

Project Administration Manual

Project Number: 51418-001
Loan Number:
November 2018

Proposed Loan for People's Republic of China:
Air Quality Improvement in the Greater Beijing–
Tianjin–Hebei Region
—Shandong Clean Heating and Cooling Project

ABBREVIATIONS

ADB	- Asian Development Bank
BTH	- Beijing–Tianjin–Hebei
CAAP	- Comprehensive Action Plan for Air Pollution Prevention and Control
CEF-CEFPF	- Clean Energy Fund under the Clean Energy and Financing Partnership Facility
DMF	- design and monitoring framework
EMP	- environmental management plan
GAP	- gender action plan
GRM	- grievance redress mechanism
IEE	- initial environmental examination
JHG	- Jinan Heating Group
JTPC	- Jinan Thermal Power Co., Ltd.
NO _x	- nitrogen oxides
OCB	- open competitive bidding
PICs	- project implementation consultants
PM _{2.5}	- particulate matter less than 2.5 micrometers in diameter
PMO	- project management office
PPMS	- project performance monitoring system
PRC	- People's Republic of China
QCBS	- quality- and cost-based selection
SO ₂	- sulfur dioxide
SPG	- Shandong Provincial Government

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Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with the policies and procedures of the government and Asian Development Bank (ADB). The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The Shandong Provincial Government (SPG), the project executing agency, and the implementing agencies, namely Jinan Heating Group (JHG) and Jinan Thermal Power Company Limited (JTPC), are wholly responsible for the implementation of ADB-financed projects, as agreed jointly between the borrower and ADB, and in accordance with the policies and procedures of the government and ADB. JHG, a Jinan City state-owned-enterprise (SOE) merged by three heating companies in 2007 with social credit code (License No.) of 91370100264313027J, it is affiliated to and managed by Jinan City Investment Group Co. while JTPC is also a Jinan City SOE merged by three heating companies in 2007 with social credit code of 91370100163155357D, it is also affiliated to and managed by Jinan City Investment Group Co. ADB staff is responsible for supporting implementation including compliance by SPG, JPG and JTPC of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At loan negotiations, the borrower and ADB shall agree to the PAM and ensure consistency with the Loan Agreement and Project Agreement. Such agreement shall be reflected in the minutes of the Loan Negotiations and Project Agreement. In the event of any discrepancy or contradiction between the PAM and the Loan Agreement and Project Agreement, the provisions of the Loan Agreement and Project Agreement shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP), changes in implementation arrangements are subject to agreement and approval pursuant to relevant government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval, they will be subsequently incorporated in the PAM.

I. PROJECT DESCRIPTION

1. The proposed project is the fourth in a multiyear, multisectoral Asian Development Bank (ADB) support program for air quality improvement in the greater Beijing–Tianjin–Hebei (BTH) region. The first loan, which ADB approved in 2015, focused on policy reforms and strengthening regulatory capacity in Hebei Province.¹ The second loan, approved in 2016, targeted better access to finance, especially for small and medium sized-enterprises, to scale-up investments in pollution reduction projects in the region.² The third loan, approved in 2017, aimed to deploy advanced technologies to reduce air pollution from large emitters in the agriculture, energy, transport, and urban sectors.³ This proposed project will help Shandong Province shift to cleaner and more efficient heating and cooling by integrating various clean and renewable energy sources.⁴

2. The greater BTH region is one of the most important economic regions in the PRC, generating about one-third of the country's gross domestic product. However, it also has a dense population and a high concentration of energy-intensive and highly polluting industries, which resulted in widespread air pollution.⁵ Cities in the greater BTH region consistently top country rankings for the highest concentration of particulate matter less than 2.5 micrometers in diameter (PM_{2.5}) and other air pollutants. Exposure to high levels of PM_{2.5} and other air pollutants is associated with health risks such as cardiovascular and respiratory disease that contribute to more than 1 million premature deaths annually in the PRC.

3. Shandong Province, as part of the greater BTH, consistently experiences poor air quality that is attributable to an overreliance on coal as an energy source for heavy industry, electricity, and heating. The province is the PRC's largest coal consumer, deriving 79.3% of its primary energy mix from coal. Whereas coal consumption in the PRC peaked in 2013 and started to decline, Shandong Province's coal consumption increased substantially from 364.7 million tons in 2011 to 409.3 million tons in 2015.⁶ High levels of coal consumption, particularly by industry and urban and rural households, are the main contributors to poor air quality in the province. In 2016, Jinan city had the highest concentration of PM_{2.5} attributable to coal use among 74 major cities in the PRC, and it ranked ninth in the province for the poorest air quality. Jinan Municipal Bureau of Environmental Protection measured the annual average concentration of PM_{2.5} in 2016 at 73 micrograms per cubic meter (µg/m³), which is more than double the category II national ambient air quality standards.⁷ In Jinan, the annual concentration of PM_{2.5} specifically attributable to coal use is 52 µg/m³, about 70% of total PM_{2.5} concentration levels. During winter, even higher

¹ ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Beijing–Tianjin–Hebei Air Quality Improvement—Hebei Policy Reforms Program*. Manila.

² ADB. 2016. *Report and Recommendation of the President to the Board of Directors: People's Republic of China: Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—China National Investment and Guaranty Corporation's Green Financing Platform Project*. Manila.

³ ADB. 2017. *Report and Recommendation of the President to the Board of Directors: People's Republic of China: Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—Regional Emission-Reduction and Pollution-Control Facility*. Manila.

⁴ The project is included in the country operations business plan, 2018–2020 lending pipeline. ADB. 2018. *Country Operations Business Plan: People's Republic of China, 2018–2020*. Manila.

⁵ More than 50% of the PRC's pollution-intensive steel and cement production capacity, about 33% of the PRC's cars and other automobiles, and about 28% of the PRC population are concentrated in the greater BTH region.

⁶ Y. Zhang, C. Liu, K. Li, and Y. Zhou. 2018. Strategy on China's regional coal consumption control: A case study of Shandong province. *Energy Policy*. 112. pp. 316–327.

⁷ Jinan Municipal Bureau of Environmental Protection. 2016. *The 2016 Bulletin on the Jinan Municipal Air Quality*. Jinan.

levels—61 $\mu\text{g}/\text{m}^3$ or 84%—of $\text{PM}_{2.5}$ emissions are attributable to coal use.⁸ Emissions are exacerbated during winter by the burning of raw coal by households for heating. The health impacts of raw coal burning are more severe because of direct inhalation and the poor quality and high sulphuric content of the coal.

4. The Government of the PRC has made air quality improvement a national priority and views restructuring the energy mix as the key to realizing this objective. This is consistent with the climate change mitigation specified in the PRC's intended nationally determined contributions. The PRC's Thirteenth Five-Year Plan sets strict air quality measures and targets on $\text{PM}_{2.5}$, sulfur dioxide (SO_2), nitrogen oxides (NO_x), and volatile organic compounds nationally, and for the BTH region. In support of the government's efforts on air quality improvement, ADB contributed, targeted, and coordinated financing of \$1.3 billion (footnotes 3, 4, and 5) and the World Bank did the same for \$1.0 billion. In 2017, the Ministry of Environmental Protection introduced the Work Program for Air Pollution Control in the BTH Region and Its Surrounding Areas.⁹ The program aims to implement strict pollution control measures in 28 cities, of which 7 are in Shandong Province. The program emphasizes the importance of reducing winter raw coal burning for heating supply in urban, semi-urban, and rural areas of the greater BTH region.

5. The Shandong Provincial Government has also committed to improving air quality. In 2012, it published the Action Plan for Air Pollution Control for 2013–2020.¹⁰ The plan targeted reducing annual average $\text{PM}_{2.5}$ concentration levels to 49 $\mu\text{g}/\text{m}^3$ by 2020. To meet this target Shandong Province must reduce its coal consumption. Opportunities include exploiting the province's abundant geothermal resources, agricultural waste, and waste heat from heavy industries.

6. The proposed project responds directly to the urgent national, provincial, and municipal government priorities to reduce coal consumption and improve air quality. This will be achieved by introducing more efficient methods and advanced technology for heat production through replacing coal with cleaner sources of energy such as natural gas and renewable energy, and reducing raw coal burning among households.¹¹ Soot pollution and other local pollutants such as $\text{PM}_{2.5}$, SO_2 , and NO_x will be reduced drastically, especially for rural households, saving lives and improving the physical health of residents. There are three subprojects proposed as part of this project. The details of the three subprojects are:

- (i) **West Jinan Waste Heat Utilization and Clean Energy Subproject.** The subproject will deploy four key types of clean heating technologies to help West Jinan transition to completely coal-free heating supply by 2020. The project will (i) retrofit and expand an existing district heating network using large temperature difference waste heat exchange technology to enable long distance transport industrial waste heat for winter heat supply; (ii) construct a biomass based combined heat and power plant that uses straw pellet feedstock to supply heat to an industrial park; (iii) develop and construct geothermal heating systems for residential areas; and (iv) deploy air and water heat pumps to deliver efficient

⁸ Jinan Institute of Environmental Protection Science and National Laboratory for Particulate Matter Control in Key Cities. 2016. *Analytic Results of Sources Apportionment for Airborne Particles in the Environmental Quality of Jinan City*. Jinan.

⁹ The government renamed the Ministry of Environmental Protection the Ministry of Ecology and Environment, which is in charge of climate change.

¹⁰ Shandong Provincial Government. 2013. *Shandong Provincial Action Plan for Air Pollution Control (2013–2020)*. Jinan.

¹¹ The project will use advanced technologies for heating and cooling such as large temperature difference waste heat exchange, deep-well geothermal district heating, ice-storage air conditioning, and distributed heat pumps.

heating supply to residential areas without geothermal sources. These clean heating technologies will displace coal-based centralized heat and power generation.

- (ii) **Shanghe Coal-Free Clean Heating Demonstration Subproject.** This subproject will deploy five types of energy efficiency and clean heating technologies in Shanghe County to demonstrate the viability of a comprehensive clean heating program at the county level. The project will (i) retrofit exterior walls and windows in 100 urban residential buildings, and retrofit roofs and install insulation curtains for 30,000 residents living in rural areas; (ii) develop and construct deep well geothermal district heating systems in urban Shanghe County and 10 semi-urban towns; (iii) deploy air, water, and ground source heat pumps, electric radiators, and carbon crystal electric heating plates to deliver efficient heating supply to urban and rural residential areas without geothermal potential and heating network; (iv) replace a 58 megawatt (MW) coal boiler with a 42 MW gas boiler; and (v) deploy modular gas boilers to serve a heating area of 10.2 million square meters in areas with no geothermal potential but with central heating network. These clean heating technologies will displace raw coal burning and coal-based centralized heat generation.
- (iii) **East Jinan Low-Emission Combined District Heating and Cooling Subproject.** The subproject will (i) retrofit and expand Jinan City's existing district heating network to utilize waste heat in place of coal; (ii) install a 30 MW electrode boiler that delivers heat in the evenings during off peak hours for electricity; and (iii) construct a district cooling system that uses highly efficient large scale chilling facilities (lithium bromide absorption chillers, ice storage air conditioning and electric cooling equipment) that use off peak electricity for cool storage and provide centralized cooling during peak hours of the day. These efficient heating and cooling network and facilities will displace coal and natural gas use in boilers and result in coal-based electricity cost savings by replacing individual air conditioning units in the building stock.

7. The proposed project is well-aligned with the priorities of broadening the response to climate change and strengthening environmental sustainability in ADB's country partnership strategy for the PRC, 2016–2020.¹² It will support the government's priorities in realizing an ecological civilization, articulated in its 13th plan and at the 19th Party Congress for the Central Committee of the Communist Party. It will also support key strategic priorities of tackling climate change, accelerating progress in gender equality, and making cities more livable, as prescribed in ADB's Strategy 2030.¹³

8. Air quality improvement requires coordinated interventions with different coverage and approaches. Unlike the first three projects of ADB's multi-year and multi-sector support to the PRC for air quality improvement uses the project loan modality. Past projects used the financial intermediary modality because subprojects supported were spread among many sectors that required different business models and financing structures. The project loan modality is appropriate because the proposed project is narrowly focused on the heating and cooling industry in a concentrated geographic area, which can result in effective and efficient delivery of project outcomes and large pollution reductions in a locality.

¹² ADB. 2016. [Transforming Partnership: Country Partnership Strategy: People's Republic of China and Asian Development Bank, 2016–2020](#). Manila.

¹³ ADB. 2018. [Strategy 2030: Achieving a Prosperous, Inclusive, Resilient, and Sustainable Asia and the Pacific](#). Manila.

A. Impact and Outcome

9. The project is aligned with the following impact: air pollution reduced and public health in the greater BTH region improved (consistent with the 13th plan).¹⁴ The project will have the following outcome: emissions of pollutants and carbon dioxide (CO₂) in Shandong Province reduced.

B. Outputs

10. These subprojects contribute towards reducing emissions of pollutants and carbon dioxide in Shandong Province. The outcome will be achieved through the following outputs:

11. **Output 1: West Jinan Waste Heat Utilization and Clean Energy Subproject constructed.** By 2024, JTPC will have installed and commissioned a biomass-based combined heat and power plant, retrofitted and expanded the existing district heating network in west Jinan, constructed and commissioned a geothermal heating system in an industrial park, and installed and commissioned a clean heating system using heat pumps in residential areas without a central heating network.

12. **Output 2: Shanghe Coal-Free Clean Heating Demonstration Subproject constructed.** By 2024, JHG will have applied energy efficiency measures to 660,400 square meters (m²) of urban buildings and 30,000 rural households in Shanghe County, developed at least 98 deep-well geothermal installations for district heating in urban and semi-urban areas of the county, delivered improved heating solutions to 80,000 households in rural Shanghe, and installed and commissioned a 42-megawatt gas boiler and modular gas boilers in Shanghe.

13. **Output 3: East Jinan Low-Emission Combined District Heating and Cooling Subproject constructed.** By 2024, JHG will have retrofitted and expanded existing district heating network in east Jinan, constructed and commissioned an efficient large-scale district cooling system in east Jinan, and developed thermal storage capacity to shift peak time household heating and cooling energy usage.

14. **Output 4: Clean Heating Awareness and the Capacity to Install and Maintain Clean Heating and Cooling Systems Strengthened.** By 2021, at least 100,000 women and men will report stronger awareness of environmental and health benefits of clean heating, at least 50 JHG and JTPC staff (of which at least 40% are women) will report improved knowledge of operation and maintenance of the new facilities, and at least 700 women will be employed in new skilled and unskilled jobs generated by the project.

15. **ADB's Value Addition.** The proposed project demonstrates advanced heating and cooling technologies with an innovative business model to deliver improved and efficient heating solutions to rural households in a cost-effective manner. The project utilizes government incentives to lower the upfront costs of heating solutions for rural households, while capitalizing on the technical expertise of the heating company to identify, manage, and deliver the most appropriate heating solutions to households and enabling the company to sustainably expand its service area to semi-urban and rural areas around Jinan city. The project combines renewable

¹⁴The health impact of the project is very difficult to estimate because of the lack of baseline data and a widely acceptable methodology, so the project team will not include an indicator on the health impact of the project in the design and monitoring framework.

energy technologies and waste heat recovered from industry and power plants and applies supply- and demand-side energy efficiency measures. This will reduce the energy and carbon intensity of heat production and refrigeration, and thereby reduce air pollution and greenhouse gas emissions. The proposed clean heating and cooling solutions will be a pilot in the PRC, with a large potential to be scaled up and duplicated to similar regions within and outside the country. ADB will organize technical knowledge exchange sessions during project implementation to strengthen the capacity of the implementing agencies and disseminate knowledge and lessons from this project to other developing member countries that face similar challenges in relation to cooling and heating.

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

Table 1: Project Readiness Activities

Indicative Activities	2018			2019		Responsibility
	Q2	Q3	Q4	Q1	Q2	
Procurement agency recruited						SPG
Advance contracting actions						ADB, SPG, JHG and JTPC
Retroactive financing actions						ADB, SPG, JHG and JTPC
Loan fact-finding mission						ADB, SPG, JHG and JTPC
Domestic EIAs and TEIRs approved						DOEP
Domestic FSRs approved						PDRC
FCUP submission and approval						SPG, NDRC
ADB management review meeting						ADB
Loan negotiations						ADB, MOF, SPG
ADB Board approval						ADB
Loan and project agreements signed						ADB, MOF, SPG
Government legal opinion provided						MOF, SPG
Onlending and Relending agreement signing						MOF, SPG
Loan effectiveness						ADB, MOF

ADB = Asian Development Bank, DOEP = Department of Environmental Protection, EIA = Environmental Impact Assessment, FCUP = Foreign Capital Utilization Plan, FSR = feasibility study report, JHG = Jinan Heating Group, JTPC = Jinan Thermal Power Co., Ltd. NDRC = National Development and Reform Commission, MOF = Ministry of Finance, SPG = Shandong Provincial Government, TEIR = tabulate of environmental impact registration.

Source: Asian Development Bank estimates.

