Mongolia: Strengthening Electricity and Heat Supply Network in Ulaanbaatar

**Project Name:** Strengthening Electricity and Heat Supply Network in Ulaanbaatar

**Country:** Mongolia

**Project Status:** Proposed

**Project Type / Modality of Assistance:** Grant

**Source of Funding / Amount:**
- Grant: Strengthening Electricity and Heat Supply Network in Ulaanbaatar
  - Japan Fund for the Joint Crediting Mechanism: US$ 10.00 million
- Loan: Strengthening Electricity and Heat Supply Network in Ulaanbaatar
  - Ordinary capital resources: US$ 150.00 million

**Strategic Agendas:**
- Environmentally sustainable growth
- Inclusive economic growth

**Drivers of Change:**
- Knowledge solutions
- Partnerships
- Private sector development

**Sector / Subsector:** Energy - Electricity transmission and distribution

**Gender Equity and Mainstreaming:** No gender elements

**Description:**
The project will develop and upgrade associated downstream facilities for electricity and heat evacuation for the combined heat and power plant number 5 (CHP 5), which is being developed through a public-private partnership modality. Together with the proposed CHP 5, it ensures reliable electricity and heat delivery not only to existing customers but also to as-yet unserved communities and entities in Ulaanbaatar, the capital city of Mongolia.

The proposed project comprises of (i) 220 kilovolt electricity transmission system development, (ii) electricity distribution system rehabilitation and upgrading which include an installation of advanced transformer technology for effective energy loss reduction, and (iii) heat transmission system development. The project will construct the essential electricity and heat transmission infrastructure to connect CHP to existing electricity grid and heating network to ensure full electricity and heat evacuation for CHP 5 in an efficient and reliable manner. Upon successful completion together with CHP 5 in 2020, it annually delivers up to 4,424 kilo giga calorie (kGcal) of heat to the densely populated central business district and the eastern districts having no access to central heating system, and up to 3,301 gigawatt hour (GWh) of electricity to central energy system including Ulaanbaatar.

**Project Rationale and Linkage to Country/Regional Strategy:**
The winter climate in Mongolia is extremely harsh with daytime temperatures ranging from -10 degrees Celsius to -30 degree Celsius (late December and January). Temperatures can drop to as low as -40 degree Celsius at night. The heating season is also long lasting usually for 9 months a year. Consequently, energy demand for heat is more than twice that for electricity. In such harsh winter, a reliable heating service is a basic human need for the population in the country. Coal is a dominant source for electricity and heat generation in Mongolia because the country has impressive coal reserves but limited access to alternative energy resources. Due to such climatic and energy resource endowment, CHP is the most suitable, efficient, and economical choice to provide both electricity and heat in Mongolia. Total capacity of CHP plants in operation is 878 megawatt (MW) which is about 91% of the country’s total installed electricity generation capacity in 2014. Mongolia is the most sparsely populated country in the world with an average of only 1.87 persons per square kilometre. Moreover, within Mongolia, population and economic activities are concentrated in Ulaanbaatar. In 2014, Ulaanbaatar accounted for 42% of the population and generated 64% of the country’s gross domestic product. Due to such spatial concentration, Ulaanbaatar is the largest energy demand center accounting for nearly half of the total energy needs in the country. Increasing population influx and further economic concentration is likely to continue demand pressure on electricity and heat in Ulaanbaatar. Heat load demand in Ulaanbaatar grew by 35% between 2004 and 2014, and is projected to grow to 7,554 kGcal in 2020 from 5,574 kGcal in 2014. The central electricity grid system, which covers Ulaanbaatar and other major cities, also experienced 42% demand growth during the same period. The demand is projected to grow to 12,844 GWh by 2020 from 6,775 GWh in 2014. However, this rapid growth in electricity and heat demand in Ulaanbaatar was not matched by investments in new power and heat plants. Moreover, due to the aging of existing plants, the country’s obsolete power system is no longer able to meet growing heat and electricity demand. The reserve margin of electricity supply has become zero in 2013 and 10% of total electricity demand in 2014 was met by electricity import from Siberian grid in Russia. The heat supply reserve margin also diminished in 2014. While additional capacity addition in electricity and heat supply is underway, it is not sufficient to meet the growing demand in 2020 and beyond. Existing facilities for providing heating and electricity (power plants, transmission and distribution lines) are also energy-inefficient and vulnerable because they are old and outdated. In Ulaanbaatar and surrounding districts, electricity distribution losses totaled 14.3% in 2014, which is much higher than the international best practice of 5.0%. The average outage duration of the distribution network in Ulaanbaatar was 300 minutes per customer with more than 14 interruptions per customer in 2014, which is unacceptably high for any modern electricity distribution network.

CHP 5 to be constructed in the outskirts of Ulaanbaatar with 450 MW of electricity and 587 MW of thermal capacities is urgent and an essential investment to avoid heat and electricity supply shortage in 2020 and beyond. It will be the most energy efficient and least pollutant emitter CHP in the country. The government is currently finalizing concession agreement and associated contracts which are scheduled to be concluded in March 2016. Asian Development Bank’s (ADB) policy and advisory technical assistance projects have been supporting CHP 5 through a preparation of feasibility study and advisory services to the government on public-private partnership transactions.

