



# UPSCALING RENEWABLE ENERGY SECTOR PROJECT

## Shallow Ground Heat Pump projects in western of Mongolia



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# GENERAL INTRODUCTION

## TARGET:

In selected targeted regions, 500 kilowatts-thermal of shallow-ground heat pump capacity will be installed in public buildings in three batches. This will supply air pollutant-free space heating for 10,000 square meters of floor area. The SGHP projects will demonstrate the performance of the heat pump systems and increase experience in design, installation, operation, and maintenance for future scale-up.

## 1<sup>st</sup> stage:

1<sup>st</sup> kindergarten building, Jargalant soum of Khovd province - 1,500 m<sup>2</sup>:  
135 kW SGHP system – Closed-loop system  
ADB, Strategic Climate Fund (SCF) grant /USD 261,098/



## 3<sup>rd</sup> stage:

5<sup>th</sup> school building, Ulaangom soum of Uvs province – 2,745 m<sup>2</sup>:  
ADB, Strategic Climate Fund (SCF) grant /USD 290,000/

## 2<sup>nd</sup> stage:

2<sup>nd</sup> school expansion building, Uliastai soum of Zavkhan province – 2,608 m<sup>2</sup>:  
110 kW SGHP – Open-loop system  
ADB, Strategic Climate Fund (SCF) grant /USD 189,530/

## 3<sup>rd</sup> stage:

High school building, Ulziit soum of Bayankhongor province – 1,886 m<sup>2</sup>:  
ADB, Strategic Climate Fund (SCF) grant /USD 270,000/

## 3<sup>rd</sup> stage:

Health center and local governance buildings – 1,317 m<sup>2</sup>:  
ADB, Strategic Climate Fund (SCF) grant /USD 240,000/

## GENERAL INTRODUCTION

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<b>Employer:</b>	Ministry of Energy, Mongolia
<b>Financial source:</b>	Asian Development bank (ADB), Strategic Climate Fund (SCF) grant
<b>Bidding procedure:</b>	International Competitive Bidding (ICB) Single-Stage: One-Envelope (1S1E)
<b>Eligibility:</b>	Open to Bidders from eligible source countries of ADB
<b>Bidding:</b>	Engineering, Procurement and Construction (EPC) contract for Shallow Ground Heat Pump Demonstration
<b>Project modality:</b>	Technical viability, Economic efficiency, Financial viability, Environmental impact

## 135 KW SHALLOW GROUND HEAT PUMP SYSTEM INSTALLATION FOR THE 1st KINDERGARTEN, JARGALANT SOUM, KHOVD PROVINCE



<b>Employer:</b>	Ministry of Energy
<b>Financial source:</b>	ADB, SCF
<b>Contractor:</b>	Joint venture of “Nar Energy Silicon Metal” LLC & “BROSK” OOO
<b>Contract price:</b>	USD 261,098
<b>Bidding type:</b>	ICB (1S 1E)
<b>Bidding:</b>	EPC

