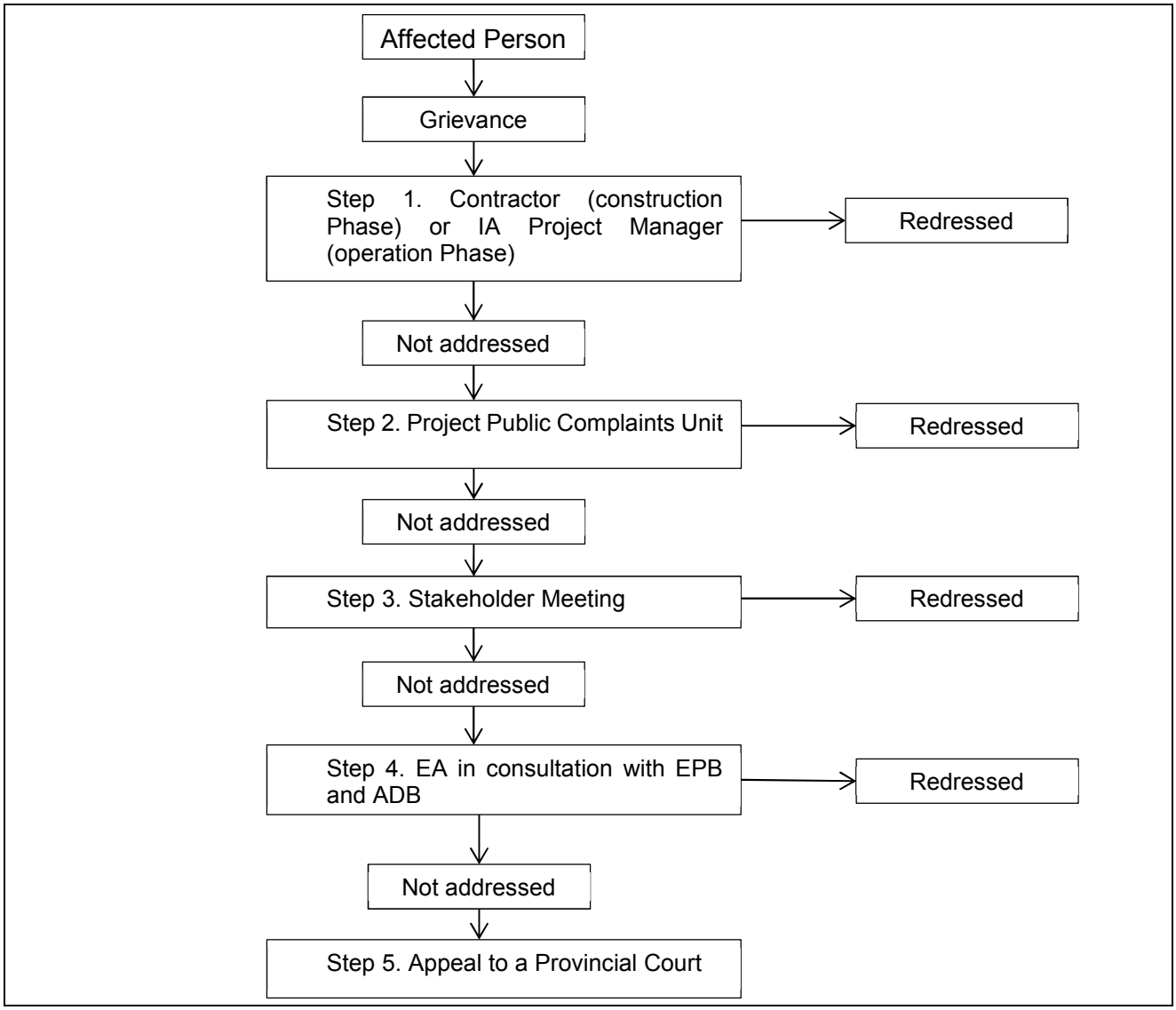
Step 4: If the multi-stakeholder hearing process under Step 3 is not successful, the PPCU, through HCDIO, will inform the GIMAR, the Hohhot EPB and the ADB accordingly. The GIMAR with the consultation from the Hohhot EPB and ADB will review the situation and attempt to develop an alternative approach to resolve the complaint within 15 working days.

Step 5: If the complainant is not satisfied with the suggested solution under Step 4 the affected person may advance the grievance to the Provincial Court. If he is not satisfied with the Provincial Court judgment, there may be an opportunity for appealing to a higher level of court.

51. The PPCU as well as the District EPBs will accept the complaints and grievances lodged by the affected persons free of charge. Any costs incurred should be covered by contractor or HCDIO or from the contingency of the contract.

52. A summary of GRM activities is reported by HCDIO in the annual project progress reports and sent to ADB. The GRM will be operational during the entire construction phase and during the operations until the project completion.