**Impact:**
- Electricity and heat supply services in Ulaanbaatar expanded and improved

**Outcome:**
- Electricity and heat supply from CHP 5 fully evacuated

**Outputs:**
- 220 kilovolt electricity transmission system developed
- Electricity distribution system in Ulaanbaatar strengthened
- Heat transmission system in Ulaanbaatar developed

**Geographical Location:**
- Ulaanbaatar
ADB and the Ministry of Energy will disclose all relevant project information. At the minimum, this includes all information regarding the bidding process, 23 Nov 2015 to 04 Dec 2015 and institutional responsibilities for ensuring proper environmental management throughout the project’s construction and operation. Meaningful public consultation was done in accordance with ADB’s Safeguard Policy Statement. The Ministry of Energy, National Power Transmission Grid, Ulaanbaatar Electricity Distribution Network, and Ulaanbaatar Heating Distribution Network are committed to managing the identified environmental risks and have agreed on a comprehensive set of environment-related loan covenants and a training program with strong emphasis on environment safeguards. The IEE will be posted on ADB website in March 2016. Environment safeguard documents were disclosed to the affected people. Potential environmental complaints or disputes will be handled in accordance with the grievance redress mechanism established for the project. A rapid climate risk assessment concludes that climate risk is medium, and the most significant risk to the project areas and their vicinities relates to flood and permafrost. Engineering designs have been modified for power transmission and distribution lines as well as heating pipelines and will be further reviewed during the detailed design. Due diligence confirmed that right-of-ways of those power and heating lines do not involve permafrost.

### Involuntary Resettlement
The project is classified category C for involuntary resettlement and indigenous peoples. The project does not entail permanent or temporary land acquisition, land use restriction, demolition of any structure, or relocation of people. Electricity transmission line is routed along barren lands or grasslands, which are state-owned lands; heat transmission pipeline is routed along existing road right-of-ways and installed underground; and all replacement and rehabilitation in electricity distribution are done in existing premises and routing.

### Indigenous Peoples
The project will be implemented in a large urban area with no ethnic minority communities; various ethnic groups are mixed and together and there is no significant difference on lifestyle, socioeconomic status, or vulnerability between individuals of ethnic majority and minorities. Thus, it is not expected to have any impact on ethnic minorities.

### Stakeholder Communication, Participation, and Consultation
During Project Design
ADB and the Ministry of Energy will disclose all relevant project information. At the minimum, this includes all information regarding the bidding process, bidders, contract awards, use of funds disbursed under the project, environment and social safeguard monitoring, and physical progress.

During Project Implementation
During project implementation, contractors and loan implementation environment consultants will consult with relevant authorities, residents in affected communities, and other stakeholders, if necessary, to accommodate any environmental concern and to check effectiveness of mitigation measures through regular dialogues, impact surveys, and/or grievance redress mechanism.

### Business Opportunities

#### Consulting Services
All consultants will be recruited according to ADB’s Guidelines on the Use of Consultants. The terms of reference for consulting services are detailed in Section 6 of the Project Administration Manual. An estimated 240 person-months (131 international, 109 national) of consulting services are required to support the Project Management Unit, National Power Transmission Grid, Ulaanbaatar Electricity Distribution Network, and Ulaanbaatar Heating Distribution Network during project implementation and to assist them in (i) detailed engineering design, (ii) procurement which includes assistance in tender document preparation, bid evaluation, and contract negotiation, (iii) social and environment impact monitoring, and (iv) amorphous transformer-related activities including project design and development preparation and validation, and monitoring and certification. Consulting firms will be engaged using the quality- and cost-based selection method with a standard quality cost ratio of 90:10.

#### Procurement
All procurement of goods and works will be undertaken in accordance with ADB’s Procurement Guidelines (2015, as amended from time to time). Except as ADB may otherwise agree, the following process thresholds shall apply to procurement of goods and works. ADB-financed civil works contracts, costing $5 million or more, and goods contracts costing $2 million or less will be procured through international competitive bidding procedures using ADB’s standard bidding documents. Goods contract packages costing more than $100,000 and less than $2 million will be procured using national competitive bidding, as well civil works contracts costing more than $100,000 and less than $5 million. Civil works and goods contract packages costing less than $100,000 will be procured using shopping procedures. The relevant sections of ADB’s Anticorruption Policy (1998, as amended to date) will be included in all documents and contracts.

#### Responsible ADB Officer
Yamamura, Shigeru

#### Responsible ADB Department
East Asia Department

#### Responsible ADB Division
Energy Division, EARD

#### Executing Agencies
Ministry of Energy
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### Timetable

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<td>Fact Finding</td>
<td>23 Nov 2015 to 04 Dec 2015</td>
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<td>MRM</td>
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<td>Approval</td>
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<td>Last Review Mission</td>
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### Project Page
https://www.adb.org/projects/46343-001/main

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