ASIAN DEVELOPMENT BANK

China, People's Republic of: Low-Carbon District Heating Project in Hohhot in Inner Mongolia Autonomous Region

Project Name	Low-Carbon District Heating Project in Hohhot in Inner Mongolia Autonomous Region
Project Number	47052-002
Country	China, People's Republic of
Project Status	Active
Project Type / Modality of Assistance	Loan
Source of Funding / Amount	**Loan 3218-PRC: Low-Carbon District Heating Project in Hohhot in Inner Mongolia Autonomous Region** Ordinary capital resources — US$ 150.00 million **Loan: Low-Carbon District Heating Project in Hohhot in Inner Mongolia Autonomous Region** Shanghai Pudong Development Bank — US$ 142.40 million
Strategic Agendas	Environmentally sustainable growth Inclusive economic growth
Drivers of Change	Knowledge solutions Partnerships
Sector / Subsector	**Energy** - Energy utility services
Gender Equity and Mainstreaming	No gender elements
Description	The proposed project will introduce a first-of-its-kind low-carbon, low-emissions, and highly energy-efficient district heating system in the eastern part of Hohhot, the capital of the Inner Mongolia Autonomous Region. The project will demonstrate the efficiency and viability of large-scale natural gas and wind-based district heating in the Inner Mongolia Autonomous Region. Combining these two energy sources will improve the poor air quality in urban areas of the Inner Mongolia Autonomous Region during the winter and help reduce carbon dioxide emissions.

Project Rationale and Linkage to Country/Regional Strategy	The Inner Mongolia Autonomous Region is located in a severe cold climate zone of the People''s Republic of China, where winter temperatures can drop to as low as _40 degree Celsius and subzero temperatures typically last for 6 months of the year. Thus, adequate heating is a basic human need and essential for socioeconomic activities. Coal has been the predominant fuel for heating in the Inner Mongolia Autonomous Region, contributing to indoor and outdoor air pollution and undermining human health. A district heating system with a centralized plant and a network of distribution pipes to provide space heating and hot water is one of the most energy-efficient and least-polluting heating modes in urban areas. Such a system allows heat sources to be located away from densely populated areas and has the flexibility to use a wide range of energy sources. As rapid urbanization increases the demand for heating, heavy use of coal-based district heating will worsen air quality, especially in large urban areas such as Hohhot. Switching to a low-emission fossil fuel, such as natural gas, and emission-free renewable energy is urgently needed. Hohhot has the highest concentration of urban residents in the Inner Mongolia Autonomous Region. About 10% of the Inner Mongolia Autonomous Region''s total population resides in the city. As urbanization and population growth increase heating demand, Hohhot faces critical gaps in its heating infrastructure. As of 2013, district heating covered only 86.8 million square meters of floor area; existing isolated, decrepit, and inefficient heating systems for an additional 42.0 million square meters of floor area need to be replaced. The hazy skies above Hohhot already have a high concentration of inhalable particulate matter during winter. Through a decree issued in 2013, the Hohhot municipal government promoted the use of natural gas to meet the growing energy demand and address associated environmental and health concerns. The decree includes (i) a natural gas subsidy for residential heating, and (ii) financial support to heating operators that replace small coal-fired neighborhood boilers with natural gas boilers in central business districts. Compared with coal, natural gas emits half as much carbon dioxide, a fraction of particulate matter and nitrogen oxides, and negligible sulfur oxides. Since the decree was issued, the Hohhot municipal government