



ADB

ASIA CLEAN ENERGY FORUM 2023


ADB's Current Clean Heating Works in Mongolia

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MONGOLIA AS ONE OF THE COLDEST COUNTRIES

 WorldAtlas

Rank	Country	Average Yearly Temperature (°C)
1	Canada	-5.35
2	Russia	-5.1
3	Mongolia	-0.7
4	Norway	1.5
5	Kyrgyzstan	1.55
6	Finland	1.7

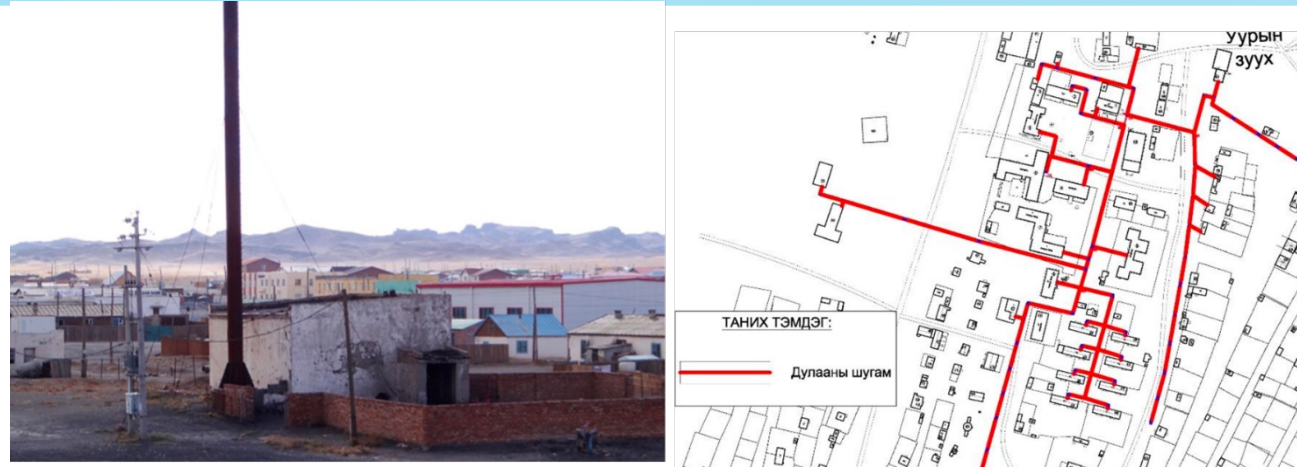
Household energy consumption share

- Heat 70 %
- Electricity 30 %



29 January 2023

HEATING IN URBAN SETTLEMENTS



Typical district heating only boiler and network map



Typical heat only boiler from the outside and inside

ADB'S CLEAN HEATING WORKS (1)

MONGOLIA ADB CLEAN HEATING PROJECTS Project Location



ADB'S CLEAN HEATING WORKS (2)

- ✓ **Scales of focus**
 - (i) Individual buildings
 - (ii) Cluster of buildings / District heating

- ✓ **Technologies used and planned**
 - (i) Shallow ground source heat pump (Open and closed loop)
 - (ii) Solar thermal collectors (for heating, hot water, ground injection for GSHP)
 - (iii) Energy efficiency (Improved insulation)
 - (iv) Air to water source heat pump
 - (v) Medium depth ground source heat pump

- ✓ **Other efforts by ADB energy projects**
 - (i) Capacity development for various stakeholders
 - (ii) Awareness raising campaign for general public

Current projects

1. Grant: Upscaling Renewable Energy Sector Project

Effectivity: 12 Feb 2019

Five Subprojects: Shallow Ground Source Heat Pump systems for heating of Hospital, Kindergartens and Schools.

2. Grant: Renewable Heating Demonstration in Remote Areas

Effectivity: 06 Mar 2023

Three soum hospitals will have energy efficiency retrofit and air source heat pump.

3. TRTA: Supporting Renewable Energy Development Project

Target board approval Q1 2024

Subproject: Medium depth ground source heat pump for district heating

ADB'S CLEAN HEATING WORKS (4)

