Environmental Monitoring Report

Reporting Period: 1 October – 31 December 2017
Project Number: 47052
Date: February 2018

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 and Government of Inner Mongolia Autonomous Region for the Asian Development Bank
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CURRENCY EQUIVALENTS
(as of 29 December 2017 (Friday), from the website of Bank of China)

Currency unit = Yuan (CNY)
CNY1.00 = $ 0.1538
$1.00 = CNY 6.504

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
LIEC  Loan Implementation Environmental 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
In this report, "$" refers to US dollars.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Unit/Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>Meter</td>
</tr>
<tr>
<td>m/s</td>
<td>Meters per Second</td>
</tr>
<tr>
<td>m³</td>
<td>Cubic Meters</td>
</tr>
<tr>
<td>mg/l</td>
<td>Milligrams per Liter</td>
</tr>
<tr>
<td>mg/m³</td>
<td>Milligrams per Cubic Meter</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>NO₂</td>
<td>Nitrogen Dioxide</td>
</tr>
<tr>
<td>NOₓ</td>
<td>Nitrogen Oxides</td>
</tr>
<tr>
<td>°C</td>
<td>Degrees Celsius</td>
</tr>
<tr>
<td>pH</td>
<td>A measure of the acidity or alkalinity of a solution</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>Particulate Matter smaller than 10 micrometers</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>Particulate Matter smaller than 2.5 micrometers</td>
</tr>
<tr>
<td>SO₂</td>
<td>Sulfur Dioxide</td>
</tr>
<tr>
<td>t/h</td>
<td>Tons per Hour</td>
</tr>
<tr>
<td>TSP</td>
<td>Total Suspended Particulates</td>
</tr>
</tbody>
</table>

NOTE
In this report, "$" refers to US dollars.
Table of Contents

PROJECT NUMBER: 47052

I. INTRODUCTION
   A. General Introduction 1
   B. Description of the Project 1
   C. Description of the Environment 3

II. PROJECT IMPLEMENTATION PROGRESS 5

III. IMPLEMENTATION OF THE EMP 9
   A. Objectives 9
   B. Implementation of Mitigation Measures 9
   C. Implementation of Environmental Monitoring Program 12
   D. Implementation of Disclosure, Consultation and Grievance 25
   E. Fulfillment of Environmental Responsibilities 29
   F. Implementation of Institutional Strengthening Program 32
   G. Status of Compliance with Loan Covenants 32
   H. Updated Work Plan for EMP Implementation 33
   I. Environmental Benefits 33

IV. CONCLUSIONS AND RECOMMENDATIONS 56

APPENDICES 56
   APPENDIX 1: Implementation Status of Environmental Related Indicators in Design and Monitoring Framework 57
   APPENDIX 2: ENVIRONMENTAL PERSONNEL AND PERFORMANCE 61
   APPENDIX 3: Public and Agency Comments and Responses 67
List of Figures and Tables

Figure 1 Project Location, Inner Mongolia Autonomous Region .................................................. IX
Figure 2 Three Heating Zones under the Project in Hohhot City........................................... X
Figure 3 Locations of three heating plants, long distance transmission line and heating pipes. 6
Figure 4 Construction site of Jinqiao heating zone .................................................................. 6
Figure 5 Construction site of Haoqingying heating zone.......................................................... 7
Figure 6 Construction site of Xinjiaying heating zone .................................................................. 7
Figure 7 Xinjiaying HSP component (signboard for onsite safety instructions) ................................ 9
Figure 8 Potentially sensitive sites, air quality and noise, Haoqingying Heating zone ................. 14
Figure 9 Potentially sensitive sites, air quality and noise, Xinjiaying Heating zone ................. 15
Figure 10 Potentially sensitive sites, air quality and noise, Jinqiao heating zone ....................... 16
Figure 11 Ambient air quality monitoring sites, SO2 and NO2. for using SCREEN3 model at appraisal ......................................................................................................... 17
Figure 12 Map of eight environmental monitoring stations in Hohhot in 2017 ............................ 18
Figure 13 Map of air quality monitoring points and project construction sites .......................... 21
Figure 14 Map of river water quality monitoring sections (at distances ranging from 2km to 25km to this Project) ................................................................................................ 23
Figure 15 Map of noise monitoring locations (at distances ranging from 1.6km to 6.5km to this Project) ........................................................................................................ 24
Figure 16 Vegetation coverage at the proposed HSP sites in three heating zones ...................... 25
Figure 17 Contract information signboard of Xinjiaying HSP component on 15 Oct. 2017 ....... 25
Figure 18 Project Management Structure .................................................................................. 31

Table 1 Existing CHPs plants in Hohhot by 2016/2017 heating season....................................... 2
Table 2 Existing Large HSPs in Hohhot by 2016/2017 heating season ...................................... 2
Table 3 Project beneficiary HHs (2020) .................................................................................... 4
Table 4 Noise Intensity of Heavy Machines on the Construction Site ...................................... 11
Table 5 Projected Results of Noise Attenuation of the Main Point Source ............................... 11
Table 6 The Summary of Balance for earth works .................................................................... 12
Table 7 Sensitive areas (air quality, noise), Haoqingying Heating zone ........................................ 14
Table 8 Sensitive areas (air quality, noise), Xinjiaying heating zone ........................................... 15
Table 9 Sensitive areas (air quality, noise), Jinqiao heating zone ............................................. 16
Table 10 Additional Ambient air quality monitoring sites, SO2 and NO2. for using SCREEN3 model at appraisal .......................................................................................................................... 17
Table 11 Contact details of GRM focal personnel at subprojects and PMO .................................. 26
Table 12 Implementation Status of Environment Impacts and Mitigation Measures ............... Error!
Table 13 Implementation Status of Environmental Monitoring Plan (EMoP) (Table A2-4 of EMP) .............................................................................................................................. 42
Table 14 Summary of Previous Consultation Results and Corrective Actions in this Reporting Period ........................................................................................................................................................................... 44
Table 15 Fulfilment of of Institutions and Responsibilities for EMP Implementation ............ 45
Table 16 Implementation Status of Institutional Strengthening and Training Program (Table A2-2 of EMP) .......................................................................................................................... 47
Table 17 Implementation Status of Reporting Requirements (Table A2-6 of EMP) .................. 48
Table 18 Implementation Status of Performance Indicators (Table A2-7 of EMP) ................. 51
Table 19 Compliance with Environment-Related Assurances and Covenants ......................... 53
Figure 1 Project Location, Inner Mongolia Autonomous Region

Source: CEIA, July 2014
Figure 2 Three Heating Zones under the Project in Hohhot City

Source: CEIA, July 2014
I. INTRODUCTION

A. General Introduction

1. This is the third semi-annual environmental monitoring report for the Low-Carbon District Heating Project in Hohhot (the or this Project) for the period from 1 October – 31 December 2017. It is prepared by the HCHC with the assistance of the independent loan implementation environmental consultant (LIEC). The LIEC has been providing project implementation consulting services to Hohhot City Development Investment and Operation Company (HCDIO)/Hohhot Chengfa Heating Company (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 October till end of December 2017 with respect to the implementation of the environmental management plan (EMP) of the Project components. As the civil works construction season usually lasts from late April to early October each year in Hohhot due to its long and harsh winter, there were only minor construction activities undertaken during this reporting period covering from October to December 2017. 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; (iii) public consultation activities; and (iv) conclusions and suggestions.

B. Description of the Project

3. The original 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 zone will be decommissioned by the Hohhot municipal government (for details please see the para. 21 in Chapter II).

4. The Government of IMAR (GIMAR) is the executing agency (EA) and the HCDIO/HCHC is the implementing agency (IA). HCDIO/HCHC has appointed three Branches which 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 implementation period for the Project will be approximately 5 years (December 2014–April 2020).

Change in Project Scope

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

7. Due to gas policy change by Hohhot city government in 2013 and price escalation in 2015, the Project contents were adjusted twice, i.e., 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.
8. 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 Haoqingying heating plant, expansion of Xinjaying 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.

9. 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. Due to the above scope change, the project EIA has been updated and uploaded on ADB website ([https://www.adb.org/projects/documents/prc-low-carbon-district-heating-hohhot-inner-mongolia-ar-apr-2016-eia](https://www.adb.org/projects/documents/prc-low-carbon-district-heating-hohhot-inner-mongolia-ar-apr-2016-eia)) following ADB’s requirements. The above change in scopes was formally approved by ADB in April 2016.

**Current heating supply status in Hohhot**

10. Current heat sources in Hohhot include a combination of coal-fired CHPs (accounting for 23.8% of total heating area), HSPs (accounting for 25.24%), regional boiler houses (capacity beyond 10t/h, accounting for 20.68%), small neighborhood boiler houses and household stoves (capacity under 10t/h, accounting for 3.20%), natural gas (accounting for 20.86%), and other clean energy sources (heat pump units and electric heating, accounting for 0.40%).

<table>
<thead>
<tr>
<th>Name</th>
<th>Heating Company</th>
<th>Heating Area Covered by CHP Million m²</th>
<th>Heating Capacity by CHP Million m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2014 at CEIA</td>
<td>2016/2017 heating season</td>
</tr>
<tr>
<td>Hohhot CHP</td>
<td>Kelin Heating Company</td>
<td>6.60</td>
<td>16.22</td>
</tr>
<tr>
<td></td>
<td>Futai Heating Company</td>
<td>4.60</td>
<td></td>
</tr>
<tr>
<td>Jinshao CHP</td>
<td>Shengtai Heating Company</td>
<td>2.95</td>
<td>8.02</td>
</tr>
<tr>
<td>Jinqiao CHP</td>
<td>CHP is owned by the Huaneng Group, but HCDIO is the heating company</td>
<td>6.55</td>
<td>14</td>
</tr>
<tr>
<td>Total (Million m²)</td>
<td></td>
<td>20.70</td>
<td>38.24</td>
</tr>
<tr>
<td>% of the total Hohhot heating area</td>
<td></td>
<td>23.8%</td>
<td>29.62%</td>
</tr>
<tr>
<td>Total Hohhot heating area (Million m²)</td>
<td></td>
<td>86.81</td>
<td>129.116</td>
</tr>
</tbody>
</table>

**Table 1 Existing CHPs plants in Hohhot by 2016/2017 heating season**

<table>
<thead>
<tr>
<th>Name</th>
<th>Owned by</th>
<th>No. Boilers</th>
<th>Heating Capacity MW</th>
<th>Heating Area Million m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xinjaying HSP</td>
<td>HCDIO</td>
<td>6</td>
<td>(4<em>70)+(2</em>84) = 448</td>
<td>4.73</td>
</tr>
<tr>
<td>Qiaokao HSP</td>
<td>HCDIO</td>
<td>12</td>
<td>(10<em>58)+(2</em>70) = 720</td>
<td>9.37</td>
</tr>
<tr>
<td>Sanhucun HSP</td>
<td>HCDIO</td>
<td>9</td>
<td>(5<em>29)+(4</em>70) = 425</td>
<td>6.70</td>
</tr>
<tr>
<td>Guangming HSP</td>
<td>Futai Heating Company</td>
<td>4</td>
<td>(4*70) = 280</td>
<td>2.30</td>
</tr>
<tr>
<td>Bayan HSP</td>
<td>Futai Heating Company</td>
<td>4</td>
<td>(4*70) = 280</td>
<td>1.30</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>2,153</td>
<td>24.4</td>
<td>32.59</td>
</tr>
</tbody>
</table>

Source: CEIA and information collected by the LIEC in December 2017.
C. Description of the Environment

Location and Topography

11. The Project consists of three heating zones, which are mixed residential, commercial and industrial areas, located in the northeastern, eastern and southeastern parts of Hohhot City:

- The Haoqingying heating zone is located in Xincheng District in northeastern Hohhot (geographic coordinates 40°53'9.80"N 111°44'42.73"E). The 202,060 m² trapezoidal shaped HSP site is in the west of Shaliang village and south of national road 110. This relatively undeveloped area is a growth area for Hohhot’s future urban and commercial development, and has recently seen housing and other developments.

- The Xinjiaying heating zone is located in Saihan District in central eastern Hohhot, adjacent to the site of the existing HSP owned by HCDIO (40°47'32.55"N, 111°46'8.35"E). The 105,087.86 m² HSP site is in the south of the Ruyi River, north of Guihua 7 Street and East of Guihua 3 Street. This area was previously farmland, and is designated for future urban expansion.