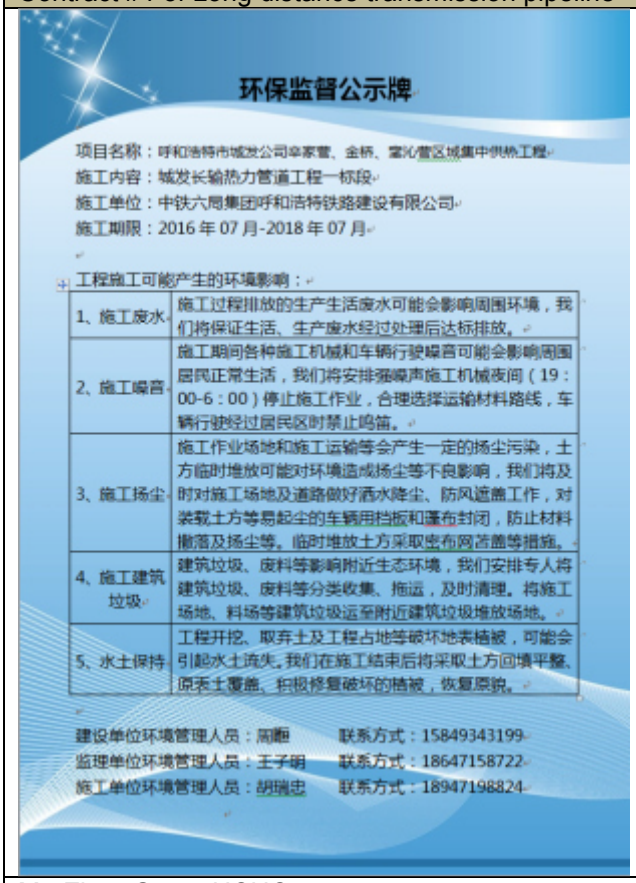
Figure 5 : Project GRM

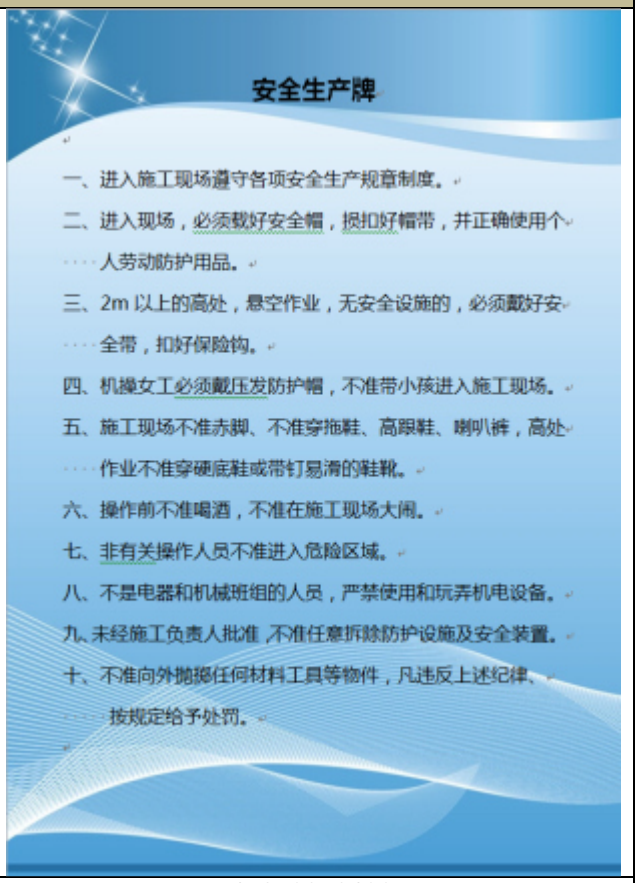


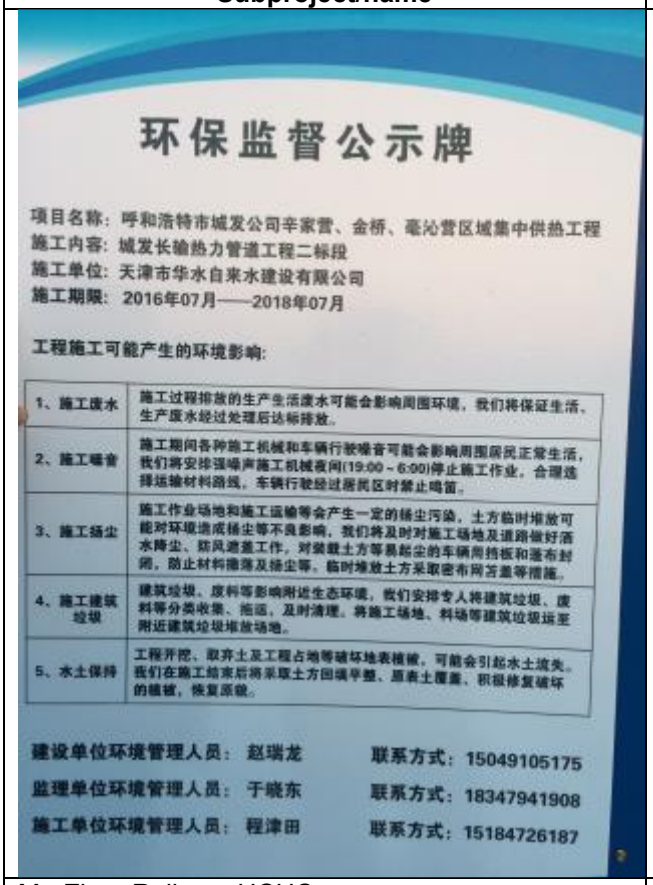
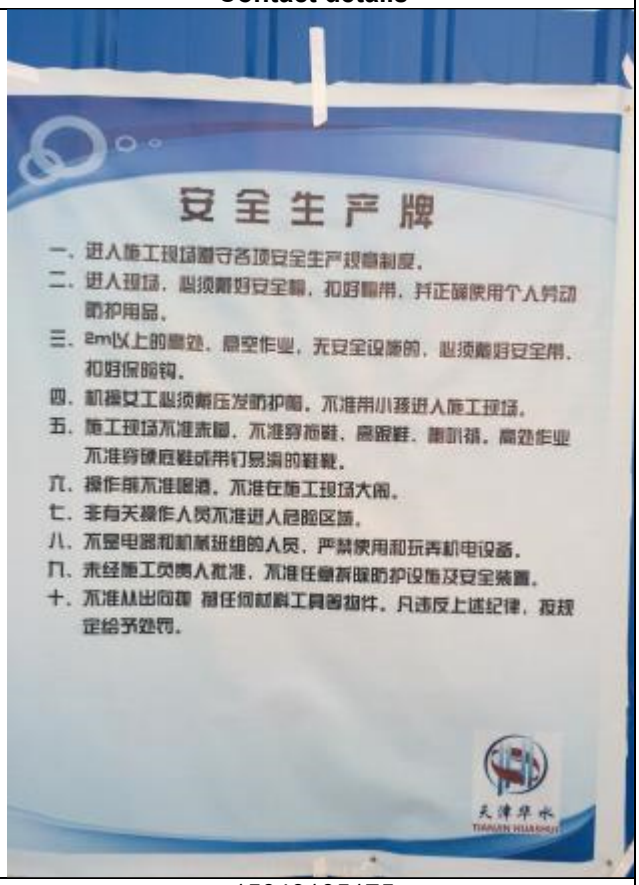
ADB = Asian Development Bank, AP = affected person, EPB = environmental protection bureau, IA = implementing agency, PPCU = Project Public Complaint Unit

53. Contact information for the contractor and on-site project managers has been posted at each construction site (see above). Public complaints and concerns can also be channelled through the hotline of the Hohhot EPB (0471-12369).

Table 3 Contact details of GRM focal personnel at subprojects and PMO

<table>
<tr><th>Subproject/name</th><th>Contact details</th></tr>
<tr><td>Mr. Miao Yongqing, EHS officer of HCHC</td><td>15049190009</td></tr>
<tr><td colspan="2">Contract #1 of Long distance transmission pipeline</td></tr>
<tr><td colspan="2"> 


</td></tr>
<tr><td>Mr. Zhou Geng, HCHC</td><td>15849343199</td></tr>
<tr><td>Mr. Wang Ziming, CSC, IMAR Ruibo construction supervision comp</td><td>18647158722</td></tr>
<tr><td>Mr. Hu Ruizhong, contractor, CSRC 6th construction company</td><td>18947198824</td></tr>
<tr><td colspan="2">Contract #2 of Long distance transmission pipeline</td></tr>
</table>

Subproject/name	Contact details
	
Mr. Zhao Ruilong, HCHC	15049105175
Mr. Yu Xiaodong, CSC, Hohhot Hongxiang supervision company	18347941908
Mr. Chen Jingtian, contractor, Tianjing Huashui water supply company	15184726187
Contract #3 of Long distance transmission pipeline	

Subproject/name	Contact details
	
Mr. Zhao Ruilong, HCHC	15049105175
Mr. Ren Ming, CSC, Beijing Zhongjing Hengji supervision company	18686095198
Mr. Ge Qianzai, CSC, Beijing Zhongjing Hengji supervision company	15384726305
Mr. Gao Zhirong, contractor, Heilongjiang building construction company	13484717250
Mr. Peng Zhixin, contractor, Heilongjiang building construction company	18704713707

54. The PPCU have visited construction sites on a regular basis. According to information from the Hohhot EPB, EMU and OEEs/construction contractors/CSCs, no complaint has been received through the formal grievance mechanism (HOHHOT EPB hotline, and posted hotlines of construction contractors at the construction sites).

E. Fulfillment of Environmental Responsibilities

55. An environmental management system, consisting of inspection, monitoring, reporting, and initiating corrective actions or measures, was set up prior to project implementation. In the design stage, HCHC passed the EMP to the design institutes for incorporating mitigation measures into the detailed designs of the subprojects. The EMP was reviewed and confirmed at the end of the detailed design, and was finally passed onto selected contractors. To ensure that contractors will comply with the EMP's provisions, HCHC prepared and provided the following specification clauses for incorporation into the bidding procedures: (i) a list of environmental items to be budgeted by the bidders in their proposals; and (ii)

environmental clauses for contract conditions and specifications.

56. The Government of Inner Mongolia Autonomous Region is the executing agency and the Hohhot Chengfa Heating Company (HCHC) is the implementing agency. Hohhot City Development Investment and Operation Company (HCDIO, commonly referred to as the "Chengfa Company") is engaged to provide supervision to project implementation and good governance. The HCHC and the HCDIO jointly established a Project Management Office (PMO) with a Project Manager since May 2014. The PMO include an appropriately staffed environmental management unit (EMU), and is supported by a Loan Implementation Environment Consultant (LIEC). An EMU was established by HCHC prior to the start of the project implementation. It is charged with the responsibility of coordinating and supervising the EMP implementation. The EMU is headed by a deputy general manager of HCHC. The HCHC has also recruited an environmental officer who also serves as the focal point (PPCU) for grievance redress. Meanwhile, the HCHC has drawn the expertise from the Hohhot environmental protection bureau in supervising the environmental management system. The Haoqingying, Xinjiaying and Jinqiao branches of the HCHC are responsible for the direct management of the three heating zones, and each branch also formed an EMU. A project management chart is presented in **Figure 6**.

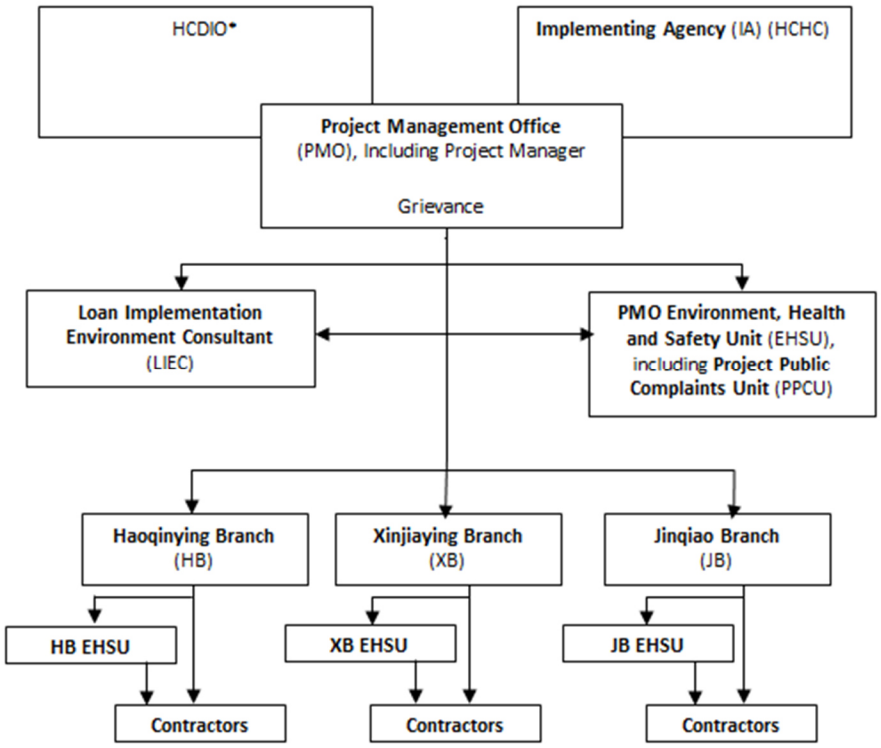
57. The PMO is responsible for day-to-day project implementation management including procurement and contract management, and payment to contractors.

58. The EMU within the PMO consist of an EMU leader and an appropriate number of staff. To ensure that the EMP requirements are incorporated into construction contracts, the PMO EMU have prepared and provide the following specification clauses to incorporate in the bidding procedures: (i) a list of environmental management requirements to be budgeted by the bidders in their tendering documents; (ii) environmental clauses for contractual terms and conditions; and (iii) environmental monitoring requirements in domestic EIAs, the EIA and the EMP. The PMO EMU is responsible to oversee EMP implementation, provide specific mitigation implementation guidance to the branch EMUs and contractors, and prepare EMP monitoring reports semi-annually during construction and annually during operation. The EMU prepare and submit the EMP monitoring reports to the PMO who review the reports and submit them to ADB and to the Saihan District Environmental Protection Bureau (EPB).[3]

59. The PMO through the EMU are responsible for contracting the Hohhot EPB Environment Monitoring Station to undertake construction and operation phase ambient monitoring.

[3] The Saihan District EPB has been delegated by Hohhot EPB to be responsible for environment protection supervision and inspection during the construction phase.

Figure 6 Project Management Structure



*Note: The HCDIO provide management oversight to the IA and (i) liaise with the GIMAR, and Hohhot municipal government; (ii) sign onlending agreements with the GIMAR, through Hohhot municipal government, and onlend to the HCHC; (iii) are directly responsible for making equity contributions; (iv) provide support and supervision in the project procurement with the IA; and (v) provide timely managerial and technical support to the IA to ensure the timely project implementation as well as good governance of the project. The HCDIO and HCHC jointly established a project management office (PMO). And EHSU is equivalent to EMU in this report.

60. The LIEC provides project management and technical support to the PMO. The LIEC is a part-time consultant who supports the PMO EMU in mitigation implementation, environmental monitoring, reporting, and addressing any environment related issues that arise including grievances.

61. The Branch EMUs have day-to-day responsibility for ensuring mitigation implementation in their respective heating zones. They will respond to complaints, and support the PMO EMU in monitoring and reporting.

62. The contractors are responsible for implementing relevant mitigation measures during construction. Following the award of the construction contract, the contractors prepared Construction Site Environmental Management Plans, which detail the means by which the contractors comply with the EMP. The contractors implement the Construction Site Environmental Management Plans, and take all reasonable measures to minimize the impact of construction activities on the environment.