## KHOVD 135 KW SGHP

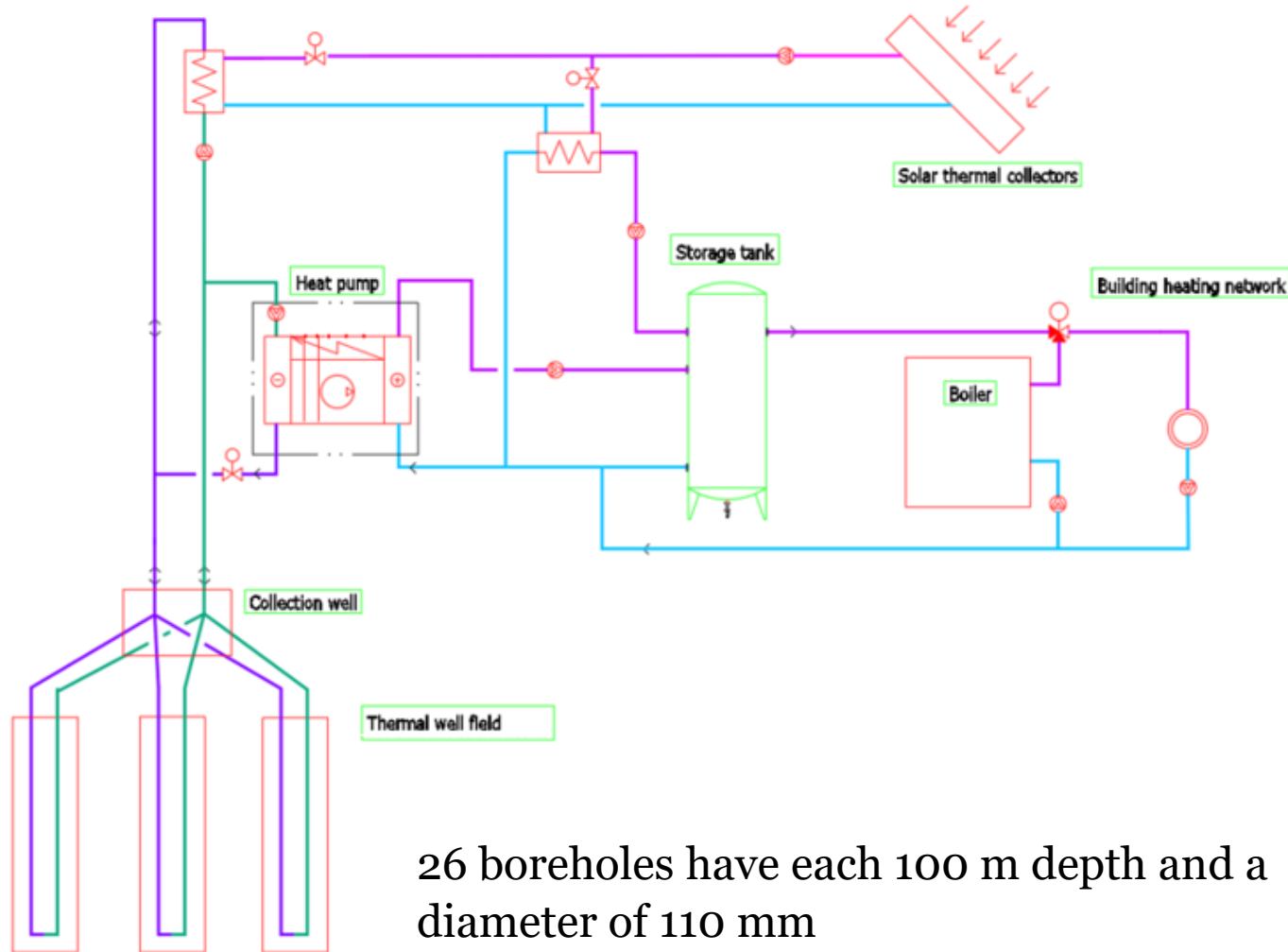
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Under the concession agreement, the new kindergarten was established on December 18 of 2017, which was financed by MNT 1,835,770,185. The 1<sup>st</sup> kindergarten has 6 classes for 150 children and 27 teachers.

The 1<sup>st</sup> kindergarten is located in a ger district area which was not connected district heat network and water supply system. The building area is 1,500 m<sup>2</sup>.



# SGHP GENERAL SCHEME



26 boreholes have each 100 m depth and a diameter of 110 mm



Borehole passport

## TECHNICAL PERFORMANCE

### 1. Heat pump

Nº	Manufacturer	Performance	Quantity
1	BROSK LLC, Russia	Mark II 40 kW,	1
2		Mark II 100 kW	1

- High COP4.5;
- High flow temperature (up to 70°C);
- Multicolor display with user instructions and multilingual support;
- Low sound level;
- Speed controlled circulation pumps for optimized heating and hot water production;

### 2. Solar collector

Nº	Manufacturer	Performance	Quantity
1	SIDITE energy, China	SC-H 24-30	10 kW
2	Solar collector frame	H 24	10 set

### 3. Ground collector system

Nº	Manufacturer	Performance	Quantity
1	OKБ Gamma, Russia	stainless steel, gofro tube	Length 5600 m, Diameter 25 mm
2	Connection tools, Germany Stahl mam		

### 4. Return pumps

Nº	Manufacturer	Performance	Quantity
1	Grundfos	UPS 50-180F380V50Hz 1 kW	1
2	Grundfos	UPS55-180F380V 50Hz 1.5 kW	1
3	Grundfos	UPS40-120F380V50Hz0.4 kW	2
4	Grundfos	UPS40-180F380v50Hz 0.98 kW	1