B. Overall Project Implementation Plan

Table 2: Overall Project Implementation Plan

Activity	2019				2020				2021				2022				2023				2024			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 1: West Jinan Waste Heat Utilization and Clean Energy Subproject Constructed																								
1.1	Construct the biomass-based combined heat and power plant (Q2 2019–Q2 2024)																							
1.2	Retrofit and expand the district heating network in west Jinan (Q2 2019–Q2 2024)																							
1.3	Construct geothermal heating system in the industrial park (Q2 2019–Q2 2024)																							
1.4	Install heat pumps in residential areas without central heating network (Q2 2019–Q2 2024)																							
Output 2: Shanghe Coal-Free Clean Heating Demonstration Subproject Constructed																								
2.1	Apply energy efficiency measures on urban buildings and rural households in Shanghe County (Q2 2019–Q2 2024)																							
2.2	Construct deep-well geothermal district heating systems developed in urban and semi-urban areas of Shanghe County (Q2 2019–Q2 2024)																							
2.3	Deliver improved heating sources to rural households in Shanghe County (Q2 2019–Q2 2024)																							
2.4	4 Install a 42 MW gas boiler and small modular gas boilers in Shanghe County (Q2 2019–Q2 2024)																							
Output 3: East Jinan Low-Emission Combined District Heating and Cooling Subproject Constructed																								
3.1	Retrofit and expand the district heating network in west Jinan (Q2 2019–Q2 2024)																							
3.2	Constructed an efficient large-scale district cooling system (Q2 2019–Q2 2024)																							
3.3	Develop thermal storage capacity in East Jinan (Q2 2019–Q2 2024)																							
Output 4: Clean Heating Awareness and Capacity to Install and Maintain Clean Heating and Cooling Technologies Strengthened																								
4.1	Undertake awareness campaigns on the environmental and health benefits of clean heating (Q1 2019–Q4 2020)																							
4.2	Enhance the implementing agencies' knowledge and understanding of installation and maintenance of advanced heating and cooling technologies (Q1 2019–Q4 2020)																							
4.3	Conduct a participant feedback survey in project areas to verify the benefits of clean heating, including time savings for preparation of household energy for heating (Q1 2019–Q1 2020)																							
Management activities - reporting and monitoring																								
5.1	Consultants recruitment																							
5.2	PPMS establishment and implementation																							
5.3	Inception / Annual / Midterm / Final Review Mission																							
5.4	Project progress reports																							
5.5	Project safeguards monitoring reports (EIA/EMP and GAP)																							
5.6	Project audit reports																							
5.7	Entity financial statements (JHG and JTPC)																							
5.8	Project completion report																							

Loan effectiveness

Project completion

Loan closing

EIA = environmental impact assessment, EMP = environmental management plan, GAP = gender action plan, JHG = Jinan Heating Group, JTPC = Jinan Thermal Power Co., Ltd., MTR = mid-term review, PPMS = Project Performance Management System, Q= quarter.

Source: Asian Development Bank estimates.

III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations: Roles and Responsibilities

16. The project implementation organization, identifying the roles and responsibilities of the participating agencies, is shown below:

Table 3: Project Implementation Organizations' Roles and Responsibilities

Project Implementation Organizations	Management Roles and Responsibilities
Executing agency Shandong Provincial Government (SPG)	<ul style="list-style-type: none"> • Provide overall guidance, coordination, supervision, and management for project preparation and implementation; and • Responsible for coordinating project implementation activities among government agencies such as Shandong Provincial Department of Finance (DOF), PDRC, Provincial Department of Housing and Urban- Rural Development (DOHURD), Department of Environmental Protection, State Grid, etc.
Shandong Provincial DOF	On behalf of SPG, responsible for overall project financial management, including: <ul style="list-style-type: none"> • Open and manage the project advance account, and liquidation and replenishment of advances made; • Review, approve, and submit loan withdrawal applications to ADB on behalf of SPG; • Sign relending agreement with the Jinan Municipal Bureau of Finance (BOF); • Monitor implementation of the relending agreements under the project; and • Prepare and monitor repayment plan of ADB loan and repayment works.
Jinan Municipal Government	<ul style="list-style-type: none"> • Sign onlending arrangement with the implementing agencies (Jinan Heating Group [JHG] and Jinan Thermal Power Co., Ltd. [JTPC]); • Sign project implementation agreement with JHG and JTPC; • Review and confirm the payment requests from the implementing agencies, and submit to DOF; and • Ensure timely provision of counterpart funds by JHG and JTPC.
PMO led by Shandong Provincial Department of Finance, Shandong Provincial Department of Housing and Urban–Rural Development, and Shandong Provincial Development and Reform Commission, and involving Jinan Municipal Public Utilities Bureau Jinan Municipal Bureau of Finance, Jinan Municipal Development and Reform Commission, JHG, and JTPC	On behalf of the executing agency, the PMO will be responsible for overall coordination and supervision of project preparation and implementation, including: <ul style="list-style-type: none"> • Facilitate interagency coordination and coordinate with other involved parties; • Direct project preparation and implementation activities; • Facilitate engagement of procurement agency; • Prepare annual work programs and budgets; • Guide project procurement activities, including the review and submission of bidding documents, bid evaluation reports, and other necessary documentations to ADB for necessary approval; • Review and confirm payment requests from respective project implementing agencies; • Establish PPMS to monitor project progress, including regular monitoring of physical and financial progress, and safeguards compliance;

Project Implementation Organizations	Management Roles and Responsibilities
Implementing agencies <ul style="list-style-type: none"> • Jinan Heating Group • Jinan Thermal Power Co., Ltd. 	<ul style="list-style-type: none"> • Consolidate and submit (a) semi-annual project progress reports, (b) semi-annual environmental and social safeguard monitoring progress report, (c) annual audit reports, (d) annual project financial statements, and (e) midterm and project completion reports to ADB and SPG, with assistance from the project implementation consultants (PICs); • Ensure project implementation compliance with loan agreement and project agreement; • Cooperate with provincial audit department for audit of project accounts; • Summarize the project experience and facilitate project replication over the province. • Recruit design institutes for detailed designs; • Prepare the bidding documents with the support of procurement agency, participate bid evaluation, including signing of bid evaluation reports (BERs), and signing and administration of contracts with the aid of procurement agency; • Ensure environmental and social safeguards are complied with based on ADB's Safeguard Policy Statement (2009); • Provide PMO with inputs to (a) semi-annual project progress report, mid-term report and project completion report (b) semi-annual environmental and social safeguard monitoring progress report, and (c) annual subproject financial statements; • Establish and maintain the required project accounting arrangement and other implementation recording systems; • Prepare payment requests and submit to PMO for review and confirmation; • Retain supporting documents under payment request procedure; • Assist ADB team and the consultants in conducting the awareness program; • Provide necessary information related to Shandong Province in developing the rural clean heating roadmap; • Assist in implementing the socially inclusive capacity building programs under the project; • Select the staff for training courses; • Provide necessary assistance in participant feedback survey if required; • Maintain the project 's financial records, making them ready for inspection by ADB missions; and • Operate and maintain the facilities constructed or improved under the project.
ADB	<ul style="list-style-type: none"> • Provide guidance to SPG to ensure compliance with loan and project agreements; • Conduct regular loan review missions, a midterm review, and a project completion review mission; • Review and/or approve procurement actions for ADB-financed procurement packages; • Process withdrawal applications and release loan funds; • Monitor project implementation progress;

Project Implementation Organizations	Management Roles and Responsibilities
	<ul style="list-style-type: none">• Review annual audit reports and follow up on audit recommendations;• Update regularly the project performance review reports with the assistance of PMO and implementing agencies;• Update regularly the project information documents for public disclosure at ADB website, including the safeguard documents; and• Monitor implementation of ADB's anticorruption policies.

ADB = Asian Development Bank, MOF = Ministry of Finance, PMO = project management office, SPG = Shandong Provincial Government.

Source: Asian Development Bank estimates.

B. Key Persons Involved in Implementation

Executing Agency

Shandong Provincial Department of Finance (PDOF)	Officer's Name: Mr. Li Xuechun Position: Director, Finance and International Cooperation Division Telephone: +86-531-82669806 Email address: sdczlx@163.com Office Address: No. 3, Jida Road, Jinan City, Shandong Province
Jinan Municipal Bureau of Finance (BOF)	Officer's Name: Mrs. Qiao Li Position: Sector Chief, Finance and International Cooperation Division Telephone: +86-531-66603818 Email address: jnsczjjrc@163.com Office Address: 6th Floor, Longao Mansion, Longding Road, Jinan City, Shandong Province
Project Management Office (Jinan Municipal Public Utilities Bureau)	Officer's Name: Mr. Feng Xunye Position: Director General, Jinan Municipal Public Utilities Bureau Telephone: +86-531-66605552 Email address: jngrb@163.com Office Address: Room E437, Jingshi East Road, Jinan City, Shandong Province

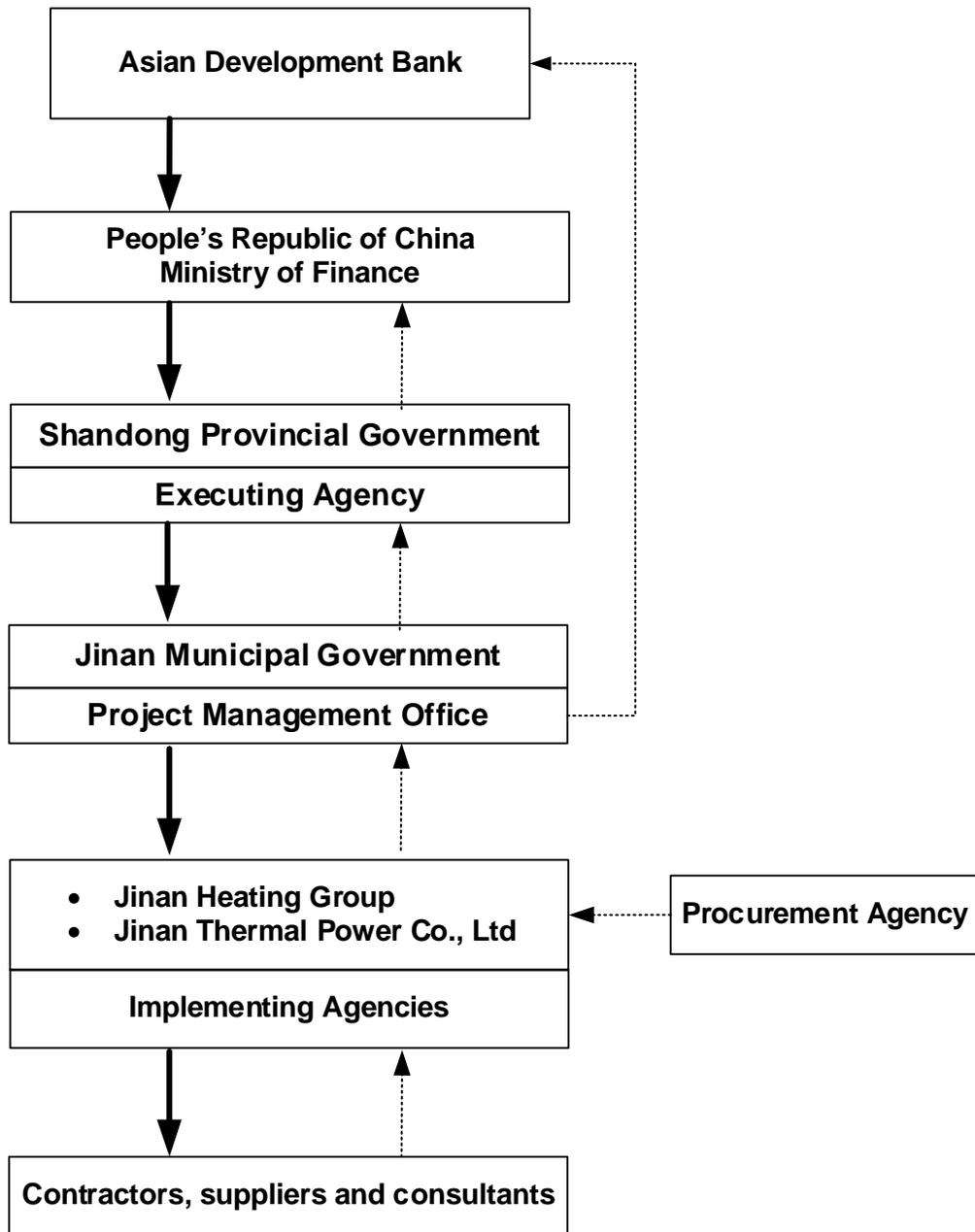
Implementing Agency

Jinan Heating Group	Officer's Name: Mr. Wang Shaoju Position: Deputy Manager General Telephone: +86-531-86106586 Email address: wsj5816@163.com Office Address: No. 50, Chaoshan Street, Lixia District, Jinan City, Shandong Province
Jinan Thermal Power Company Limited	Officer's Name: Mr. Zhou Huiren Position: Deputy Manager General Telephone: +86-531-67887276 Email address: huirenzhou@126.com Office Address: No. 36, Jingliu Road, Shizhong District, Jinan City, Shandong Province

Asian Development Bank

Division Director	Ms. Sujata Gupta Director, Sustainable Infrastructure Division East Asia Department, Asian Development Bank Telephone No.: +63 2 632 6156 Fax No. +63 2 636 2302 Email address: sgupta@adb.org Office Address: Room 6648, 6 ADB Avenue, Mandaluyong City, 1550 Metro Manila, Philippines
Mission Leader	Ms. Lin Lu Senior Operations Coordination Specialist Sustainable Development and Climate Change Department, Asian Development Bank Telephone No.: +63 2 632 4703 Fax No.: + 63 2 636 2302 Email address: llu@adb.org Office Address: 6 ADB Avenue, Mandaluyong City, 1550 Metro Manila, Philippines

C. Project Organization Structure



—————▶ Coordination and/or administration

.....▶ Reporting

Source: Asian Development Bank estimates.

IV. COSTS AND FINANCING

A. Cost Estimates Preparation and Revisions

17. The project investment costs include goods, works, and consulting services to support the establishment or rehabilitation of the heating and cooling system in Jinan City and Shanghe County, including equipment and materials. Cost categories include:

Category	Description
Output 1	Includes civil works, equipment, materials and goods for West Jinan Waste Heat Utilization and Clean Energy Subproject
Output 2	Includes civil works, equipment, materials and goods for Shanghe Coal-Free Clean Heating Demonstration Subproject
Output 3	Includes civil works, equipment, materials and goods for East Jinan Low-Emission Combined District Heating and Cooling Subproject
Output 4	Includes trainings, workshops, international study tours and domestic study tours for the staff of project implementing agencies
Project management	Includes project preparation, detailed designs, project monitoring and evaluation, facility operation trials, and operations of project implementing agencies, as well as PICs and PPMS establishment.

PIC= project implementation consultants, PPMS=project performance management system.

Source: Asian Development Bank.

18. The Government of the PRC has requested a loan of €350 million from ADB's ordinary capital resources to help finance the project. The loan will have a 25-year term, including a grace period of 5 years, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year, and such other terms and conditions set forth in the draft loan and project agreements. Based on the above loan terms and borrower's choice of straight-line repayment method, the average loan maturity is 15.25 years, the loan maturity premium payable to ADB will be 0.1% per year. The government has allocated the loan proceeds as follows: €105 to Jinan Thermal Power Co., Ltd. (JTTC) and €245 to Jinan Heating Group (JHG). The PRC Government is the borrower of the loan and will make the loan proceeds available to the provincial governments and onlend the loan to JHP and JTTC on the same terms and conditions. JHG and JTTC will assume the foreign exchange and interest rate risks of the ADB loan. A technical assistance (TA) grant of \$0.75 million from Clean Energy Fund¹⁵ under the Clean Energy Financing Partnership Facility (CEF-CEFPF) will also be provided to strengthen the project implementation.

19. The ADB loan will finance 56.21% of the project costs, including civil works, goods and taxes and duties for eligible ADB-financed expenditures. SPG will make counterpart funds available for project management. JHG and JTTC will finance their respective costs related to project preparation, detailed designs, training, project management, physical and price contingencies, and financing charges during implementation.¹⁶

¹⁵ Financing partners: the governments of Australia, Norway, Spain, Sweden, and the United Kingdom.

¹⁶ The interest and commitment charges during implementation will not be capitalized in the loan.

Table 4: Indicative Financing Plan

Source	Amount (\$ million)	Amount (€ million)	Share of Total (%)
Asian Development Bank	399.91	350.00	56.21
TA Grant from CEF-CEFPF	0.75	0.66	0.11
Commercial Banks	139.47	122.06	19.60
Project implementing agencies	145.08	126.97	20.39
Beneficiaries	26.30	23.02	3.70
Total	711.51	622.71	100.00

CEF-CEFPF = Clean Energy Fund under the Clean Energy and Financing Partnership Facility.

Source: Asian Development Bank estimates.

20. **Preparation.** The cost estimates were prepared jointly by the design institutes, implementing agencies, and ADB with assistance from the project preparatory technical assistance consultants. The sources and basis for cost estimates were reviewed during the project preparation and had been confirmed by related parties. The process was facilitated by a model in excel software which enabled easy updating or revision, if necessary. The model is maintained by both implementing agencies and ADB.

21. **Revisions.** Revision of cost estimates will be conducted when deemed necessary during implementation. The implementing agencies will be responsible in proposing and drafting the revision which will be subject to ADB's approval.