- The Jinqiao heating zone is also located in Saihan District in southeastern Hohhot, 5.5 km north of the existing Jinqiao CHP. The 131,701 m² HSP site is east of Fengzhou road, west of Labaying road, north of South Third Ring Road and south of Shijiedajie (40°45'21.54"N, 111°44'46.21"E). The site consists of an abandoned brick and tile factory and unused land, and is considered waste land.

12. Hohhot is on the northern edge of the Hetao Plateau (upper reaches of the Yellow River) and the southern edge of the Gobi Desert. It has an elevation of 1,065 masl (metres above sea level). 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

13. 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

14. 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. (for details please see the para. 38 in Chapter II of the EMR no. 2 dated Oct. 2017).

Ecological and Sensitive Resources

15. 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

16. Hohhot has a total area of 17,224 km². The land area of the rural portion of Hohhot is 15,170 km² (88.1% of the total land area), while the urban area is 2,054.0 km² (11.9% of the total land area). The urban area includes a built-up (city) area of 79.2 km². Hohhot has a population of 3.089 million (at end 2016), including the urban area with a population of 2.107 million and the rural area with a population of 0.982 million.

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1 http://www.nmg.cei.gov.cn/wx/tjgb/201704/t20170421_126276.html
**Project Beneficiaries**

17. The beneficiaries of the Project include both current and potential future heat users (*Table 3*). The potential future users include current residents with heating from small boilers and home stoves and residents who will settle in the heating zone areas. Using an average household (HH) size of 3.0 persons, by 2020 the Project will benefit an estimated 294,500 user HHs with a population of 883,500:

i) The Haoqingying heating zone will benefit 87,000 HHs with 261,000 residents.

ii) The Xinjiaying Heating zone will benefit 68,000 HHs with 204,000 residents.

iii) The Jinqiao Heating zone will benefit its current users of 66,500 HHs with 199,500 residents through peak regulation, and will benefit an additional 73,000 HHs with 219,000 residents as a result of increased capacity.

*Table 3 Project beneficiary HHs (2020)*

<table>
<thead>
<tr>
<th>Heating zone</th>
<th>Current Beneficiaries</th>
<th>Potential Beneficiaries</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of HHs</td>
<td>No. of residents</td>
<td>No. of HHs</td>
</tr>
<tr>
<td>Jinqiao</td>
<td>73,000</td>
<td>219,000</td>
<td>68,000</td>
</tr>
<tr>
<td>Xinjiaying</td>
<td>66,500</td>
<td>199,500</td>
<td>87,000</td>
</tr>
<tr>
<td>Haoqingying</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>66,500</td>
<td>199,500</td>
<td>228,000</td>
</tr>
</tbody>
</table>


**Physical Cultural Resources**

18. The heating zones are located within urban landscapes. They are not on or near any tourism sites, and there are no known 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. (For details please see the *para. 29 in Chapter II* of the *EMR no. 2* dated Oct. 2017).
II. PROJECT IMPLEMENTATION PROGRESS

19. **Procurement and Consultant Recruitment Activities.** There are totally 17 packages committed by ADB loan. As of end December 2017, 1 (one) package for consulting service and 11 packages for equipment and materials had completed procurement procedures. Among of them, all packages’ contracts were signed, at a cumulative amount of USD 130 million (equivalent to CNY 849 million). As the civil works construction season usually lasts from late April to early October each year in Hohhot due to its long and harsh winter, there were only minor construction activities undertaken during this reporting period covering from 1 October to 31 December 2017.

20. Progress achieved so far. The total project cost estimate is CNY 2.429 billion, by end Dec 2017, actual investment completed is about CNY 0.784 billion or 32.28% (against CNY 0.738 billion or 30.38% by last reporting period ending 30 Sept.2017). The physical progress is shown below:

- **Progress of long distance transmission pipelines** (including 36.095 km of the long-distance heating pipeline covering a heating area of 15 million square meters). 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 uses ADB loan to procure DN 1.5m pipes via five packages, respectively contracts #6, #7, #9, #12 and #16. By the end of Dec 2017, the main line (27.435 km) and the remaining 8.66 km of the branch lines were completed.

Source: website of PRC central government
http://www.gov.cn/xinwen/2017-10/15/content_5231865.htm

Source: IMAR government website, on 28 Nov. 2017
Progress of Jingqiao heating plant, Haoqingying heating plant and Xinjiaying heating plant. The design for the three plants was finished. (i) The civil works of Jingqiao heating plant’s main structure, booster pump station, 3 heating exchange stations and 2.6km heating pipelines were completed. (ii) For Haoqingying heating plant, preparatory works is being conducted; 11 heating exchange stations and 6.08km heating pipelines were completed. (iii) The booster pump station, 8 heating exchange stations and 4 km heating pipelines for Xinjiaying heat source plant were completed and put to use with 1 million m² heating area.

Figure 3 Locations of three heating plants, long distance transmission line and heating pipes.
Source: the LIEC based on Google Earth 2017

Figure 4 Construction site of Jingqiao heating zone

Contract information signboard and access road of Jingqiao heating plant, on 15 Oct.2017

Construction site of Jingqiao heating plant, on 15 Oct.2017
Figure 5 Construction site of Haoqingying heating zone

Construction site of Baihe road heating pipeline, on 15 Oct. 2017

Construction site of Horqin road heating pipeline, on 20 Oct. 2017

Figure 6 Construction site of Xinjiaying heating zone

Civil works construction site of the booster pump station, Oct. 22 2017

Engineering installation site of the booster pump station, Oct. 22 2017

Installation sites of heating exchange station, on Oct. 22 2017

21. **Decommissioning of small coal-fired boilers.** The project will result in the decommissioning and
dismantling of 50 existing small urban low-efficiency and polluting coal-fired boilers (the boiler decommissioning is not included within the scope of the Project). Here below indicates the existing low efficiency coal-fired boiler in Jinqiao heating zone. The boiler will be decommissioned and dismantled once the Project becomes operational.
III. IMPLEMENTATION OF THE EMP

A. Objectives

22. 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 CEIA, domestic EIA reports and on the discussions and agreements with the relevant government agencies during project implementation stage.

23. As the civil works construction season usually lasts from late April to early October each year in Hohhot due to its long and harsh winter, there were only minor construction activities undertaken during this reporting period covering from October to December 2017. An evaluation of the implementation of the EMP is summarized in the following sections.

B. Implementation of Mitigation Measures

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

Environmental Clauses in Civil Works Contracts

25. 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

26. The contractor takes precautionary measures to ensure workers’ safety. Protective equipment is worn at all 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.

27. 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 7 Xinjiaying HSP component (signboard for onsite safety instructions)
Environmental Protection
28. 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. For details on submission of Contractor’s site specific EMP please see the Table 17 of page 53 in this report.

29. 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
30. 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. According to the CEIA dated July 2014, there was a tomb approximately 100 m south of the Jinqiao heating zone boundary near the existing access road, and demarcation by fence and signs as a no-entry area was suggested during construction to protect the tomb. In Sept. 2017, the IA (HCHC) informed that the tomb (less than 100 hundred years old and no significant value recognized) was located outside the Project area, and had been relocated by local government during urban metro construction through 2016 to April 2017 according to domestic cultural relics protection regulation requirements (for details please see the para. 30 of EMR no. 2 dated Oct.2017\(^3\)). No physical and cultural relics were discovered at the construction sites under this Project.

Pollution Control Measures

Air Pollution Control
31. 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 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 Fueled 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.

\(^2\) Contractor’s site specific EMP.
\(^3\) https://www.adb.org/projects/47052-002/main
32. 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.

33. 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.

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

Noise Control
35. 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>
<thead>
<tr>
<th>Machinery</th>
<th>Noise Level</th>
<th>Machinery</th>
<th>Noise Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulldozer</td>
<td>78~96</td>
<td>Concrete-mixer</td>
<td>75~88</td>
</tr>
<tr>
<td>Air hammer</td>
<td>80~98</td>
<td>(≥ten tons)</td>
<td>85~94</td>
</tr>
<tr>
<td>Concrete-crushing machine</td>
<td>80~90</td>
<td>Excavator</td>
<td>80~93</td>
</tr>
</tbody>
</table>

Unit: dB(A).

36. 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>
<thead>
<tr>
<th>Noise Source</th>
<th>Distance from Noise Intensity (m)</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Bulldozer</td>
<td>58~76</td>
<td>44~62</td>
</tr>
<tr>
<td>Concrete-mixer</td>
<td>55~68</td>
<td>41~54</td>
</tr>
<tr>
<td>Air hammer</td>
<td>60~78</td>
<td>46~64</td>
</tr>
<tr>
<td>Concrete-crushing machine</td>
<td>80~90</td>
<td>60~70</td>
</tr>
</tbody>
</table>

| Machine                   | 55~65 | 41~54 | 35~48 | 29~42 | 25.5~38.5 | 70 | 55 |
| Concrete-crushing machine | 95~105 | 75~95 | 61~71 | 55~65 | 49~59 | 45.5~55.5 | 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).

37. 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.

**Construction Wastewater**

38. The major pollutant in construction wastewater is suspended solids. At the construction sites in the long-distance 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).

**Soil Erosion Control**

39. 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. The CEIA dated July 2014 revealed that there are a series of fish ponds to the northwest boundary of the Jinqiao HSP site. Those fish ponds will be protected by silt fences when nearby construction activities are underway (scheduled from April 2018) to avoid pond contamination. As heating pipeline will be laid underneath the fish ponds bed, the HCHC made agreement with the local village committees (for details please see the paragraph 30 of EMR no. 2 dated Oct.2017).

40. The implementation status of the mitigation measures, as proposed in the EIA, is presented in the right column of the Table 12 (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.

<table>
<thead>
<tr>
<th>Table 6 The Summary of Balance for earth works</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation (m³)</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Civil works construction of the booster pump station, Xinjiayin heating zone (only the figures of this contract available during this reporting period)</td>
</tr>
<tr>
<td>10,800</td>
</tr>
</tbody>
</table>

C. Implementation of Environmental Monitoring Program

41. 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

4 Same as the Footnote 3 in page 10.
42. As the civil works construction season usually lasts from late April to early October each year in Hohhot due to its long and harsh winter, there were only minor construction activities undertaken during this reporting period covering from October to December 2017. During this reporting period, the environmental monitoring was mainly 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.

43. The implementation status of the environmental monitoring program, as defined in the EMP, is presented in the right column of the Table 13. As field sampling and lab analysis shall be undertaken by a local qualified, nationally accredited environmental monitoring agency (either Environmental Monitoring Station under EPB or private environmental monitoring service company) through government counterpart funds, in this reporting period, the independent environmental monitoring consultant (LIEC) assisted with HCHC in formulating a comprehensive environmental monitoring program including budgets through detailed discussions. HCHC has conducted several rounds of comprehensive discussions with local finance bureau, local EPB, local government project bidding center under Housing and Urban-rural Construction Bureau, Hohhot City Environmental Monitoring Station and related private environmental monitoring service companies on the issues of external environmental monitoring (EEM). Through formal domestic bidding procurement, the HCHC issued a bid invitation on 28 Nov. 2017 through China Bidding Network website (http://www.chinabidding.com.cn)IMAR government bid center website (http://www.nmgztb.com.cn/). Eight potential bidders submitted their bids prior to the deadline of 4 Dec. 2017. The bid evaluation results were disclosed on IMAR government bid center website during 25~27 Dec. 2017 (as shown below). The HCHC informed that the environmental monitoring agency is expected to be mobilized by March 2018.

44. As the civil works of the project construction are being and will be performed phase by phase with some uncertainties in monitoring scope, detailed monitoring points in the year of 2018 will be further elaborated under technical assistance from the LIEC when the new engaged environmental monitoring agency is mobilized in March 2018. Although, those points monitored, and sensitive sites identified at appraisal (in the CEIA and domestic EIAs, as shown in the below figures and tables) will be prioritized in order to compare the baseline values with actual monitoring results, so that the actual environmental impacts and effectiveness of EMP implementation could be verified.
The views expressed herein are those of the consultant and do not necessarily represent those of ADB's members, Board of Directors, Management, or staff, and may be preliminary in nature.