# IMPLEMENTATION STAGE



Storage tank



Heat pumps



Solar collectors

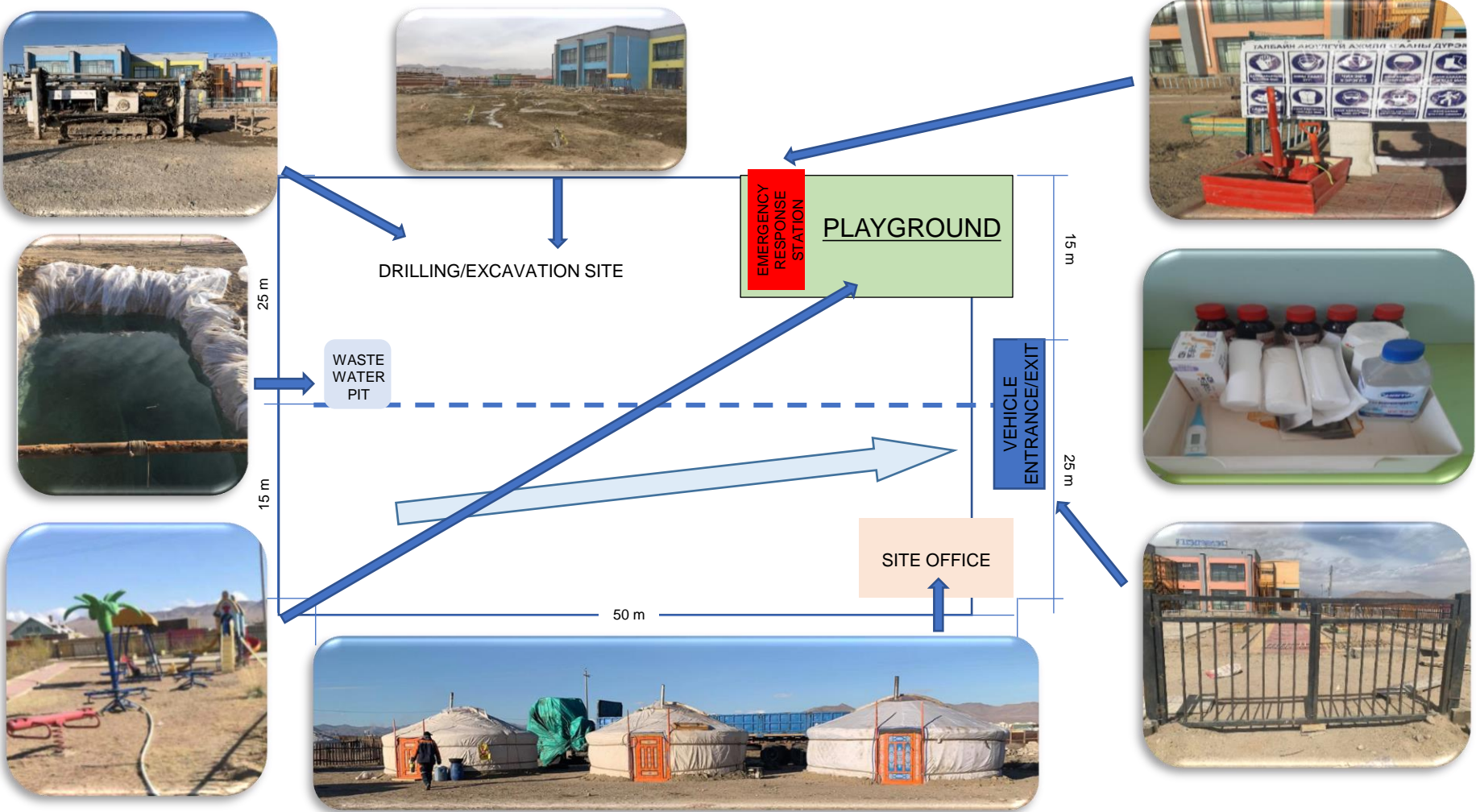


Flexible gtofro tubes and circulation pumps





# FIELD ORGANIZATION



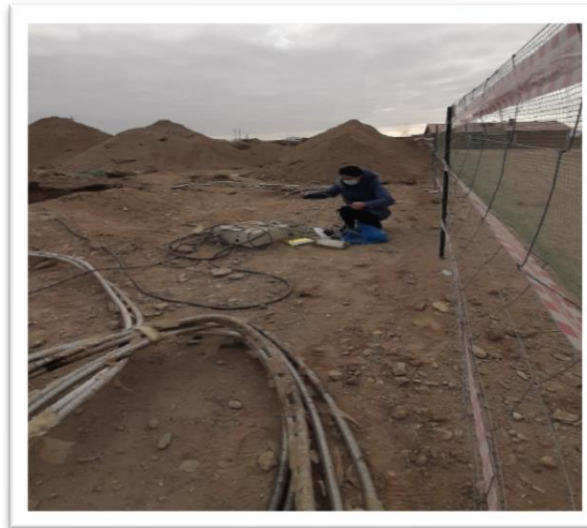
# DRILLING PROCESS



**GROUND HEAT SYSTEM  
TRENCHING**

**DATE: 10 NOV 2020**

<b>CLIENT:</b>	MINISTRY OF ENERGY
<b>CONTRACTOR:</b>	NAR ENERGY SILICON METAL LLC AND BROSK LLC
<b>CONTRACT NAME:</b>	KHOVD SHALLOW GROUND HEAT PUMP SYSTEM (135Kw GHP, 10kW SC)