B. Key Assumptions

22. The following key assumptions underpin the cost estimates and financing plan:

- (i) Exchange rate: CNY 6.9200 = \$1.00; CNY7.9068 = €1.00; \$1.00 = €0.8752 (as of 12 November 2018).
- (ii) Price contingencies based on expected cumulative inflation over the implementation period are as follows:

Table 5: Escalation Rates for Price Contingency Calculation (%)

Item	2019	2020	2021	2022	2023	Average
Foreign rate of price inflation	1.50	1.50	1.60	1.60	1.60	1.56
Domestic rate of price inflation	2.50	2.50	2.50	2.50	2.50	2.50

Source: Asian Development Bank Estimates.

C. Detailed Cost Estimates by Expenditure Category

Table 6: Detailed Cost Estimates by Expenditure Category

Item	(CNY million)			(€ million)			% of Total Base Cost
	Foreign Exchange	Local Exchange	Total Cost	Foreign Exchange	Local Exchange	Total Cost	
A. Investment Costs							
1. Civil works (ADB financed)	314.28	1,257.14	1,571.42	39.75	158.99	198.74	40%
a. JHG-CHCP	91.11	364.45	455.56	11.52	46.09	57.62	12%
b. JHG-Shanghe	167.96	671.86	839.82	21.24	84.97	106.22	22%
b.1 JHG-Shanghe Urban and Township Area	149.96	599.86	749.82	18.97	75.87	94.83	19%
b.2 JHG-Shanghe Rural Area	18.00	72.00	90.00	2.28	9.11	11.38	2%
c. JTPC	55.21	220.84	276.04	6.98	27.93	34.91	7%
2. Civil works (non-ADB financed)	142.71	570.86	713.57	18.05	72.20	90.25	18%
a. JHG-CHCP	20.56	82.26	102.82	2.60	10.40	13.00	3%
b. JHG-Shanghe	12.98	51.94	64.92	1.64	6.57	8.21	2%
b.1 JHG-Shanghe Urban and Township Area	12.98	51.94	64.92	1.64	6.57	8.21	2%
b.2 JHG-Shanghe Rural Area	-	-	-	-	-	-	0%
c. JTPC	109.17	436.67	545.83	13.81	55.23	69.03	14%
3. Equipment and materials (ADB-financed)	717.37	478.25	1,195.61	90.73	60.49	151.21	31%
a. JHG-CHCP	58.60	39.07	97.67	7.41	4.94	12.35	3%
b. JHG-Shanghe	325.75	217.17	542.92	41.20	27.47	68.67	14%
b.1 JHG-Shanghe	17.35	11.57	28.92	2.19	1.46	3.66	1%
b.2 JHG-Shanghe Rural Area - air heaters	234.00	156.00	390.00	29.59	19.73	49.32	10%
b.3 JHG-Shanghe Rural Area - water heaters	72.00	48.00	120.00	9.11	6.07	15.18	3%
b.4 JHG-Shanghe Rural Area - wall mounted gas boiler	2.40	1.60	4.00	0.30	0.20	0.51	0%
c. JTPC	333.01	222.01	555.02	42.12	28.08	70.19	14%
4. Equipment and materials (non-ADB financed)	44.82	179.29	224.11	5.67	22.67	28.34	6%
a. JHG-CHCP	5.33	21.33	26.66	0.67	2.70	3.37	1%
b. JHG-Shanghe	-	-	-	-	-	-	0%
c. JTPC	39.49	157.96	197.45	4.99	19.98	24.97	5%
5. Workshops	0.02	0.22	0.25	0.00	0.03	0.03	0%
6. Consulting services-ADB loan	1.02	4.10	5.12	0.13	0.52	0.65	0%
7. Consulting services-CEF-CEFPF Grant	4.67	0.52	5.19	0.59	0.07	0.66	0%
8. International and domestic training and study tours	1.99	0.37	2.37	0.25	0.05	0.30	0%
a. International study tours	1.97	0.22	2.19	0.25	0.03	0.28	0%
b. Domestic study tours	0.02	0.15	0.17	0.00	0.02	0.02	0%
9. Training	0.18	0.02	0.21	0.02	0.00	0.03	0%
10. Environment and social monitoring	0.15	1.31	1.45	0.02	0.17	0.18	0%
11. Project management	-	178.14	178.14	-	22.53	22.53	5%
Subtotal (A)	1,227.23	2,670.21	3,897.45	155.21	337.71	492.92	100%
Total Base Cost	1,227.23	2,670.21	3,897.45	155.21	337.71	492.92	100%
B. Contingencies							
1. Physical	92.80	202.52	295.32	11.74	25.61	37.35	8%
2. Price	250.27	219.83	470.10	31.65	27.80	59.46	12%
Subtotal (B)	343.07	422.35	765.42	43.39	53.42	96.81	20%
C. Financing Charges During Implementation							
1. Interest during implementation for ADB loan	-	45.63	45.63	-	5.77	5.77	1%
2. Commitment charges	-	13.32	13.32	-	1.68	1.68	0%
3. Interest during implementation for domestic loan	-	201.81	201.81	-	25.52	25.52	5%
Subtotal (C)	-	260.76	260.76	-	32.98	32.98	7%
Total Project Cost (A+B+C)	1,570.30	3,353.32	4,923.63	198.60	424.11	622.71	126%

ADB = Asian Development Bank, JHG = Jinan Heating Group, CEF-CEFPF=Clean Energy Fund under the Clean Energy and Financing Partnership Facility, JHG-CHCP = JHG combined heating and cooling subproject, JTPC = Jinan Thermal Power Co., Ltd.

Notes: Numbers may not sum precisely because of rounding.

Source: Asian Development Bank estimates.

D. Allocation and Withdrawal of Loan Proceeds

Table 7: Allocation and Withdrawal of Loan Proceeds^a

No.	Item	Amount Allocated	Percentage and Basis for Withdrawal from the Loan Account
1	Works, equipment, and capacity building ^b	350,000,000	Up to 100% of total expenditure claimed ^a

^a Detailed categories and disbursement percentages to be used during disbursement are in Table 8.

^b Subject to the condition for withdrawal described in paragraph 7 of Schedule 3.

Source: Asian Development Bank.

Table 8: Detailed Allocation and Withdrawal of Loan Proceeds

Category			ADB Financing	
No.	Item	Amount Allocated		Percentage and Basis for Withdrawal from the Loan Account
		(€)		
		Category	Subcategory	
1.	Civil Works	191,163,057		
A.	JHG-CHCP		57,506,834	100% of eligible expenditures
B.	JHG-Shanghe Urban and Township Area		91,472,695	96% of eligible expenditures
C.	JHG-Shanghe Rural Area		7,588,405	67% of eligible expenditures
D.	JTPC		34,595,123	99% of eligible expenditures
2.	Equipment and materials	131,989,298		
A.	JHG-CHCP, JHG-Shanghe Urban and Township, and JTPC		86,205,922	100% of eligible expenditures
B.	JHG-Shanghe Rural Area - air heaters		34,147,822	69% of eligible expenditures
C.	JHG-Shanghe Rural Area - water heaters		11,382,607	75% of eligible expenditures
D.	JHG-Shanghe Rural Area - wall mounted gas boilers		252,947	50% of eligible expenditures
3.	Consulting Services	647,645		100% of eligible expenditures
4	Unallocated	26,200,000		
	Total	350,000,000		

ADB = Asian Development Bank, JHG = Jinan Heating Group, JHG-CHCP = JHG combined heating and cooling subproject, JTPC = Jinan Thermal Power Co., Ltd.

Source: Asian Development Bank.

E. Detailed Cost Estimates by Financier

Table 9: Detailed Cost Estimates by Financier
(€ million)

Item	Asian Development Bank		CEF-CEFPF Grant		Commercial Banks		Project implementing agencies		Beneficiaries		Total Cost
	Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category	
A. Investment Costs											
1. Civil works (ADB financed)	191.16	96%	-	-	3.47	2%	0.32	0%	3.79	2%	198.74
a. JHG-CHCP	57.51	100%	-	-	0.11	0%	-	0%	-	0%	57.62
b. JHG-Shanghe	99.06	93%	-	-	3.36	3%	-	-	3.79	4%	106.22
b.1 JHG-Shanghe Urban and Township Area	91.47	96%	-	-	3.36	4%	-	0%	-	0%	94.83
b.2 JHG-Shanghe Rural Area	7.59	67%	-	-	-	0%	-	0%	3.79	33%	11.38
c. JTPC	34.60	99%	-	-	-	0%	0.32	1%	-	0%	34.91
2. Civil works (non-ADB financed)	-	0%	-	-	90.25	100%	0.00	0%	-	0%	90.25
a. JHG-CHCP	-	0%	-	-	13.00	100%	-	0%	-	0%	13.00
b. JHG-Shanghe	-	0%	-	-	8.21	100%	-	0%	-	0%	8.21
b.1 JHG-Shanghe Urban and Township Area	-	0%	-	-	8.21	100%	-	0%	-	0%	8.21
b.2 JHG-Shanghe Rural Area	-	-	-	-	-	-	-	-	-	-	-
c. JTPC	-	0%	-	-	69.03	100%	0.00	0%	-	0%	69.03
3. Equipment and materials (ADB-financed)	131.99	87%	-	-	-	0%	-	0%	19.22	13%	151.21
a. JHG-CHCP	12.35	100%	-	-	-	0%	-	0%	-	0%	12.35
b. JHG-Shanghe	49.44	-	-	-	-	0%	-	0%	19.22	28%	68.67
b.1 JHG-Shanghe	3.66	100%	-	-	-	0%	-	0%	-	0%	3.66
b.2 JHG-Shanghe Rural Area - air heaters	34.15	69%	-	-	-	0%	-	0%	15.18	31%	49.32
b.3 JHG-Shanghe Rural Area - water heaters	11.38	75%	-	-	-	0%	-	0%	3.79	25%	15.18
b.4 JHG-Shanghe Rural Area - wall mounted gas boilers	0.25	50%	-	-	-	0%	-	0%	0.25	50%	0.51
c. JTPC	70.19	100%	-	-	-	0%	-	0%	-	0%	70.19
4. Equipment and materials (non-ADB financed)	-	0%	-	-	28.34	100%	-	0%	-	0%	28.34
a. JHG-CHCP	-	0%	-	-	3.37	100%	-	0%	-	0%	3.37
b. JHG-Shanghe	-	-	-	-	-	-	-	-	-	-	-
c. JTPC	-	0%	-	-	24.97	100%	-	0%	-	0%	24.97
5. Workshops	-	0%	-	-	-	0%	0.03	100%	-	0%	0.03
6. Consulting services-ADB loan	0.65	100%	-	-	-	0%	-	0%	-	0%	0.65
7. Consulting services-CEF-CEFPF Grant	-	0%	0.66	100%	-	0%	-	0%	-	0%	0.66
8. International and domestic training and study tours	-	0%	-	-	-	0%	0.30	100%	-	0%	0.30
a. International study tours	-	0%	-	-	-	0%	0.28	100%	-	0%	0.28
b. Domestic study tours	-	0%	-	-	-	0%	0.02	100%	-	0%	0.02
9. Training	-	0%	-	-	-	0%	0.03	100%	-	0%	0.03
10. Environment and social monitoring	-	0%	-	-	-	0%	0.18	100%	-	0%	0.18
11. Project management	-	0%	-	-	-	0%	22.53	100%	-	0%	22.53
Subtotal (A)	323.80	66%	0.66	0%	122.06	25%	23.39	5%	23.02	5%	492.92
Total Base Cost	323.80	66%	0.66	0%	122.06	25%	23.39	5%	23.02	5%	492.92
B. Contingencies											
1. Physical	8.89	24%	-	0%	-	0%	28.46	76%	-	0%	37.35
2. Price	17.31	29%	-	0%	-	0%	42.15	71%	-	0%	59.46
Subtotal (B)	26.20	27%	-	0%	-	0%	70.61	73%	-	0%	96.81
C. Financing Charges During Implementation											
1. Interest during implementation for ADB loan	-	0%	-	0%	-	0%	5.77	100%	-	-	5.77
2. Commitment charges	-	0%	-	0%	-	0%	1.6840	100%	-	-	1.68
3. Interest during implementation for domestic loan	-	0%	-	0%	-	0%	25.52	100%	-	-	25.52
Subtotal (C)	-	0%	-	0%	-	0%	32.98	100%	-	-	32.98
Total Project Cost (A+B+C)	350.00	56%	0.66	0%	122.06	20%	126.97	20%	23.02	4%	622.71

ADB = Asian Development Bank, CEF-CEFPF=Clean Energy Fund under the Clean Energy and Financing Partnership Facility, JHG = Jinan Heating Group, JHG-CHCP = JHG combined heating and cooling subproject, JTPC = Jinan Thermal Power Co., Ltd.

Note: Numbers may not sum precisely because of rounding.

Source: Asian Development Bank Estimates.

F. Detailed Cost Estimates by Outputs and/or Components

Table 10: Detailed Cost Estimates by Outputs and/or Components
(€ million)

Item	Total Cost	West Jinan Waste Heat Utilization and Clean Energy Subproject constructed		Shanghe Coal-Free Clean Heating Demonstration Subproject constructed		East Jinan Low-Emission Combined District Heating and Cooling Subproject constructed		Capacity to Install and Maintain Clean Heating and Cooling Technologies Strengthened		Project Management	
		Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category
A. Investment Costs											
1. Civil works (ADB financed)	198.74	34.91	18%	106.22	53%	57.62	29%	-	-	-	-
a. JHG-CHCP	57.62	0.00	-	0.00	-	57.62	100%	0.00	-	0.00	-
b. JHG-Shanghe	106.22	-	-	106.22	100%	-	-	-	-	-	-
b.1 JHG-Shanghe Urban and Township Area	94.83	0.00	-	94.83	100%	0.00	-	0.00	-	0.00	-
b.2 JHG-Shanghe Rural Area	11.38	0.00	-	11.38	100%	0.00	-	0.00	-	0.00	-
c. JTPC	34.91	34.91	100%	0.00	-	0.00	-	0.00	-	0.00	-
2. Civil works (non-ADB financed)	90.25	69.03	76%	8.21	9%	13.00	14%	-	-	-	-
a. JHG-CHCP	13.00	0.00	-	0.00	-	13.00	100%	0.00	-	0.00	-
b. JHG-Shanghe	8.21	-	-	8.21	100%	-	0%	-	-	-	-
b.1 JHG-Shanghe Urban and Township Area	8.21	0.00	-	8.21	100%	0.00	-	0.00	-	0.00	-
b.2 JHG-Shanghe Rural Area	-	-	-	-	-	-	-	-	-	-	-
c. JTPC	69.03	69.03	100%	-	-	-	-	-	-	-	-
3. Equipment and materials (ADB-financed)	151.21	70.19	46%	68.67	45%	12.35	8%	-	-	-	-
a. JHG-CHCP	12.35	-	-	-	-	12.35	100%	-	-	-	-
b. JHG-Shanghe	68.67	-	-	68.67	-	-	-	-	-	-	-
b.1 JHG-Shanghe	3.66	-	-	3.66	100%	-	-	-	-	-	-
b.2 JHG-Shanghe Rural Area - air heaters	49.32	-	-	49.32	100%	-	-	-	-	-	-
b.3 JHG-Shanghe Rural Area - water heaters	15.18	-	-	15.18	100%	-	-	-	-	-	-
b.4 JHG-Shanghe Rural Area - wall mounted gas boilers	0.51	-	-	0.51	100%	-	-	-	-	-	-
c. JTPC	70.19	70.19	100%	-	-	-	0%	-	-	-	-
4. Equipment and materials (non-ADB financed)	28.34	24.97	88%	-	-	3.37	12%	-	-	-	-
a. JHG-CHCP	3.37	-	-	-	-	3.37	100%	-	-	-	-
b. JHG-Shanghe	-	-	-	-	-	-	-	-	-	-	-
c. JTPC	24.97	24.97	100%	-	-	-	-	-	-	-	-
5. Workshops	0.03	-	-	-	-	-	-	0.03	100%	-	-
6. Consulting services-ADB loan	0.65	-	-	-	-	-	-	-	-	0.65	100%
7. Consulting services-CEF-CEFPF Grant	0.66	-	-	-	-	-	-	-	-	0.66	100%
8. International and domestic training and study tours	0.30	-	-	-	-	-	-	0.30	100%	-	-
a. International study tours	0.28	-	-	-	-	-	-	0.28	100%	-	-
b. Domestic study tours	0.02	-	-	-	-	-	-	0.02	100%	-	-
9. Training	0.03	-	-	-	-	-	-	0.03	100%	-	-
10. Environment and social monitoring	0.18	-	-	-	-	-	-	-	-	0.18	100%
11. Project management	22.53	0.00	-	0.00	-	0.00	-	0.00	-	22.53	100%
Subtotal (A)	492.92	199.11	40%	183.09	37%	86.34	18%	0.36	0%	24.02	5%
Total Base Cost	492.92	199.11	40%	183.09	37%	86.34	18%	0.36	0%	24.02	5%
B. Contingencies	0.00	0.00		0.00		0.00		0.00		0.00	
1. Physical	37.35	15.13	41%	13.91	41%	6.56	37%	0.03	-	1.73	5%
2. Price	59.46	21.33	36%	25.11	42%	10.77	18%	0.00	-	2.25	4%
Subtotal (B)	96.81	36.46	38%	39.02	40%	17.33	18%	0.03	0%	3.97	4%
C. Financing Charges During Implementation	0.00	0.00		0.00		0.00		0.00		0.00	
1. Interest during implementation for ADB loan	5.77	1.63	28%	2.59	45%	1.54	27%	0.00	-	0.01	0%
2. Commitment charges	1.6840	0.52	31%	0.77	46%	0.39	23%	0.00	-	0.00	0%
3. Interest during implementation for domestic loan	25.52	18.84	74%	3.14	12%	0.00	-	0.00	-	3.54	14%
Subtotal (C)	32.98	20.99	64%	6.51	37%	1.92	17%	-	-	3.56	0%
Total Project Cost (A+B+C)	622.71	256.55	41%	228.63	37%	105.59	17%	0.38	0%	31.55	5%

ADB = Asian Development Bank, CEF-CEFPF=Clean Energy Fund under the Clean Energy and Financing Partnership Facility, JHG = Jinan Heating Group, JHG-CHCP = JHG combined heating and cooling subproject, JTPC = Jinan Thermal Power Co., Ltd.