63. The PMO EMU and the LIEC are responsible for regular internal inspections of mitigation measures at the construction site, in accordance with the Environmental Monitoring Plan. Local environmental monitoring agency will be engaged to undertake construction phase ambient monitoring as per the Environmental Monitoring Plan (see below **paragraph 66**).

64. ADB are responsible for reviewing overall environmental performance of the Project. ADB will review the semi-annual and annual environmental monitoring reports submitted by the PMO and will disclose the reports on its website. ADB will conduct due diligence of environment issues during the project review missions. If the PMO fails to meet safeguards requirements described in the EMP, ADB will seek corrective measures and advise the IA on items in need of follow-up actions.

65. Key project institutions and their EMP implementation responsibilities are summarized in **Table 6**.

66. HCHC as the implementing agency is seeking a contract with the local environmental monitoring agency. HCHC has conducted several rounds of discussion with local finance bureaus, Hohhot City Environmental Monitoring Station and related private environmental monitoring service companies on the issues of external environmental monitoring (EEM), but no agreement has been reached. In this reporting period, the independent environmental monitoring consultant assisted with HCHC in formulating a comprehensive environmental monitoring program including budgets based on detailed discussions. HCHC informed that the environmental monitoring agency is expected to be engaged by March 2017 through formal bidding procurement.

67. The status of fulfillment of environmental responsibilities is summarized in **Table 6**.

F. Implementation of Institutional Strengthening Program

68. The proposed institutional strengthening and capacity building program in the EMP and the status of implementation of the proposed capacity building activities are presented in **Table 7**. In summary, the institutional strengthening and capacity building programs has to date been implemented well.

69. HCHC and the contractors/CSCs engaged are all first time involved into ADB loan project, although previously HCHC experienced three Janpanese Government loan projects and one KFW loan project and one contractor as well as one CSC reported ever involved into other internation projects, such as WB loan.

70. A training program comprising of twelve sessions tackling environmental management at both construction and operation stages was proposed in the Table 2-2, EMP of final EIA (dated April 2016).

71. Under the Low-Carbon District Heating Project in Hohhot in Inner Mongolia Autonomous Region (PRC Loan-3218), Mr. Mingtao Nie, as an independent environmental consultant was engaged by Hohhot City Development, Investment, and Operation Company in August 2016 to undertake consulting services in both environmental monitoring and environmental training. The first site visit was delayed until January 2017 due to various reasons. Details on site visit will be included in the next environmental monitoring report (covering January~June 2017).

G. Status of Compliance with Loan Covenants

72. The status of compliance with the environmental safeguard provisions as prescribed in the EIA and EMP as well as environmental safeguard-related loan covenants is summarized in **Table 10**. In summary, all environmental safeguard provisions and covenants have been complied with.

H. Updated Work Plan for EMP Implementation

73. An updated work plan for EMP implementation for the reminder of the current year and till the end of the project is provided in below **Table 11**.

Table 4 Implementation Status of Environment Impacts and Mitigation Measures

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	Supervised by	
Pre-construction Phase					
Incorporate Mitigation Measures and Monitoring in Detailed Design and Bidding and Contracting	Include mitigation measures and monitoring program in detailed designs	Environmental mitigation measures identified in this EIA, the EMP including health and safety requirements, landscaping, etc, and the domestic EIAs will be incorporated in the engineering design.	EMU supported by LIEC	PMO, ADB	*Fulfilled*
	Include mitigation measures and monitoring program in bidding documents	Environmental mitigation measures identified in this EIA and the domestic EIAs will be incorporated in the bidding documents for the project, and will be included in contract documents for civil constructions and equipment installations. All contractors shall be required to strictly comply with the EMP.	EMU supported by LIEC	PMO, ADB	*Fulfilled*
	Environmental monitoring incorporated into design.	The environmental monitoring program (EMoP, see Table A-4 in Appendix I) will be incorporated into the design to ensure that environmental impacts are closely monitored and activities of the Project construction and operating are closely supervised against the PRC environmental laws, regulations and standards, ADB SPS, and the Project EMP and approved domestic EIAs.	EMU supported by LIEC	PMO, ADB	*Fulfilled*
Grievance Redress Mechanism (GRM)	Impacts on Project Affected Persons	In accordance with the GRM presented in Chapter VIII of the EIA, establish a Project Public Complaints Unit (PPCU) in IA's office; provide GRM training for PPCU members and GRM access points; disclose the PPCU's phone number, fax, address, and email to the public.	EMU supported by LIEC	PMO, ADB	*Fulfilled*
Construction Phase					

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	Supervised by	
Erosion and Spoil	Soil erosion, spoil disposal	Good practice construction erosion controls and site maintenance: HSP site storm water runoff will be assessed and estimated and appropriate storm water Fish ponds along the northwestern boundary of the Jinqiao HSP will be protected by silt fences when nearby construction activities are underway. Spoil will be reused onsite to the maximum extent feasible as fill to rehabilitate disturbed areas or for landscaping. Temporary spoil storage sites will be identified, designed, and operated to minimize impacts. Sites will be restored at the conclusion of storage activities. Excess spoil that cannot be used onsite will be transported to an approved spoil disposal site. Spoil and aggregate piles will be covered with landscape material. During earthworks the area of soil is exposed to potential erosion at any one time will be minimized. Construction and material handling activities during periods of rains and high winds will be limited or halted. Pipelines will be installed and backfilled in a sequenced section-by-section approach, with sections not exceeding 300 m in length. Open excavation areas during trenching activities will be minimized, and appropriate construction compaction techniques utilized. Any planned paving or vegetating of areas will be done as soon as practical after the materials are removed to protect and stabilize the soil. Once construction is complete disturbed surfaces will be properly sloped and revegetated with native trees and grass (see greening plan, below).	Contractors directed by Branch EMUs	EMU supported by LIEC	*Being fulfilled*

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	Supervised by	
Wastewater	Surface and groundwater contamination from construction wastewater, and domestic water	Good wastewater management practices: Adequate temporary sanitary facilities and ablutions will be provided for construction workers. Toilets will be equipped with septic tanks in accordance with PRC standards. Septic tanks will be pumped out on an as needed basis and the effluent will be discharged for final treatment at the Jinqiao wastewater treatment plant. Wastewater from the canteen should be treated in an oil-water separator, and then discharged into the municipal sewer for final treatment at the Jinqiao wastewater treatment plant. Construction wastewater will be directed to temporary detention and settling ponds prior to discharge to urban storm sewers. Areas where construction equipment is being washed will be equipped with water collection basins and sediment traps.	Contractors directed by Branch EMUs	EMU supported by LIEC	*Being fulfilled. Construction wastewater was treated with retainment and settlement ponds. Construction sewage was discharged into municipal sewers or treated with a septic tank when municipal sewers were not available.*

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	Supervised by	
Air Pollution	Dust, vehicle emissions	HSP sites, HES sites and pipeline sections under construction will be fully enclosed by a 3 m fence prior to the commencement of construction. Fence height will be increased near sensitive locations (residential areas, schools, clinics and hospitals). Water will be sprayed on active construction sites where fugitive dust is being generated on a daily basis, and more frequently during windy days. Construction activities will be halted during high wind events. All construction piles with the potential to generate dust will be covered and/or regularly watered. Transport vehicles will be limited to low speeds in construction sites. Loads will be covered during truck transportation to avoid spillage or fugitive dust generation. Fine materials will be transported in fully contained trucks. Construction site roads will be well maintained, and watered and swept on an as-needed basis. Construction site road entry points will be equipped with truck drive through wash ponds. Transport routes will avoid residential neighborhoods and other sensitive areas to the maximum extent practical. Vehicles and construction machineries will be maintained to a high standard (to be done off-site) to ensure efficient operating and fuel-burning and compliance with the PRC emission standards GB 11340-2005, GB 17691-2005, GB 18285-2005 and GB 18352-2005. The use of coal for cooking on site, heating and hot water is prohibited. Non-ozone depleting blowing agents will be utilized for the polyurethane foam (PUR) during the construction of pre-insulated bonded heating pipes.	Contractors directed by Branch EMUs	EMU supported by LIC EHSS	*Being fulfilled.* *All construction vehicles and machinery were certified to comply with the applicable national emission standards.* *Dust suppression measures were adopted when the construction sites were located close to sensitive areas and during dry, windy days.*

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	Supervised by	
Noise	Impacts from construction noise on sensitive resources	To ensure construction activities meet PRC noise standards (*Noise Standards for Construction Site Boundary*, GB 12523-2011) and protect workers: Construction activities will be restricted to 6:00-12:00 h and 14:00-22:00 h. Construction activities will be prohibited during the nighttime (22:00 h to 07:00 h). Exceptions will only be allowed in special cases, and only after getting approval of the surrounding residents, EPB and other relevant departments. When undertaking construction planning, simultaneous high-noise activities will be avoided, and high noise activities will be scheduled during that day rather than evening hours. Similarly, construction sites will be planned to avoid multiple high noise activities or equipment from operating at the same location. Low-noise equipment will be selected as much as possible. Noise levels from equipment and machinery must conform to the PRC standard GB 12523-2011, will be equipped with mufflers, and will be properly maintained to minimize noise. Machines in intermittent use will be shut down in the intervening periods between work or throttled down to a minimum. Noise personal protective equipment will be provided to workers. Transportation routes and delivery schedules will be planned during detailed design to avoid densely populated and sensitive areas and high traffic times. Vehicles transporting construction materials or wastes will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals. Given their location within residential areas, special attention will be paid to protect sensitive sites near HESs and along the pipeline routes: High noise construction activities will be positioned as far away from sensitive sites as possible. Low noise equipment will be utilized to the extent possible. Temporary or permanent noise barriers will be installed to protect sensitive sites.	Contractors directed by Branch EMUs	EMU supported by LIC EHSS	*Being fulfilled. All construction vehicles and equipment were certified to comply with the applicable national standards. Transport routes were carefully selected to avoid community disturbance. Construction activities were suspended during night hours when close to sensitive spots.*

