



# Project Information Document (PID)

---

Concept Stage | Date Prepared/Updated: 30-Sep-2019 | Report No: PIDC26985



**BASIC INFORMATION**

**A. Basic Project Data**

Country Mongolia	Project ID P170676	Parent Project ID (if any)	Project Name Ulaanbaatar Heating Sector Improvement Project (P170676)
Region EAST ASIA AND PACIFIC	Estimated Appraisal Date Jan 23, 2020	Estimated Board Date Apr 23, 2020	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) Ministry of Finance	Implementing Agency Ministry of Energy	

**Proposed Development Objective(s)**

The Project Development Objective is to enable access to and improve efficiency of district heating in selected project areas.

**PROJECT FINANCING DATA (US\$, Millions)**

**SUMMARY**

<b>Total Project Cost</b>	41.00
<b>Total Financing</b>	41.00
<b>of which IBRD/IDA</b>	21.00
<b>Financing Gap</b>	0.00

**DETAILS**

**World Bank Group Financing**

International Development Association (IDA)	21.00
IDA Credit	21.00

**Non-World Bank Group Financing**

Other Sources	20.00
Asian Infrastructure Investment Bank	20.00



Environmental and Social Risk Classification

Moderate

Concept Review Decision

Track I-The review did authorize the preparation to continue

Other Decision (as needed)

## B. Introduction and Context

### Country Context

1. **The Mongolian economy experienced rapid growth over the last 15 years led by the mining sector and private sector development, despite a recent slow-down in 2015/16.** Exploitation of abundant mineral resources led to a doubling of the country's GDP in the last 10 years, shifting the country's traditional agricultural economy to a largely mining-driven economy. The mining industry contributes about 20 percent of GDP, and nearly 86 percent of total exports and the majority of foreign direct investment. However, the over-dependence on mineral wealth has made the economy highly susceptible to external shocks and contributed to boom-and-bust cycles. Most recently, the economy slowed down significantly in 2015/16 due to external and domestic factors, and the country approached a severe economic and fiscal crisis in 2016.
2. **Building on the momentum in 2017 and 2018, Mongolia's medium-term economic outlook remains positive but there are reasons to be vigilant.** Supported by a strong domestic demand, FDI and relatively robust commodity exports, economic growth is projected to further improve to 5.9 percent in 2018, and to accelerate to around 6.6 percent in 2019. Notwithstanding the recent progress, substantial external and domestic risks remain, including commodity market volatility and weakening global demand, and growing political uncertainty due to the 2020 election. To safeguard the economic recovery, it will be important to ensure a prudent fiscal policy and improve public financial management. To promote longer-term resilience of the Mongolian economy, it will be key to further improve economic institutions, strengthen human capital, enhance the investment climate, and accelerate structural reforms.

### Sectoral and Institutional Context

3. **In Ulaanbaatar (UB), the coldest capital city in the world, and with one of the highest recorded levels of air pollution in winter, access to reliable, efficient and clean heating services is essential for survival.** More than half of the city's 376,400 households (55 percent) live in urban buildings, while the other 45 percent live in detached houses or *gers*<sup>1</sup>. In the urban areas, heat is supplied through a district heating (DH) network whereas in ger districts—informal settlements in the outskirts of UB—homes are not connected to the DH network. Most of the households in ger areas burn raw coal and/or wood to keep warm in winter. The predominantly lower- to middle-income migrant workers who reside in these unplanned districts burn over a million tons of raw coal per

---

<sup>1</sup> A *ger* is a traditional Mongolian dwelling.



year. This is one of the leading causes of the city's high levels of air pollution in winter, as well as smog-induced public health problems.