Source: Asian Development Bank Estimates.

G. Detailed Cost Estimates by Year

Table 11: Detailed Cost Estimates by Year
(€ million)

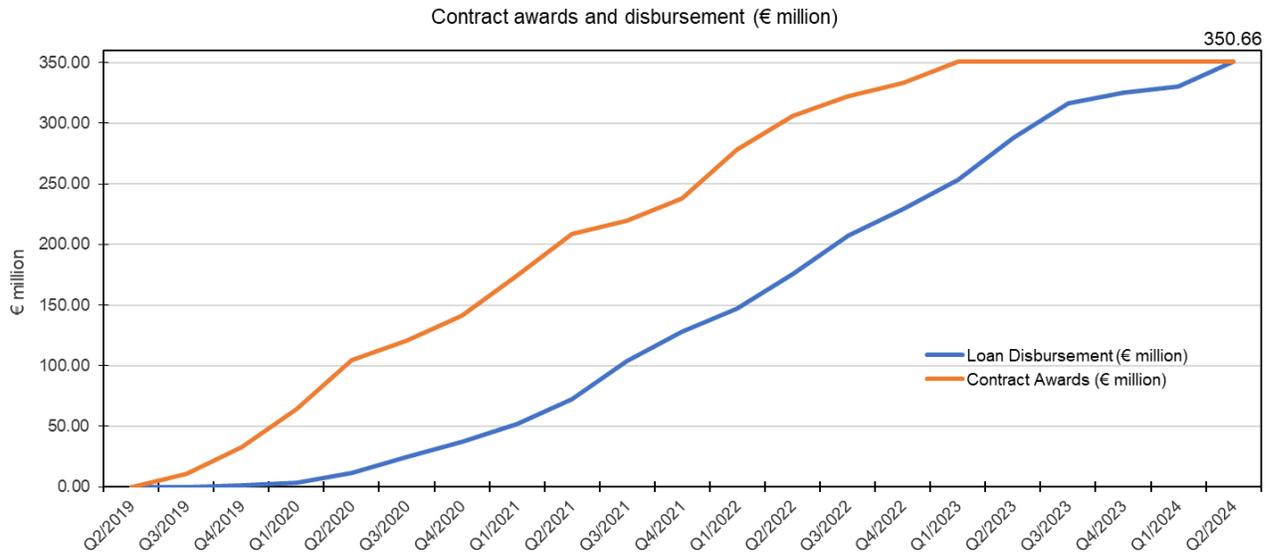
Item	Total Cost	2019	2020	2021	2022	2023
A. Investment Costs						
1. Civil works (ADB financed)	198.74	3.26	29.24	52.43	56.71	57.09
a. JHG-CHCP	57.62	1.85	12.77	21.63	8.13	13.23
b. JHG-Shanghe	106.22	0.57	10.89	23.35	33.50	37.90
b.1 JHG-Shanghe Urban and Township Area	94.83	-	6.34	18.80	32.93	36.76
b.2 JHG-Shanghe Rural Area	11.38	0.57	4.55	4.55	0.57	1.14
c. JTPC	34.91	0.85	5.57	7.44	15.08	5.97
2. Civil works (non-ADB financed)	90.25	66.62	16.68	1.03	5.33	0.59
a. JHG-CHCP	13.00	11.70	1.30	-	-	-
b. JHG-Shanghe	8.21	7.39	0.82	-	-	-
b.1 JHG-Shanghe Urban and Township Area	8.21	7.39	0.82	-	-	-
b.2 JHG-Shanghe Rural Area	-	-	-	-	-	-
c. JTPC	69.03	47.53	14.56	1.03	5.33	0.59
3. Equipment and materials (ADB-financed)	151.21	0.14	19.59	48.53	47.69	35.26
a. JHG-CHCP	12.35	-	-	0.78	5.15	6.42
b. JHG-Shanghe	68.67	0.14	12.20	36.02	13.35	6.96
b.1 JHG-Shanghe	3.66	0.14	1.11	0.93	0.91	0.57
b.2 JHG-Shanghe Rural Area - air heaters	49.32	-	11.10	29.59	6.17	2.47
b.3 JHG-Shanghe Rural Area - water heaters	15.18	-	-	5.31	6.07	3.79
b.4 JHG-Shanghe Rural Area - wall mounted gas boilers	0.51	-	-	0.18	0.20	0.13
c. JTPC	70.19	-	7.39	11.73	29.20	21.88
4. Equipment and materials (non-ADB financed)	28.34	24.50	3.73	0.11	-	-
a. JHG-CHCP	3.37	3.03	0.34	0.00	0.00	0.00
b. JHG-Shanghe	0.00	0.00	0.00	0.00	0.00	0.00
c. JTPC	24.97	21.47	3.39	0.11	0.00	0.00
5. Workshops	0.03	0.01	0.01	0.01	0.01	0.01
6. Consulting services-ADB loan	0.65	0.10	0.16	0.13	0.13	0.13
7. Consulting services-CEF-CEFPF Grant	0.66					
8. International and domestic training and study tours	0.30	0.06	0.06	0.06	0.06	0.06
a. International study tours	0.28	0.06	0.06	0.06	0.06	0.06
b. Domestic study tours	0.02	0.00	0.00	0.00	0.00	0.00
9. Training	0.03	0.01	0.01	0.01	0.01	0.01
10. Environment and social monitoring	0.18	0.04	0.04	0.04	0.04	0.04
11. Project management	22.53	12.88	3.67	2.16	2.16	1.67
Subtotal (A)	492.92	107.71	73.34	104.63	112.26	94.98
Total Base Cost	492.92	107.71	73.34	104.63	112.26	94.98
B. Contingencies	0.00	0.00	0.00	0.00	0.00	0.00
1. Physical	37.35	8.17	5.55	7.93	8.51	7.20
2. Price	59.46	6.20	6.67	12.90	18.06	15.64
Subtotal (B)	96.81	14.36	12.21	20.83	26.57	22.83
C. Financing Charges During Implementation	0.00	0.00	0.00	0.00	0.00	0.00
1. Interest during implementation for ADB loan	5.77	0.02	0.25	0.90	1.83	2.77
2. Commitment charges	1.68	0.52	0.48	0.38	0.23	0.07
3. Interest during implementation for domestic loan	25.52	2.47	5.20	5.75	5.95	6.16
Subtotal (C)	32.98	3.01	5.93	7.03	8.01	9.00
Total Project Cost (A+B+C)	622.71	125.08	91.49	132.49	146.84	126.82

ADB = Asian Development Bank, CEF-CEFPF=Clean Energy Fund under the Clean Energy and Financing Partnership Facility, JHG = Jinan Heating Group, JHG-CHCP = JHG combined heating and cooling subproject, JTPC = Jinan Thermal Power Co., Ltd.

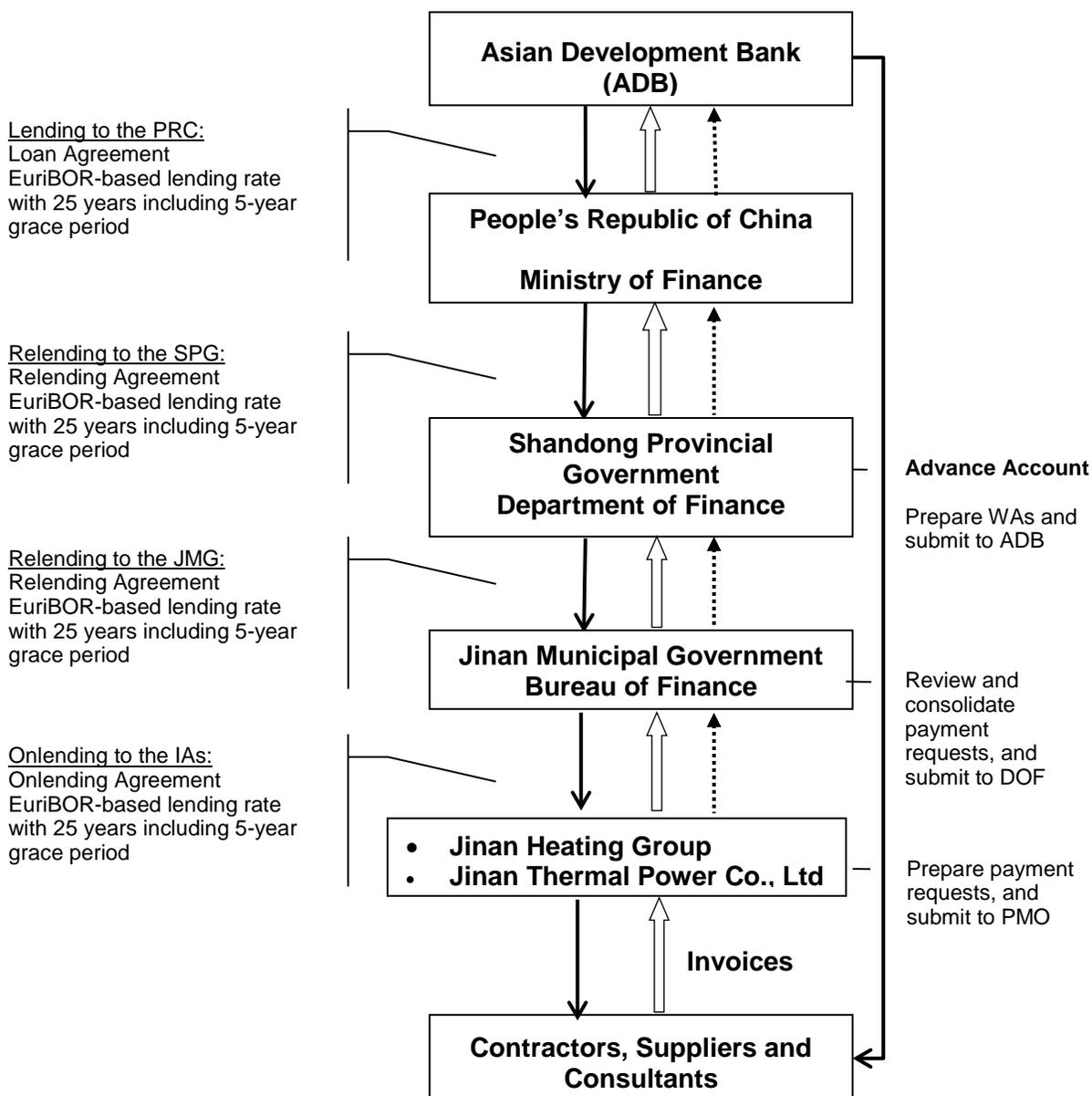
Source: Asian Development Bank Estimates.

H. Contract and Disbursement S-Curve

Year	Contract Awards (€million)					Disbursements (€million)				
	Q1	Q2	Q3	Q4	Total	Q1	Q2	Q3	Q4	Total
2019	0.0	0.0	10.8	22.0	32.80	0.0	0.0	0.0	1.1	1.15
2020	31.4	40.5	15.7	20.7	108.31	2.6	7.4	13.8	12.3	36.08
2021	33.4	33.8	11.2	18.2	96.62	14.7	20.3	32.0	24.0	90.93
2022	40.5	27.6	16.4	11.2	95.76	18.6	28.6	31.6	22.0	100.88
2023	17.2	0.0	0.0	0.0	17.16	24.2	34.4	28.7	8.8	96.11
2024	0.0	0.0			0.00	5.4	20.1			25.51
Total					350.66					350.66



I. Fund Flow Diagram



- Indicative funds flow
-→ Repayment
- ⇨ Flow of WAs and payment requests

ADB = Asian Development Bank, DOF = Department of Finance, JHG = Jinan Heating Group, JTPC = Jinan Thermal Power Co., Ltd., PRC = People's Republic of China, SPG = Shandong Provincial Government,

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

23. The financial management assessment (FMA) was conducted in May 2018 in accordance with the ADB Guidelines for Financial Management and Analysis of Projects and ADB's Financial Management Technical Guidance Note on Financial Management Assessment.¹⁷ The FMA considered the capacity of the implementing agencies, including funds-flow arrangements, staffing, accounting and financial reporting systems, financial information systems, and internal and external auditing arrangements. Based on the assessment, the key financial management risks identified are (i) financial leverage of the two IAs are high; (ii) they are inexperienced in management of foreign exchange risk and EURIBOR-linked interest rate risk and with consideration of their ADB loan scale, the consequence of adverse fluctuations of the two risks may harm their debt service capability; and (iii) delay of completing subproject construction.

24. Furthermore, through analysis of the audited entity financial reports, two major mismatches have been identified: (i) mismatch of investment cost of primary heating network construction, which is recorded as operation cost, with the corresponding cash inflows, which are received from real estate developers via the local government and thus are directly recorded as capital surplus, This accounting practice, although legal, lead to no match of cost and revenue; and (ii) misclassification of unpaid investment cost for primary heating network as current liabilities, but which may largely be non-current. JHG and JTPC should classify in their future accounting practice the unpaid investment project costs for procurement of equipment/civil works as current or non-current liability as per the actual payment due date of the related contracts and update the accounts on a timely basis.

25. The project overall risks before mitigation is considered to be moderate. The PMO, JHG, and JTPC have agreed to implement an action plan as key measures to mitigate the identified risks. The financial management action plan is provided in Table 12.

Table 12: Financial Management Action Plan

Identified Risks	Action for Mitigating Risks	Responsibility Unit	Timing
Lack of ADB project experience	Training on ADB's financial management requirements, including accounting and auditing, loan disbursement, and foreign exchange risk management to the implementing agencies	ADB, PMO, JHG, JTPC, PICs	Prior to the first loan disbursement
Insufficient internal control manpower	Recruit one additional auditor with financial background	JHG	2 months before the loan effectiveness
Not using ADB loan proceeds for designated subprojects	Both JHG and JTPC shall establish project accounts for receiving and paying back the ADB loan proceeds. Proceedings in such accounts can only be used for designated purpose	JHG, JTPC	1 months before the loan effectiveness
	Audited project financial statements combining all subprojects financed with the ADB loan should be provided to ADB for review	JHG, JTPC	Within 6 months from the end of the fiscal year

¹⁷ ADB. 2005. *Guidelines for Financial Management and Analysis of Projects*. Manila; ADB. 2015. *Financial Management Technical Guidance Note on Financial Management Assessment*. Manila.

Identified Risks	Action for Mitigating Risks	Responsibility Unit	Timing
Delay of project implementation	Ex-ante risk mitigation measure has been taken by ADB in the financial analysis through setting 2-year delay in the sensitivity analysis, which indicates the FIRR in such a case is still higher than the WACC	ADB	Completed
	Project implementation progress should be updated by the IAs to ADB periodically	JHG, JTPC	As scheduled
	Assessment of a subproject's feasibility shall be restored if it is delayed for more than two years	ADB, JHG, JTPC	Starting within 1 month after the over-delay is founded
High foreign exchange risk	Set aside 1% of their respective ADB loan balance in a separate bank account as risk reserve for foreign exchange rate fluctuations each year	JHG, JTPC	2 months after the loan effectiveness
Mismatch of investment cost of primary heating network with the corresponding cash inflows	Implementing agencies should attach a footnote to the audited financial statements to be provided to ADB, indicating the adjusted revenues by adding to the sales revenue the portion of capital surplus resulted from the construction of primary heating network	JHG, JTPC	Same as the time for provision of audited financial statements
Misclassification of unpaid investment cost for main heating network	Implementing agencies should classify the unpaid investment project costs for procurement of equipment/civil works as current or non-current liability as per the actual payment due date of the related contracts and update the accounts on a timely basis	JHG, JTPC	After the loan effectiveness
High financial leverage	Ex-ante mitigation measure of signing the on-lending loan agreement, accepted by ADB, with the condition requiring the IAs to control its total liabilities to total asset ratio below 80% has been done	JHG, JTPC, ADB	Completed
	Submit its audited annual financial statements including the audit report	JHG, JTPC	No later than 1 month after the auditor finalized the audit report

ADB = Asian Development Bank, PMO = project management office, JHG = Jinan Heating Group, JTPC = Jinan Thermal Power Co, Ltd, PICs = project implementation consultants.
Source: Asian Development Bank.

B. Disbursement

1. Disbursement Arrangements for ADB Funds

26. The loan proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time),¹⁸ and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available.¹⁹ Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

27. JHP and JTPC will prepare payment requests and submit them to ADB through PMO. At the end of each year PMO will prepare realistic projections of contract awards and disbursements for the following year and submit them to ADB.

¹⁸ The handbook is available electronically from the ADB website.