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	Supervised by	
Solid Waste	Inappropriate Waste Disposal	Wastes will be reused or recycled to the extent possible. Littering by workers will be prohibited. Domestic waste containers will be provided at all works sites. Domestic waste will be collected on a regular basis all work by the local sanitation departments and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements. Construction waste dumpsters will be provided at all work sites. Construction waste will be collected on a regular basis by a licensed waste collection company and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements. Excavated soil will be backfilled onsite to the extent possible. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site. There should be no final waste disposal on site. Waste incineration at or near the site is strictly prohibited. Contractors will be held responsible for proper removal and disposal of any significant residual materials, wastes, and contaminated soils that remain on the site after construction.	Contractors , local sanitation departments (domestic waste), licensed waste collection companies (construction waste)	EMU, LIC	*Being fulfilled. Garbage bins were used at construction sites and camps. Garbages were collected regularly and disposed at local landfills.*
Hazardous and Polluting Materials	Inappropriate transportation, storage, use and spills	A hazardous materials handling and disposal protocol that includes spill emergency response will be prepared and implemented by contractors. Storage facilities for fuels, oil, chemicals and other hazardous materials will be within secured areas on impermeable surfaces provided with dikes, and at least 300 m from drainage structures and important water bodies. A standalone site within the storage facility will be designated for hazardous wastes. Suppliers of chemicals and hazardous materials must hold proper licenses. They will follow all relevant protocols in “Operation Procedures for Transportation, Loading and Unloading of Dangerous or Harmful Goods” (JT 3145-91). A licensed company will be hired to collect, transport, and dispose of hazardous materials in accordance with relevant PRC regulations and requirements. Vehicles and equipment will be properly maintained and refueled in designated service areas on impermeable surfaces provided with oil traps, at least 300 m from drainage structures and important water bodies.	Contractors, waste management companies	EMU, LIEC	*Being fulfilled. No accidental releases were reported.*

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	Supervised by	
Flora and Fauna	Removal of vegetation	A greening plan will be implemented in each HSP site , using appropriate native species. According to the domestic EIAs, the approximate area to be vegetated for each HSP is: Haoqingying greening area: 34,486 m^2 Xinjiaying greening area: 27,226 m^2. Jinqiao greening area: 34,375 m^2. Any vegetated areas impacted by pipeline works or construction of HESs will be restored post-construction using appropriate native species.	DI (plan design), Contractors (plan implementation)	EMU, LIEC	*Being fulfilled. Vegetation removal and exposed surface were minimized. Spoils were disposed in preselected sites which were rehabilitated uponcompletion of construction.*
	Waterway pipeline crossing	The Jinqiao heating zone will require one river crossing. To minimize potential impacts: Directional drilling will be used to embed the pipeline under the waterway. The waterbody will be protected by siltation fences.			

Socioeconomic Resources	Community Disturbance and Safety	**Traffic and Public Safety** Traffic control plans, agreed to by the local traffic control authority, will be developed and implemented for each heating zone in order to minimize community disturbance: Local government, using information provided by the PMO, will inform residents, institutions, bossiness and other affected parties as to planned construction activities including schedule and duration of construction works, and expected traffic and other disruptions. Transportation routes and delivery schedules will be planned during detailed design to avoid densely populated and sensitive areas and high traffic times. Warning signs and cones will be installed along roads to protect workers and people in the neighborhood. Safety flag people will be used if appropriate. During evening construction warning lights will also be used. Vehicles transporting construction materials or wastes will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals. Roadside earthworks should be completed as quickly as possible, and all spoil either backfilled or removed. Road crossing will use the pipe-jacking installation method where possible in order to minimize disruption. Public access to construction sites and other areas of danger will be restricted and temporary barriers installed.	DI (plan design), Contractors (plan implementation)	EMU, LIEC	*Being fulfilled. Traffic disturbance was minimized by selected transport routes, avoiding rush hours and building interim roads.*
		Access to Public Services, Private Properties and Businesses Local authorities will be consulted to minimize disruption of public services such as telephone, water, gas and power supply. Contactors will use good construction practices to avoid disruption of other services. The contractor shall take measures to minimize disruption of access to private properties and businesses where possible. Temporary access to affected private properties, businesses and public service buildings will be provided including temporary crossings over pipeline trenches, and subsequently good quality permanent access will be provided.	Contractors directed by Branch EMUs	EMU supported by LIEC	*Being fulfilled.*

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	**Supervised by**	
	Worker Occupational Health and Safety	Contractors will implement adequate precautions to protect the health and safety of their workers: Each contractor will implement the relevant heating zone construction phase EHS plan developed by the LIC EHS experts.	EHS Plan Developed by LIEC	EMU	*Being fulfilled.*
		An EHS officer will be appointed by each contractor to implement and supervise the EHS management plan. The EHS Plans will: Identify and minimize the causes of potential hazards to workers. Implement appropriate safety measures. Ensure the provision of adequate type and number of fire extinguishers and first aid facilities onsite. Provide training to workers on occupational health and safety and emergency response, especially with respect to using potentially dangerous equipment. Ensure that all equipment is maintained in a safe operating condition. Ensure that material stockpiles or stacks, such as, pipes are stable and well secured to avoid collapse and possible injury to workers. Provide appropriate personal protective equipment to workers to minimize risks, including ear protection, hard hats and safety boots, and post adequate signage in risk areas. Provide procedures for limiting exposure to high noise or heat working environments in compliance with PRC noise standards for construction sites (GB 12523-2011). Provide training to workers on the storage, handling and disposal of hazardous wastes. Ensure regular safety meetings with staff.	EHS Plan implemented by contractors directed by Branch EMUs	EMU supported by LIEC	

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		*Implementation Status*
			Implemented by	Supervised by	
Physical Cultural Resources	PCRs may be damaged if proper precaution is not taken.	The tomb south of the Jinqiao HSP will be demarcated by fence and signs as a no-entry area. A construction phase chance find procedure will be established and activated if any chance finds of PCRs are encountered: construction activities will be immediately suspended if any PCRs are encountered; destroying, damaging, defacing, or concealing PCRs will be strictly prohibited in accordance with PRC regulations; the local Cultural Heritage Bureau will be promptly informed and consulted; and, construction activities will resume only after thorough investigation and with the permission of the local Cultural Heritage Bureau.	Contractors	EMU supported by LIEC and District Cultural Heritage Bureau	*Not applicable so far.* *No physical and cultural relics were discovered at the construction sites.*
C. Operation Phase (not applicable so far)					

ADB = Asian Development Bank, DI = design institute, EHS =environment, health, and safety, EHSS = environment, health and safety specialist, EMU = environment, health and safety unit, EIA = environment impact assessment, EMP = environment monitoring plan, EMS = environment monitoring station, EPB = environment protection bureau, ,GRM = grievance redress mechanism, HCHC = Hohhot Chengfa Heating Company, HSP = heating source plant, IA = implementing agency, LIEC = loan implementation environmental consultant, m = meter, m^2 = square meter, m^3 = cubic meter, PCR = Physical Cultural Resources, PMO = project management office, PPCU = Project Public Complaints Unit, PPE = personal protective equipment, PRC = People's Republic of China.

Table 5 Implementation Status of Environmental Monitoring Plan (EMoP) (Table A2-4 of EMP)

Subject	Parameter	Location	Frequency	Implemented by	Supervised by	Implementation Status
A. Construction Phase						
Erosion and Spoil	Compliance inspection of erosion protection measures and spoil management	Construction sites, spoil disposal sites	Monthly; and once after completion of spoil disposal	EMU supported by LIEC	PMO	*Being fulfilled Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant (LIEC)*
Wastewater generated from construction	Compliance inspection of wastewater mitigation measures (detention ponds, septic systems)	HSP construction sites	Monthly	EMU supported by LIEC	PMO	
Air Pollution	Ambient dust monitoring (TSP, PM_{10})	HSP construction sites; representative number (15%) of HESs and pipeline construction segments	Monthly	Hohhot EPB EMS	PMO	*To be fulfilled. The local environmental monitoring agency is to be mobilized in March 2017.*
	Compliance inspection of dust mitigation measures (water spraying, cover transport vehicles, etc.); and maintenance and condition of vehicles and construction equipment.	All construction sites	Weekly when there are construction activities	EMU supported by LIEC	PMO	*Being fulfilled Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant(LIEC)*
Noise	Leq dB(A)	HSP construction sites; representative number (15%) of HESs and pipeline constriction segments	Monthly: a day each time and two samples; once during daytime, once during nighttime.	Hohhot EPB EMS	PMO	*To be fulfilled. The local environmental monitoring agency is to be mobilized in March 2017.*
Solid Waste	Compliance inspection of domestic and construction waste collection and disposal	Waste collection and disposal sites.	Monthly	EMU supported by LIEC	PMO	*Being fulfilled. Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant(LIEC)*
Hazardous and Polluting Materials	Compliance inspections of hazardous management, protocols, and licenses of suppliers and waste removers	Storage facilities for fuels, oil, chemicals and other hazardous materials.	Monthly	EMU supported by LIEC	PMO	*Being fulfilled. Field inspection by HCHC, CSCs, the loan implementation*

Subject	Parameter	Location	Frequency	Implemented by	Supervised by	Implementation Status
		Vehicle and equipment maintenance areas.				*environmental monitoring consultant(LIEC)*
Greening Plan	Compliance inspection of implementation of greening plans (HSPs), HESs and pipelines	HSP sites, HES sites, pipeline routes.	After construction is complete.	EMU supported by LIEC	PMO	*Not yet due.*
Health and Safety	Record and report both minor and lost-time incidents	HSPs, HESs, pipelines	Continuous	HCHC EHS	HCHC and	*Being fulfilled.* *Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant(LIEC)*
Socioeconomic Impacts	Compliance inspection to determine if traffic and public safety measures are in place	Pipeline and HSP construction sites at or near roads.	Monthly	Specialists EMU supported by LIEC	HCDIO PMO	*Being fulfilled.* *Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant(LIEC)*
	Compliance inspection to determine if temporary access being provided to public and private properties	Transportation routes. Pipeline routes	Monthly	EMU supported by LIEC	PMO	
	Compliance inspection to determine if EHS Plans developed and implemented, and workers have appropriate PPE	All construction sites	Monthly	EMU supported by LIEC	PMO	
B. Operation Phase (Not yet due)						

ADB = Asian Development Bank, dB = decibel, CEMS = continuous emissions monitoring system, EMU = environment, health and safety unit, EMS = environment monitoring station, EPB = environment protection bureau, HCDIO = Hohhot City Development, Investment, and Operation Company, HCHC = Hohhot Chengfa Heating Company, HES = heat exchange station , HSP = heating source plant, IA = implementing agency, Leq = equivalent continuous noise level, LIEC = loan implementation environmental consultant, NO_2 = nitrogen dioxide, pH = potential hydrogen, PM = particulate matter, PMO = project management office, PRC = People's Republic of China, SO_2 = sulfur dioxide, TSP = total suspended particulates.
Source: Domestic EIA Reports (2014) and TA consultants estimate.