Figure 8 Potentially sensitive sites, air quality and noise, Haoqingying Heating zone

Table 7 Sensitive areas (air quality, noise), Haoqingying Heating zone

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>No</th>
<th>Area</th>
<th>Direction</th>
<th>Distance</th>
<th>Function</th>
<th>Protection</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality</td>
<td>1</td>
<td>Halaqin</td>
<td>NW</td>
<td>4.2km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Henan</td>
<td>NW</td>
<td>3.7km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Dongliang</td>
<td>NW</td>
<td>3.8km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Halageng</td>
<td>N</td>
<td>3.3km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Wulanbulang</td>
<td>N</td>
<td>3.6km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Yushugou</td>
<td>NNE</td>
<td>4.6km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Taoshihao</td>
<td>NE</td>
<td>4.9km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Shenggaiying</td>
<td>NE</td>
<td>2.3km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Shaliang village</td>
<td>SE</td>
<td>83m</td>
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<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Zhengjiashaliang</td>
<td>SSE</td>
<td>0.8km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Dongju village</td>
<td>SE</td>
<td>0.9km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Xindian village</td>
<td>SSE</td>
<td>1.6km</td>
<td>Residential Area</td>
<td>Class II</td>
<td>Monitored at EIA in 2014</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Tali village</td>
<td>ESE</td>
<td>2.5km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Heituao village</td>
<td>SE</td>
<td>5.3km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Haoqingying town</td>
<td>WSW</td>
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<td>Class II</td>
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<tr>
<td></td>
<td>16</td>
<td>Hohhot urban area</td>
<td>SW</td>
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<td>Class II</td>
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<td></td>
<td>17</td>
<td>Waterbank town</td>
<td>S</td>
<td>4.2km</td>
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<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Municipal government</td>
<td>SSW</td>
<td>4.8km</td>
<td>Office Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Jinxiuyuan</td>
<td>SE</td>
<td>4.5km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
</tbody>
</table>

Noise: 9 Shaliang (east of project site) E 83m Residential Area Class II Monitored at EIA in 2014

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Figure 9 Potentially sensitive sites, air quality and noise, Xinjiaying Heating zone

Table 8 Sensitive areas (air quality, noise), Xinjiaying heating zone

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>No</th>
<th>Area</th>
<th>Direction</th>
<th>Distance</th>
<th>Function</th>
<th>Protection</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality</td>
<td>1</td>
<td>Xianggeli</td>
<td>N</td>
<td>2.2km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Yiliaodong Guoji Huayuan</td>
<td>NW</td>
<td>2.0km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Xiaochang Kulun village</td>
<td>NW</td>
<td>2.5km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Maidixun Huayuan</td>
<td>NW</td>
<td>1.5km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Gonghui plot</td>
<td>NW</td>
<td>2.0km</td>
<td>Residential Area</td>
<td>Class II</td>
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<tr>
<td></td>
<td>6</td>
<td>Aohua Chengshi Huayuan</td>
<td>N</td>
<td>1.69km</td>
<td>Residential Area</td>
<td>Class II</td>
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</tr>
<tr>
<td></td>
<td>7</td>
<td>Wanlishuian Jiayuan</td>
<td>N</td>
<td>1.7km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Hepanjiayuan</td>
<td>N</td>
<td>1.9km</td>
<td>Residential Area</td>
<td>Class II</td>
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<td></td>
<td>9</td>
<td>Shuiyunxunhua plot</td>
<td>N</td>
<td>1.1km</td>
<td>Residential Area</td>
<td>Class II</td>
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</tr>
<tr>
<td></td>
<td>10</td>
<td>Xinjiaying village</td>
<td>NW</td>
<td>0.3km</td>
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<td>Class II</td>
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<td>11</td>
<td>Party School of Inner Mongolia</td>
<td>NW</td>
<td>0.5km</td>
<td>School</td>
<td>Class II</td>
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<td></td>
<td>12</td>
<td>Inner Mongolia Administrative College</td>
<td>W</td>
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<td>School</td>
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<td>13</td>
<td>Baquan village</td>
<td>W</td>
<td>1.9km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
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<tr>
<td></td>
<td>14</td>
<td>Xibazha village</td>
<td>W</td>
<td>0.7 km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Residential buildings</td>
<td>E</td>
<td>40m</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Helin village</td>
<td>E</td>
<td>1.4 km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Fanjiaying</td>
<td>SW</td>
<td>1.6 km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>West Gulou village</td>
<td>SW</td>
<td>0.6 km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>East Gulou village</td>
<td>S</td>
<td>0.5 km</td>
<td>Residential Area</td>
<td>Class II</td>
<td>Monitored at EIA in 2014</td>
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<tr>
<td></td>
<td>20</td>
<td>Liujiuniu village</td>
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<td>Class II</td>
<td>Monitored at EIA in 2014</td>
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<td></td>
<td>21</td>
<td>East Labaying village</td>
<td>SW</td>
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<td>Residential Area</td>
<td>Class II</td>
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<td></td>
<td>22</td>
<td>Xibazha Center School</td>
<td>NE</td>
<td>21. km</td>
<td>School</td>
<td>Class II</td>
<td></td>
</tr>
</tbody>
</table>

| Noise       | 14 | Residential buildings | E       | 40m      | Residential Area | Class II | Monitored at EIA in 2014 |

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Figure 10 Potentially sensitive sites, air quality and noise, Jinqiao heating zone

Table 9 Sensitive areas (air quality, noise), Jinqiao heating zone

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>No</th>
<th>Area</th>
<th>Direction</th>
<th>Distance</th>
<th>Function</th>
<th>Protection</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality</td>
<td>1</td>
<td>Xinkang Jiayuan</td>
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<td>2.5km</td>
<td>Residential Area</td>
<td>Class II</td>
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<tr>
<td></td>
<td>2</td>
<td>Saihan Dasha</td>
<td>NW</td>
<td>2.4 km</td>
<td>Office</td>
<td>Class II</td>
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</tr>
<tr>
<td></td>
<td>3</td>
<td>Wandijiahua</td>
<td>NW</td>
<td>2.1km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Branch school of Beijing</td>
<td>NW</td>
<td>2.0km</td>
<td>School</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Zhongfa</td>
<td>NW</td>
<td>2.1km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Fanjiaying</td>
<td>NE</td>
<td>2.3km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>East Gulou village</td>
<td>NE</td>
<td>0.7km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>East Labaying village</td>
<td>N</td>
<td>178m</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Zhenglabaying village</td>
<td>N</td>
<td>21m</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Residential buildings</td>
<td>N</td>
<td>168m</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Saihan District Hospital</td>
<td>NW</td>
<td>1.5km</td>
<td>Hospital</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11a</td>
<td>Xiyingzi village</td>
<td>NW</td>
<td>0.8Km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11c</td>
<td>Jinqiao Primary School</td>
<td>W</td>
<td>2.1km</td>
<td>School</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>No. 17 Middle School</td>
<td>W</td>
<td>1.4km</td>
<td>School</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12a</td>
<td>Petrochemical hospital</td>
<td>W</td>
<td>1.1km</td>
<td>Hospital</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12b</td>
<td>Petrochemical company</td>
<td>W</td>
<td>0.9km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>PetroChina Hohhot refinery</td>
<td>W</td>
<td>1.2km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>East Heihe village</td>
<td>SW</td>
<td>1.0km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Meidi Jiayuan</td>
<td>SW</td>
<td>1.5m</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Maoshengying</td>
<td>SW</td>
<td>1.0km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Zhiliang plot</td>
<td>SW</td>
<td>1.4km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Geertu village</td>
<td>S</td>
<td>1.1km</td>
<td>Residential Area</td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>10</td>
<td>Zhenglabaying buildings</td>
<td>N</td>
<td>168m</td>
<td>Residential Area</td>
<td>Class II</td>
<td>Monitored at EIA in 2014</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Zhenglabayings buildings</td>
<td>W</td>
<td>21m</td>
<td>Residential Area</td>
<td>Class II</td>
<td>Monitored at EIA in 2014</td>
</tr>
</tbody>
</table>

The views expressed herein are those of the consultant and do not necessarily represent those of ADB’s members, Board of Directors, Management, or staff, and may be preliminary in nature.

Figure 11 Ambient air quality monitoring sites, SO$_2$ and NO$_2$ for using SCREEN3 model at appraisal

Table 10 Additional Ambient air quality monitoring sites, SO$_2$ and NO$_2$ for using SCREEN3 model at appraisal

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Function</th>
<th>Applicable Air Quality Standard (GB3095-)</th>
<th>Parameters Monitored</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Halaqin village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td>All monitored at EIA in 2014</td>
</tr>
<tr>
<td>2</td>
<td>Tali village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Shilandai village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Inner Mongolia Museum</td>
<td>Mixed zone (commercial, transportation and residential)</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Liujiuniu village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Babai village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Qianbaimiao village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Houqiaobao village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Xiashitouxinying village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>West Dahei River village</td>
<td>Rural residential area</td>
<td>Class II</td>
<td>SO$_2$, NO$_2$</td>
<td></td>
</tr>
</tbody>
</table>


45. In this report, the Hohhot City EPB’s regular quarterly ambient environment quality data is cited as
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reference since no field sampling and lab analysis data specific for this Project is available although the whole project started construction in July 2016 (long-distance transmission pipeline). The Hohhot City EPB’s data includes air quality/surface water quality/noise and is available on Hohhot City EPB’s website for public to understand the overall ambient environmental quality in Hohhot. The field sampling points and sections are evenly distributed in whole Hohhot City, whereas all this ADB project subcomponents are located in the eastern urban area, so data citations are justified according to geographic relationships and relevance to these project construction activities during this reporting period. In addition, considering the sensitivity of air pollution, daily ambient environmental quality data analysis through 1 Oct. – 31 Dec. 2017 is cited from an independent website where monitoring data is also sourced from government EPB.

46. During 1 Oct. – 31 Dec. 2017, eight regular air quality stations were set up by Hohhot City EPB to monitor the overall air quality in Hohhot. The results are analyzed as shown below.

(i) The air quality monitoring results indicate that the AQI (as defined below) ranged from 28 (on 10 Oct) to 200 (on 19 Nov due to PM$_{10}$), and averaged from 82 to 115 at the eight air quality stations during the period through 1 Oct. – 31 Dec. 2017.

Figure 12 Map of eight environmental monitoring stations in Hohhot in 2017

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5 http://hbj.huhhot.gov.cn/
6 https://www.zq12369.com
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Note: As the new standard of measurement for air quality, AQI is a quantitative description of the air quality index. The major pollutants involved in the analysis including fine particulate matter (PM$_{2.5}$), inhalable particles (PM$_{10}$), sulfur dioxide (SO$_2$), nitrogen dioxide (NO$_2$), ozone (O$_3$), carbon monoxide (CO).

<table>
<thead>
<tr>
<th>AQI</th>
<th>Air Quality</th>
<th>Health Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–50</td>
<td>Excellent</td>
<td>No air pollution</td>
</tr>
<tr>
<td>51–100</td>
<td>Good</td>
<td>Few hypersensitive individuals should reduce the time for outdoor activities.</td>
</tr>
<tr>
<td>101–150</td>
<td>Minor pollution</td>
<td>Slight irritations may occur, children, and those who with breathing or heart problems should reduce outdoor exercise.</td>
</tr>
<tr>
<td>151–200</td>
<td>Moderately Polluted</td>
<td>Irritations may occur, and it may have an impact on healthy people’s heart and / or respiratory system, so all people should reduce the time for outdoor exercise.</td>
</tr>
<tr>
<td>201–300</td>
<td>Heavily Polluted</td>
<td>Healthy people will be noticeably affected. People with breathing or heart problems will lack exercise tolerance. Those patients, children and elders should remain indoors.</td>
</tr>
<tr>
<td>300+</td>
<td>Severely Polluted</td>
<td>Even healthy people will lack endurance during activities. There may be strong irritations and symptoms. So, all people should avoid outdoor activities.</td>
</tr>
</tbody>
</table>

Source: [https://www.zq12369.com](https://www.zq12369.com)
(ii) The air quality monitoring results indicate that the PM$_{10}$ concentration levels ranged from 15µg/m$^3$ (on 8 Feb, lowest) to 537µg/m$^3$ (on 28 Jan, second highest) and 1,388µg/m$^3$ (on 4 May, highest), of which the latter caused two serious air pollution in Hohhot on 28 Jan and 4 May, when high PM$_{10}$ concentration levels were susceptible from seasonal sandstorm or floating dusty weather (on 4 May) or random activities (28 Jan was the Chinese Spring Festival eve celebration with residual pollutants from fireworks cracking activities).