<https://www.adb.org/documents/loan-disbursement-handbook>.

¹⁹ Disbursement eLearning. http://wpqr4.adb.org/disbursement_elearning

28. The PMO will be responsible for (i) preparing disbursement projections, (ii) requesting budgetary allocations for counterpart funds, (iii) collecting supporting documents, and (iv) consolidate and send the withdrawal applications (WA) to ADB.

29. **Advance fund procedure.** The PDOF will establish an exclusive advance account promptly after loan effectiveness at a commercial bank. The currency of the advance account is the EURO (€). The advance account is to be used exclusively for ADB's share of eligible expenditures. The PDOF, who administers the advance account is accountable and responsible for proper use of advances to the advance account.

30. The total outstanding advance to the advance account should not exceed the estimate of ADB's share of expenditures to be paid through the advance account for the forthcoming 6 months. The PDOF may request for initial and additional advances to the advance account based on an Estimate of Expenditure Sheet²⁰ setting out the estimated expenditures to be financed through the account for the forthcoming 6 months. Supporting documents should be submitted to ADB or retained by the PMO, JHG and JTPC in accordance with ADB's Loan Disbursement Handbook (2017, as amended from time to time) when liquidating or replenishing the advance account.

31. **Statement of expenditure procedure.**²¹ The SOE procedure may be used for reimbursement of eligible expenditures or liquidation of advances to the advance account. The ceiling of the SOE procedure is the equivalent of \$500,000 per individual payment. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB's disbursement and review missions, upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. Reimbursement and liquidation of individual payments in excess of the SOE ceiling should be supported by full documentation when submitting the WA to ADB.

32. **Reimbursement.** The reimbursement procedure is a disbursement procedure where ADB pays from the loan account to the borrower's account for the eligible expenditure which have been incurred and paid for by the borrower out of its budget allocation or its own resources. Use of the procedure is encouraged for all eligible expenditures when the borrower has sufficient resources. Under this procedure, ADB's payment are made only to the borrower. This procedure requires submission of full supporting documentation, unless simplified documentation, such as SOE procedure, is approved.

33. Before the submission of the first WA, the borrower should submit to ADB sufficient evidence of the authority of the person(s) who will sign the WA on behalf of the government, together with the authenticated specimen signatures of each authorized person. The minimum value per WA is stipulated in the Loan Disbursement Handbook (2017, as amended from time to time). Individual payments below such amount should be paid (i) by the executing or implementing agencies and subsequently claimed to ADB through reimbursement, or (ii) through the advance fund procedure, unless otherwise accepted by ADB. The borrower should ensure sufficient

²⁰ Estimate of Expenditure sheet is available in Appendix 8A of ADB's *Loan Disbursement Handbook* (2017, as amended from time to time),

²¹ SOE forms are available in Appendix 7B and 7D of ADB's *Loan Disbursement Handbook* (2017, as amended from time to time).

category and contract balances before requesting disbursements. Use of ADB's Client Portal for Disbursements (CPD)²² system is encouraged for submission of WA to ADB.

34. **Condition for Withdrawals from Loan Account.** Notwithstanding any other provision of this Loan Agreement, no withdrawals shall be made from the Loan Account for onlending to a Project Implementing Agency until (a) ADB has confirmed to SPG that the Onlending Agreement and Project Implementation Agreement signed with such Project Implementing Agency are acceptable to ADB and (b) SPG has certified to ADB that such Project Implementing Agency has opened a dedicated bank account to hold a risk reserve against foreign exchange rate fluctuations as provided in the PAM.

2. Disbursement Arrangements for Counterpart Fund

35. Counterpart funds will come from the JHG and JTPC. JHG will provide €158.85 million, or 25.59% of the total project cost, to cover the financial charges, environmental management and monitoring, social safeguards monitoring, surveys, design, and supervision; taxes and duties for civil works and goods, and contingencies during implementation. JTPC will provide €126.95 million, or 20.45% of the project cost, to cover the financial charges, environmental management and monitoring, social safeguards monitoring, surveys, design, and supervision; taxes and duties for civil works and goods, and contingencies during implementation.

C. Accounting

36. The PMO, JHG, and JTPC will maintain, or cause to be maintained, separate project accounts and records by funding source for all expenditures incurred on the project following Accounting Methods for Projects Financed by the World Bank (reference No. 2000 [13]).²³ Each IA will prepare annual financial statements for submission to PMO. The PMO will consolidate all annual project accounts and financial statements for the project in accordance with the government's accounting laws and regulations which are consistent with international accounting principles and practices.

D. Auditing and Public Disclosure

37. The PMO will cause the detailed project financial statements to be audited in accordance with International Standards on Auditing and the PRC auditing standards by an auditor acceptable to ADB. The audited project financial statements together with the auditor's opinion will be presented in English to ADB within 6 months from the end of the fiscal year by the PMO.

38. The audited entity financial statements, together with the auditor's report and management letter, will be submitted in English to ADB within 1 month after their approval by the relevant authority, for monitoring the total liabilities to total assets ratio and financial standings of each implementing agency as they are on a corporate level.

39. The audit report for the project financial statements will include a management letter and auditor's opinions, which cover (i) whether the project financial statements present an accurate and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting standards; (ii) whether the proceeds of the loan were used only for the

²² The CPD facilitates online submission of WA to ADB, resulting in faster disbursement. The forms to be completed by the Borrower are available online at <https://www.adb.org/documents/client-portal-disbursements-guide>.

²³ Accounting regulations issued by the Ministry of Finance for all foreign aid-funded projects.

purpose(s) of the project; and (iii) whether the borrower or executing agency was in compliance with the financial covenants contained in the legal agreements (where applicable).

40. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

41. The government, executing and implementing agencies have been made aware of ADB's approach to delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements.²⁴ ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

42. Public disclosure of the audited project financial statements, including the auditor's opinion on the project financial statements, will be guided by ADB's Public Communications Policy 2011.²⁵ After the review, ADB will disclose the audited project financial statements and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The management letter, additional auditor's opinions, and audited entity financial statements will not be disclosed.²⁶

²⁴ ADB's approach and procedures regarding delayed submission of audited project financial statements:

- (i) When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (a) the audit documents are overdue; and (b) if they are not received within the next 6 months, requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.
- (ii) When audited project financial statements are not received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of advance accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (a) inform the executing agency of ADB's actions; and (b) advise that the loan may be suspended if the audit documents are not received within the next 6 months.
- (iii) When audited project financial statements are not received within 12 months after the due date, ADB may suspend the loan.

²⁵ Public Communications Policy: <https://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications>.

²⁶ This type of information would generally fall under public communications policy exceptions to disclosure. ADB. 2011. *Public Communications Policy*. Paragraph 97(iv) and/or 97(v).

VI. PROCUREMENT AND CONSULTING SERVICES

A. Project Procurement Risk Assessment

43. A project procurement risk assessment was conducted for the project, in accordance with the Guide on Assessing Procurement Risks and Determining Project Procurement Classification (ADB, 2014). Overall project procurement risk is low.

44. According to the assessment, the main strengths identified include: (i) Staff of the implementing agencies have adequate experience in domestic procurement; (ii) Both implementing agencies have adequate staff and equipment to support the procurement and consultant recruitment during the project implementation. The main weaknesses identified include: (i) lack of experience of the implementing agencies in ADB-financed projects; (ii) some discrepancies between domestic and ADB practices; and (iii) lack of procedures in place for engaging consultants.

45. Proposed mitigation measures include training to be provided to relevant staff of the implementing agencies, PMO, and other stakeholder agencies. Some procurement training was delivered by TRTA consultants during the project preparation to the IAs and PMO on topics in ADB procedures for procurement of goods, works and consulting services to ensure that the non-familiarity with ADB procurement framework has been addressed. The procurement training will be delivered on a well-defined interval by the loan implementation consultants during the project implementation to ensure that procurement activities are undertaken in full conformity with 2017 ADB Procurement Regulations.

B. Advance Contracting and Retroactive Financing

46. **Advance contracting** will apply to the urgent procurement of civil works and goods. All advance contracting and retroactive financing will be undertaken in conformity with ADB Procurement Policy: Goods, works, Nonconsulting and Consulting Services (2017, as amended from time to time)²⁷ and Procurement Regulations for ADB Borrowers: Goods, works, Nonconsulting and Consulting Services (2017, as amended from time to time),²⁸ and will require ADB's prior review and approval of each step. The borrower, executing and implementing agencies have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project.

47. **Retroactive financing** will apply to the urgent procurement of civil works and goods. Retroactive financing will be subject to a maximum amount equivalent to 20% of the loan amount for eligible expenditures incurred prior to loan effectiveness, but not earlier than 12 months before the loan agreement is signed.

C. Procurement of Goods, Works, and Consulting Services

48. All procurement of ADB financing works and goods will be undertaken in accordance with ADB Procurement Policy: Goods, works, Nonconsulting and Consulting Services (2017, as amended from time to time)²⁹ and Procurement Regulations for ADB Borrowers: Goods, works, Nonconsulting and Consulting Services (2017, as amended from time to time).

²⁷ Available at: <https://www.adb.org/documents/adb-procurement-policy>

²⁸ Available at: <https://www.adb.org/documents/procurement-regulations-adb-borrowers>

²⁹ Available at: <https://www.adb.org/documents/adb-procurement-policy>

49. Before the start of any procurement, ADB and the government will review the public procurement laws of the central and state governments to ensure consistency with ADB's Procurement Policy and Procurement Regulations for ADB Borrowers.

50. An 18-month procurement plan indicating threshold and review procedures, goods, works, and consulting service contract packages and national competitive bidding guidelines is in Section C.

1. Open Competitive Bidding

51. OCB will be used for ADB financing contracts for works and goods. If a bidding attracts foreign companies, the bidding document will be written in English using the latest ADB standard international competitive bidding document which can be downloaded from ADB website, and internationally advertised. If a bidding does not attract foreign companies, the following provisions will be applied: (i) the advertisement will be limited to the national press, an official gazette, or an open access website; (ii) standard bidding documents issued by the Ministry of Finance will be used; and (iii) bidding documents will only be in the Chinese (except for contracts which require ADB's prior review and approval), and the currency for bidding and payment will be in Chinese Yuan. If a bidding document is internationally advertised, the invitations for bids needs to be submitted to ADB at latest 1 week before the advertisement for parallel advertisement in Business Opportunities of ADB's website. Unless otherwise agreed between the PMO, JHG, JTPC, and ADB and set forth in the procurement plan, procurements under OCB will use the single-stage one-envelope procedure.

2. Consulting Services

52. All ADB financing individual consultants, consulting firms, and monitoring agencies will be recruited according to ADB's Procurement Policy and Procurement Regulations for ADB Borrowers. The indicative terms of reference for PICs are in Appendix 1.

3. Thresholds for ADB Review

53. For (i) all ADB financing OCB contracts for advance contracting, and (ii) the first ADB financing OCB contracts for civil works and goods for each implementing agency, ADB's prior review and approval of the following documents (if applicable) will be required for: invitation for bids, bidding documents, bid evaluation report, draft negotiated contract, signed contract, and contract variations.

54. The other ADB financing contracts for civil works and goods will be subject to post review (sampling), and for each contract, (i) ADB's approval of the invitation for bids and bidding document for OCB (if applicable) will not be necessary as long as the first OCB document approved by ADB is used as a model without substantial modification; (ii) procurement process can be conducted without ADB's prior approval (if a bidding document is internationally advertised, the invitations for bids needs to be submitted to ADB at latest one week before the advertisement for parallel advertisement in Business Opportunities of ADB's website); and (iii) after the contract is signed, the bid evaluation report (if applicable) and signed contract needs to be submitted to ADB for ADB's post review (sampling) and approval.

55. For all consultant recruitments (including the recruitments of monitoring agencies), ADB's prior review and approval of each step will be required.

D. Procurement Plan

56. The procurement plan shall be updated as needed throughout the duration of the project.

Basic Data

Project Name: Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—Shandong Clean Heating and Cooling Project		
Project Number: 51418-001	Approval Number:	
Country: People's Republic of China	Executing Agency: Shandong Provincial Government	
Project Procurement Classification: Category B	Implementing Agency: Jinan Heating Group, Jinan Thermal Power Co., Ltd	
Procurement Risk: Low	Project Closing Date: 30 October 2024	
Project Financing Amount:		
ADB Financing: ADB: €350,000,000 (loan) Clean Energy Fund ^a under the Clean Energy Financing Partnership Facility: \$750,000		
Non-ADB Financing: €272.05 million		
Date of First Procurement Plan: 07 May 2018	Date of this Procurement Plan: 12 November 2018	
Procurement Plan Duration (in months): 18	Advance Contracting: Yes	e-Procurement: No

^a Financing partners: the governments of Australia, Norway, Spain, Sweden, and the United Kingdom.

1. Methods, Review and Procurement Plan

57. Except as ADB may otherwise agree, the following process thresholds shall apply to procurement of works and goods and consultant recruitments:

Procurement of Goods, Works and Nonconsulting Services	
Methods	Comments
Open competitive bidding within national advertising for goods	Roads, pipelines materials and equipment are available locally and local market is competitive
Open competitive bidding with international advertising for works	Local contractors are experienced
Consulting services	
Open competitive bidding with international advertising, using quality- and cost- based selection for consulting services	Two consulting firms are required for supporting the project implementation, and international advertising is warranted

ADB = Asian Development Bank.

2. Lists of Active Procurement Packages (Contracts)

58. The following table lists goods, works, nonconsulting, and consulting services contracts for which the procurement activity is either ongoing or expected to commence within the procurement plan's duration.

Goods, Works, and Nonconsulting Services							
Package No.	General Description	Estimated value (\$ million)	Procurement method	Review	Bidding procedure	Advertisement Date (Q, Y)	Comments
JHG_CBDSS_CW01	Civil works, goods, materials and equipment for Southern Energy Station	10.55	OCB	Prior	1S1E	Q1, 2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: Yes Bidding documents: Large works E-procurement: No

Goods, Works, and Nonconsulting Services							
Package No.	General Description	Estimated value (\$ million)	Procurement method	Review	Bidding procedure	Advertise ment Date (Q, Y)	Comments
JHG_DXLQT_CW01	Civil works, goods, materials and equipment for Dongxin Cooling Tower component	4.63	OCB	Post review (sampling)	1S1E	Q4, 2020	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
JHG_GWGC_CW01	Installation for 36.86 km heating pipes	17.70	OCB	Post review (sampling)	1S1E	Q4, 2019	Advertising: National No. of contracts: 3 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
JHG_GWGC_CW02	36.86 km heating pipes	14.79	OCB	Post review (sampling)	1S1E	Q1, 2020	Advertising: National No. of contracts: 3 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_U_GM01	Air-source heating pumps for 2 communities	0.31	OCB	Post review (sampling)	1S1E	Q3, 2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
SH_U_CW01	Heating supply network in Shanghe Urban area	0.96	OCB	Post review (sampling)	1S1E	Q1, 2020	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_U_CW02	Heating supply and exchanging stations for 7 communities	6.07	OCB	Post review (sampling)	1S1E	Q4, 2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_T_CW01	Geothermal pumps and associated pipes in 4 communities	4.51	OCB	Post review (sampling)	1S1E	Q3,2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_U_CW04	Geothermal energy stations in 6 communities	14.01	OCB	Post review (sampling)	1S1E	Q4,2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_T_CW03	CW for geothermal well in 1 community	18.27	OCB	Post review (sampling)	1S1E	Q3,2020	Advertising: National No. of contracts: 3 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_T_CW04	Heating pipe networks for 4 communities	26.58	OCB	Post review (sampling)	1S1E	Q4,2020	Advertising: National No. of contracts: 4 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_Boiler	Natural gas hot water boiler	1.27	OCB	Post review (sampling)	1S1E	Q3,2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No

Goods, Works, and Nonconsulting Services								
Package No.	General Description	Estimated value (\$ million)		Procurement method	Review	Bidding procedure	Advertise ment Date (Q, Y)	Comments
	(capacity of 42 MW)							Advance contracting: No Bidding documents: Goods E-procurement: No
SH_RAE_AS HP_AH_B01	30,000 air-source heat pump air heaters	Lot 1:	4.70	OCB	Prior	1S1E	Q3,2019	Advertising: International No. of contracts: 6 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
		Lot 2:	4.70					
		Lot 3:	4.70					
		Lot 4:	4.70					
		Lot 6:	4.70					
SH_RAE_EQ	10,000 air-source heat pump water heaters, 1,000 wall-mounted gas boilers, 3000 sets of carbon crystal plates, 6,000 storage heaters	Lot 1:	17.34	OCB	Post review (sampling)	1S1E	Q3, 2020	Advertising: International No. of contracts: 4 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
		Lot 2:	0.58					
		Lot 3:	0.87					
		Lot 4:	1.73					
SH_RA_CW0 1	30,000 HHs house renovation for clean heating and energy-saving	Lot 1:	3.25	OCB	Post review (sampling)	1S1E	Q2, 2019	Advertising: National No. of contracts: 4 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
		Lot 2:	3.25					
		Lot 3:	3.25					
		Lot 4:	3.25					
JTPC-EHS- HP-GM01	31.97 km heating pipelines	Lot 1:	7.44	OCB	Post review (sampling)	1S1E	Q2, 2020	Advertising: International No. of contracts: 3 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
		Lot 2:	8.70					
		Lot 3:	7.57					
JTPC-EHS- HP-CW01	CW for 11.62 km heating pipelines	7.13		OCB	Post review (sampling)	1S1E	Q2, 2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: Yes Bidding documents: Large works E-procurement: No
JTPC-RE- GM01	130 gas fired absorption heat pumps (GAHPs)	2.57		OCB	Prior	1S1E	Q3, 2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
JTPC-RE- CW01	CW - geothermal well for Biomass Power Plant	3.74		OCB	Prior	1S1E	Q2, 2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
JTPC-BPP- HP-GM01	11.62 km heating pipelines	Lot 1:	2.37	OCB	Post review (sampling)	1S1E	Q3, 2019	Advertising: National No. of contracts: 3 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
		Lot 2:	2.79					
		Lot 3:	1.11					
JTPC-BPP- HP-CW01	Heating pipelines installation- 11.62km	2.19		OCB	Post review (sampling)	1S1E	Q4, 2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
JTPC-BPP- HP-CW02	CW for 6.87 km heating pipelines	2.37		OCB	Post review (sampling)	1S1E	Q2, 2019	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No

Goods, Works, and Nonconsulting Services							
Package No.	General Description	Estimated value (\$ million)	Procurement method	Review	Bidding procedure	Advertisement Date (Q, Y)	Comments
							Advance contracting: No Bidding documents: Large works E-procurement: No

Consulting Services							
Package No.	General Description	Estimated value (\$ million)	Procurement method	Review	Bidding procedure	Advertisement Date (Q, Y)	Comments
CS-2019-01	Consulting services for project implementation support	0.54	QCBS	Prior	STP	Q2, 2019	Type: Firm Assignment: International Quality-Cost Ratio (if applicable): 90:10 Prequalification of bidders: Yes Domestic preference applicable: No Advance contracting: No E-procurement: No
CS-2019-02	PPMS establishment and equipment	0.20	QCBS	Prior	STP	Q2, 2019	Type: Firm Assignment: International Quality-Cost Ratio (if applicable): 90:10 Prequalification of bidders: Yes Domestic preference applicable: No Advance contracting: No E-procurement: No

3. Lists of Inactive Procurement Packages (Contracts) Required Under the Project

59. The following table lists goods, works, nonconsulting, and consulting services contracts for which the procurement activity is either ongoing or expected to commence beyond the current procurement plan's duration.