Table 6 Fulfilment of of Institutions and Responsibilities for EMP Implementation

Institution	Responsibilities	*Status of Fulfilment*
HCHC	Together with the HCDIO, jointly establish appropriately staffed PMO and hire LIEC and EMS; provide overall project management guidance to PMO;	*Fulfilled or to be fulfilled.* *A local environmental monitoring agency, instead of EMS, is to be mobilized in March 2017.*
HCDIO	Together with the HCHC, jointly establish appropriately staffed PMO and hire LIEC and EMS; provide supervision and guidance to the HCHC in order to ensure smooth and effective project management and good governance; Provide overall project management guidance to PMO.	*Fulfilled or to be fulfilled.*
Project Management Office (PMO)	Establish appropriately staffed EMU; provide overall management and direction to EMU.	*Fulfilled.*
PMO Environment, Health and Safety Unit (EMU)	Ensure incorporation of EMP requirements into bidding documents and contracts; oversee EMP implementation; provide mitigation implementation guidance to the Branch EMUs and contractors; undertake compliance inspections of mitigation measures at the construction sites, in accordance with the environmental monitoring plan; establish a Project Public Complaints Unit and ensure implementation of grievance redress mechanism; recruit and supervise the Hohhot Environmental Protection Bureau EMS to undertake construction and operation phase ambient monitoring; prepare EMP monitoring reports semi-annually during construction and annually during operation; coordinate the role of the LIEC.	*Fulfilled or to be fulfilled.* *The Project EMP was reviewed and updated in April 2016 addressing the scope change (see paragraphs 16 to 19).* *The mitigation measures were incorporated into the detailed engineering designs.* *The mitigation measures were incorporated into the tendering documents and construction contracts.* *PPCU was eatablished. GRM is operational.*
Loan Implementation Environment Consultant (LIEC)	Provide technical assistance to the PMO EMU in all aspects of EMP implementation; develop construction and operation phase EHS plans and provide training to the staff of the IA and contractor on EMP and EHS, utilizing additional consultants as required; assist and coordinate environmental monitoring, including undertaking compliance inspections and assisting EMS with ambient monitoring; assist the PMO EMU in addressing any environmental issues that may arise, including grievances; and assist the PMO EMU in preparing semi-annual and annual environmental EMP monitoring reports.	*Fulfilled.* *The LIEC is assisting with HCHC in recruiting a local environmental monitoring agency.* *This is the first semi-annual environmental monitoring report. The next semi-annual environmental monitoring report is expected to submit in August 2017.*
Branch EMUs	Day-to-day responsibility for mitigation implementation; assisting the PMO EMU and LIEC for compliance and ambient monitoring; assisting in implementation of grievance redress mechanism.	*Fulfilled.*
Contractors	Develop and implement Construction Site Environmental Management Plans in accordance with the EMP and other contract	*Fulfilled.*

Institution	Responsibilities	*Status of Fulfilment*
	conditions; implement all required mitigations during construction; report all spills and accidents, and take appropriate actions.	*Construction Site Environmental Management Plans were prepared and approved.*
Hohhot EPB EMS	Conduct ambient monitoring according to the environmental monitoring plan.	*To be fulfilled. Instead, a certified local environmetnal monitoring agency will be engaged to provide such service.*
Saihan District EPB	Inspect the facilities during construction and operation to ensure compliance; enforce applicable the PRC's environmental laws and regulations; review EMP monitoring reports; and conducting an environmental acceptance inspection after a three months trial operation period. Ensure the boiler decommissioning activities led by Hohhot Utility Bureau will be performed in accordance with relevant PRC environmental laws and regulations and other all relevant domestic requirements. Ensure the gas company to follow a domestic EIA approval procedures and requirements and perform their gas pipe construction in accordance with all the relevant PRC environmental laws and regulations, and other domestic requirements, including their domestic EIA requirements. Ensure a planned Phase II heating source plant to meet all domestic approval requirements to minimize cumulative impact at project site.	*Fulfilled.*
ADB	Monitor and supervise the overall environmental performance of the project; review the environmental monitoring reports and disclose the project monitoring reports on its website; conduct due diligence of environment issues during the project review missions.	*Fulfilled.*

EMU = Environment, Health and Safety Unit, EIA = environment impact assessment, EMP = environmental management plan, EMS = environmental monitoring stations, HCDIO = Hohhot City Development, Investment and Operation Company, HCHC = Hohhot Chengfa Heating Company, LIEC = Loan Implementation Environment Consultant, PMO = Project Management Office, PRC = People's Republic of China.

Table 7 Implementation Status of Institutional Strengthening and Training Program (Table A2-2 of EMP)

Training Topic	Trainers	Attendees	Contents	Times	Period (days)	# Persons	Budget (USD)	*Implementation Status*
Construction Phase EHS Plan Development and Training	LIEC	HCHC, PMO, EMU, Branch PMOs, Saihan District EPB, Contractors	**ADB and PRC EHS laws, regulations and policies** – ADB's safeguard policy statement – Project applicable PRC EHS laws, policies, standards and regulations International environmental, health and safety management practice in civil constructions **GRM** – GRM structure, responsibilities, and timeframe Types of grievances and eligibility assessment **Implementation of EMoP** – Impacts and mitigation measures during construction and operation – Monitoring and auditing mechanism – Reporting requirements Corrective actions for EMP **Implementation of Heating zone Construction Phase EHS Plans** – Plan descriptions – Roles and responsibilities	6 (2 per sub-project)	3	15	**EHS Plan Development** (fees and per diem): 3 plans x 10 days/plan x 350/day = $10,500 **EHS Plan Training Course Development** (fees and per diem): 10 days x $350/day = $3,500 **Course Delivery** (fees and per diem): 6 x 5 days x 350/day = $10,500 (fixed costs): $1,000 per course delivery x 6 = $6,000 **TOTAL = $30,500**	*To be fulfilled in future reporting periods.* *To be enhanced in future reporting periods.*
Operation Phase EHS Plan Training	LIEC	HCHC, PMO, EMU, Branch PMOs, Saihan District EPB	**International good practices in natural gas-fired HSP operation** – Environmental, health and safety issues associated with natural gas-fired HSPs. **Implementation of Operation Phase EHS Plans** – Plan descriptions Roles and responsibilities	6 (2 per sub-project)	3	15	**Course EHS Plan Development** (fees and per diem): 3 plans x 10 days/plan x 350/day = $10,500 **EHS Plan Training Course Development** (fees and per diem): 10 days x $350/day = $3,500	*Not yet due.*
			Total	**12**	**36**	**180**		

Training Topic	Trainers	Attendees	Contents	Times	Period (days)	# Persons	Budget (USD)	*Implementation Status*
							Course Delivery (fees and per diem): 6 x 5 days x 350/day = $10,500 (fixed costs): $1,000 per course delivery x 6 = $6,000 **TOTAL = $30,500** **$70,000**	

ADB = Asian Development Bank, EHS = Environment, Health, and Safety, EMU = Environment, Health and Safety Unit, EMP = environmental management plan, EMoP = environmental monitoring plan, EPB = Environment Protection Bureau, GRM = grievance redress mechanism, HCHC = Hohhot Chengfa Heating Company, HSP = heating source plant, LIEC = Loan Implementation Environment Consultant, PMO = Project Management Office, PRC = People's Republic of China.

Table 8 Implementation Status of Reporting Requirements (Table A2-6 of EMP)

Report	Prepared by	Submitted to	Frequency	Implementation Status
A. Construction Phase				
Environmental monitoring records	EMU supported by LIEC	PMO	Monthly	*Not yet. Engagament of field environmental monitoring agency is still underway, and expected to confirm by end March 2017.*
Environmental monitoring report	EMU supported by LIEC, prepares and submits to PMO	PMO reviews and submits to ADB	Semi-annually	*Being fulfilled. This is the first semi-annual Environmental monitoring report. The next is expected to be submitted by 31 August 2017.*
B. Operation Phase				
Environmental monitoring report, including annual CO_2 emissions[4]	EMU prepares and submits to PMO	PMO reviews and submits to ADB	Annually	*Not yet due.*

ADB = Asian Development Bank, CO_2 = carbon dioxide, EMU = environment, health and safety unit, LIEC = loan implementation environmental consultant, PMO = project management office.

Note: The following environmental related reports were prepared for the Project in this reporting period:

- Environmental Protection Operation And Supervision Plan/Manuals, by contractors
- Environmental supervision monthly reports, by the CSCs;
- The first semi-annual EMR, by the LIEC.

Summary of the Completed Environmental Related Reports

No.	*Environmental Reports and preparer*	*Reporting Period*	*Prepared in*	*Submitted in*

[4] The ADB Safeguard Policy Statement (2009) requires quantification and monitoring of GHG emissions for projects which emit more than 100,000 tCO2e per annum.