4. **Driven by population growth, urbanization, and economic development in UB, the demand for heating has been increasing rapidly.** Over the past two decades, population growth in Mongolia's capital city has increased exponentially, mainly due to rapid rural-to-urban migration, and it is expected to reach 1.9 million by 2035. With urbanization and economic growth, new buildings are being built at a rapid pace, requiring connections to the DH network. Over the next decade, it is projected that demand for DH will grow by an average annual rate of 5–6 percent.
5. **The current DH infrastructure that serves most urban buildings is insufficient, unreliable and deteriorating.** While about two-fifths of the population (some 120,000 households) are supplied from the DH network, the system is dilapidated, resulting from a lack of investments for needed rehabilitation and upgrading in past decades, as concluded in the World Bank report on UB's heating sector. DH network losses are high at above 17 percent, compared to 9 percent in Harbin the coldest provincial capital in China. It is estimated that 50 percent of the transmission pipelines are in poor technical condition, urgently requiring replacement. The secondary (distribution) network has a variety of owners and operators and also requires major rehabilitation and replacement. Additional capacity has been added to CHPs for generation, but the heat transmission network is reaching the capacity limit – which has become a main constraint connecting new customers. Tariffs, which are set below cost-recovery levels, exacerbate the sector's financial distress and contribute to its decay.
6. **The fragmented institutional structure of the UB heating sector limits incentives for efficiency improvements and constrains long-term investment planning.** The unbundled DH sector in UB includes four generation companies (CHP2, CHP3, CHP4 and Amgalan plant), UB District Heating Company (UBDHC) which is responsible for heat transmission in the primary network and serves direct customers, one Housing and Public Utilities of Ulaanbaatar City (OSNAUG), and a number of Private City Housing Companies. The number of private housing companies has more than doubled over the past few years. In addition, many companies are involved in daily operation of the DH system compromising holistic optimization of the DH. Combined with inadequate tariffs, the fragmentation in DH distribution has weak incentives for operating efficiency, makes investment planning coordination very difficult, and leaves each company with inadequate funds for maintenance and capital investments.
7. **The DH system is in urgent need of rehabilitation and extension; the costs of non-action, including the adverse effects on human health, are enormous.** Failure to provide reliable heating service and pipeline repair could lead to a much larger share of underserved and unserved urban populations. In the face of further deterioration of the DH network, existing customers might abandon the DH system for alternative heating solutions. In the case of Ulaanbaatar, this would inevitably mean fuel-inefficient, and polluting coal-burning stoves and coal-fired boilers as no other sources are available in the medium term, which contributes to increased air pollution and its associated health risks, along with further deterioration of DH services.
8. **The Government of Mongolia recognizes that that improving the heating sector has great potential to meet UB's growing heating needs and reduce air pollution.** The State Policy on Energy, released by the Ministry of Energy in 2015, sets forth efficiency, environment, and safety as the three priority areas and strategic goals for the energy sector. As a top priority, the government has set the vision to develop an adequate, sustainable and self-financed district heating systems in urban areas and to reduce emissions from non-network heating by switching to cleaner alternatives in ger areas. The Government's National Program on Reducing Air and Environmental Pollution places great emphasis on DH network rehabilitation and expansion. Moreover, improving DH network fully complements the government's efforts to build more apartment buildings in the ger areas supplied by DH.



9. **The Bank has been supporting the government’s vision of a sustainable heating sector through a combination of investment lending, policy dialogue, and technical support in the past decade.** The recently completed Technical Assistance supported the government to develop a heating sector roadmap to achieve the government’s vision. The roadmap identified the urgent need for improvement in the DH network and scaling up clean heating solutions in ger areas, as well as policy recommendations on policy and institutional reforms in the sector. The ongoing Ulaanbaatar Clean Air Project (UBCAP) financed by the Bank has enable targeted households in ger areas to switch to cleaner heating appliances and developed feasibility studies for selected medium-term particulate matter abatement measures. To scale up its development impact, an additional financing (AF) of UBCAP is under preparation. As part of the ongoing engagement, the Bank is continuously providing technical support to the government on sector policy, regulation and institutional structure.
10. **The proposed operation will build on and complement the Bank’s strong engagement in the heating sector in Mongolia.** Investment in the DH network combined with regulatory and institutional actions is urgently needed, to enable its improved services to existing customers and provision of DH access to new customers in urban and ger areas in a sustainable manner. The proposed operation is one step towards a sustainable heating sector as recommended in the roadmap. It will be an integral part of the Bank’s comprehensive sector engagement. More specifically, it will help address capacity constraint through rehabilitation and capacity expansion to meet the increasing demand. Furthermore, connecting more households and businesses to DH network will help reduce emissions by replacing existing inefficient HoBs and traditional stoves and preventing new ones to be adopted in the near future. Additionally, rehabilitating and upgrading DH network will help improve the sector’s financial performance by improving revenues and operating efficiencies through connecting more customers, reducing operating losses and maintenance costs, and extending the lifetime of sector assets.

### C. Proposed Development Objective(s)

The Project Development Objective is to enable access to and improve efficiency of district heating in selected project areas.

Key Results (From PCN)

#### 11. The proposed key results indicators for the project include:

- Number of new customers provided access to the DH network
- Projected lifetime energy savings due to investments financed under the project (megawatt-hours [MWh]).
- Projected lifetime reduction in CO<sub>2</sub> emissions due to investments financed under the project (metric ton).

### D. Concept Description

12. As concluded in the Heating sector Roadmap<sup>2</sup> developed under the World Bank technical assistance, the investment needs in the heating sector are large. To merely avoid further deterioration, an estimated investment around US\$244 million is required to replace the worst sections of its pipeline network alone. A priority investment program costing around US\$75 million has been identified to include measures that are likely to have the highest economic return or are critically important to DH operations in the near term. The initial proposal covering part of the identified priority measures amounts to US\$41 million, which can be considered for inclusion in the Phase I of the Bank’s investment in the sector.