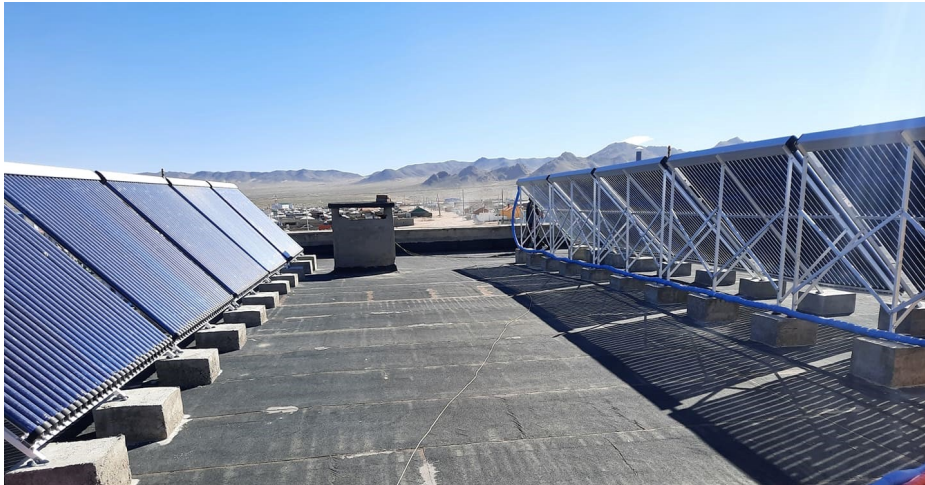
Upscaling Renewable Energy Sector Project (Effectivity: 12 Feb 2019)



The system was easily reverted to the heat only boiler for the first operation year temporary due to the reasons:

- Subsidy for heat only boiler was available for use
- Budget for increased electricity use was absent
- Lack of on-site O&M capacity
- Low energy efficiency of the building

MOU was signed between Ministry of Energy and the relative province to increase commitment.



Kindergarten in Khovd soum, Shallow ground source heat pump and solar thermal collector system

ADB'S CLEAN HEATING WORKS (5)

Renewable Heating Demonstration in Remote Areas (Effectivity: 06 Mar 2023)

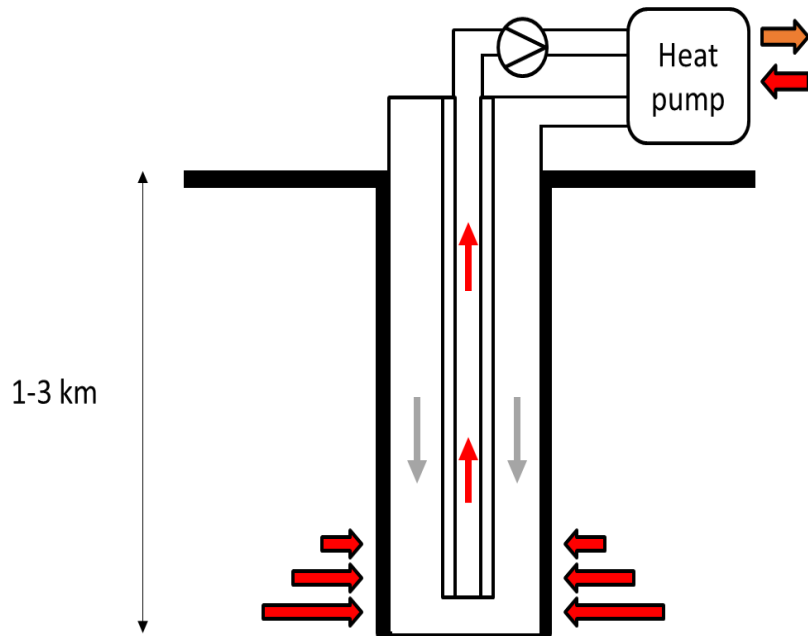
Rationale: Demonstrate **scalable cleaner** heating technology in remote areas Scope:

- Providing clean heating for hospitals which are of high value for less-wealthy and remote communities (**Air Source Heat Pump**)
- Demonstrating energy efficiency first principle
- Demonstrating the benefits, feasibility and scalability of heat pumps, solar energy and electric heating
- Financing: \$2 million from **JFPR** (Japan Fund for Prosperous and Resilient Asia and the Pacific)
 - Out of which USD 250k will be spent for **CSOs** to conduct the work prescribed.

ADB'S CLEAN HEATING WORKS (6)

TRTA: Supporting Renewable Energy Development Project/ Approval Q1 2024

Subproject: Medium depth ground source heat pump for District Heating in Kharkhorin



Operating principle of medium depth geothermal heat pump system

Parameter	Medium-Depth GSHP	Shallow GSHP
Well depth	2,000 m	240 m
Number of wells	4	440
Total units (meters) drilled	8,000 m	105,600 m
Drilling costs (\$/m)	100 – 500	40-60
Estimated cost in Mongolia (\$/m)	450	59
Drilling cost (\$)	3.6 million	6.2 million

Comparison table for MDGSHP and SGSHP systems with equal capacity

NOTE: The proposed project will supply heat to a standard soum district heating network in the megawatt range (2.6 MW, 31 buildings, and 118,600 m³).



Thank you.

EXAMPLE OF LESSONS LEARNED AS OF NOW

MOU was signed between The Ministry of Energy and the relative province specifying:

- Capacity development activities for wide groups
- Ownership of the system by the local government
- Local government to bear O&M expenses
- The operating entity shall be responsible for the integrity/functionality and efficient operation of the assets procured using grant funds