<table>
<thead>
<tr>
<th>Air Quality Parameter</th>
<th>Averaging Period</th>
<th>PRC GB 3095-2012 (µg/m$^3$)</th>
<th>Hohhot city from 1 Oct. – 31 Dec. 2017 (highest and lowest)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Class II</td>
<td></td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>1-year</td>
<td>70</td>
<td>279 (on 29 Dec)</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>150</td>
<td>24 (on 10 Oct)</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>1-year</td>
<td>35</td>
<td>150 (on 19 Nov)</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>75</td>
<td>4 (on 9 Oct)</td>
</tr>
<tr>
<td>SO$_2$</td>
<td>1-year</td>
<td>60</td>
<td>75 (on 28 Dec)</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>150</td>
<td>9 (on 9 Oct)</td>
</tr>
<tr>
<td>NO$_2$</td>
<td>1-year</td>
<td>40</td>
<td>91 (on 28 Dec)</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>80</td>
<td>15 (on 9 Oct)</td>
</tr>
</tbody>
</table>

Source: [https://www.zq12369.com](https://www.zq12369.com)
(iii) In the eight monitored points, three points are located at distances from 1.1km to 4.3km to this Project, while the remaining five points’ locations are situated more than 5km faraway, so these three points’ monitoring results are used in this report, including the chemical fertilizer factory staff dormitory at 1.1km south of Jinqiao HSP, the 29th middle school at 2.6km north of Jinqiao HSP, and Ruyi water treatment plant at 3.3km south of Baihe road heating pipeline. Overall the SO$_2$, PM$_{10}$, and PM$_{2.5}$ concentration levels complied with national standard limits, while the NO$_2$ exceeded national standard limits. However, the three points were still with the lowest NO$_2$ and relatively better air quality or lower AQI in whole Hohhot city. With regard to this Project, the closest point monitored is the chemical fertilizer factory staff dormitory at a distance of 1.1km, so the NO$_2$ or other gaseous pollution contribution from this Project was insignificant.

Figure 13 Map of air quality monitoring points and project construction sites

Source: based on Google Earth 2017, prepared by the LIEC.

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.

7 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.
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<table>
<thead>
<tr>
<th>Air Quality Parameter</th>
<th>Averaging Period</th>
<th>PRC GB 3095-2012 (µg/m³)</th>
<th>The chemical fertilizer factory staff dormitory at 1.1km south of Jinqiao HSP</th>
<th>The 29th middle school at 2.6km north of Jinqiao HSP</th>
<th>Ruyi water treatment plant at 3.3km south of Baihe road heating pipeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO₂</td>
<td>1-year</td>
<td>60</td>
<td>24</td>
<td>14</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM₁₀</td>
<td>1-year</td>
<td>200</td>
<td>100</td>
<td>106</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM₂,₅</td>
<td>1-year</td>
<td>70</td>
<td>57</td>
<td>45</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO₂</td>
<td>1-year</td>
<td>35</td>
<td>48</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>24-hour</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

47 The Project will go through Dahei river (long-distance transmission pipeline) and through (Baihe road heating pipe) /along (Jinqiao heating plant at a distance of 1.1km) Xiaohei river. During 1 Oct. – 31 Dec. 2017, six regular river water quality monitoring points were set up by Hohhot City EPB for these two rivers. The closest monitored section at Dahei river is Hunjing bridge section at a distance of 25km downstream this Project. The closest monitored sections at Xiaohei river are Qingfeng bridge section (upstream 2km) and Zhanggaiyin section (downstream 12km). Given the remoteness of other monitored sections, only these three sections’ data is used. The EPB quarterly monitoring results indicate that all these three monitored sections cannot meet national standard limits (Environmental quality standards for surface water (GB 3838-2002)) due to excessive pollutants of COD, NH₃-N and TP, as shown in the below table. With regard to this Project, the closest downstream section monitored is Zhanggaiyin at a distance of 12km, so the wastewater contribution from this Project was insignificant.

Source: https://www.zq12369.com
The views expressed herein are those of the consultant and do not necessarily represent those of ADB’s members, Board of Directors, Management, or staff, and may be preliminary in nature.

Figure 14 Map of river water quality monitoring sections (at distances ranging from 2km to 25km to this Project)

Data source: based on Google Earth 2017, prepared by the LIEC.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Monitoring results (against Environmental quality standards for surface water, (GB 3838-2002))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 of 2017</td>
<td>No data for Hunjing bridge section at Dahei river (downstream 25km) due to frost The two other sections were worse than class V, in compliance of COD, NH3-N and TP (Qingfeng bridge section (upstream 2km) and Zhanggaiyin section (downstream 12km) at Xiaohei river)</td>
</tr>
</tbody>
</table>

Data source: Hohhot City EPB’s website

During 1 Oct. – 31 Dec. 2017, five regular acoustic environmental monitoring points were set up by Hohhot City EPB. In the five points, four points are located at distances from 1.6km to 6.5km to this Project, while the remaining point’s location is unknown, so four points’ monitoring results are used in this report to depict the overall acoustic environment in Hohhot. The EPB quarterly monitoring results indicate that the daytime noises complied with national standard limits, excluding one point (No.1 Party school due to nearby construction activities); while the nighttime noises exceeded national standard limits at three points (No.1 Party school, No.4 Zhaojun hotel and No. 5 IMAR communication school). With regard to this Project, the closest point is No.1 Party school at a distance of 1.6km, so the noise contribution from this Project was insignificant.
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**Figure 15** Map of noise monitoring locations (at distances ranging from 1.6km to 6.5km to this Project)

<table>
<thead>
<tr>
<th>Duration</th>
<th>Monitoring results (four points are located at distances from 1.6km to 6.5km to this Project)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 of 2017</td>
<td>Daytime noise complied with; nighttime noise partially exceeded national standard (at points of No.1 Party school, No.4 Zhaojun hotel and No. 5 IMAR communication school). No reason on exceedances is available.</td>
</tr>
</tbody>
</table>

Data source: Hohhot City EPB’s website.

**Ecological and Sensitive Resources.** The three HSP sites are all located within urban or semi-rural environments within the city limits with surrounding landuse including mixed commercial, residential, agricultural and industrial. Original vegetation cover has been previously removed, and existing site vegetation is typically grass or shrubs, or disturbed dirt with little or no vegetation cover (Figure 16). Based on site visits by the LIEC, there are no known rare or endangered flora or fauna, parks, nature reserves or areas with special national, regional or local ecological significance within or adjacent to any of the sites. The project sites are considered as modified habitat under ADB’s SPS (2009) definition.
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Figure 16 Vegetation coverage at the proposed HSP sites in three heating zones

(i) Jinqiao HSP site, looking to the north
(ii) Xinjiaying HSP site, looking from the southern boundary to the north
(iii) Haoqingying HSP site, looking from the northern boundary to the south

D. Implementation of Disclosure, Consultation and Grievance

Redress
1) Information Disclosure
50 A project information bulletin board has been erected at each construction site. The bulletin board contains a description about the Project,layout map(435,723),(566,902), construction safety, labour standards, environmental and health standards, name of HCHC/the contractor/CSC(s) and contact information of the on-site managers.

Figure 17 Contract information signboard of Xinjiaying HSP component on 15 Oct. 2017

2) Public Consultation and Grievance Redress
51 The PMO confirmed that the public consultation program has to date been implemented properly.

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

53 Contact information for the contractor and on-site project managers has been posted at each
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Public complaints and concerns can also be channeled through the hotline of the Hohhot EPB (0471-12369). However, the environmental GRM disclosure information is not available for Baihe road and Horqin road heating piping works. There were very minor construction activities fulfilled during this reporting period. The GRM information of Xinjiaying component is newly added in the following table. For others, those will be supplemented in the next EMR to be submitted by 31 July 2018.

Table 11 Contact details of GRM focal personnel at subprojects and PMO

<table>
<thead>
<tr>
<th>Subproject/name</th>
<th>Contact details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Miao Yongqing, EHS officer of HCHC</td>
<td>15049190009</td>
</tr>
<tr>
<td>Contract #1 of Long distance transmission pipeline</td>
<td></td>
</tr>
<tr>
<td>Mr. Zhou Geng, HCHC</td>
<td>15849343199</td>
</tr>
<tr>
<td>Mr. Wang Ziming, CSC, IMAR Ruibo construction supervision company</td>
<td>18647158722</td>
</tr>
<tr>
<td>Mr. Hu Ruizhong, contractor, CSRC 6th construction company</td>
<td>18947198824</td>
</tr>
<tr>
<td>Contract #2 of Long distance transmission pipeline</td>
<td></td>
</tr>
</tbody>
</table>
The views expressed herein are those of the consultant and do not necessarily represent those of ADB's members, Board of Directors, Management, or staff, and may be preliminary in nature.

<table>
<thead>
<tr>
<th>Subproject/name</th>
<th>Contact details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Zhao Ruilong, HCHC</td>
<td>15049105175</td>
</tr>
<tr>
<td>Mr. Yu Xiaodong, CSC, Hohhot Hongxiang supervision company</td>
<td>18347941908</td>
</tr>
<tr>
<td>Mr. Chen Jingtian, contractor, Tianjing Huashui water supply company</td>
<td>15184726187</td>
</tr>
</tbody>
</table>

Contract #3 of Long distance transmission pipeline
The views expressed herein are those of the consultant and do not necessarily represent those of ADB's members, Board of Directors, Management, or staff, and may be preliminary in nature.

<table>
<thead>
<tr>
<th>Subproject/name</th>
<th>Contact details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Zhao Ruilong, HCHC</td>
<td>15049105175</td>
</tr>
<tr>
<td>Mr. Ren Ming, CSC, Beijing Zhongjing Hengji supervision company</td>
<td>18686095198</td>
</tr>
<tr>
<td>Mr. Ge Qianzai, CSC, Beijing Zhongjing Hengji supervision company</td>
<td>15384726305</td>
</tr>
<tr>
<td>Mr. Gao Zhirong, contractor, Heilongjiang building construction company</td>
<td>13484717250</td>
</tr>
<tr>
<td>Mr. Peng Zhixin, contractor, Heilongjiang building construction company</td>
<td>18704713707</td>
</tr>
<tr>
<td>Civil works/engineering installation contracts of the booster pump station and HES, Xinjiayin heating zone</td>
<td></td>
</tr>
<tr>
<td>Subproject/name</td>
<td>Contact details</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Mr. Yu Xiaodong, CSC, Hohhot Hongxiang supervision company</td>
<td>18347941908</td>
</tr>
<tr>
<td>Mr. Zhang Ping, EHS manager, IMAR construction company (civil works of booster pump station)</td>
<td>13848179089</td>
</tr>
<tr>
<td>Mr. Peng Rixing, EHS manager, Heilongjiang building construction company (engineering installation of booster pump station)</td>
<td>18704713707</td>
</tr>
<tr>
<td>Mr. Geng Jianwei, EHS manager, Zhangjiakou building construction company (HES)</td>
<td>13483303707</td>
</tr>
</tbody>
</table>

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).

55 The results of consultations are summarized in Table 14. Next public consultation activities, including informal interviews during site visits and workshops to solicit comments and suggestions from the local residents are scheduled in Q2 2018.

E. Fulfillment of Environmental Responsibilities

56 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
The views expressed herein are those of the consultant and do not necessarily represent those of ADB's members, Board of Directors, Management, or staff, and may be preliminary in nature.

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.

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 18.

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

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).

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

The Saihan District EPB has been delegated by Hohhot EPB to be responsible for environment protection supervision and inspection during the construction phase.
The views expressed herein are those of the consultant and do not necessarily represent those of ADB's members, Board of Directors, Management, or staff, and may be preliminary in nature.

Figure 18 Project Management Structure

Note: The HCDIO/HCHC 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.

61 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.

62 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.

63 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.

64 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 above para. 43).
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.

Key project institutions and their EMP implementation responsibilities are summarized in Table 15.

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.

The status of fulfillment of environmental responsibilities is summarized in Table 15.