Semi-annual EMR				
1	*The first semi-annual EMR by the loan implementation environmental monitoring consultant*	*From 1 July to 31 December 2016*	*January~February 2017*	*February 2017*
Contractors' site specific EMP, soil erosion prevention plan, safety/occupational/health management plans				
2	*For contract #1 of long distance transmission pipeline component, by CSRC 6th construction company*	*Whole construction period*	*August 2016*	*August 2016*
3	*For contract #2 of long distance transmission pipeline component, by Tianjing Huashui water supply company*	*Whole construction period*	*August 2016*	*August 2016*
4	*For contract #3 of long distance transmission pipeline component, by Heilongjiang building construction company*	*Whole construction period*	*1 August 2016*	*1 1August 2016*
Contractors' Emergency preparedness plan				
5	*For contract #1 of long distance transmission pipeline component, by CSRC 6th construction company*	*Commencement of construction period*	*28 July 2016*	*28 July 2016*
6	*For contract #2 of long distance transmission pipeline component, by Tianjing Huashui water supply company*	*Commencement of construction period*	*August 2016*	*August 2016*
7	*For contract #3 of long distance transmission pipeline component, by Heilongjiang building construction company*	*Commencement of construction period*	*1 August 2016*	*1 August 2016*
Contractors' environmental training records				
8	*For contract #1 of long distance transmission pipeline component, by CSRC 6th construction company*	*Commencement of construction period*	*November 2016*	*November 2016*
9	*For contract #2 of long distance transmission pipeline component, by Tianjing Huashui water supply company*	*Commencement of construction period*	*2 August 2016*	*2 August 2016*
10	*For contract #3 of long distance transmission pipeline component, by Heilongjiang building construction company*	*n/a*	*n/a*	*n/a*
CSCs' Environmental supervision monthly reports				
11	*For contract #1 of long distance transmission pipeline component, by IMAR Ruibo construction supervision company*	*August 2016* *September 2016* *October 2016* *November 2016*	*1 September 2016* *1 October 2016* *1 November 2016* *1 December 2016*	*1 September 2016* *1 October 2016* *1 November 2016* *1 December 2016*
12	*For contract #2 of long distance transmission pipeline component, by Hohhot Hongxiang supervision company*	*August 2016* *September 2016* *October 2016* *November 2016*	*1 September 2016* *1 October 2016* *1 November 2016* *1 December 2016*	*1 September 2016* *1 October 2016* *1 November 2016* *1 December 2016*
13	*For contract #3 of long distance transmission pipeline component, by Beijing Zhongjing Hengji supervision company*	*September 2016* *October 2016* *November 2016* *December 2016*	*1 October 2016* *1 November 2016* *1 December 2016* *1 January 2017*	*1 October 2016* *1 November 2016* *1 December 2016* *1 January 2017*

Table 9 Implementation Status of Performance Indicators (Table A2-7 of EMP)

No.	Description	Indicators	*Implementation Status*
1	Staffing	(i) PMO EMU established with appropriately qualified staff. (ii) Appropriately qualified LIEC EHSS recruited. (iii) Branch EMUs established with appropriately qualified staff.	*Complied with.*
2	Budgeting	(i) Environment mitigation cost during construction and operation is sufficiently and timely allocated. (ii) Environment monitoring cost is sufficiently and timely allocated. (iii) Budget for capacity building is sufficiently and timely allocated.	*Complied with.*
3	Monitoring	(i) Compliance monitoring is conducted by EMU and LIEC as per EMoP. (ii) Ambient and effluent monitoring is conducted by the local EMS as per EMoP. (iii) CEMS installed and functioning during operation phase.	*Being complied with.* *See the above **Table 5**.*
4	Supervision	(i) ADB mission to review EMP implementation at least once a year during the construction phase. (ii) Saihan District EPB to supervise monitoring and reporting. (iii) Saihan District EPB to conduct an environmental acceptance inspection after a three months trial operation period.	*Being complied with.*
5	Reporting	(i) Monthly environment monitoring reports prepared by the EMU supported by the LIEC are submitted to PMO. (ii) Semi-annual (during construction period) and annual (during operation) EMP monitoring reports, prepared by the EMU supported by the LIEC, are submitted to ADB and Saihan District EPB through the PMO. (iii) Construction completion report prepared by the PMO is submitted to EA and Saihan EPB. (iv) Environment acceptance report prepared by the Saihan EPB is submitted to the PMO and ADB after a 3 months trial operation period.	*Being complied with. See the above **Table 8**.*
6	Capacity Building	(i) Construction phase HSE plan developed and in place before substantive construction activities begin.	*To be complied with.*

No.	Description	Indicators	*Implementation Status*
		(ii) Training on HSE plan implementation, ADB Safeguard Policy Statement (2009), EMP implementation, and grievance redress mechanism is provided to at the beginning of project implementation. (iii) Operation phase HSE plan developed and in place before substantive Project operation activities begin. (iv) Training on HSE plan implementation and best international practices in natural-gas fired HSP operation is provided prior to Project operation.	
7	Grievance Redress Mechanism	(i) Project public complaints unit is established in the PMO. (ii) Contact persons of project public complaints unit are assigned and disclosed to the public before construction. (iii) Complains are recorded and processed within the set time framework in the grievance redress mechanism of this environment impact assessment.	*Complied with.*
8	Compliance with the PRC standards	(i) Project complies with the PRC's environmental laws and regulations and meets all required standards.	*Complied with.*

ADB = Asian Development Bank, CEMS = continuous emission monitoring system , EHSS = environment, health and safety specialist , EMU = environment, health and safety unit, EMoP = environmental monitoring plan, EMP = environmental management plan, EMS = environmental monitoring stations, EPB = environment protection bureau, HSE =health, safety, and environment ,HSP = heating source plant ,LIEC = loan implementation environmental consultant, PMO = project management office, PRC = People's Republic of China.

Table 10 Compliance with Environment-Related Assurances and Covenants

Covenants	Reference	*Status of Compliance*
Safeguard Policy Statement (SPS) 2009		
Environmental Safeguard Assurances		
The SPS 2009 requires a number of additional considerations, including: (i) project risk and respective mitigation measures and project assurances; (ii) project-level grievance redress mechanism; (iii) definition of the project area of influence; (iv) physical cultural resources damage prevention analysis; (v) climate change mitigation and adaptation; (vi) occupational and community health and safety requirements (including emergency preparedness and response); (vii) economic displacement that is not part of land acquisition; (viii) biodiversity conservation and natural resources management requirements; (ix) provision of sufficient justification if local standards are used; (x) assurance of adequate consultation and participation; and (xi) assurance that the EMP includes an implementation schedule and measurable performance indicators.	Paragraph 131	*(i) In compliance.* *(ii) In compliance.* *(iii) In compliance.* *(iv) In compliance.* *(v) In compliance.* *(vi) In compliance.* *(vii) In compliance.* *(viii) In compliance.* *(ix) In compliance.* *(x) In compliance.* *(xi) In compliance.*
PROJECT AGREEMENT **SCHEDULE-Execution of Project; Financial, Environmental, Social and Other Matters**		
GIMAR shall, and shall, through HMG, cause HCDIO and HCHC to, ensure that the preparation, design, construction, implementation, operation and decommissioning of the project and all Project facilities comply with (a) all applicable laws and regulations of the Borrower relating to environment, health and safety; (b) the Environmental Safeguards; and (c) all measures and requirements set forth in the EIA, EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.	Paragraph 3	*(a) In compliance.* *(b) In compliance.* *(c) In compliance.*
Safeguards-Related Provisions in Bidding Documents and Works Contracts GIMAR shall, through HMG, cause HCDIO and HCHC to ensure that all bidding documents and contracts for civil works under the Project contain provisions that require contractors to: (a) comply with the measures relevant to the contractor set forth in the EIA and the EMP, and any corrective or preventative actions set forth in (i) a Safeguards Monitoring Report, or (ii) subsequently agreed between ADB and GIMAR; (b) make available a budget for all environmental measures; and (c) provide GIMAR, through HCDIO and HCHC, with a written notice of any unanticipated environmental or social risks or impacts that arise during construction, implementation or operation of the Project that were not considered in the EIA and EMP.	Paragraph 6	*(a) In compliance.* *(b) In compliance.* *(c) An updated EIA was prepared and uploaded to ADB website in April 2016 due to change in project scope.*
Safeguards Monitoring and Reporting GIMAR shall, through HMG, cause HCDIO and HCHC to do the following: (a) submit Safeguard Monitoring Reports to ADB semi-annually during construction and the implementation of the Project and the EMP, and thereafter annually during operation, until the issuance of ADB's project completion report unless a longer period is agreed in the EMP, and disclose relevant information from such reports to the respective affected people under the Environmental Safeguards promptly upon submission;	Paragraph 7	*(a) Being complied. This is the first environmental Safeguard Monitoring Report. The next environmental Safeguard Monitoring Report is expected to submit by 31 August 2017.*

Covenants	Reference	*Status of Compliance*
(b) if any unanticipated environmental or social risks and impacts arise during construction, implementation or operation of the project that were not considered in the EIA and EMP promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; (c) …; and (d) report any actual or potential breach of compliance with the measures and requirements set forth in the EMP promptly after becoming aware of the breach.		*(b) In compliance. An updated EIA was prepared and uploaded to ADB website in April 2016 due to change in project scope.* *(d) Not applicable. No breach was incurred.*
Health and Social Risks GIMAR shall cause the appropriate government authorities, and, through HMG, HCDIO and HCHC to require contractors employed, under the Project, to disseminate information (in local languages) on the risks of sexually-transmitted infections, including HIV/AIDS, in health and safety programs to those employed during implementation. Specific provisions to this effect shall be included in the bidding documents and civil works contracts under the Project, and compliance shall be strictly monitored by GIMAR, HMG, HCDIO and HCHC.	Paragraph 10	*Being complied.*
Grievance Redress Mechanism GIMAR shall, and shall, through HMG, cause HCDIO and HCHC to, ensure that a safeguards grievance redress mechanism acceptable to ADB is established in accordance with the provisions of the EIA and EMP, within the timeframes specified in the relevant EIA and EMP, to consider safeguards complaints.	Paragraph 19	*In compliance.*
GIMAR shall, and shall, through HMG, cause HCDIO and HCHC to further ensure that within 60 days after the Effective Date, a grievance redress mechanism acceptable to ADB is established for non-safeguards complaints. In each case, such mechanism shall function to (a) review and document eligible complaints of Project stakeholders; (b) proactively address grievances; (c) provide the complainants with notice of the chosen mechanism and/or action; and (d) prepare and make available to ADB upon request periodic reports to summarize (i) the number of complaints received and resolved, (ii) chosen actions, and (iii) final outcomes of the grievances and make these reports available to ADB upon request. Eligible non-safeguards complaints include those related to the Project, any of the service providers, any person responsible for carrying out the Project, complaints on misuse of funds and other irregularities as well as gender issues.	Paragraph 20	*In compliance.* *The Project GRM is under operation. No environmental complaint has been received so far.*