---

<sup>2</sup> World Bank, 2019. Paving the Way to a Sustainable Heating Sector - A Roadmap for Ulaanbaatar Urban Heating.



13. Other priority investments identified in the larger program include heat accumulator to supply more heat from CHP4 to downtown, development of SCADA to cover more stations and facilitate side monitoring, as well as critical measures to further facilitate transition towards building level consumption-based billing. New substations/end-user installations identified the entire program shall be constructed with the aim to adopt consumption-based billing and install heating control at building level/staircase level. Building and staircase level substations with mixing loops will allow customers to better control their heat consumption comparing with large traditional substations, thus gaining considerable energy savings.
14. Depending on the amount of financing that is and will become available, the appropriate size of the operation will be revisited. Based on the initial discussion, Phase I of the heating sector operation is currently estimated at US\$41 million, which comprises of the following two components:
15. **Component 1 (US\$40 million): Investments in rehabilitation and expansion of DH network.** This component will mainly comprise replacement of poorly insulated and leaking pipes and expansion loops, upgrading of existing and the installation of new booster pumping stations, installation of Individual Heat Substations at building level, as well as network expansions and reinforcements. The proposed component will finance investments to two subcomponents: (i) rehabilitating and upgrading the DH transmission network in selected district; and (ii) expanding the network to selected near-urban ger areas.
16. Given limited funding availability while ensuring the highest impact per dollar invested, three criteria are used to prioritize the measures: (1) highest economic return for investment as measured by the economic internal rate of return; (2) critical importance to DH operations; and (3) technical interlinkages between various measures proposed. As a result, the preliminary scope for Component 1 is proposed to include replacement of transmission and distribution pipes from CHP3 to downtown area, and installation of primary side pipes and Individual Heat Substations for expansion into Denjiin-1000 and Mongolian Radio and TV areas. The proposed prioritized investment plan was developed as part of World Bank technical assistance and the follow-up discussions with the Government and stakeholders are ongoing.
17. **Subcomponent 1.1: Rehabilitation and upgrading of the DH transmission network in selected district.** District 6, currently connected to the DH network, is undergoing redevelopment to add more high-rise buildings. Fast construction and increase in heat demand are posing significant challenge to the DH network due to high system losses and limited capacity. It is estimated more than 7,000 households would need new connections to DH services in next three years. The peak heat demand of the district is expected to increase by 50 Gcal/h. Rehabilitating and upgrading the DH transmission network in the district will help provide access to these households, and thereby prevent more than 50 small HoBs of 1.4 Gcal/h each from being built in the future, resulting in efficiency improvement and substantial reductions in coal consumption and emissions such as CO<sub>2</sub> and PM<sub>2.5</sub>.
18. **Subcomponent 1.2: Expansion into selected ger areas.** New buildings have been and are being built in the near-urban ger areas. In Mongolian Radio and TV area (Khoroo 7 and 8) and the Deniin-1000 area (Khoroo 7 to 11), new constructions are leading to a rising peak heat demand. It is estimated that the number of households will increase by approximately 9,000 from 2018 to 2021. The proposed expansion is expected to add 90 Gcal/h heat transmission capacity to enable connections to more households. Therefore, expanding the network into selected areas will help to replace existing HoBs and traditional stoves that are currently in use and prevent more from being built, which is expected to lead to a significant emissions reduction.
19. **Component 2 (US\$1 million): Technical assistance and capacity building.** TA and capacity building activities were proposed, which aim to build capacity of key stakeholders on (1) technical topics such as modern DH technologies and international experience with sector project design and implementation, and (2) policy level topics such as sector planning, institutional arrangement, and sector regulations and policies. This component also includes



Implementation support for project management, including environmental and social preparatory and implementation work, monitoring and evaluation and incremental operating expenses of the Project Management Unit (PMU). The program needs to be developed in cooperation with key sector stakeholders.

Legal Operational Policies	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No
Summary of Screening of Environmental and Social Risks and Impacts	

## CONTACT POINT

### World Bank

Yun Wu  
Senior Energy Specialist

### Borrower/Client/Recipient

Ministry of Finance  
Batkhuu Idesh  
Director General  
Batkhuu\_i@mof.gov.mn

### Implementing Agencies

Ministry of Energy  
Enkhtaivan G  
Director General  
enkhtaivan@energy.gov.mn



**FOR MORE INFORMATION CONTACT**

The World Bank  
1818 H Street, NW  
Washington, D.C. 20433  
Telephone: (202) 473-1000  
Web: <http://www.worldbank.org/projects>

**APPROVAL**

Task Team Leader(s):	Yun Wu	
<b>Approved By</b>		
Environmental and Social Standards Advisor:		
Practice Manager/Manager:		
Country Director:		