has provided CNY230 million in subsidies for natural gas use and switching from coal to gas boilers. The Hohhot municipal government policy to promote natural gas in district heating is aligned with the central government''s 2013 Air Pollution Prevention Act, which requires all prefecture-level cities like Hohhot to reduce inhalable particulate matter by 10% in 2017 compared with 2012 levels. The Inner Mongolia Autonomous Region is a resource-rich province. In addition to being the People's Republic of China''s top coal-producing province, the Inner Mongolia Autonomous Region has large reserves of natural gas and excellent solar and wind energy resources. In 2013, the Inner Mongolia Autonomous Region reached 18 gigawatts of installed wind power capacity, equivalent to 25% of the total installed wind power capacity in the People's Republic of China. The Government of Inner Mongolia Autonomous Region plans to increase installed wind capacity up to 50 gigawatts by 2020. The Inner Mongolia Autonomous Region prioritizes combined heat and power plants to meet the electricity and heat demand, rather than electricity-only wind power plants. As a result, many wind farms are forced to disconnect from the grid, particularly at night during the winter when power demand is low but wind power generation is high. In 2013, about 11.3 terawatt-hours of wind power generation was curtailed in the Inner Mongolia Autonomous Region. The National Energy Administration in the People's Republic of China issued a policy notice in 2013 strongly encouraging the use of curtailed wind power for district heating, which requires high energy use at night during the winter. Both the Government of Inner Mongolia Autonomous Region and Hohhot municipal government are keen to pilot the use of curtailed wind power for district heating, taking into consideration that the current curtailed wind power in the Inner Mongolia Autonomous Region could meet the heating demand up to about 100 million square meters of floor area and contribute to better air quality in the winter by eliminating hazardous emissions from coal-based heating systems. Yet, the Inner Mongolia Autonomous Region currently does not have a business model for using the curtailed wind energy for district heating and needs to gain more insights into the technical and economic challenges before wider deployment. The proposed project will demonstrate a large-scale low-emission and low-carbon district heating system using wind power and natural gas. Because of its easy access to sufficient natural gas and excess wind power, Hohhot is an appropriate choice to demonstrate such heating system. If successful, it can be replicated in the Inner Mongolia Autonomous Region and elsewhere in the People's Republic of China''s northern provinces. The Asian Development Bank has supported two other projects in the Inner Mongolia Autonomous Region to provide energy-efficient district heating. The Hohhot project is a logical next step to improve energy efficiency and reduce emissions from such projects through advanced natural gas boiler technology. The project will also pilot a new business model to enable sharing of renewable energy subsidies. The project is closely aligned with the Midterm Review of Strategy 2020, which identifies environmentally sustainable growth as a priority for helping developing member countries move onto a low-carbon growth path by improving energy efficiency and expanding renewable energy. The project also supports the goal of Asian Development Bank''s Energy Policy, which prioritizes energy efficiency and access to energy for all, including district heating. It is aligned with Asian Development Bank''s country partnership strategy, 2011-_2015 for the People's Republic of China, which identifies environmental sustainability as one of the three pillars of Asian Development Bank assistance.
Impact	Improved energy efficiency and cleaner environment in IMAR