Goods, Works, and Nonconsulting Services							
Package No.	General Description	Estimated value (\$ million)	Procurement method	Review	Bidding procedure	Advertisement Date (Q, Y)	Comments
JHG_CBDNS_CW01	Civil works, goods, materials and equipment for Northern Energy Station	9.24	OCB	Post review (sampling)	1S1E	Q1, 2022	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
JHG_HES_GM01	Heating and Cooling HES in Greenland Group sites - equipment & materials and installation	8.94	OCB	Post review (sampling)	1S1E	Q3, 2021	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
JHG_GWGC_CW03	CW for 36.86 km heating pipes	8.93	OCB	Post review (sampling)	1S1E	Q4, 2021	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
JHG_GWGC_CW04	6.45 km cooling supply pipe networks	5.18	OCB	Post review (sampling)	1S1E	Q3, 2022	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_U_CW03	Heating supply and exchanging stations for 8 communities	10.29	OCB	Post review (sampling)	1S1E	Q1, 2021	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No

Goods, Works, and Nonconsulting Services

Package No.	General Description	Estimated value (\$ million)	Procurement method	Review	Bidding procedure	Advertisement Date (Q, Y)	Comments
SH_T_CW02	Geothermal pumps and associated pipes in 3 communities	6.75	OCB	Post review (sampling)	1S1E	Q3,2022	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_U_CW05	Geothermal energy stations in 5 communities	16.72	OCB	Post review (sampling)	1S1E	Q4,2021	Advertising: National No. of contracts: 2 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_UA_ESR B_CW01	Urban area - Energy-saving reconstruction of buildings (323,104 m ²)	4.20	OCB	Post review (sampling)	1S1E	Q4, 2021	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No
SH_RAE_AS HP_AH_B02	30,000 air-source heat pump air heaters	Lot 1: 4.70 Lot 2: 4.70 Lot 3: 4.70 Lot 4: 4.70 Lot 5: 4.70 Lot 6: 4.70	OCB	Post review (sampling)	1S1E	Q3, 2022	Advertising: International No. of contracts: 6 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
JTPC-EHS- HP-GM02	24.4 km heating pipelines	Lot 1: 6.22 Lot 2: 9.65	OCB	Post review (sampling)	1S1E	Q4, 2021	Advertising: International No. of contracts: 2 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
JTPC-EHS- HP-CW02	CW for 17.33 km heating pipelines	8.56	OCB	Post review (sampling)	1S1E	Q1, 2021	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: Yes Bidding documents: Large works E-procurement: No
JTPC-RE- GM02	Geothermal well for Biomass Power Plant	4.51	OCB	Post review (sampling)	1S1E	Q1, 2021	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
JTPC-RE- GM03	582 GAHPs	7.84	OCB	Post review (sampling)	1S1E	Q3, 2021	Advertising: National No. of contracts: 3 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
JTPC-RE- GM04	551 GAHPs	7.22	OCB	Post review (sampling)	1S1E	Q2, 2022	Advertising: National No. of contracts: 3 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
JTPC-BPP- HP-GM02	16.93 km pipelines	Lot 1: 6.96 Lot 2: 5.31	OCB	Post review (sampling)	1S1E	Q3, 2021	Advertising: National No. of contracts: 2 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Goods E-procurement: No
JTPC-BPP- HP-CW03	Pipeline installation for 16.93 km pipelines	4.17	OCB	Post review (sampling)	1S1E	Q4, 2021	Advertising: National No. of contracts: 1 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No

Goods, Works, and Nonconsulting Services							
Package No.	General Description	Estimated value (\$ million)	Procurement method	Review	Bidding procedure	Advertisement Date (Q, Y)	Comments
							Bidding documents: Large works E-procurement: No
JTPC-BPP-HP-CW04	Pipeline CW for 15.6 km pipelines	Lot 1: 6.90 Lot 2: 4.83	OCB	Post review (sampling)	1S1E	Q2, 2021	Advertising: National No. of contracts: 2 Prequalification of bidders: No Domestic preference applicable: No Advance contracting: No Bidding documents: Large works E-procurement: No

4. Lists of Awarded and Completed Contracts

60. The following table lists the awarded and completed contracts for goods, works, nonconsulting services and consulting services.

Goods, Works, and Nonconsulting Services					
Package No.	General Description	Contract value	Date of ADB approval of Contract Award	Date of Completion	Comments
[None]					

ADB=Asian Development Bank.

Consulting Services					
Package No.	General Description	Contract value	Date of ADB approval of Contract Award	Date of Completion	Comments
[None]					

ADB=Asian Development Bank.

5. Non-ADB Financing

61. The following table list works, goods, and consulting services contracts over the life of the project, financed by non-ADB sources.

Goods, Works, and Nonconsulting Services					
No.	General Description	Estimated value (\$ million)	Estimated No. of Contracts	Procurement method	Comments
1	JHG-High-voltage power system for the Southern Station and Northern Station	4.66	3	OCB	Financed by counterpart funds of both IAs
2	HES in Greenland Group sites - equipment & materials and installation	0.21	1	OCB	
3	JTPC-Goods and materials for heating supply pipelines	15.14	8	OCB	Advertising planned: Q4, 2018- Q4 2022
4	JTPC-Material and equipment supply for biomass power plant	12.12	15	OCB	Advertising: National
5	JHG-Civil works for Southern Station decoration	13.85	1	OCB	Prequalification of bidders: No
6	JHG Shanghe-Geothermal wells and associated pipes in 2 communities, heating pipe networks for 3 communities and 4 streets, machinery rooms in Shanghe	4.99	4	OCB	Domestic preference applicable: No
7	Urban area - Energy-saving reconstruction of buildings (337,364 m ²)	4.39	1	OCB	Advance contracting: No
8	JTPC- heating pipeline installation	48.16	50	OCB	
9	CW for 2.35 km heating pipelines (DN 900) from Danji Railway to G309	4.21	3	OCB	Bidding document: Goods or Civil works
10	Equipment installation for biomass power plant	8.86	11	OCB	E-procurement: No
11	Civil works for biomass plant	18.92	9	OCB	

Consulting Services					
General Description	Estimated Value	Estimated No. of Contracts	Recruitment Method	Comments	
[None]					

E. Open Competitive Bidding (National Advertising)

1. Regulation and Reference Documents

62. The procedures to be followed for Open Competitive Bidding (National Advertising) shall be those set forth in The Government Procurement Law of People's Republic of China approved on 29 June 2002 (revised in August 2014) and Law of the People's Republic of China on Bid Invitation and Bidding of the People's Republic of China promulgated on 30 August 1999 (revised on 28 December 2017) with the clarifications and modifications described in the following paragraphs required for compliance with the provisions of the ADB Procurement Guidelines.

2. Procurement Procedures

a. Competitive Bidding Procedure (Procurement Law Art. 26 and Law on Bidding Art. 10).

63. Public tendering is the acceptable method of government procurement, and public invitation is the accepted bid invitation mode.

b. Eligibility

64. The eligibility of bidders shall be as defined under section I of the Procurement Regulations for ADB Borrowers; accordingly, no bidder or potential bidder should be declared ineligible for reasons other than those provided in section I of the Regulations, as amended from time to time.

c. Advertising

65. All invitations to prequalify or to bid shall be advertised in the national press (China Daily Newspaper) or a free and open access website (www.chinabidding.com). Such advertisement shall be made in sufficient time for prospective bidders to obtain prequalification or bidding documents and prepare and submit their responses. In any event, a reasonable time shall be given to the bidders for preparation of their bid docs. The preparation period shall count (a) from the date of advertisement, or (b) when the documents are available for issue, whichever date is later. The advertisement and the prequalification and bidding documents shall specify the deadline for such submission.

d. Bidding Period

66. The minimum bidding period should be reasonable enough for bidders to prepare their bids prior to the deadline for the submission of bids.

e. Participation by Government-Owned Enterprises

67. Government owned enterprises in the Borrower's country may be permitted to bid if they can establish that they (a) are legally and financially autonomous, (b) operate under commercial law and (c) are not a dependent agency of the Borrower/Project Executing Agency.

f. Rebidding

68. Re-bidding shall not be allowed solely because the number of bids is less than three (3).

3. Bidding Documents

a. Qualification requirements

69. Qualification requirements of bidders and the method of evaluating the qualification of each bidder shall be specified in detail in the bidding documents, and in the prequalification documents if the bidding is preceded by a prequalification process.

b. Bid Submission and Opening

70. Bidders shall be allowed to submit bids by mail or by hand.

71. All bids shall be opened in public; all bidders shall be afforded an opportunity to be present (either in person or through their representatives) at the time of bid opening, but bidders shall not be required to be present at the bid opening.

c. Bid Evaluation and Award

72. No bid may be rejected solely on the basis that the bid price falls outside any standard contract estimate, or margin or bracket of average bids established by the Borrower/Project Executing Agency.

73. Each contract shall be awarded to the lowest evaluated responsive bidder, that is, the bidder who meets the appropriate standards of capability and resources and whose bid has been determined (a) to be substantially responsive to the bidding documents and (b) to offer the lowest evaluated cost. The winning bidder shall not be required, as a condition of award, to undertake responsibilities for work not stipulated in the bidding documents or otherwise to modify the bid as originally submitted.

d. ADB Policy Clauses

74. Each contract financed with the proceeds of the Loan shall provide that the suppliers and contractors shall permit ADB, at its request, to inspect their accounts and records relating to the performance of the contract and to have said accounts and records audited by auditors appointed by ADB.

75. A provision shall be included in all bidding documents for OCB (National Advertising) works and goods contracts financed by ADB stating that the Borrower shall reject a proposal for award if it determines that the bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question.

76. A provision shall be included in all bidding documents for OCB (National Advertising) works and goods contracts financed by ADB stating that ADB will declare a firm or individual ineligible, either indefinitely or for a stated period, to be awarded a contract financed by ADB, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices or any integrity violation in competing for, or in executing, ADB-financed contract.

VII. SAFEGUARDS

77. **Prohibited investment activities.** Pursuant to ADB's Safeguard Policy Statement (2009), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the Safeguard Policy Statement (SPS) (2009).

78. **Environment.** The project is classified category A for environment. An Environmental Impact Assessment (EIA) for the 2 x 75 t/h Biomass Combined Heating and Power component, and Initial Environmental Examinations (IEEs) for East Jinan Low-Emission Combined District Heating and Cooling component, distributed Natural-gas based District Heating component, and Shanghe Clean Energy District Heating component, including environmental management plans (EMPs) have been prepared in accordance with ADB's SPS (2009) and government regulations. The EIA was disclosed on the ADB website on 13 August 2018 and the IEEs will be disclosed. Any update in the EIA/IEEs resulting from a change in project scope will be similarly disclosed.

79. The Project is not expected to cause significant adverse environmental impacts as it will use natural gas, waste heat from thermal power plants, biomass and other renewable energy to replace individual household coal stoves, and coal-fired boilers to provide heating and cooling to residents and commercial buildings. The Project will reduce CO₂ and other air pollutants emissions and help improve the local air quality. During construction, the main environmental impacts are temporary, short-term and reversible, including (i) soil erosion; (ii) construction noise, vibration and dust affecting local residents; (iii) inappropriate storage of construction materials and wastes; (iv) waste water; and (v) safety to construction workers and community. During operation, the adverse environmental impacts are anticipated, mainly including low-level air pollutants emissions, waste water, solid waste, and occupational and community health and safety. The environmental assessments conclude that those impacts can be mitigated through the implementation of the EMPs, which specifies mitigation measures, monitoring requirements, and institutional responsibilities for ensuring proper environmental management throughout the project's construction and operation. The executing and implementing agencies are committed to managing the identified environmental impacts and have agreed on a comprehensive set of environment-related loan covenants and training programs with strong emphasis on environment safeguards.

80. JHG and JTPC will have designated environment and social staff who will assist in promoting environmentally responsible implementation of contracts, monitor the implementation of mitigation measures, and prepare environmental monitoring reports. JHG and JTPC will monitor and report to ADB on the implementation of the EMP. JHG and JTPC will prepare environmental monitoring reports semi-annually during construction and annually during operation. These monitoring reports will be disclosed on ADB website as required by SPS (2009) and Public Communications Policy (2011) as well as IAs' websites.

81. The mitigation measures will be incorporated in bidding and contract documents. The contractor(s) are required to comply with the EMPs during pre-construction and construction stages and JHG and JTPC will monitor compliance. If any unanticipated impacts are identified, or there are changes in project scope and design, IAs shall inform ADB and prepare corrective actions. Corrective actions will be implemented by the contractors/IAs, which will be documented in the environmental monitoring reports.

82. Meaningful public consultation was conducted in accordance with ADB's SPS (2009). Consultation with project stakeholders will continue through pre-construction, construction and operation stages as needed. A grievance redress mechanism (GRM) will be established as soon

as the project commences. Potential environmental complaints or disputes will be handled in accordance with the GRM. All complaints related documentation such as minutes of the meetings and decisions will be summarized and included in the environmental monitoring reports submitted to ADB. If the grievance is not addressed, the complainant can seek legal redress of the grievance in the appropriate courts.

83. Implementing agencies will retain qualified environmental consultants to assist in monitoring the implementation of EMPs, preparing environmental monitoring reports, and delivering training to implementing agencies and contractors. An external qualified environmental expert will also be engaged to verify the monitoring information.

84. A rapid climate risk assessment using AWARE tool concludes that climate risk of the project is *high*. The main climate risk factors include wild fire, flood, and water availability (high risk), temperature increase and wind speed increase (medium risk), and the main geological hazard risk factor includes earthquake (medium risk). A climate risk and vulnerability assessment study will be conducted. Climate risk adaptation recommendations from the study will be incorporated into the project detailed design.

85. **Involuntary Resettlement and Indigenous Peoples.** The project is classified category C for involuntary resettlement and indigenous peoples since it does not entail permanent or temporary physical or economic displacement as (i) heat exchange stations will use existing space of residential communities and buildings which is reserved for the construction of public facilities; (ii) heating and cooling pipelines will be laid underground within the existing right of way or along roadways; (iii) biomass combined heat and power plant will be built on existing state-owned land which have been acquired before; (iv) geothermal and natural gas energy stations will be constructed in the existing vacant and reserved space inside of the government buildings, residential communities and schools, and (v) clean heating facilities such as heat pumps and distributed natural gas boilers will be constructed on the vacant state-owned land or in existing buildings. The project is not expected to have adverse impact on ethnic minorities as the project site is not close to any ethnic minority towns or villages.

86. If there is any change in scope that may result in affecting people by land acquisition, structure demolition, and involuntary resettlement, the project companies are required to inform ADB of the situation in advance and prepare and submit a resettlement plan to ADB for review and approval, in accordance with ADB's Safeguard Policy Statement, prior to award of works all efforts should be made to exclude project activities that caused involuntary resettlement.