F. Implementation of Institutional Strengthening Program

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 16. In summary, the institutional strengthening and capacity building programs has to date been implemented well.

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

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 CEIA (dated April 2016).

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 undertaken in January 2017 and second in Sept.2017.

An environmental management training needs assessment for HCHC, was prepared based on the findings of the January 2017 site visit. This highlights the performance requirements expected to be met by HCHC’s Environmental Management Unit (EMU), including adherence to ADB SPS (2009), as well as National, Provincial and Local environmental laws. The above needs assessment results and the indicative training program will be used as basis for future trainings. Each future training program will be discussed in details with HCHC prior to each training activity is undertaken.

Next field training by the LIEC is scheduled in Q2 2018. And the third training report will be included in the fourth EMR due end July 2018.

G. Status of Compliance with Loan Covenants

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 19. In summary, all
environmental safeguard provisions and covenants have been complied with or not yet due.

H. Updated Work Plan for EMP Implementation

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 20.

I. Environmental Benefits

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 1.270 million tons of raw coal; (iii) result in energy savings equivalent to 848,500 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.

With the long distance transmission pipelines (non-bank financed, as associated facilities) put into operation since 15 October 2017, by using clean heating source from CHP, the annual raw coal consumption for heating use will be reduced from 0.80 million tons to 0.61 million tons according to the estimates by the HCHC, as results, the raw coal transport will decrease by 5,000 trips; and the pollutant reduction of SO$_2$, PM and NOx will be 192t, 33.75t and 870t in each heating season. As informed by Hohhot EPB, the numbers of days with good or excellent air quality were respectively 93 days during 2013/2014 heating season, 117 days during 2014/2015 heating season, and 130 days during 2015/2016 heating season. The updates of Implementation Status of Environmental Related Indicators in Design and Monitoring Framework please see the Appendix 1.
Table 12 Implementation Status of Environment Impacts and Mitigation Measures

<table>
<thead>
<tr>
<th>Category</th>
<th>Potential Impacts and Issues</th>
<th>Mitigation Measures and/or Safeguards</th>
<th>Responsibility Implemented by</th>
<th>Supervised by</th>
<th>Implementation Status during this reporting period</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-construction Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorporate Mitigation Measures and Monitoring in Detailed Design and Bidding and Contracting</td>
<td>Include mitigation measures and monitoring program in detailed designs</td>
<td>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.</td>
<td>EMU supported by LIEC</td>
<td>PMO, ADB</td>
<td>Fulfilled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EMU supported by LIEC</td>
<td>PMO, ADB</td>
<td>Fulfilled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>EMU supported by LIEC</td>
<td>PMO, ADB</td>
<td>Fulfilled</td>
</tr>
<tr>
<td>Environmental monitoring incorporated into design.</td>
<td>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.</td>
<td>EMU supported by LIEC</td>
<td>PMO, ADB</td>
<td>Fulfilled</td>
<td></td>
</tr>
</tbody>
</table>

| 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** | | | | | |

(34)
| 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.  
(for details on fish ponds please see the para. 38 in Chapter II of EMR no. 2 dated Oct.2017). |
|---|---|---|
| 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.  
Contractors directed by Branch EMUs  
EMU supported by LIEC  
Being fulfilled.  
Construction wastewater was treated with retention and settlement ponds.  
Construction sewage was discharged into municipal sewers or treated with a septic tank when municipal sewers were not available. |
<p>| 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. |</p>
<table>
<thead>
<tr>
<th>Noise</th>
<th>Impacts from construction noise on sensitive resources</th>
<th>To ensure construction activities meet PRC noise standards <em>(Noise Standards for Construction Site Boundary, GB 12523-2011)</em> and protect workers:</th>
<th>Contractors directed by Branch EMUs</th>
<th>EMU supported by LIC EHSS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>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.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Being fulfilled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>All construction vehicles and equipment were certified to comply with the applicable national standards. Transport routes were carefully selected to avoid community disturbances. Construction activities were suspended during night hours when close to sensitive spots.</td>
</tr>
</tbody>
</table>

| 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 |
|-------------|------------------------------|---------------------------------------------------------------------------------|---------------------------------|---------------------------|
|             |                              |                                                                                 | Contractors, local sanitation departments (domestic waste), licensed waste collection | EMU, LIC |
|             |                              |                                                                                 | Being fulfilled. |
|             |                              |                                                                                 | Garbage bins were used at construction sites and camps. Garbages were collected regularly |
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.

| 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. |

| 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 m² Xinjiaying greening area: 27,226 m² Jinqiao greening area: 34,375 m² 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 |
### 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

<table>
<thead>
<tr>
<th>Community Disturbance and Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traffic and Public Safety</strong></td>
</tr>
</tbody>
</table>
| 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, businessness 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. |

<table>
<thead>
<tr>
<th>Access to Public Services, Private Properties and Businesses</th>
</tr>
</thead>
</table>
| 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. |

### 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, businessness 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.

### 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.

### Being fulfilled.

- Traffic disturbance was minimized by selected transport routes, avoiding rush hours and building interim roads.
### 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.
- 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

- Developed by LIEC
- Implemented by contractors directed by Branch EMUs
- Supported by LIEC
- Being fulfilled.

### Physical Cultural Resources

<table>
<thead>
<tr>
<th>PCRs may be damaged if proper precaution is not taken.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The tomb south of the Jinqiao HSP will be demarcated by fence and signs as a no-entry area.</td>
</tr>
<tr>
<td>A construction phase chance find procedure will be established and activated if any chance finds of PCRs are encountered:</td>
</tr>
<tr>
<td>construction activities will be immediately suspended if any PCRs are encountered;</td>
</tr>
<tr>
<td>destroying, damaging, defacing, or concealing PCRs will be strictly prohibited in accordance with PRC regulations;</td>
</tr>
</tbody>
</table>

### Contractors

- EMU supported by LIEC and District Cultural Heritage Bureau

### EMU

- Not applicable so far.

No physical and cultural relics were discovered at the construction sites.

(for details on the tomb please see the [details]).

---

(40)
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.

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, m² = square meter, m³ = 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.

para. 29 in Chapter II of EMR no. 2 dated Oct. 2017)
Table 13 Implementation Status of Environmental Monitoring Plan (EMoP) (Table A2-4 of EMP)

<table>
<thead>
<tr>
<th>Subject</th>
<th>Parameter</th>
<th>Location</th>
<th>Frequency</th>
<th>Implemented by</th>
<th>Supervised by</th>
<th>Implementation Status during this period</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Construction Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erosion and Spoil</td>
<td>Compliance inspection of erosion protection measures and spoil management</td>
<td>Construction sites, spoil disposal sites</td>
<td>Monthly; and once after completion of spoil disposal</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Being fulfilled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant (LIEC)</td>
</tr>
<tr>
<td>Wastewater generated from</td>
<td>Compliance inspection of wastewater mitigation measures (detention ponds, septic systems)</td>
<td>HSP construction sites</td>
<td>Monthly</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Being fulfilled</td>
</tr>
<tr>
<td>construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant (LIEC)</td>
</tr>
<tr>
<td>Air Pollution</td>
<td>Ambient dust monitoring (TSP, PM$_{10}$)</td>
<td>HSP construction sites; representative number (15%) of HESs and pipeline construction segments</td>
<td>Monthly</td>
<td>Hohhot EPB EMS</td>
<td>PMO</td>
<td>To be fulfilled.</td>
</tr>
<tr>
<td></td>
<td>Compliance inspection of dust mitigation measures (water spraying, cover transport vehicles, etc.); and maintenance and condition of vehicles and construction equipment.</td>
<td>All construction sites</td>
<td>Weekly when there are construction activities</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Being fulfilled Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant (LIEC)</td>
</tr>
<tr>
<td>Noise</td>
<td>Leq dB(A)</td>
<td>HSP construction sites; representative number (15%) of HESs and pipeline constriction segments</td>
<td>Monthly: a day each time and two samples; once during daytime, once during nighttime.</td>
<td>Hohhot EPB EMS</td>
<td>PMO</td>
<td>To be fulfilled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>The local environmental monitoring agency is to be mobilized in March 2018.</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Compliance inspection of domestic and construction waste collection and disposal</td>
<td>Waste collection and disposal sites.</td>
<td>Monthly</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Being fulfilled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant (LIEC)</td>
</tr>
<tr>
<td>Hazardous and Polluting</td>
<td>Compliance inspections of hazardous management, protocols, and licenses of suppliers and waste removers</td>
<td>Storage facilities for fuels, oil, chemicals and other hazardous materials.</td>
<td>Monthly</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Being fulfilled.</td>
</tr>
<tr>
<td>Materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Field inspection by HCHC, CSCs, the loan implementation environmental monitoring consultant (LIEC)</td>
</tr>
<tr>
<td>Subject</td>
<td>Parameter</td>
<td>Location</td>
<td>Frequency</td>
<td>Implemented by</td>
<td>Supervised by</td>
<td>Implementation Status during this period</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------</td>
<td>----------------------</td>
<td>--------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td><strong>Vehicle and equipment maintenance areas.</strong></td>
<td><strong>Greening Plan</strong> Compliance inspection of implementation of greening plans (HSPs), HESs and pipelines</td>
<td>HSP sites, HES sites, pipeline routes.</td>
<td>After construction is complete.</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Not yet due.</td>
</tr>
<tr>
<td><strong>Health and Safety</strong> Record and report both minor and lost-time incidents</td>
<td>HSPs, HESs, pipelines</td>
<td>Continuous</td>
<td></td>
<td>HCHC EHS</td>
<td>HCHC and</td>
<td>Being fulfilled.</td>
</tr>
<tr>
<td><strong>Socioeconomic Impacts</strong> Compliance inspection to determine if traffic and public safety measures are in place</td>
<td>Pipeline and HSP construction sites at or near roads.</td>
<td>Monthly</td>
<td>Specialists EMU supported by LIEC</td>
<td>HCDIO/HCHC</td>
<td>PMO</td>
<td>Being fulfilled.</td>
</tr>
<tr>
<td></td>
<td>Compliance inspection to determine if temporary access being provided to public and private properties</td>
<td>Transportation routes. Pipeline routes</td>
<td>Monthly</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Field inspection by HCHC, CSCs, the loan implementation environmental consultant(LIEC)</td>
</tr>
<tr>
<td></td>
<td>Compliance inspection to determine if EHS Plans developed and implemented, and workers have appropriate PPE</td>
<td>All construction sites</td>
<td>Monthly</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Field inspection by HCHC, CSCs, the loan implementation environmental consultant(LIEC)</td>
</tr>
</tbody>
</table>

**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, NO₂ = nitrogen dioxide, pH = potential hydrogen, PM = particulate matter, PMO = project management office, PRC = People’s Republic of China, SO₂ = sulfur dioxide, TSP = total suspended particulates.
Table 14 Summary of Previous Consultation Results and Corrective Actions in this Reporting Period