Project Outcome

Description of Outcome	Improved air quality and reduced greenhouse gas emissions in Hohhot

Progress Toward Outcome	Majority of the packages under Jinqiao and Xinjiaying heating zones have either contracts awarded or bids evaluation reports are under review. Four goods packages and two consulting contracts have been awarded since 2015. Two of the five BERs (1 ICB and 1 NCB) received in March 2017 have been reviewed by ADB and comments were provided to EA/IA.
Implementation Progress	
Description of Project Outputs	District heating coverage expanded Low-carbon and highly efficient heat-generation system installed A new business model for wind-based district heating piloted
Status of Implementation Progress (Outputs, Activities, and Issues)	1 and 2. A part of heating pipeline packages are under installation. The other packages under ADB finance are in procurement stage. 3. Not yet due
Geographical Location	

Safeguard Categories

Environment	A
Involuntary Resettlement	C
Indigenous Peoples	C

Summary of Environmental and Social Aspects

Environmental Aspects	The project is classified as category A for environment. A project environmental impact assessment was drafted and disclosed on Asian Development Bank website on 12 May 2014. A revised draft of the environmental impact assessment was disclosed on 10 July 2014 and a reformatted version of the revised draft was disclosed on 15 October 2014. The environmental impact assessment complies with Asian Development Bank's policies and requirements including Asian Development Bank's Safeguard Policy Statement (2009). The project will avoid 848,500 tons of standard coal, and will emit 60% less carbon dioxide, 82% less nitrogen oxides, negligible particulate matters, and 98% less sulfur dioxide compared with the existing heating supply. The project identifies potential environmental adverse impacts. During construction, these would include (i) soil erosion; (ii) noise, vibration, and dust; (iii) solid waste, (iv) community disturbance and public safety; and (v) occupational health and safety. During operation, potential adverse impacts would be (i) pollutants emission from the heat sources, (ii) noise from the heat sources and the heat exchange stations, (iii) waste water, and (iv) occupational health and safety. The environmental impact assessment concludes that the construction and operation impacts can be mitigated through the implementation of an environmental management plan, which defines mitigation measures, monitoring requirements, and institutional responsibilities to ensure proper environmental management throughout the project construction and operation.
Involuntary Resettlement	The project is classified category C for involuntary resettlement. The project does not entail permanent land acquisition. Installing the underground heating pipelines will temporarily occupy the publicly owned land (road and sidewalks) for a maximum of 6 months, which will not cause involuntary resettlement of people. The project will not entail demolition of any structure.
Indigenous Peoples	The project is classified category C for indigenous peoples. The project beneficiaries include ethnic minorities. Thus, the project does not have any adverse impact on ethnic minority people.
Stakeholder Communication, Participation, and Consultation	
During Project Design	Project information was communicated through public consultation, information disclosure mechanism in Asian Development Bank''s and government''s website, meetings, interviews, focus group discussions, and community consultation meetings, in accordance with Asian Development Bank''s requirements of information disclosure policy. Two meaningful consultations with stakeholders have been conducted during feasibility study and environmental impact assessment in accordance with the People's Republic of China Interim Guideline on Public Consultation in Environmental Impact Assessment (2006) and Asian Development Bank''s Safeguard Policy Statement (2009). Representatives of 16 communities, 7 community clinics, 14 local government agencies and social institutions, 210 households, and 12 small boiler houses in the project area were consulted through meetings, focus group discussions, and household surveys. Generally, there is a high level of public support for heating service improvements, so the beneficiary communities were very supportive. The project environmental impact assessment was disclosed at www.adb.org and on the website of the Hohhot City Development, Investment and Operation Company.

During Project Implementation	During construction, the affected people will be consulted through formal questionnaire surveys and informal interviews by the environmental management unit and/or the external environmental monitor. The semiannual and annual environmental management plan progress and monitoring reports will be disclosed at www.adb.org. The Hohhot Chengfa Heating Company together with the Hohhot City Development, Investment and Operation Company will establish the grievance redress mechanism and procedures to address environment and social issues associated with the project. Both the Asian Development Bank and the Hohhot Chengfa Heating Company will disclose all project documents, including the project data sheet, design and monitoring framework, consolidated environmental impact assessment, and the Report and Recommendation of the President to the Board of Directors on their websites. Disclosure of social and environmental monitoring reports will be undertaken during project implementation.

Business Opportunities

Consulting Services	Two experts--district heating and environment experts--have been engaged by the EA to help implement the project. One expert is yet to be recruited--social specialist, national for 2 person-months, intermittent) to support in the project implementation and capacity development. The consultant will be recruited in accordance with Asian Development Bank''s Guidelines on the Use of Consultants (2013, as amended from time to time). The Hohhot City Development, Investment and Operation Company, and the Hohhot Chengfa Heating Company will be responsible for engaging consultants through individual consultant selection method.
Procurement	Taking into consideration the maturity of district heating market in the People's Republic of China and experiences from past district heating projects, Asian Development Bank-financed goods contracts that cost $10 million or more will be procured through international competitive bidding and less than $10 million will be procured through national competitive bidding, using Asian Development Bank's standard bidding documents. Yet, the project will install low nitrogen oxides natural gas and electrode boilers, which are new to the People's Republic of China's district heating market. Therefore, international competitive bidding will still be used for goods packages relevant to new types of heating boilers, which include boilers, heat exchange units, and electric and control system packages even though they are less than $10 million.

Responsible Staff

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Timetable

Concept Clearance	15 Jul 2013
Fact Finding	19 May 2014 to 30 May 2014
MRM	11 Jul 2014
Approval	09 Dec 2014
Last Review Mission	-
Last PDS Update	16 Mar 2017

Loan 3218-PRC

Milestones					
Approval	Signing Date	Effectivity Date	Closing		
			Original	Revised	Actual
09 Dec 2014	19 Mar 2015	17 Jun 2015	31 Oct 2020	31 Oct 2021	-

Financing Plan		Loan Utilization			
	Total (Amount in US$ million)	Date	ADB	Others	Net Percentage
Project Cost	372.70	Cumulative Contract Awards			
ADB	150.00	09 Dec 2014	117.20	0.00	78%

Counterpart	80.30	Cumulative Disbursements			
Cofinancing	142.40	09 Dec 2014	24.83	0.00	17%

Project Page	https://www.adb.org/projects/47052-002/main
Request for Information	http://www.adb.org/forms/request-information-form?subject=47052-002
Date Generated	06 July 2017