VIII. GENDER AND SOCIAL DIMENSIONS

87. **Social benefits.** The project will directly benefit 646,815 households, 1,988,011 people in the project area (31.4% of total population in Jinan City).³⁰ By 2024, (i) clean individual household-based heating systems³¹ will be delivered to 80,000 households, including 2,091 women from poor households in scattered rural areas in Shanghe County and a modernized “geothermal heat plus” centralized heating system will be delivered to 52,211 households in urban and semi-urban areas in **Shanghe County**, (ii) a clean district heating and cooling system will be provided to about 19,800 new users in **East Jinan** in the future, and (iii) an improved heating services by multiple heating sources including waste heat from power plants, biomass combined heat and power plant, and distributed natural gas-based heating systems and other renewable energy will be provided to 453,944 existing heating supply users and 26,018 new users in **West Jinan**. In addition, the project will provide energy saving retrofit to 36,600 households in Shanghe County including 6,600 households in urban area and 30,000 households in rural area to further improve the efficiency and reduce air pollution of this project. There are about 35,860 children in 29 schools and kindergartens, about 440 patients and medical staff in 9 hospitals, 729 elderly people and caregivers in 8 elderly care centers will be benefited through providing a better school and medical care environment in Shanghe County during the winter by providing cleaner and more reliable heating services. The poor will benefit more through reducing exposures to pollutant emissions and adverse health impact caused by the air pollution. In addition, the farmers within 30-kilometer collection radius of the straw will be indirectly benefited by the operation of Biomass Combined Heat and Power Plant. The indirect beneficiaries are population in Shandong Province and the greater BTH region.

88. The project will enhance the efficient use of clean energy in Jinan, improve air pollution and thereby improve the living and environmental condition for urban and rural residents. The project will (i) reduce cases of respiratory diseases through improved indoor and outdoor air quality, (ii) reduce carbon monoxide poisoning by providing safer heating solutions, (iii) improve heating efficiency through adequate and reliable heating services and energy saving renovation, (iv) relieve women from housework related to using, maintaining and cleaning coal stove, and allow more time to be spent on production, training, and self-development, (v) switch energy use in cooking and heating, (vi) provide a better school and medical care environment by providing cleaner and more reliable heating services, and (vii) increase income through the creation of 3,078 temporary jobs during construction and 881 permanent jobs during operation.

89. **Gender impact.** The project is classified as “effective gender mainstreaming” (EGM). Women in project sites have the main responsibility for the use and maintenance of coal stoves and are disproportionately affected by the resulting in-door air pollution. By switching the type of energy used in cooking and heating, the project will directly affect women’s health outcomes. Furthermore, the project will enable the sharp reduction in time spent by beneficiary women on unpaid household work related to the preparation of household energy for heating from a current average of 2.75 hours to less than 1 hour. This will allow women to spend more time on production, training, and self-development, which could lead to increased income.

90. The project will (i) provide access to clean heating for about 2,091 households headed by poor women; (ii) improve the technical capacity of JHG and JTPC women staff on the operation

³⁰ The total population of Jinan is 6.33 million in 2016, among which 50.33% are women, and nearly 70% of residents live in urban areas. The total population in Shanghe County is 0.64 million in 2016, among which 49.26% are female and 65.87% of residents live in rural areas.

³¹ The improved heating system such as air source heat pump, shallow ground heat pump, solar heating, switching from coal to gas together with building energy efficiency renovation.

and maintenance of the new facilities through training (at least 40% are women), (iii) ensure that women are employed in skilled and unskilled jobs generated by the project during construction and operation (at least 700 jobs for women); (iv) conduct campaigns to raise awareness of the environmental and health benefits of clean energy (at least 40% of the participants are women); (v) ensure the participation of women in consultations during project implementation (at least 40% of the participants are women); and (vi) ensure that the design of services is gender-sensitive. The project will encourage JHG and JTPC to conduct a corporate gender analysis, which could lead to the drafting of a corporate gender action plan for JHG and JTPC during project implementation. The project will encourage JHG and JTPC to adopt an appropriate gender policy under its corporate social responsibility program with support from the TA.

91. PMO, through JHG and JTPC, and Shanghe County Government will be responsible for the implementation of the GAP and will make necessary budgetary arrangements and hire a social and gender development specialist to support the implementation. The PMO will also seek support from Jinan Municipal Women's Federation (JMWF) for effective implementation of the GAP. The implementation of the GAP will be financed through the project budget and monitored through collection of gender-disaggregated data. The PMO will ensure that the contractors' bidding documents will clearly indicate the gender features outlined in the GAP. All the actions, indicators, responsible institutions, timeframe, and budget have been discussed with the PMO, JTPC, JHG, and relevant local government departments and agreement reached on the actions included. The implementation of the GAP will be financed through the project budget and monitored through collection of gender-disaggregated data. The PMO will ensure that the contractors' bidding documents will clearly indicate the gender features outlined in the GAP.

92. **Other.** A poverty and social assessment, including a questionnaire survey of 769 households, 24 community and focus group discussions and 3 key informant interviews with related government officers were conducted during project preparation in project areas. The Shanghe County Government also installed pilot clean heating facilities in 107 households located in 15 villages of 12 townships from November 2017 to March 2018 in order to test the feasibility and affordability of the facilities. According to the social survey, the heating cost is around 4.25% of the annual income of poor households for those using coal-fired stoves. It can be seen from the operational data in the pilot households that the indoor temperature increased 5 °C in average and could reach 20 °C in the pilot households, but the heating cost was reduced from CNY15/day to CNY10/day after switching from coal-fired stoves to the clean energy heating systems. Therefore, the heating cost will be reduced to 3% of the annual income. There are also existing policies to ensure the affordability of heating supply to the poor and for the district heating tariff in Shanghe County which will increase to CNY24/m² after the project construction, Shanghe County government has committed to pay the gap between the proposed heating tariff and the old tariff if the proposed tariff was not approved by public hearing in the county to ensure the affordability of heating supply for the residents. Therefore, the affordability will not be an issue for the project.

Table 13: Gender Action Plan

Actions	Indicators/Targets	Budget and Sources	Timeframe	Responsible Agencies
Output 1 – Output 3: Integrated renewable energy and coal free-based heating and cooling systems installed				
1.1 Promote women's participation through consultations and awareness campaign of environmental and health benefits of clean energy with women and men in project areas about energy efficiency practices at household level to complement the investment in clean heating.	At least 40% of local women participate in consultation meetings and understand the benefits and any possible increases in the operation cost of clean heat supply. (2017 baseline: 0)	Project budget	2018–2019	PMO, JHG, JTPC, Shanghe County Government, JMWF, social and gender development specialist, communities and township governments
	At least 40% local women participate in awareness raising activities of environmental and health benefits of clean heating. (2017 baseline: 0)	Project budget	2018–2020	
1.2 Relieving women from housework related to using, maintaining, and cleaning coal stove	Time savings reported in preparation of household energy for heating (2017 baseline: 2.75 hours) Participant feedback surveys	Project management budget	2019–2023	PMO, JHG, JTPC, Shanghe County Government, social and gender development specialist, communities and township governments
1.3 Ensure women's participation in public hearings in case of raising tariff	Women's voices should be heard during the public hearings for heat tariff. Women participants should not be less than 40%. (2017 baseline: 0)	Project budget	2019–2023	SPMO, DRC, Shanghe County Government
1.4 Satisfaction survey on improved heating supply services	60% of residents surveyed (including more than 60% women) reported satisfaction in the project area (2017 baseline: 55.86%) ^a	Project management budget	2019–2023	PMO, JHG, JTPC, Shanghe County Government, social and gender development specialist, communities and township governments
1.5 Ensure employment of women in both unskilled and skilled jobs	<ul style="list-style-type: none"> The number of women employed in new skilled jobs generated by the project within JHG and JTPC (2017 baseline: 0) The percentage of women employed in new skilled jobs generated by the project within JHG and JTPC will reach more than 30% (2017 baseline: the percentage of recent female skilled staff is 25%) 	Project budget	2019–2023	PMO, JHG, JTPC, Shanghe County Government, JMWF

Actions	Indicators/Targets	Budget and Sources	Timeframe	Responsible Agencies
	<ul style="list-style-type: none"> • 50% of the unskilled new jobs are held by women (2017 baseline: the percentage of recent women unskilled staff is 45%) • Number of poor women employed in unskilled jobs is increased (2017 baseline: 0) 			
1.6 Provide clean heating solution in rural area	<ul style="list-style-type: none"> • Improved heating sources delivered to 80,000 households in Shanghe (2,091 poor women-headed) (2017 baseline: 0) 	Project budget	2019–2023	PMO, JHG, JTPC, Shanghe County Government,
Output 4: Capacity to install and maintain clean heating and cooling technologies strengthened				
2.1 Provide training courses on operation and maintenance of the new facilities for the staff of JHG and JTPC	<ul style="list-style-type: none"> • At least five courses will be provided (2017 baseline: 0) • 40% of the participants of the courses are women (2017 baseline: 28%) 	Project budget		PMO, JHG, JTPC
2.2 Recruit a social and gender development specialist to support GAP implementation and reporting	<ul style="list-style-type: none"> • One social and gender development specialist with 9 person-months input 	Project management budget	2019–2023	PMO, JHG, JTPC, Shanghe County Government, consultant
2.3 Appoint a PMO staff responsible for GAP implementation and monitoring	One social development and gender focal staff appointed	Project management budget	2019–2023	PMO, JHG, JTPC, Shanghe County Government, consultant
2.4 Recruit a gender and education specialist to prepare the skills development training program for JHG and JTPC in operation and maintenance of new technologies for clean heating and cooling, accounting/finance, and energy economics	One gender and education specialist with 6 person-months input	To be determined	2019–2023	PMO, JHG, JTPC, Shanghe County Government, consultant
2.5 Staff trained in appropriate skills required by the heat and cooling sector	20 people (of which at least 40% are women) participated in workshops and study tours abroad. (2017 baseline: 0)	To be determined	2019–2023	PMO, JHG, JTPC, consultant
2.6 Professional trainings conducted among JHG and JTPC staffs in skills useful to their growth.	By 2023, 50 JHG, JTPC, and Shanghe County Government professionals (of which at least 40% are women) completed a training program relevant to operation of maintenance of new technologies (2017 baseline: 0)	To be determined	2019–2023	PMO, JHG, JTPC, Shanghe County Government, consultant
For all outputs: Providing job opportunities for women and protecting women's labor rights				
3.1 Ensure female employment in construction jobs	<ul style="list-style-type: none"> • 30% of women are employed as skilled and unskilled workers 	Project budget	2019–2023	PMO, JHG, JTPC, Shanghe County

Actions	Indicators/Targets	Budget and Sources	Timeframe	Responsible Agencies
	<ul style="list-style-type: none"> •Number of women from poor household in unskilled jobs 			Government, contractors
3.2 Ensure work environment and conditions on construction sites are conducive to women's participation	100% work sites with facilities (i.e., separate latrines, washing arrangements, women only dormitories, safety measures during the night, etc.) designed particularly for female workers	Project budget	2019–2023	
3.3 Ensure equal pay for equal work	Wages paid to local women and local men by type of job	Project budget	2019–2023	

DRC = Development and Reform Committee, GAP = Gender Action Plan, JHG = Jinan Heating Group, JMWF = Jinan Municipal Women's Federation, JTPC = Jinan Thermal Power Co., Ltd., PMO = project management office.

^a According to the result of the social survey.

<p>2. Shanghe Coal-Free Clean Heating Demonstration Subproject constructed</p> <p>3. East Jinan Low-Emission Combined District Heating and Cooling Subproject constructed</p>	<p>commissioned in an industrial park (2017 baseline: 0)</p> <p>1d. Clean heating system using heat pumps installed and commissioned in residential areas without central heating network (2017 baseline: 0)</p> <p>2a. Energy efficiency measures applied on 660,400 m² of urban buildings and 30,000 rural households in Shanghe County^c (2017 baseline: 0)</p> <p>2b. At least 98 deep-well geothermal installations for district heating developed in urban and semi-urban areas of Shanghe County (2017 baseline: 0)</p> <p>2c. Improved heating solutions delivered to 80,000 households in rural Shanghe (2,091 poor female-headed) (2017 baseline: 0)</p> <p>2d. 42 MW gas boiler and modular gas boilers installed and commissioned in Shanghe County (2017 baseline: 0)</p> <p>3a. Existing district heating network retrofitted and expanded in east Jinan (2017 baseline: 0)</p> <p>3b. An efficient large-scale district cooling system constructed and commissioned in east Jinan (2017 baseline: 0)</p>		
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<p>4. Cleaning Heating Awareness and Capacity to Install and Maintain Clean Heating and Cooling Technologies Strengthened</p>	<p>3c. Thermal storage capacity developed in East Jinan to shift peak time household heating and cooling energy usage (2017 baseline: 0)</p> <p>4a. At least 100,000 people educated on environmental and health benefits of clean heating (2017 baseline: 0)</p> <p>4b. At least 50 JHG and JTPC staff (of which at least 40% are women) report improved knowledge of operation and maintenance of the new facilities (2017 baseline: not applicable)</p> <p>4c. At least 700 women employed in new skilled and unskilled jobs generated by the project (2017 baseline: 0)</p>	<p>4a. Participant feedback surveys</p> <p>4b–4c. Annual report by the implementing agencies</p>	
<p>Key Activities with Milestones</p> <p>Output 1. West Jinan Waste Heat Utilization and Clean Energy Subproject constructed</p> <p>1.1. Construct the biomass-based combined heat and power plant (Q2 2019–Q2 2024)</p> <p>1.2. Retrofit and expand the district heating network in west Jinan (Q2 2019–Q2 2024)</p> <p>1.3. Construct geothermal heating system in the industrial park (Q2 2019–Q2 2024)</p> <p>1.4. Install heat pumps in residential areas without central heating network (Q2 2019–Q2 2024)</p> <p>Output 2. Shanghe Coal-Free Clean Heating Demonstration Subproject constructed</p> <p>2.1. Apply energy efficiency measures on urban buildings and rural households in Shanghe County (Q2 2019–Q2 2024)</p> <p>2.2. Construct deep-well geothermal district heating systems developed in urban and semi-urban areas of Shanghe County (Q2 2019–Q2 2024)</p> <p>2.3. Deliver improved heating sources to rural households in Shanghe County (Q2 2019–Q2 2024)</p> <p>2.4. Install a 42 MW gas boiler and small modular gas boilers in Shanghe County (Q2 2019–Q2 2024)</p> <p>Output 3. East Jinan Low-Emission Combined District Heating and Cooling Subproject constructed</p> <p>3.1. Retrofit and expand the district heating network in west Jinan (Q2 2019–Q2 2024)</p> <p>3.2. Constructed an efficient large-scale district cooling system (Q2 2019–Q2 2024)</p> <p>3.3. Develop thermal storage capacity in East Jinan (Q2 2019–Q2 2024)</p> <p>Output 4: Clean Heating Awareness and Capacity to Install and Maintain Clean Heating and Cooling Technologies Strengthened</p> <p>4.1. Undertake awareness campaigns on the environmental and health benefits of clean heating (Q1 2019–Q4 2020)</p> <p>4.2. Enhance the implementing agencies' knowledge and understanding of installation and maintenance of advanced heating and cooling technologies (Q1 2019–Q4 2020)</p> <p>4.3. Conduct a participant feedback survey in project areas to verify the benefits of clean heating, including time savings for preparation of household energy for heating (Q1 2019–Q1 2020)</p>			
<p>Inputs</p> <p>ADB: €350,000,000 (loan)</p>			

Clean Energy Fund ^b under the Clean Energy Financing Partnership Facility: \$750,000

Beneficiaries: €23,018,200

Commercial banks: €122,060,700

Counterpart funds: €126,972,600

Assumptions for Partner Financing
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Not Applicable.

ADB = Asian Development Bank, BTH = Beijing–Tianjin–Hebei, CO₂ = carbon dioxide, gWh = gigaWatt per hour, km = kilometer, m² = square meters, NO_x = nitrogen oxides, SO₂ = sulfur dioxide.

^a Government of the PRC. 2016. *Thirteenth Five-Year Plan, 2016–2020*. Beijing.

^b Financing partners: the governments of Australia, Norway, Spain, Sweden, and the United Kingdom.

^c Energy efficiency improvement measures for urban area include (i) replacing thermal insulation material for the exterior walls, and (ii) replacing single-layer glass windows with double glazing; while for rural area include adding insulation curtain and adding insulation layer to the roof etc.

Source: Asian Development Bank.

B. Monitoring

93. **Project performance monitoring.**³² To monitor the progress of the project in achieving the planned outcome and outputs, the PMO, JHG, and JTPC will establish a project performance monitoring system (PPMS) before the project implementation starts (before the loan effectiveness) and will maintain accordingly. The basis for project performance monitoring and reporting will be the DMF, which identifies performance targets for the outcomes and outputs of the project. It will be designed to permit adequate flexibility to adopt remedial action regarding project design, schedules, activities, and development impacts. The PPMS will cover the following aspects of the project implementation: (i) project physical and financial progress; (ii) progress and results of capacity development; (iii) implementation of EMP; (iv) implementation of GAP; and (v) compliance with loan covenants (policy, financial, economic, sector, and others). The PMO, JHG and JTPC agreed and confirmed that they will (i) establish the PPMS before the loan effectiveness; (ii) recruit the PICs before the loan effectiveness to facilitate the project start-up and provide consulting service as described in Appendix 1; (iii) confirm that targets are achievable; and (iv) develop recording, monitoring and reporting arrangements.