<b>CONTRACT NO.:</b>	MONSREP/2019/08-B1



Water sample

Air analysis

Soil analysis

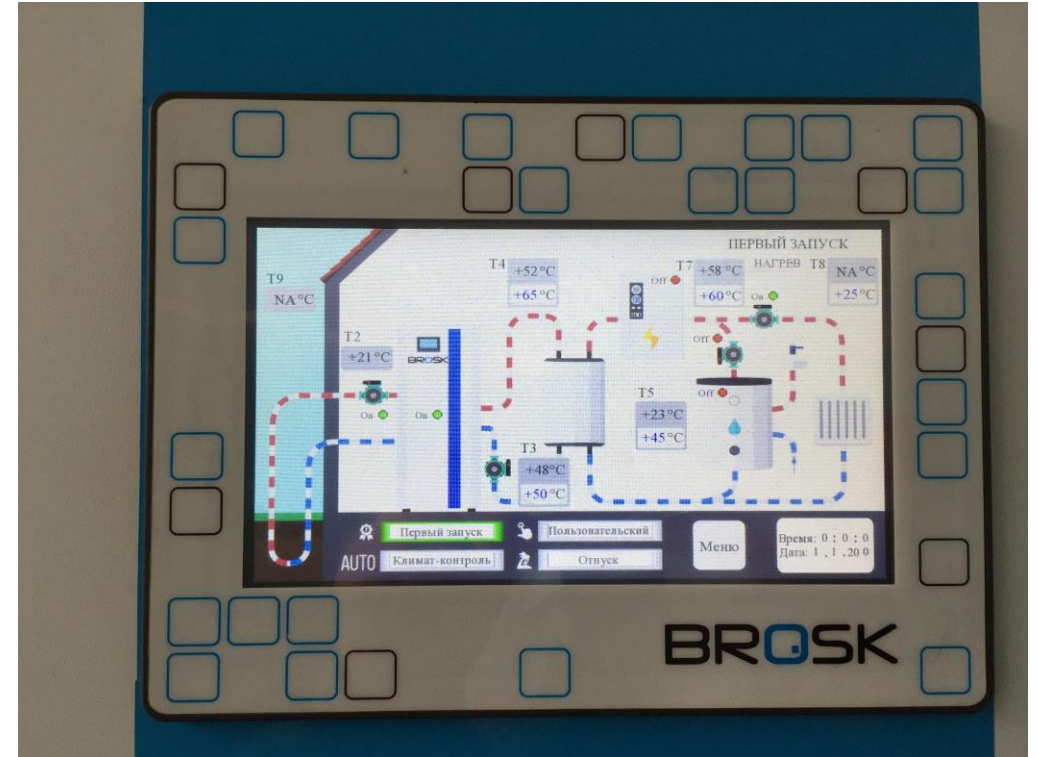
# SYSTEM CONTROL ROOM



System control room before



System control room after



Heat pump monitor

## SOLAR COLLECTOR SYSTEM ON THE ROOF





Technical commissioning



**Before / After**

- Heat supply
- Domestic hot water supply
- Sport field
- Tree plantation
- Playground
- Land extended
- Land remediation
- Parking

**Thank you very much**