<table>
<thead>
<tr>
<th>Date</th>
<th>Participants/ Source</th>
<th>Organizer/ Recipient</th>
<th>Comment</th>
<th>Corrective Action Taken</th>
<th>Post Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2017</td>
<td>APs nearby the long distance transmission pipeline component</td>
<td>HCHC/the loan implementation consultant (LIEC)</td>
<td>The APs expressed satisfaction with the project environmental performance.</td>
<td>No need to follow up in this monitoring period.</td>
<td>No need. Next public consultation campaign will be conducted in Q2 2018.</td>
</tr>
<tr>
<td>September 2017</td>
<td>APs nearby the long distance transmission pipeline component, Xinjiaying and Jinqiao HSP</td>
<td>HCHC/the loan implementation consultant (LIEC)</td>
<td>The APs expressed satisfaction with the project environmental performance.</td>
<td>No need to follow up in this monitoring period.</td>
<td>No need. Next public consultation campaign will be conducted in Q2 2018.</td>
</tr>
<tr>
<td>Institution</td>
<td>Responsibilities</td>
<td>Status of Fulfilment during this period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------</td>
<td>---------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCHC</td>
<td>Together with the HCDIO, jointly establish appropriately staffed PMO and hire LIEC and EMS; provide overall project management guidance to PMO;</td>
<td>Fulfilled or to be fulfilled. A qualified and accredited local environmental monitoring agency (either EMS under EPB or a private monitoring service company) is to be mobilized in March 2018.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCDIO</td>
<td>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.</td>
<td>Fulfilled or to be fulfilled.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Management Office (PMO)</td>
<td>Establish appropriately staffed EMU; provide overall management and direction to EMU.</td>
<td>Fulfilled or being complied with.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMO Environment, Health and Safety Unit (EMU)</td>
<td>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.</td>
<td>Fulfilled or being complied with.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loan Implementation Environment Consultant (LIEC)</td>
<td>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.</td>
<td>Being fulfilled. Two course trainings were provided in January 2017 and September 2017 respectively. Next training will be undertaken in Q2 2018. Two course trainings were provided in January 2017 and September 2017 respectively. Next training will be undertaken in Q2 2018. The LIEC is assisting with HCHC in recruiting a local environmental monitoring agency. The first semi-annual environmental monitoring report was submitted in Feb 2017. The second semi-annual environmental monitoring report was submitted in June 2017. PPCU was established. GRM is operational.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institution</td>
<td>Responsibilities</td>
<td>Status of Fulfilment during this period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Branch EMUs</td>
<td>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.</td>
<td>Being fulfilled.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contractors</td>
<td>Develop and implement Construction Site Environmental Management Plans in accordance with the EMP and other contract conditions; implement all required mitigations during construction; report all spills and accidents, and take appropriate actions.</td>
<td>Fulfilled or being fulfilled.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hohhot EPB EMS</td>
<td>Conduct ambient monitoring according to the environmental monitoring plan.</td>
<td>To be fulfilled. Instead, a certified local environmental monitoring agency will be engaged to provide such service.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saihan District EPB</td>
<td>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.</td>
<td>Being fulfilled.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADB</td>
<td>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.</td>
<td>Being fulfilled.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 16 Implementation Status of Institutional Strengthening and Training Program (Table A2-2 of EMP)

<table>
<thead>
<tr>
<th>Training Topic</th>
<th>Trainer</th>
<th>Attendees</th>
<th>Contents</th>
<th>Times</th>
<th>Period (days)</th>
<th># Persons</th>
<th>Implementation Status</th>
</tr>
</thead>
</table>
| 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 | 6 | 3 | 15 | Fulfilled twice in January 2017 and September 2017 respectively. For details please see the ‘The First (1st) Training Report’ and ‘The Second(2nd) Training Report’. About 26 person-days were rendered. To be enhanced in future reporting periods. Next training will be undertaken in Q2 2018. |
| 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. | 6 | 3 | 15 | Not yet due. Still a training workshop on the WBG EHS guidelines was provided by the LIEC in Sept. 2017 as the HCHC has being operated some heating supply plants. |

**Total** | 12 | 36 | 180 |

### Table 17 Implementation Status of Reporting Requirements (Table A2-6 of EMP)

<table>
<thead>
<tr>
<th>Report</th>
<th>Prepared by</th>
<th>Submitted to</th>
<th>Frequency</th>
<th>Implementation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Construction Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental monitoring records</td>
<td>EMU supported by LIEC</td>
<td>PMO</td>
<td>Monthly</td>
<td>Not yet. Engagement of field environmental monitoring agency is still underway, and expected to confirm by March 2018.</td>
</tr>
<tr>
<td>Environmental monitoring report</td>
<td>EMU supported by LIEC, prepares and submits to PMO</td>
<td>PMO reviews and submits to ADB</td>
<td>Semi-annually</td>
<td>Being fulfilled. The first semi-annual environmental monitoring report was submitted in Feb 2017. The second semi-annual environmental monitoring report was submitted in Oct 2017. This is the third semi-annual environmental monitoring report. The next semi-annual environmental monitoring report is expected to submit in July 2018.</td>
</tr>
<tr>
<td><strong>B. Operation Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental monitoring report, including annual CO₂ emissions⁹</td>
<td>EMU prepares and submits to PMO</td>
<td>PMO reviews and submits to ADB</td>
<td>Annually</td>
<td>Not yet due.</td>
</tr>
</tbody>
</table>

⁹ The ADB Safeguard Policy Statement (2009) requires quantification and monitoring of GHG emissions for projects which emit more than 100,000 tCO2e per annum.

Note: The following environmental related reports were prepared for the Project in this reporting period (as shown in the table of next page):

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

ADB = Asian Development Bank, CO₂ = carbon dioxide, EMU = environment, health and safety unit, LIEC = loan implementation environmental consultant, PMO = project management office.
<table>
<thead>
<tr>
<th>No.</th>
<th>Environmental Reports and preparer</th>
<th>Reporting Period</th>
<th>Prepared in/on</th>
<th>Submitted in/on</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Semi-annual EMR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The third semi-annual EMR by the loan implementation environmental monitoring consultant</td>
<td>From 1 October – 31 December 2017</td>
<td>December 2017</td>
<td>January 2018</td>
</tr>
<tr>
<td>2</td>
<td><strong>Contractors’ site specific EMP, soil erosion prevention plan, safety/occupational/health management plans</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For Haoqingying HSP component, by Jingxing construction company (for heating exchange stations in Lvdizhichuang and bus company), IMAR construction company (for Baihe road heating piping) and Hengcheng construction company (for Horqin road heating piping)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>2</td>
<td>For Xinjiaying HSP component, by the contractors (Safety inspection guideline+dust, noise and community environmental, safety and health plan by Zhangjiakou building construction company for HES construction and installation)</td>
<td>Commencement of construction period</td>
<td>October 2017</td>
<td>October 2017</td>
</tr>
<tr>
<td>3</td>
<td><strong>Contractors’ Emergency preparedness plan</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For Haoqingying HSP component, by Jingxing construction company (for heating exchange stations in Lvdizhichuang and, bus company), IMAR construction company (for Baihe road heating piping) and Hengcheng construction company (for Horqin road heating piping)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>3</td>
<td>For Xinjiaying HSP component, by the contractors (IMAR construction company for booster pump station civil works construction; Heilongjiang building construction company for booster pump station engineering installation; and Zhangjiakou building construction company for HES construction and installation)</td>
<td>Commencement of construction period</td>
<td>October 2017</td>
<td>October 2017</td>
</tr>
<tr>
<td>4</td>
<td><strong>Contractors’ environmental/safety/occupational health training records</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For contract #3 of long distance transmission pipeline component, by Heilongjiang building construction company</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>For Jinqiao HSP component, by IMAR construction company</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>For Haoqingying HSP component, by Jingxing construction company (for heating exchange stations in Lvdizhichuang and bus company), IMAR construction company (for Baihe road heating piping) and Hengcheng construction company (for Horqin road heating piping)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>For Xinjiaying HSP component, by the contractors</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>4</td>
<td><strong>CSCs’ Environmental supervision monthly reports</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For Jinqiao HSP component, by IMAR construction company</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>For Haoqingying HSP component, by Jingxing construction company (for heating exchange stations in Lvdizhichuang and bus company), IMAR construction company (for Baihe road heating piping) and Hengcheng construction company (for Horqin road heating piping)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>For Xinjiaying HSP component, by the contractors (Hohhot Hongxiang construction supervision company)</td>
<td>Oct 2017</td>
<td>31 Oct 2017</td>
<td>31 Oct 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nov 2017</td>
<td>30 Nov 2017</td>
<td>30 Nov 2017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dec 2017</td>
<td>31 Dec 2017</td>
<td>31 Dec 2017</td>
</tr>
</tbody>
</table>
### Table 18 Implementation Status of Performance Indicators (Table A2-7 of EMP)

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Indicators</th>
<th>Implementation Status</th>
</tr>
</thead>
</table>
| 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 or to be complied with.  
     |              | See the above Table 13. |
| 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.  
<pre><code> |              | (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 17. |
</code></pre>
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Indicators</th>
<th>Implementation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Capacity Building</td>
<td>(i) Construction phase HSE plan developed and in place before substantive construction activities begin.&lt;br&gt;(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.&lt;br&gt;(iii) Operation phase HSE plan developed and in place before substantive Project operation activities begin.&lt;br&gt;(iv) Training on HSE plan implementation and best international practices in natural-gas fired HSP operation is provided prior to Project operation.</td>
<td>Being complied with.&lt;br&gt;Two training reports were submitted by the LIEC, respectively in Feb. and Sept. 2017. Next training report is to be submitted in July 2018.</td>
</tr>
<tr>
<td>7</td>
<td>Grievance Redress</td>
<td>(i) Project public complaints unit is established in the PMO.&lt;br&gt;(ii) Contact persons of project public complaints unit are assigned and disclosed to the public before construction.&lt;br&gt;(iii) Complains are recorded and processed within the set time framework in the grievance redress mechanism of this environment impact assessment.</td>
<td>Being complied with.</td>
</tr>
<tr>
<td>8</td>
<td>Compliance with the PRC standards</td>
<td>(i) Project complies with the PRC’s environmental laws and regulations and meets all required standards.</td>
<td>Being complied with.</td>
</tr>
</tbody>
</table>

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 19 Compliance with Environment-Related Assurances and Covenants

<table>
<thead>
<tr>
<th>Covenants</th>
<th>Reference</th>
<th>Status of Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safeguard Policy Statement (SPS) 2009</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environmental Safeguards Assurances</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The SPS 2009 requires a number of additional considerations, including:</td>
<td>Paragraph 131</td>
<td></td>
</tr>
<tr>
<td>(i) project risk and respective mitigation measures and project assurances;</td>
<td></td>
<td>(i) In compliance.</td>
</tr>
<tr>
<td>(ii) project-level grievance redress mechanism;</td>
<td></td>
<td>(ii) In compliance.</td>
</tr>
<tr>
<td>(iii) definition of the project area of influence;</td>
<td></td>
<td>(iii) In compliance.</td>
</tr>
<tr>
<td>(iv) physical cultural resources damage prevention analysis;</td>
<td></td>
<td>(iv) In compliance.</td>
</tr>
<tr>
<td>(v) climate change mitigation and adaptation;</td>
<td></td>
<td>(v) In compliance.</td>
</tr>
<tr>
<td>(vi) occupational and community health and safety requirements (including emergency preparedness and response);</td>
<td></td>
<td>(vi) In compliance.</td>
</tr>
<tr>
<td>(vii) economic displacement that is not part of land acquisition;</td>
<td></td>
<td>(vii) In compliance.</td>
</tr>
<tr>
<td>(viii) biodiversity conservation and natural resources management requirements;</td>
<td></td>
<td>(viii) In compliance.</td>
</tr>
<tr>
<td>(ix) provision of sufficient justification if local standards are used;</td>
<td></td>
<td>(ix) In compliance.</td>
</tr>
<tr>
<td>(x) assurance of adequate consultation and participation; and</td>
<td></td>
<td>(x) In compliance.</td>
</tr>
<tr>
<td>(xi) assurance that the EMP includes an implementation schedule and measurable performance indicators.</td>
<td></td>
<td>(xi) In compliance.</td>
</tr>
<tr>
<td><strong>PROJECT AGREEMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SCHEDULE-Execution of Project; Financial, Environmental, Social and Other Matters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>Paragraph 3</td>
<td>(a) In compliance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) In compliance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(c) In compliance.</td>
</tr>
<tr>
<td><strong>Safeguards-Related Provisions in Bidding Documents and Works Contracts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>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:</td>
<td>Paragraph 6</td>
<td>(a) In compliance.</td>
</tr>
<tr>
<td>(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;</td>
<td></td>
<td>(b) In compliance.</td>
</tr>
<tr>
<td>(b) make available a budget for all environmental measures; and</td>
<td></td>
<td>(c) An updated EIA was prepared and uploaded to ADB website in April 2016 due to change in project scope.</td>
</tr>
<tr>
<td>(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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safeguards Monitoring and Reporting</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIMAR shall, through HMG, cause HCDIO and HCHC to do the following:</td>
<td>Paragraph 7</td>
<td></td>
</tr>
<tr>
<td>(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</td>
<td></td>
<td>(a) Being complied. The first semi-annual environmental monitoring report was submitted</td>
</tr>
<tr>
<td>Covenant</td>
<td>Reference</td>
<td>Status of Compliance</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------</td>
</tr>
<tr>
<td>reports to the respective affected people under the Environmental Safeguards promptly upon submission;</td>
<td>in Feb 2017. The second semi-annual environmental monitoring report was submitted in Oct 2017. This is the third semi-annual environmental monitoring report. The next semi-annual environmental monitoring report is expected to submit in July 2018.</td>
<td>(b) In compliance. An updated EIA was prepared and uploaded to ADB website in April 2016 due to change in project scope.</td>
</tr>
<tr>
<td>(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;</td>
<td>(c) In compliance.</td>
<td>(d) Not applicable. No breach was incurred.</td>
</tr>
<tr>
<td>(c) ...; and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health and Social Risks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>Paragraph 10</td>
<td>Being complied with.</td>
</tr>
<tr>
<td>Grievance Redress Mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>Paragraph 19</td>
<td>In compliance.</td>
</tr>
<tr>
<td>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.</td>
<td>Paragraph 20</td>
<td>In compliance. The Project GRM is under operation. No environmental complaint has been received so far.</td>
</tr>
</tbody>
</table>
### Table 20 Work Plan for implementing EMP

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

(55)
IV. CONCLUSIONS AND RECOMMENDATIONS

79 As the civil works construction season usually lasts from late April to early October each year in Hohhot due to its long and harsh winter, there were only minor construction activities undertaken during this reporting period covering from October to December 2017. 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:

80 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 and Loan Agreement.