Table 11 Work Plan for implementing EMP

Task	*Description*	*Frequency/Date*	*Responsibility*	*Note*
Mitigation Measures	*Air, water and noise pollution control; soil erosion control; labour health and safety; community health and safety*	*Continuous*	*Contractors*	
Internal Monitoring and Inspection	*Monitoring and inspection of pollution sources and impacts on ambient environmental quality*	*Bi-weekly*	*Contractors, CSCs, HCHC*	
External monitoring	*Construction-related pollution sources and impacts on ambient environmental quality*	*Monthly*	*Local Environmental Monitoring Agency contracted through HCHC*	*External monitoring will continue on a monthly basis till loan closure on 31 October 2021. The final semi-annual environmental monitoring is planned for April/May 2017.*
External inspection	*Inspection of procedural compliance with EMP*	*Monthly*	*Loan implementation support consultants*	*Loan implementation support consultants will advise and supervise the environmental safeguards requirements during the project implementation period.*
Public consultations	*Local residents in Pingminchong, Zaochong and Hongling*	*Q2/2017*	*Loan implementation support consultants, HCHC*	*Next public consultations will be conducted in Q2/2017.*
Environmental training	*EHS training for new contractors*	*Not planned as there is no new contractors are expected to be engaged during the reporting period. Loan implementation support consultants will conduct training of HCHC, HOHHOT EPB, local environmental monitoring agency and other relevant authorities on project implementation environmental safeguards requirements.*	*Loan implementation support consultants*	*Training and workshops on project implementation environmental safeguards requirements is planned for Q2 / 2017.*
Reporting	*Environmental monitoring reports*	*1st half of 2017 (to be submitted by 31 August 2017) 2nd half of 2017 (to be submitted by 28 February 2018).*	*HCHC with assistance from loan implementation support consultants*	
Construction completion environmental audit	*As per PRC regulations*	*Not due*	*Local Environmental Monitoring Agency contracted through HCHC*	*The loan implementation support consultants will work with the PMO and Hohhot EPB for project completion environmental audit of all the components.*
Project Completion Report	*Project Completion Report*	*Not yet due*	*HCHC with assistance from loan implementation support consultants and ADB.*	*The PCR will include the performance of the project.*

I. Environmental Benefits

74. The project will result in significant positive socioeconomic and environmental benefits, and will not result in significant adverse environmental impacts that are irreversible, diverse, or unprecedented. Air quality dispersion modelling results indicate that even the worst case cumulative operation phase pollutant ground level concentrations (GLCs), which occur only a few times per year at a few specific locations, are fully in compliance with relevant standards. When compared to the equivalent production of heat through traditional coal-fired sources, once operational the Project will: (i) result in the closure of 50 small urban low-efficiency and polluting coal-fired boilers; (ii) eliminate the use and transport through urban areas of 1.25 million tons of raw coal; (iii) result in energy savings equivalent to 675,500 ton of standard coal, thereby providing a global public good by avoiding the annual emission of 1,682,000 tons CO_2; and (iv) improve local air quality through the estimated annual reduction of emissions of SO_2 by 9,000 tons, NOx by 9,500 tons, PM by 25,600 tons, and fly and bottom ash by 187,700 tons. By 2020 the Project will provide low-emission high efficiency district heating to an estimated 294,500 households with a population of 883,500.

75. Since this project just commenced construction in 2016, no project benefits have been derived. However, updates of Implementation Status of Environmental Related Indicators in Design and Monitoring Framework please see the **Appendix 1**.

IV. CONCLUSIONS AND RECOMMENDATIONS

76. In this reporting period, the contractors have implemented proper measures to mitigate unfavorable environmental impacts produced in construction. The monitoring and evaluation exercise has revealed that the EMP is generally being satisfactorily implemented, and the following conclusions can be drawn:

77. The environmental management system which was established during the inception stage of the Project implementation consultancy has progressively been improved and strengthened. Under the coordination of the HCHC, all related parties have cooperated for better implementation of the EMP and to comply with the environmental requirement of the Project Agreement.

78. For the ongoing contracts, noise, dust, wastewater, solid waste pollution, water and soil erosion during construction have been minimized through undertaking the relevant mitigation measures.

79. The independent environmental monitoring consultant (LIEC) assisted with HCHC in formulating a comprehensive environmental monitoring program including budgets based on detailed discussions. HCHC informed that the environmental monitoring agency is expected to be engaged by March 2017 through formal bidding procurement.

APPENDICES

Appendix 1: Implementation Status of Environmental Related Indicators in Design and Monitoring Framework
Appendix 2: Environmental Personnel And Performance
Appendix 3: Photographs

Appendix 1: Implementation Status of Environmental Related Indicators in Design and Monitoring Framework

Design Summary	Performance Targets and Indicators with Baselines		Data Sources and Reporting Mechanisms	Assumptions and Risks
	Appraisal	*Actual*		
Impact Improved energy efficiency and cleaner environment in IMAR	By 2025, energy intensity in IMAR is reduced by 23%, compared with 2010.[a] (2010 baseline: 1.95 t of standard coal equivalent per CNY10,000 of gross regional products)	*2010:1.44t* *2011:1.30t* *2012:1.25t* *2013:1.22t or 5% reduction than 2012* *2014: 5% reduction than 2013* *2015: 5% reduction than 2014*	Data from IMAR Development and Reform Commission and IMAR Government websites	**Assumptions** The IMAR government and enterprises make the required investments in energy efficiency and emission reduction.
	By 2025, emission of SO_2 is reduced by at least 4.5% and NO_x by 6.5%, compared with 2010. (2010 baseline: 1,397,000 t of SO_2 and 1,314,000 t of NO_x)[b]	*2011 data: 1,409,400 t of SO_2 and 1,421,900 t of NOx;* *2012 data: 1,385,015 t of SO_2 and 1,419,049 t of NOx;* *2013 data: 1,358,700 t of SO_2 and 1,377,600 t of NOx;* *2014 data: 1,312,400 t of SO_2 and 1,258,300 t of NOx;* *2015 data: 1,231,000 t of SO_2 and 1,138,900 t of NOx; 13% reductions SO_2 and NOx vs 2010 baseline*	IMAR Environment Protection Department and IMAR Government websites	Local environmental protection bureaus enforce air pollution laws and standards. **Risk** Additional polluting industries in urban area worsen air quality in IMAR.
Outcome Improved air quality and reduced greenhouse gas emissions in Hohhot	By 2022, average annual concentration of $PM_{2.5}$ decreases by 12% compared with 2013. (2013 baseline: 59.1 μg/m^3)	*By 2016, average annual concentration of $PM_{2.5}$ decreases by 29% compared with 2013.* *(2016: 41μg/m^3 vs 2013 baseline: 57 μg/m^3)*	Hohhot Environment Protection Department	**Assumption** Successful demonstration of the pilot project leads to large uptake of natural gas and wind energy in heating.
	By 2022, natural gas and wind-power-based district heating project cumulatively avoids annual CO_2 emissions of 1.3 million t[c] (2013 baseline: 0 t of CO_2)[d]	*Not due.*	Chengfa Heating Company project performance reports Loan review missions and project performance reports Data from the project's	**Risk** Reduction or removal of subsidies on gas and wind reduces financial viability of using natural gas and wind energy for heating.

Design Summary	Performance Targets and Indicators with Baselines		Data Sources and Reporting Mechanisms	Assumptions and Risks
	Appraisal	*Actual*		
			environmental monitoring reports Data from Hohhot and/or IMAR Environment Protection Bureau	
Outputs 1. District heating coverage expanded	By 2020, district heating covers 116.5 million square meters in Hohhot. (2013 baseline: district heating covers 86.8 million square meters)	*Not environmental related indicator*	Data from Hohhot and/or IMAR Construction Bureau Loan review missions and project performance reports	**Assumption** Housing development activities in the new heating areas are completed on time. **Risk** Full occupancy has not been achieved by 2020.
2. Low-carbon and highly efficient heat-generation system installed	By 2020, the project avoids 848,500 t of coal per year; annual emissions of 1.6 million t of CO_2; 11,000 t of SO_2; 26,000 t of PM; and 9,000 t of NO_x.[c] (2013 baseline: 665,000 t of standard coal consumption; and emissions of 1.6 million t of CO_2, 9,000 t of SO_2, 65,000 t of PM, and 7,500 t of NO_x)[d]	*Not yet due*	Loan review missions and project performance reports Data from the project's environmental monitoring reports Data from Hohhot and/or IMAR Environment Protection Bureau	**Assumption** Sufficient counterpart funds are mobilized on time. **Risks** Changes in subsidy schemes on wind energy and natural gas may impact the financial sustainability of the project.
	By 2020, the project achieves energy efficiency of 0.5 GJ/m^2. (2013 baseline: average energy efficiency 0.6 GJ/m^2)	*Not yet due*		Project implementation may be delayed because HCDIO and HCHC have limited experience with ADB procurement.

Design Summary	Performance Targets and Indicators with Baselines		Data Sources and Reporting Mechanisms	Assumptions and Risks
	Appraisal	***Actual***		
3. A new business model for wind-based district heating piloted	By 2020, a new business model for wind-based district heating is successfully tested.	*Not environmental related indicator*	Loan review missions and project performance reports	**Assumption** Three parties—heating company, wind farms, and grid company—sign purchasing contracts with agreed financial arrangement before testing and commercial operation. **Risk** Wind energy market is changed and available wind energy for district heating is insufficient for the entire project life time.
Activities with Milestones **1. Output 1. District heating coverage expanded** 1.1. Complete civil works by September 2019. 1.2. Complete construction of pipelines and heat exchange stations by March 2020. 1.3. Complete trial testing by April 2020. **2. Output 2. Low-carbon and highly efficient heat-generation system installed** 2.1. Engage loan implementing consultants and a tendering agency by March 2015. 2.2. Complete detailed engineering design by December 2015. 2.3. Complete installation of boilers, electric, and control equipment by March 2020. 2.4. Complete trial testing by April 2020. 2.5. Conduct a series of capacity development activities for project management, safeguards performance, and district heating advancement by April 2020. **3. Output 3. New business model for wind-based district heating piloted**		*Underway.* *The long distance transmission pipelines are expected to complete by 15 October 2017.* *Engaged in 2015/2016, excluding the loan implementation social consultant is in engagement process.* *Underway.* *Not yet due.* *Not yet due.* Underway.	**Inputs** **Loan** **ADB: $150.0 million** **Shanghai Pudong Development Bank: $162.4 million** **Government (Hohhot City Development, Investment, and Operation Company): $90.8 million**	

Design Summary	Performance Targets and Indicators with Baselines		Data Sources and Reporting Mechanisms	Assumptions and Risks
	Appraisal	*Actual*		
3.1. Agree on financial arrangement among three parties—heating company, wind farms, and grid company—and sign the three party agreement by September 2015.		*Not environmental related indicator*		
3.2. Sign purchasing contracts among three parties by December 2019.		*Not yet due*		
3.3. Complete the first financial transaction by December 2021.		*Not yet due*		

ADB = Asian Development Bank, CO_2 = carbon dioxide, GJ/m^2 = gigajoule per square meter, IMAR = Inner Mongolia Autonomous Region, µg/m3 = microgram per cubic meter, NO_x = nitrogen oxides, PM = particulate matter, SO_2 = sulfur dioxide, t = ton.