94. With inputs from JHG, JTPC, and other stakeholders, the PMO will prepare the project progress report semi-annually. Disaggregated baseline data for output and outcome indicators gathered during project preparation will be updated and reported in the semi-annual reports and after each ADB review mission. At the start of project implementation, the PMO, JHG, JTPC, and ADB will develop integrated PPMS procedures to generate data systematically on the inputs and outputs, as well as the indicators to be used to measure the project's impact and outcome taking into account the project scope.

95. **Environmental safeguards monitoring.** Three types of project monitoring will be conducted under the EMP: (i) internal monitoring and supervision and reporting by each IA; (ii) EMP implementation monitoring and progress reporting by the project implementation environmental consultant (PIEC); and (iii) environmental compliance monitoring by local qualified Environmental Monitoring Companies (EMC). The PIEC will provide training on domestic and ADB's environment safeguard requirements and the EMP to IAs and the contractors and support the IAs in monitoring the EMP implementation and preparing environmental monitoring reports semi-annually during construction and annually during operation. An external qualified environmental expert will also be engaged to verify the monitoring information.

³² ADB's project performance reporting system is available at <http://www.adb.org/Documents/Slideshows/PPMS/default.asp?p=evaltool>

96. The environmental monitoring plans in the EMPs specify the scope of monitoring, monitoring parameters, time and frequency, implementation and supervision agencies, and estimated costs. The monitoring shall comply with the standards and methodology provided in EIA/IEEs.

97. **EMP implementation monitoring and progress reporting.** The PIEC will review project progress and compliance with the EMP based on field visits, and the review of the environmental monitoring results provided by the EMC. The findings of the PIEC will be reported to ADB through the semi-annually environmental monitoring reports during construction and annual reports during operation. The reports will include (i) progress made in EMP implementation, (ii) compliance with EMP and loan covenants, (iii) environmental monitoring and compliance, (iv) institutional strengthening and training, (v) public consultation (including GRM), and (vi) any problems encountered during construction and operation, and the relevant corrective actions undertaken. The PIEC will help the PMO prepare the environmental monitoring reports and submit the English report to ADB for review and disclosure. The template for environmental monitoring reports is shown in Appendix 2.

98. **Environmental compliance monitoring by local EMCs.** The implementing agencies will contract an EMC to conduct environmental monitoring in accordance with the EMP and national environmental regulations. A detailed cost will be budgeted by the implementing agencies. Monitoring will be conducted during construction and operation period, until a Project Completion Report is issued. Semi-annual monitoring reports will be prepared by the EMCs and submitted to implementing agencies.

99. **Social safeguards monitoring.** Monitoring of GAP implementation will be conducted, and the methodologies or targets are specified in the relevant action plan, and some indicators are also included in the DMF. PMO and IAs will appoint staff for implementation and internal monitoring of GAP. A national Gender and Social Specialist with 9 person-months input is included under the project implementation consultants. The consultant will assist the PMO and IAs in setting up effective monitoring systems, by working with the social officers, to ensure implementation of the GAP. The monitoring results will be submitted to ADB semi-annually.

C. Evaluation

100. In addition to regular monitoring, project performance will be reviewed at least once a year jointly by ADB and SPG. The review will assess implementation performance and achievement of project outcomes and outputs, assess financial progress, identify issues and constraints affecting implementation, and work out a time-bound action plan for their solution. ADB will undertake annual project reviews during the project period. Additionally, ADB and SPG will undertake a midterm review of the project in 2021, covering all institutional, administrative, organizational, technical, environmental, social, poverty reduction, economic, financial, procurement, and other relevant aspects that may have an impact on the performance of the project and its continuing viability. The review will (i) examine the progress in implementing project outputs; (ii) evaluate environment and social impact; (iii) ensure compliance with assurances in the loan agreement and project agreement; and (iv) evaluate effectiveness of the procurement implementation activities of JHG, JTPC, and Procurement Agency using procurement review for effective implementation evaluation. The review shall also undertake a comprehensive review of potential loan savings, identify areas for reallocation of loan proceeds, and change disbursement

percentages, as appropriate. Within 6 months of physical completion of the Project, SPG will submit a project completion report to ADB.³³

D. Reporting

101. The PMO will provide ADB with (i) semi-annual progress reports in a format consistent with ADB's project performance reporting system; (ii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months; and (iii) a project completion report within 6 months of physical completion of the project. To ensure that projects will continue to be both viable and sustainable, project accounts and the executing agency audited financial statement together with the associated auditor's report, should be adequately reviewed.

102. SPG has agreed on the following reporting commitments:

Report	Timing	Reference
Semi-annual project progress reports	Semi-annually (January, July)	Project agreement, schedule
Project audited financial statements	Not later than 6 months after the closure of fiscal year	Project agreement, schedule
Entity audited financial statements	1 month after the completion and their approval by relevant authorities (April)	Project agreement, schedule
Social monitoring reports	Semi-annually (January, July)	Project agreement, schedule
Environmental monitoring reports		Project agreement, schedule
<ul style="list-style-type: none"> ➤ During the construction period ➤ During the operation period 	<ul style="list-style-type: none"> Semi-annually (January, July) Annually (January) 	
Project completion report	Not later than 6 months after the physical completion of the project	Project agreement, schedule

E. Stakeholder Communication Strategy

103. Project information will be communicated through public consultation, information disclosure mechanism in ADB's and government's website, meetings, interviews, focus group discussions, community consultation meetings, and awareness campaigns in accordance with ADB's requirements of information disclosure policy.

104. Meaningful consultation for the project has been conducted during domestic environmental impact assessment (EIA) and ADB's environment safeguard due diligence in accordance with the PRC Interim Guideline on Public Consultation in EIA (2006) and ADB's SPS (2009). Public consultation will continue through pre-construction, construction and operation stage as needed. Project information will be disclosed as follows: (i) the project EIA/IEEs will be disclosed on ADB website; (ii) domestic EIAs will be disclosed on the websites of JHG and JTPC; and (iii) semi-annual/annual environmental monitoring reports will be disclosed on ADB and implementing agencies' websites. JHG and JTPC will establish a GRM to address environment and social issues associated with the project.

105. Public disclosure of all project documents will be undertaken by JHG and JTPC and on ADB website including the project data sheet, design and monitoring framework, IEE, and the

³³ Project completion report format is available at: <http://www.adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar>

report and recommendation of the president to the Board of Directors. Disclosure of social and environmental monitoring reports will be undertaken during project implementation.

X. ANTICORRUPTION POLICY

106. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.³⁴ All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all project contractors, suppliers, consultants, and other service providers. Individuals and/or entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the project.³⁵

107. To support these efforts, relevant provisions are included in the loan and project agreement and the bidding documents for the Project. The project design and implementation arrangements provide for mitigating corruption risks. Risks associated with project management will be mitigated by (i) training of the executing and implementing agencies' staff in the procurement of civil works, goods, and services under the project; and (ii) periodic inspection of contractors' activities related to fund withdrawals and settlements by the executing agency's staff.

³⁴ Anticorruption Policy: <http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf>

³⁵ ADB's Integrity Office web site: <http://www.adb.org/integrity/unit.asp>

XI. ACCOUNTABILITY MECHANISM

108. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.³⁶

³⁶ Accountability Mechanism. <http://www.adb.org/Accountability-Mechanism/default.asp>.

XII. RECORD OF CHANGES TO THE PROJECT ADMINISTRATION MANUAL

109. All revisions/updates during the course of implementation will be retained in this Section to provide a chronological history of changes to implemented arrangements recorded in the PAM.

Date	Project Administration Manual Changes
09 May 2018	Discussion on the draft PAM during the loan pre fact-finding mission
12 November 2018	Discussion during the loan negotiations

APPENDIX I: Terms of Reference for Consulting Service of Project Implementation Support

I. Objectives of the Assignment and Scope of Services

1. The objective of this assignment is to support the Project Management Office (PMO) and (especially) the project implementing agencies to carry out their project implementation responsibilities as indicated in the loan agreement, project agreement, project administration manual (PAM), and other project documents. The consultants will work under the general guidance of the PMO, providing advice, assistance and necessary training.

II. Team Composition & Qualification Requirements for the Key Experts

2. A team combination of national experts is required, and the proposed positions are summarized in the table below.

Position of consultants	Person-months
Team Leader, Project and Construction Management Specialist	20
Procurement and Contract Management Specialist	15
Financial Management Specialist	12
Gender and Social Development Specialist	9
Environment Specialist	9
Total	65

A. Team Leader, Project and Construction Management Specialist (national, intermittent, 20 person-months)

3. **Qualifications and experience required.** The specialist will be a professionally qualified engineer or relevant discipline with a bachelor's degree or above and have 15 years' relevant post qualification work experience and 10 years of management experience in Asian Development Bank (ADB) or World Bank financed projects. The expert will be expected to possess good report writing, presentation, and training skills. Previous successful team or deputy team leadership on the implementation of two ADB or World Bank funded loan projects is also required, together with excellent bilingual ability in English and Mandarin Chinese.

4. **Tasks assigned.** The specialist will work on an intermittent based frequency. This specialist will take overall team leading and coordination responsibilities for all consulting assignments, the duties will include, but not be limited to, the following:

- (i) Develop comprehensive project implementation plans and procedures for monitoring and controlling the overall project and activities undertaken by the implementing agencies;
- (ii) Using the template agreed with ADB for the reporting of project progress to the ADB, including the procurement plan, construction progress, withdrawal of funds and payment to contractors and suppliers and the implementation of EMPs necessary to facilitate compliance with the ADB Safeguards Policy Statement (SPS) (2009) and specific loan assurances contained in the loan and project agreements. Provide related training on this to implementing agency staff;
- (iii) Responsible for the establishment of the PPMS and provide advice and support in its ongoing operation, including report preparation;

- (iv) Prepare progress reports, midterm, and project completion report (PCR) (English and Chinese version) in accordance with PAM requirements for PMO submission to ADB;
- (v) Advise the implementing agencies on all aspects of construction management, including active support in the resolution of any issues that arise during the construction process;
- (vi) Advise and train on action needed to ensure adherence to ADB safeguard policies and project agreement covenants;
- (vii) Review bidding documents, withdrawal of funds, contract variations, and making written review reports to the relevant implementing agency and PMO;
- (viii) Review monthly construction supervision reports, and timely monitor project progress;
- (ix) Implement tasks in relation to safeguards in conjunction with the environment specialist; and
- (x) Assess training needs and develop training programs/seminars pertaining to the ADB's procedures and requirements concerning construction and contract management, and quality assurance.

B. Procurement and Contract Management Specialist (national, intermittent, 15 person-months)

5. **Qualifications and experience required.** This specialist will have an engineering background or technical discipline with a bachelor's degree or above, with 7 years continuous work experience in international and national procurement for ADB and/or World Bank projects in the PRC. The expert will also be highly accomplished in reading and writing in the English language and Chinese Mandarin, and fully familiar with the practical application of ADB's Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time).

6. **Tasks assigned.** Working under the overall guidance of the team leader, this specialist will provide comprehensive technical assistance to the PMO and the implementing agencies to establish procurement procedures in accordance with ADB's Procurement Policy (2017, as amended from time to time) and Procurement Regulations for ADB Borrowers (2017, as amended from time to time) that include the review bidding documents, bid evaluation reports, contracts, contract variations and other procurement related documents. Specific tasks will include but not be limited to the following:

- (i) Update the project procurement plan as necessary and obtain PMO and ADB sign-off;
- (ii) Undertake a detailed review and suggest detailed modifications to all bidding documents;
- (iii) Review bid evaluation reports and provide advice on the improvements;
- (iv) Ensure all implementing agencies, PMO and the procurement agency staff involved in project procurement are fully briefed on project specific procurement requirements;
- (v) Ensure the safeguards requirements are adequately included in all contracts, as needed;
- (vi) Support for the preparation of project progress report associated with procurement aspects;
- (vii) Explain ambiguities and/or discrepancies in the contract documents and assist the implementing agencies in the settlement of any disputes with the contractors that involve interpretation of contract provisions;

- (viii) Provide ongoing procurement training as required; and
- (ix) Provide advice as necessary to other members of the consulting team, the PMO, implementing agencies, and the procurement agency. Most especially in respect of contractual provisions for contract variations, evaluating the validity of contractual claims and in the settlement of contractual disputes.

C. Financial Management Specialist (national, intermittent, 12 person-months)

7. **Qualifications and experience required.** The specialist will be professionally qualified with a master's degree or above in finance, accounting and/or financial management or relevant discipline and will have 10 years work experience in financial management, 7 years of which would be on the implementation of ADB or World Bank funded projects in the PRC. Good working knowledge of ADB disbursement procedures, ADB's Financial Management and Economic Analysis of Projects, and the PRC Ministry of Finance's requirements for project accounting for ADB and World Bank funded projects is essential. The expert will also be highly accomplished in reading and writing in the English language and Chinese Mandarin.

8. **Tasks assigned.** This expert will provide comprehensive technical assistance to the PMO and the implementing agencies to establish financial management procedures, including payment request procedures in accordance with ADB's Disbursement Handbook (2017, as amended from time to time), accounting work, auditing findings and other financial matters. Specific tasks will include but not be limited to the following:

- (i) Assist the team leader to prepare the work plans and budgets to implement the project;
- (ii) Assist the implementing agencies in all aspects of project accounting;
- (iii) Assist the implementing agencies in payment requests (withdraw application), disbursement, and other financial matters;
- (iv) Review financial statements of implementing agencies and prepare consolidated project financial statements;
- (v) Assist the PMO and implementing agencies to ensure compliance of annual financial auditing requirements under the project;
- (vi) Conduct periodic visits to the implementing agencies to provide guidance on the preparation of financial statements, financial management and accounting work, and the preparation and monitoring of commercial business plans;
- (vii) Prepare financial parts of the project progress reports;
- (viii) Collect necessary information for ADB loan administration missions and assist to conduct financial and economic analysis during the loan midterm review and after the project completion;
- (ix) Prepare financial and economic analysis parts of the project midterm adjustment report and project completion report; and
- (x) Provide training on all aspects of financial management and accounting.

D. Gender and Social Development Specialist (national, intermittent, 9 person-months)

9. **Qualifications and experience required.** The national social development and gender specialist will be professionally qualified and have a master's degree or above in relevant discipline and will have 10 years' work experience in gender, social development and impact assessments. In addition, the expert will be fully familiar with and have 7 years' experience on the requirements of ADB's and social dimensions policies (gender, poverty, labor, and indigenous peoples) and be able to demonstrate previous experience in the successful practical application

of these policies during a previous project assignment(s). The expert will also be highly accomplished in reading and writing in the English language and Chinese Mandarin.

10. **Tasks assigned.** The specialist will be responsible for ensuring that the GAP is implemented and reported on and briefings on these to PMO, implementing agency staff, contractors, and other stakeholders as appropriate. The specialist will undertake specific duties that include but are not necessarily restricted to the following:

- (i) Help the PMO and implementing agencies establish management supervision mechanisms for implementation, monitoring and reporting of the project social safeguards issues based on the PAM, GAP and other social related documents, and provide support for their implementation;
- (ii) Help the PMO and implementing agencies to ensure smooth implementation of the GAP requirements by conducting necessary workshops and focus groups meetings;
- (iii) Assist in the conduct of surveys and consultations required in the GAP and in the follow up of issues that arise from these;
- (iv) Prepare semi-annual social monitoring reports; and
- (v) Prepare the relevant parts related to project progress reports.

E. Environment Specialist (national, intermittent, 9 person-months)

11. **Qualifications and experience required.** The specialist shall have a master's degree or above related to environmental sciences, engineering or other related areas, and a specialization in environmental management systems. The specialist shall have 5 years of experience in environmental management of ADB- or World Bank-funded projects and is familiar with relevant ADB and the World Bank Group's environmental guidelines and requirements, including ADB's SPS (2009) and World Bank Group's EHS Guidelines. Bilingual written and verbal ability in English and Chinese is highly desirable.

12. **Tasks assigned.** The expert will support the implementation of the Environmental Management Plans (EMP), including but not necessarily limited to the following requirements:

- (i) Assist the environment staff of implementing agencies in supervising the implementation of EMPs of the contractors;
- (ii) Update the EIA/IEE/EMPs including monitoring plan due to the scope or design changes including additional environmental mitigation and monitoring measures, budget, institutional arrangements, etc.;
- (iii) Provide advice and support to the implementing agencies to ensure compliance with the PRC's environmental laws and regulations, ADB's Safeguard Policy Statement (2009) and Public Communications Policy (2011);
- (iv) Assist PMO and the implementing agencies in implementing the Grievance Redress Mechanism (GRM), conduct regular EMPs' compliance verification, undertake site visits as required, identify any environment-related implementation issues, propose necessary corrective actions, and reflect these in a corrective action plan;
- (v) Assist PMO to prepare environmental monitoring semi-annually during construction and annually during operation, and progress reports to ADB, and the relevant part of project midterm adjustment report and special report as required;
- (vi) Assist IAs to conduct ongoing consultations with affected persons and local communities; and

- (vii) Provide training to PMO, the implementing agencies and contractors on environmental laws, regulations and policies, safeguard, EMPs' implementation, and GRM in accordance with the training plan defined in the EMPs.

III. Budget

Items	Budget (\$)
Consultancy (Including remuneration, per diems, and other out of pocket expenses)	520,000
Contingency	20,000
Total	540,000