81 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.

82 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 2018 through formal bidding procurement. Some environmental documents are absent (please see the Table 17 in Chapter III) and environmental GRM disclosure is not adequate (for Baihe road and Horqin road heating piping works, referring to para. 53 of section D in Chapter III). There were very minor construction activities fulfilled during this reporting period. The GRM information of Xinjiaying component is newly added in the following table. For others, those will be supplemented in the next EMR to be submitted by 31 July 2018. HCHC agreed to enhance environmental documentation and reporting in the next reporting period.

APPENDICES

Appendix 1: Implementation Status of Environmental Related Indicators in Design and Monitoring Framework
Appendix 2: Environmental Personnel and Performance
Appendix 3: Public and Agency Comments and Responses
## APPENDIX 1: Implementation Status of Environmental Related Indicators in Design and Monitoring Framework

<table>
<thead>
<tr>
<th>Design Summary</th>
<th>Performance Targets and Indicators with Baselines</th>
<th>Data Sources and Reporting Mechanisms</th>
<th>Assumptions and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impact</strong></td>
<td><strong>Appraisal</strong></td>
<td><strong>Actual</strong></td>
<td><strong>Assumptions</strong></td>
</tr>
<tr>
<td>Improved energy efficiency and cleaner environment in IMAR</td>
<td>By 2025, energy intensity in IMAR is reduced by 23%, compared with 2010. <em>(2010 baseline: 1.95 t of standard coal equivalent per CNY10,000 of gross regional products)</em></td>
<td>2011: not available 2012: 5% reduction than 2011 2013: 4.57% reduction than 2012 2014: 1.05 t&lt;sup&gt;10&lt;/sup&gt; 2015: 4% reduction than 2014 2016: 4.1% reduction than 2015 2017: to be available in next EMR</td>
<td>Data from IMAR Development and Reform Commission and IMAR Government websites (IMAR annual statements on economic and social development)&lt;sup&gt;11&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>By 2025, emission of SO₂ is reduced by at least 4.5% and NOₓ by 6.5%, compared with 2010. <em>(2010 baseline: 1,397,000 t of SO₂ and 1,314,000 t of NOₓ)&lt;sup&gt;6&lt;/sup&gt;</em></td>
<td>2011 data: 1,409,400 t of SO₂ and 1,421,900 t of NOₓ; 2012 data: 1,385,015 t of SO₂ and 1,419,049 t of NOₓ; 2013 data: 1,358,700 t of SO₂ and 1,377,600 t of NOₓ; 2014 data: 1,312,400 t of SO₂ and 1,258,300 t of NOₓ; 2015 data: 1,231,000 t of SO₂ and 1,138,900 t of NOₓ; 2016 data: 1,199,000 t of SO₂ and 1,109,300 t of NOₓ; 14% reduction of SO₂ and 16% reduction of NOₓ vs 2010 baseline 2017 data: to be available in next EMR</td>
<td>IMAR Environment Protection Department and IMAR Government websites (IMAR annual statements on ambient environment)&lt;sup&gt;12&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>10</sup> [http://www.nmgtj.gov.cn/nmgttj/tjbg/zzq/webinfo/2016/02/1455760440200983.htm](http://www.nmgtj.gov.cn/nmgttj/tjbg/zzq/webinfo/2016/02/1455760440200983.htm)
<table>
<thead>
<tr>
<th>Design Summary</th>
<th>Performance Targets and Indicators with Baselines</th>
<th>Data Sources and Reporting Mechanisms</th>
<th>Assumptions and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Improved air quality and reduced greenhouse gas emissions in Hohhot</strong></td>
<td><strong>Appraisal</strong>&lt;br&gt;By 2022, average annual concentration of PM$_{2.5}$ decreases by 12% compared with 2013. (2013 baseline: 59.1 µg/m$^3$) &lt;br&gt;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$_2$)$^{13}$</td>
<td><strong>Actual</strong>&lt;br&gt;<strong>In whole year of 2017, average concentration of PM$_{2.5}$ decreases by 22% compared with 2013. (Q1 to Q4 2017: 44 µg/m$^3$ vs 2013 baseline: 57 µg/m$^3$)</strong>&lt;br&gt;2016: 41µg/m</td>
<td><strong>Hohhot Environment Protection Department</strong>&lt;br&gt;(Hohhot quarterly statements on ambient environment$^{13}$ and estimated by the LIEC, to be confirmed in next EMR through EPB’s formal statement)&lt;br&gt;Chengfa Heating Company project performance reports&lt;br&gt;Loan review missions and project performance reports&lt;br&gt;Data from the project’s environmental monitoring reports&lt;br&gt;Data from Hohhot and/or IMAR Environment Protection Bureau</td>
</tr>
</tbody>
</table>

| **Outputs** | **1. District heating coverage expanded**<br>By 2020, district heating covers 116.5 million square meters in Hohhot. (2013 baseline: district heating covers 86.8 million square meters) | **Not environmental directly related indicator** | **Assumption**<br>Sufficient counterpart funds are mobilized on time. | **Risk**<br>Full occupancy has not been achieved by 2020. |
| **2. Low-carbon and highly efficient heat-generation system** | 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$^c$ (2013 baseline: 665,000 t of standard coal consumption; and emissions of 1.6 million t of | **Not yet due** | **Loan review missions and project performance reports** |<br>**Assumption** Housing development activities in the new heating areas are completed on time. |

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$^{13}$ [http://hbj.huhhot.gov.cn/xwzx/tzgg/201711/n0311636.shtml](http://hbj.huhhot.gov.cn/xwzx/tzgg/201711/n0311636.shtml)
### Design Summary

<table>
<thead>
<tr>
<th>Performance Targets and Indicators with Baselines</th>
<th>Data Sources and Reporting Mechanisms</th>
<th>Assumptions and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appraisal</strong></td>
<td><strong>Actual</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Installed</strong></td>
<td>CO$_2$, 9,000 t of SO$_2$, 65,000 t of PM, and 7,500 t of NO$_x$</td>
<td>Data from Hohhot and/or IMAR Environment Protection Bureau</td>
</tr>
</tbody>
</table>

3. A new business model for wind-based district heating piloted

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

By 2020, a new business model for wind-based district heating is successfully tested. Not environmental directly related indicator

Loan review missions and project performance reports

Project implementation may be delayed because HCDIO and HCHC have limited experience with ADB procurement.

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**
   1.3. Complete trial testing by April 2020.

Underway.

The long distance transmission pipelines were completed on 15 October 2017.

Engaged in 2015/2016, excluding the loan implementation social

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.

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

<table>
<thead>
<tr>
<th>Performance Targets and Indicators with Baselines</th>
<th>Data Sources and Reporting Mechanisms</th>
<th>Assumptions and Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appraisal</strong></td>
<td><strong>Actual</strong></td>
<td><strong>Assumptions and Risks</strong></td>
</tr>
<tr>
<td>2.2. Complete detailed engineering design by December 2015.</td>
<td>consultant is in engagement process.</td>
<td><strong>Assumptions and Risks</strong></td>
</tr>
<tr>
<td>2.3. Complete installation of boilers, electric, and control equipment by March 2020.</td>
<td>Underway.</td>
<td><strong>Assumptions and Risks</strong></td>
</tr>
<tr>
<td>2.4. Complete trial testing by April 2020.</td>
<td>Not yet due.</td>
<td><strong>Assumptions and Risks</strong></td>
</tr>
<tr>
<td>2.5. Conduct a series of capacity development activities for project management, safeguards performance, and district heating advancement by April 2020.</td>
<td>Underway.</td>
<td><strong>Assumptions and Risks</strong></td>
</tr>
</tbody>
</table>

### Output 3. New business model for wind-based district heating piloted

| 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 yet due | **Assumptions and Risks** |
| 3.2. Sign purchasing contracts among three parties by December 2019. | Not yet due | **Assumptions and Risks** |
| 3.3. Complete the first financial transaction by December 2021. | Not yet due | **Assumptions and Risks** |

ADB = Asian Development Bank, CO₂ = carbon dioxide, GJ/m² = gigajoule per square meter, IMAR = Inner Mongolia Autonomous Region, µg/m³ = microgram per cubic meter, NOₓ = nitrogen oxides, PM = particulate matter, SO₂ = 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 A2-1: IAs’ Environmental Personnel and Performance
From 1 October – 31 December 2017

<table>
<thead>
<tr>
<th>Component</th>
<th>IA</th>
<th>IAs’ Environmental Personnel</th>
<th>Tel</th>
<th>Email</th>
<th>IAs’ Environmental Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>All components</td>
<td>HCHC</td>
<td>Deputy General Manager</td>
<td>Mr. Wu Liqing</td>
<td>n/a</td>
<td><a href="mailto:chengfawaizi@126.com">chengfawaizi@126.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manager of EHS Department, HCHC</td>
<td>Mr. Hu Yuezai</td>
<td>13500693768</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Officer of EHS Department, HCHC</td>
<td>Mr. Miao Yongqing</td>
<td>15049190009</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manager of Contract Management Department, HCHC</td>
<td>Mr. Wu Zhanjie</td>
<td>15904878788</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>International Department, HCHC</td>
<td>Mr. Shi Wei</td>
<td>+86-0471-5103421 13947150480</td>
<td></td>
</tr>
<tr>
<td>Long distance transmission Pipe</td>
<td></td>
<td>Department, HCHC</td>
<td>Mr. Zhang Feifei</td>
<td>18947100981</td>
<td></td>
</tr>
<tr>
<td>Jinqiao component</td>
<td></td>
<td>Manager of Department, HCHC</td>
<td>Mr. Zhang Dawei</td>
<td>18947109225</td>
<td></td>
</tr>
<tr>
<td>Haoqingying component</td>
<td></td>
<td>Manager of Department, HCHC</td>
<td>Mr. Cao Fei</td>
<td>13084712268</td>
<td></td>
</tr>
<tr>
<td>Xinjiaying component</td>
<td></td>
<td>Department, HCHC</td>
<td>Mr. Zhang Yu</td>
<td>15326006667</td>
<td></td>
</tr>
</tbody>
</table>