[a] Energy intensity is calculated as units of energy per unit of gross domestic product. Energy intensity reduction rate from 2005 to 2010 in IMAR was 22.6%.

[b] IMAR Environmental Protection Bureau. 2011. *The Twelfth Five-Year Plan for Environmental Protection in Inner Mongolia Autonomous Region.* IMAR.

[c] Emission avoidance is based on the business-as-usual scenario of coal-fired district heating system, taking into consideration the expected increase of heat demand in the project area by 2020.

[d] Energy consumption and emissions indicated in the 2013 baseline are based on the actual coal consumption of existing households in the project area and associated emissions.

Source: Asian Development Bank

APPENDIX 2: ENVIRONMENTAL PERSONNEL AND PERFORMANCE

Table 2-1: IAs' Environmental Personnel and Performance
From 1 July 2016 to 31 December 2016

Component	IA	IAs' Environmental Personnel				IAs' Environmental Performance
		Key Person and positions		Tel	Email	
All components	HCHC	Deputy General Manager	Mr. Wu Liqing			Implemented the EMPs; supervised and coordinated the Contractors and SE's environmental work; and assisted in preparation of this1st EMR.
		Manager of EHS Department, HCHC	Mr. Hu Yuezai	13500693768		
		Officer of EHS Department, HCHC	Mr. Miao Yongqing	15049190009		
		Manager of Contract Management Department, HCHC	Mr. Wu Zhanjie	15904878788		
		International Department, HCHC	Mr. Shi Wei	+86-0471-5103421 13947150480	chengfawaizi@126.com	
Long distance transmission Pipe		Department, HCHC	Mr. Zhang Feifei	18947100981	slhscsgx@163.com	
Xinjiaying component		Department, HCHC	Mr. Zhang Yu	15326006667		
Haoqinying component		Manager of Department, HCHC	Mr. Cao Fei	13084712268		
Jinqiao component		Manager of Department, HCHC	Mr. Zhang Dawei	18947109225		

Duties:

- to refine and implement the EMP;
- to ensure the mitigation and monitoring measures recommended in the EMPs and EIAs are incorporated into the design and bidding documents;
- to supervise and coordinate implementation of mitigation measures and environmental monitoring in construction phase;
- to analyze environmental monitoring weekly reports;
- to organize environmental compliance monitoring;
- to monitor and coordinate environmental supervision;
- to establish, organize and carry out training plan;
- to establish and implement publish consultation plan; to prepare semi-annual progress reports and EMRs with assistance of the Consultant; and to undertake other related work as required.

Table 2-2: Contractors' Environmental Personnel and Performance for Ongoing Civil Works Contracts

From 1 July 2016 to 31 December 2016

Component	Contract	Contractor	Contractors' Environmental Personnel				Contractors' Environmental Performance
			Key Person and positions		Tel	Email	
Civil works for Long distance transmission pipelines(the only three civil works under construction)	#1	CSRC 6th construction company	Mr.Huang Jian	site manger	13314870693	54685516@qq.com	Overall satisfactory
			Mr. Hu Ruizhong	EHS manager	18947198824	renxiaohu520@163.com	
	#2	Tianjing Huashui water supply company	Ms. Wang Rui	Site manager	15102281098	15102281098@126.com	
			Mr. Chen Jingtian	EHS manager	15184726187	clz721208@163.com	
	#3	Heilongjiang building construction company	Mr. Gao Zhirong	Site manager	13484717250	354601686@qq.com	
			Mr. Zhang Wei	EHS manager	15148038231	1247736472@qq.com	

DUTIES:

- to implement mitigation measures during construction phase;
- to establish environmental monitoring plan and detailed action plan as needed;
- to carry out environmental monitoring, maintain relevant records, produce weekly reports, and submit to the relevant SE and IA;
- to participate relevant environmental training;
- to assist with public consultation;
- to assist with resolving environmental problems accoutered in construction; and to provide information and undertake other work as required.

Table 2-3: SEs' Environmental Personnel and Performance for Ongoing Civil Works Contracts

From 1 July 2016 to 31 December 2016

Component	Contract	SE	SEs' Environmental Personnel				SEs' Environmental Performance
			Key Person and positions		Tel	Email	
Civil works for Long distance transmission pipelines(the only three civil works under construction)	#1	IMAR Ruibo construction supervision comp	Mr. Wang Ziming	Site manager	18647158722	1114574919@qq.com	Conducted environmental supervision; and prepared and regularly submitted monthly supervision reports.
			Mr. Liu Zhiqiang	EHS manager	15384726305	985047007@qq.com	
	#2	Hohhot Hongxiang supervision company	Mr. Yu Xiaodong	Site manager	18347941908	1074630916@qq.com	
			Mr. Qi Lizhong	EHS manager	13848619030	2690328175@qq.com	
	#3	Beijing Zhongjing Hengji supervision company	Mr. Ren Ming	Site manager	18686095198	331695911@qq.com	
			Mr. Ge Qianzai	EHS manager	15384726305	331695911@qq.com	

DUTIES:

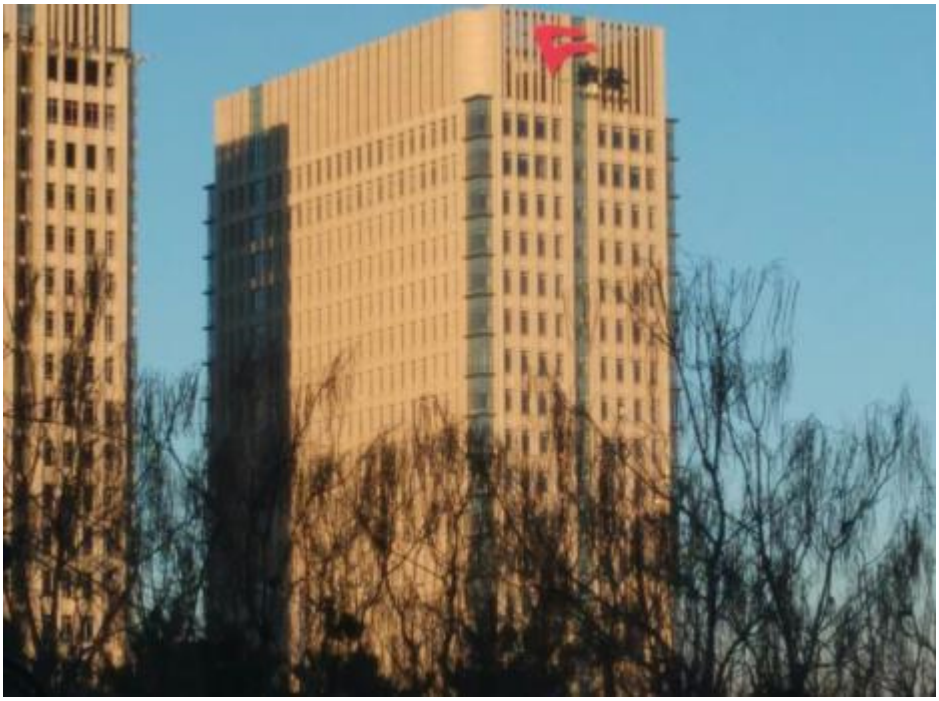
- to participate various review meetings and recommend environmental improvement to construction arrangements, technical issues, progress etc.;
- to review environmental performance of construction equipment;
- to supervise the implementation and any changes of mitigation measures;
- to inspect ambient environment and impacts;
- to report and help to deal with any environmental problems or accidents encountered;
- to prepare monthly environmental supervision reports and submit to NPMO and the respective IA; and
- to participate in construction completion audit in terms of environmental aspects, and submit related reports or certification as needed.

Table 2-4: Other Supervision Agencies' Environmental Personnel and Performance for Ongoing Civil Works Contracts
From 1 July 2016 to 31 December 2016

Component	Other Supervision Agencies	Supervision Agencies' Environmental Personnel		Supervision Agencies' Environmental Personnel Performance
		Key Person	Contact	
Civil works for Long distance transmission pipelines (the only three civil works under construction)	IMAR/Hohhot EPB	-	+86-0471-12369	Implementing compliance /environmental monitoring, supervising implementation Of mitigation measures
	The PMO	-	-	
	Design Institute	-	-	
	Independent Environmental Monitoring Expert	Mr. Nie Mingtao	Cell: 18086056438 Email: hjpmo@163.com	

APPENDIX 3: PHOTOGRAPHS

1. Office building of HCHC



2. Construction site status of Long distance transmission pipe (which civil works are expected to complete by 15 Oct 2017)
Project information signboard at the entrance of the construction sites (including the whole alignment map, component introduction, design features, names of project proponent, design institute, contractor, CSC, responsible local quality supervision department)

Site management office set up in the existing Xinjiaying heatping plant

Contract #1

Construction site status in August 2016 September 2016

Oct 2016

Nov 2016

Dec 2016

Contract #2

Project information signboard

Construction site status in August 2016

September 2016

Construction material covered with green canvas

Water sprinkler

Construction site status in October 2016

November 2016

Contract #3

Civil works in August 2016

Laying pipe in September 2016

3. Existing Xinjiayin heating plant under operation

Desulfurization facilities

4. Existing site status of the proposed pressure adjustment station, located within the existing Xinjiayin heating plant (expected to commence civil works from 1 Apr 2017, and to last six months)

Surrounding environment

Surrounding environment

5. Existing site status of the proposed Jinqiao heating plant (expected to commence civil works from 1 Apr 2017, and to last six months)

Surrounding environment

Surrounding environment