**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>
<thead>
<tr>
<th>Component</th>
<th>Contract</th>
<th>Contractor</th>
<th>Contractors' Environmental Personnel</th>
<th>Contractors' Environmental Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil works for Long distance transmission pipelines</td>
<td>#1</td>
<td>CSRC 6th construction company</td>
<td>Mr. Huang Jian (site manager) 13314870693</td>
<td>Overall satisfactory</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mr. Hu Ruizhong (EHS manager) 18947198824</td>
<td><a href="mailto:renxiaohu520@163.com">renxiaohu520@163.com</a></td>
</tr>
<tr>
<td></td>
<td>#2</td>
<td>Tianjing Huashui water supply company</td>
<td>Ms. Wang Rui (site manager) 15102281098</td>
<td><a href="mailto:15102281098@126.com">15102281098@126.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mr. Chen Jinglian (EHS manager) 15184726187</td>
<td><a href="mailto:clz721208@163.com">clz721208@163.com</a></td>
</tr>
<tr>
<td></td>
<td>#3</td>
<td>Heilongjiang building construction company</td>
<td>Mr. Gao Zhirong (site manager) 13484717250</td>
<td><a href="mailto:354601686@qq.com">354601686@qq.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mr. Zhang Wei (EHS manager) 15148038231</td>
<td><a href="mailto:1247736472@qq.com">1247736472@qq.com</a></td>
</tr>
<tr>
<td>Civil component for Jinqiao</td>
<td>IMAR construction company</td>
<td>Mr. Zhang Linchao (EHS manager) 13474705982</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Civil works for Haoqingyi compone nt</td>
<td>Horqin road</td>
<td>Hecheng construction company</td>
<td>Mr. Chen Hongbo (EHS manager) 0427-7845230</td>
<td><a href="mailto:348031024@qq.com">348031024@qq.com</a></td>
</tr>
<tr>
<td></td>
<td>Baihe road</td>
<td>IMAR construction company</td>
<td>Mr. Han Chenyue (EHS manager) 0471-4920579</td>
<td><a href="mailto:124042616@qq.com">124042616@qq.com</a></td>
</tr>
<tr>
<td></td>
<td>Heating exchange stations (Lvdizichuan g, bus company)</td>
<td>Jingxing construction company</td>
<td>Mr. Sun Liangtao (EHS manager) 13704784049</td>
<td><a href="mailto:124042616@qq.com">124042616@qq.com</a></td>
</tr>
<tr>
<td>Civil works for Xinjiaying compone nt</td>
<td>Civil works of booster pump station</td>
<td>IMAR construction company</td>
<td>Mr. Zhang Ping (EHS manager) 13848179089</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>Engineering installation of booster pump station</td>
<td>Heilongjiang building construction company</td>
<td>Mr. Peng Rixing (EHS manager) 18704713707</td>
<td>n/a</td>
</tr>
<tr>
<td></td>
<td>HES</td>
<td>Zhangjiakou building construction company</td>
<td>Mr. Geng Jianwei (EHS manager) 13483303707</td>
<td><a href="mailto:1942116152@qq.com">1942116152@qq.com</a></td>
</tr>
<tr>
<td>Component</td>
<td>Contract</td>
<td>Contractor</td>
<td>Contractors’ Environmental Personnel</td>
<td>Contractors’ Environmental Performance</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>------------</td>
<td>-------------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>DUTIES:</td>
<td></td>
<td></td>
<td>Key Person and positions Tel Email</td>
<td></td>
</tr>
<tr>
<td>•</td>
<td></td>
<td></td>
<td>to implement mitigation measures during construction phase;</td>
<td></td>
</tr>
<tr>
<td>•</td>
<td></td>
<td></td>
<td>to establish environmental monitoring plan and detailed action plan as needed;</td>
<td></td>
</tr>
<tr>
<td>•</td>
<td></td>
<td></td>
<td>to carry out environmental monitoring, maintain relevant records, produce weekly reports, and submit to the relevant SE and IA;</td>
<td></td>
</tr>
<tr>
<td>•</td>
<td></td>
<td></td>
<td>to participate relevant environmental training;</td>
<td></td>
</tr>
<tr>
<td>•</td>
<td></td>
<td></td>
<td>to assist with public consultation;</td>
<td></td>
</tr>
<tr>
<td>•</td>
<td></td>
<td></td>
<td>to assist with resolving environmental problems accoutered in construction; and to provide information and undertake other work as required.</td>
<td></td>
</tr>
</tbody>
</table>
Table A2-3: SEs’ Environmental Personnel and Performance for Ongoing Civil Works Contracts
From 1 October – 31 December 2017

<table>
<thead>
<tr>
<th>Component</th>
<th>Contract</th>
<th>SE</th>
<th>SEs' Environmental Personnel</th>
<th>SEs’ Environmental Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil works for Long distance transmission pipelines</td>
<td>#1</td>
<td>IMAR Ruibo construction supervision comp</td>
<td>Mr. Wang Ziming Site manager 18647158722</td>
<td>Conducted environmental supervision; and prepared and regularly submitted monthly supervision reports.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mr. Liu Zhiqiang EHS manager 15384726305</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#2</td>
<td>Hohhot Hongxiang supervision company</td>
<td>Mr. Yu Xiaodong Site manager 18347941908</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mr. Qi Lizhong EHS manager 13848619030</td>
<td></td>
</tr>
<tr>
<td></td>
<td>#3</td>
<td>Beijing Zhongjing Hengji supervision company</td>
<td>Mr. Ren Ming Site manager 18686095198</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mr. Ge Qianzai EHS manager 13848619030</td>
<td></td>
</tr>
<tr>
<td>Civil works for Jinqiao component</td>
<td>IMAR Ruibo construction supervision company</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Civil works for Haoqingying component</td>
<td>Horqin road</td>
<td>n/a</td>
<td>Mr. Wang Ying EHS manager 0471-3315475</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Baihe road</td>
<td>n/a</td>
<td></td>
<td><a href="mailto:hshxgcb@163.com">hshxgcb@163.com</a></td>
</tr>
<tr>
<td></td>
<td>Heating exchange stations (Lvidzhichuang, bus company)</td>
<td>n/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil works for Xinjiaying component</td>
<td>Civil works of booster pump station</td>
<td>Hohhot Hongxiang supervision company</td>
<td>Mr. Qi Lizhong EHS manager 13848619030</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Engineering installation of booster pump station</td>
<td>Hohhot Hongxiang supervision company</td>
<td>Mr. Qi Lizhong EHS manager 13848619030</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HES</td>
<td>Hohhot Hongxiang supervision company</td>
<td>Mr. Qi Lizhong EHS manager 13848619030</td>
<td></td>
</tr>
</tbody>
</table>

(64)
### 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 A2-4: Other Supervision Agencies' Environmental Personnel and Performance for Ongoing Civil Works Contracts
From 1 October – 31 December 2017

<table>
<thead>
<tr>
<th>Component</th>
<th>Other Agencies</th>
<th>Supervision Agencies’ Environmental Personnel Key Person</th>
<th>Contact</th>
<th>Supervision Agencies’ Environmental Personnel Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil works for Long distance transmission pipelines, Jinqiao component, Haoqingying component, Xinjiaying component</td>
<td>IMAR/Hohhot EPB</td>
<td>-</td>
<td>+86-0471-12369</td>
<td>Implementing compliance/environmental monitoring, supervising implementation of mitigation measures</td>
</tr>
<tr>
<td></td>
<td>The PMO</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Design Institute</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Independent Environmental Monitoring Expert</td>
<td>Mr. Nie Mingtao</td>
<td>Cell: 18086056438 Email: <a href="mailto:hjpmo@163.com">hjpmo@163.com</a></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 3: Public and Agency Comments and Responses

The LIEC received comments on the project environmental impacts and on the previous EMRs from ADB and individuals listed below. ADB’s comments had been incorporated in the EMRs. Public concerns received in the January and September 2017 public consultation meetings were transcribed for inclusion into this EMR with the response provided on the opposite page.

Individual comments were received at the public consultation meetings from the following:

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Gender</th>
<th>Minorities</th>
<th>Age</th>
<th>Designation</th>
<th>Dept./ Organization</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mr. Liu Lianping</td>
<td>Male</td>
<td>Han</td>
<td>45</td>
<td>villager</td>
<td>Donggulu village (nearby contract #3)</td>
<td>High school</td>
</tr>
<tr>
<td>2</td>
<td>Mr. Guo Junwen</td>
<td>Male</td>
<td>Han</td>
<td>40</td>
<td>villager</td>
<td>Xigulu village, Xibazhe town (nearby contract #3)</td>
<td>Junior school</td>
</tr>
<tr>
<td>3</td>
<td>Mr. Yun Bo</td>
<td>Male</td>
<td>Mongolian</td>
<td>52</td>
<td>villager</td>
<td>Xibazhe town (nearby contract #3)</td>
<td>High school</td>
</tr>
<tr>
<td>4</td>
<td>Miss Liu Xiaoling</td>
<td>Female</td>
<td>Han</td>
<td>28</td>
<td>officer worker</td>
<td>Lvdi group</td>
<td>College</td>
</tr>
<tr>
<td>5</td>
<td>Mr. Song Zhengjiang</td>
<td>Male</td>
<td>Han</td>
<td>30</td>
<td>villager</td>
<td>Jinghe town</td>
<td>College</td>
</tr>
<tr>
<td>6</td>
<td>Mr. Hu Ruizhong</td>
<td>Male</td>
<td>Han</td>
<td>35</td>
<td>villager</td>
<td>Donggulu village (nearby contract #3)</td>
<td>High school</td>
</tr>
<tr>
<td>7</td>
<td>Mr. Gao Xiaorong</td>
<td>Male</td>
<td>Han</td>
<td>43</td>
<td>villager</td>
<td>Donggulu village (nearby contract #3)</td>
<td>Junior school</td>
</tr>
<tr>
<td>8</td>
<td>Mr. Cheng Jingtian</td>
<td>Male</td>
<td>Han</td>
<td>45</td>
<td>villager</td>
<td>Xigulu village, Xibazhe town (nearby contract #3)</td>
<td>High school</td>
</tr>
<tr>
<td>9</td>
<td>Mr. Qi Lizhong</td>
<td>Male</td>
<td>Han</td>
<td>48</td>
<td>villager</td>
<td>Xigulu village, Xibazhe town (nearby contract #3)</td>
<td>High school</td>
</tr>
<tr>
<td>10</td>
<td>Mr. Liu Yingqiang</td>
<td>Male</td>
<td>Han</td>
<td>34</td>
<td>villager</td>
<td>Xibazhe town (nearby contract #3)</td>
<td>Junior school</td>
</tr>
<tr>
<td>11</td>
<td>Mr. Ren Min</td>
<td>Male</td>
<td>Han</td>
<td>45</td>
<td>villager</td>
<td>Xibazhe town (nearby contract #3)</td>
<td>High school</td>
</tr>
</tbody>
</table>

2nd round in September 2017

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Gender</th>
<th>Minorities</th>
<th>Age</th>
<th>Designation</th>
<th>Dept./ Organization</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ms. Li Min</td>
<td>Female</td>
<td>Han</td>
<td>29</td>
<td>villager Zhenglabayin village (nearby Jingqiao HSP construction site)</td>
<td>College</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Ms. Liu Lianping</td>
<td>Female</td>
<td>Han</td>
<td>46</td>
<td>villager Donggulu village (nearby Xinjiabayin HSP construction site)</td>
<td>High school</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mr. Qi Lizhong</td>
<td>Male</td>
<td>Han</td>
<td>49</td>
<td>villager Donggulu village (nearby long distance transmission pipelines contract #3) Wulanchabu east road (nearby Xinjiabayin relay pump construction site)</td>
<td>High school</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Ms. Zhang Ling</td>
<td>Female</td>
<td>Han</td>
<td>46</td>
<td>officer worker Jingqiaohuayuan community (nearby Jingqiao HSP construction site)</td>
<td>High school</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ms. Yin Cai</td>
<td>Female</td>
<td>Han</td>
<td>58</td>
<td>officer worker Jingqiaohuayuan community (nearby Jingqiao HSP construction site)</td>
<td>High school</td>
<td></td>
</tr>
</tbody>
</table>

(67)
<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Gender</th>
<th>Minorities</th>
<th>Age</th>
<th>Designation</th>
<th>Dept./ Organization</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Mr. Wang Yongxiang</td>
<td>Male</td>
<td>Han</td>
<td>29</td>
<td>officer worker</td>
<td>Jingqiaohuayuan community (nearby Jingqiao HSP construction site)</td>
<td>College</td>
</tr>
</tbody>
</table>
### Summary of Public Opinion Survey

- Overall the respondents were satisfied with all the three contractors’ environmental performance during construction. No environmental pollution issue, including dust, noise/vibration, wastewater, solid waste or soil erosion, was reflected.

- GRM was well acknowledged. However, no environmental complaint from this Project was reported. And

- The only concern is that the construction activities involve plenty of earth works. After balance of cut and fill, significant spoiled soil and construction waste were suggested to be well reused and controlled.

- Reuse of spoiled construction waste is noted and discussed with HCHC and contractors. The 2nd and this 3rd EMR reported the earth balance status of long distance transmission pipes (contract #2) and booster pump station of Xinjiayin heating zone. More follow-ups will be reported in the next EMR to be submitted by 31 July 2018.