GOVERNMENT OF MONGOLIA

MINISTRY OF ENERGY

ADB
ASIAN DEVELOPMENT BANK

Upscaling Renewable Energy Sector Project

UREP PROJECT OVERVIEW

The project will deliver three outputs:

(i) 45.3 MW distributed renewable energy system developed and connected to AUES and WRES; and for the first time in the energy system, new battery storage stations will be put into operation.

1. Yesenbulag 10 MW solar power plant
2. Altai soum 0.5 MW
3. Uliastai 5 MW solar power plant and BESS
4. Murun 10 MW solar power plant
5. Myangad 19.8 MW solar power plant and BESS

(i) In selected areas of the Western Region, 500kW shallow-ground source heat pump technology will be introduced in three phases

1. Kindergarten No. 1, Jargalant soum, Khovd aimag
2. Expansion of Javkhlant Complex School, Uliastai Soum, Zavkhan Aimag
3. School No. 5, Ulaangom soum, Uvs aimag,
4. High School of Ulziit Soum, Bayankhongor Province,
5. Hospital and administrative building of Altai soum, Gobi-Altai aimag

(i) Improve the technical capacity of local energy companies, increase the coordination capacity of the NDC's energy sector, and develop an energy sector investment plan for the region for 2023-2030.

GOVERNMENT OF MONGOLIA
MINISTRY OF ENERGY

UREP PROJECT OVERVIEW

ADB
ASIAN DEVELOPMENT BANK

Loan and Grant data

Approved date	2018.09.20
Signage date	2018.11.02
Effective date	2019.02.12
Original closing date	2024.02.29
Extended closing date	2027.02.28

Financing Plan

	Item		ADB (Loan)	SCF (Grant)	JCM (Grant)	Budget	Contract	Disbursement	Notes
1	Umnogovi wind		5,940	7,770		13,710			Projects were consolidated to Myangad 19.8 MW solar power plant and bid is ongoing.
2	Telmen wind		6,000			6,000			
3	10 МВт Есөнбулагийн нарны станц		3,880	5,830		9,710	10,442	9,364	In operation
4	Uliastai solar		2,950		5,000	7,950	7,350	7,350	In operation
5	Murun solar		8,990			8,990	9,499	7,565	In operation
6	Алтай сумын сэргээгдэх эрчим хүчний хосломол систем		920			920	1,079	1,079	In operation
7	Shallow ground heat pump			1,000		1,000	1,318	776	
8	Consultanting sevices		550		1,000	1,550	2,185	1,719	
9	Project administration	Telmen SVG	1,280			1,280	1,146	1,146	In operation
		PMU					1,750	1,704	
10	Interest and Commitment charges		5,120			5,120		2,668	
11	Unallocated		4,370			4,370			
	Total		40,000	14,600	6,000	60,600	34,769	34,092	

GOVERNMENT OF MONGOLIA
MINISTRY OF ENERGY

Estimated Project emission savings

ADB
ASIAN DEVELOPMENT BANK

A total of 89,098 tonnes of carbon dioxide equivalent (t CO2e) of greenhouse gases will be saved annually.
Over the entire life cycle, 2,227,441 tonnes of carbon dioxide equivalent (t CO2e) of greenhouse gases will be saved.

Subprojects	Capacity (MW)	Annual Power Generation (MWh)	Annual GHG emission savings (t CO_{2e})	Lifetime GHG emission savings (t CO_{2e})	Annual SO_2 emission savings (t)	Lifetime SO_2 emission savings (t)	Annual NOx emission savings (t)	Lifetime NOx emission savings (t)	Annual PM_{10} emission savings (t)	Lifetime PM_{10} emission savings (t)	Annual $PM_{2.5}$ emission savings (t)	Lifetime $PM_{2.5}$ emission savings (t)
Component 1: Distributed RE System												
Umnugovi Wind Power	10.0	34,038	30,396	759,900	106	2,638	133	3,319	20	511	17	425
Altai Solar PV	10.0	17,147	15,313	382,816	53	1,329	67	1,672	10	257	9	214
Altai Soum Solar PV	0.5	2,190	1,956	48,892	7	170	9	214	1	33	1	27
Uliastai Solar PV + battery	5.0	10,025	8,953	223,813	31	777	39	977	6	150	5	125
Telmen Wind Power	5.0	16,773	14,979	374,466	52	1,300	65	1,635	10	252	8	210
Moron Solar PV	10.0	16,267	14,527	363,166	50	1,261	63	1,586	10	244	8	203
Component 2: GSHP												
GSHPs	0.5	3,370	2,976	74,388	10	261	13	329	2	51	2	42
Total	**41.0**	**99,811**	**89,098**	**2,227,441**	**309**	**7,735**	**389**	**9,732**	**60**	**1,497**	**50**	**1,248**

MW = megawatt, MWh = megawatt-hour, PV = photovoltaic, RE = renewable energy, tCO_{2e} = tons of carbon dioxide equivalent, SO_2 = Sulfur Dioxide, NO_x = Nitrogen Oxides, PM_{10} = Particulate Matter smaller than 10 micrometers, $PM_{2.5}$ = Particulate Matter smaller than 2.5 micrometers.

Emission Factors

CO_2 - 0.8930 tons CO_{2e} per MWh
SO_2 - .0031 tons SO_2 per MWh
NOx - .0039 tons NOx per MWh
PM_{10} - .0006 tons PM_{10} per MWh
$PM_{2.5}$ - .0004 tons $PM_{2.5}$ per MWh

Source

Siberian grid emission factor (0.893 tons CO_{2e} per MWh), *Development of Electricity Carbon Emission Factors for Russia*, Lahmeyer, Oct 2010.

Wei Peng et al, *Air quality and climate benefits of long-distance electricity transmission in China*, Environ. Res. Lett. 12 (2017). Emission factors based on small coal power plants over six provinces (Tianjin, Hebei, Shandong, Jiangsu, Shanghai, Zhejiang and Guangdong)

GOVERNMENT OF MONGOLIA
MINISTRY OF ENERGY

ULIASTAI 5 MW SOLAR, 3600 KW/H BESS

ADB
ASIAN DEVELOPMENT BANK

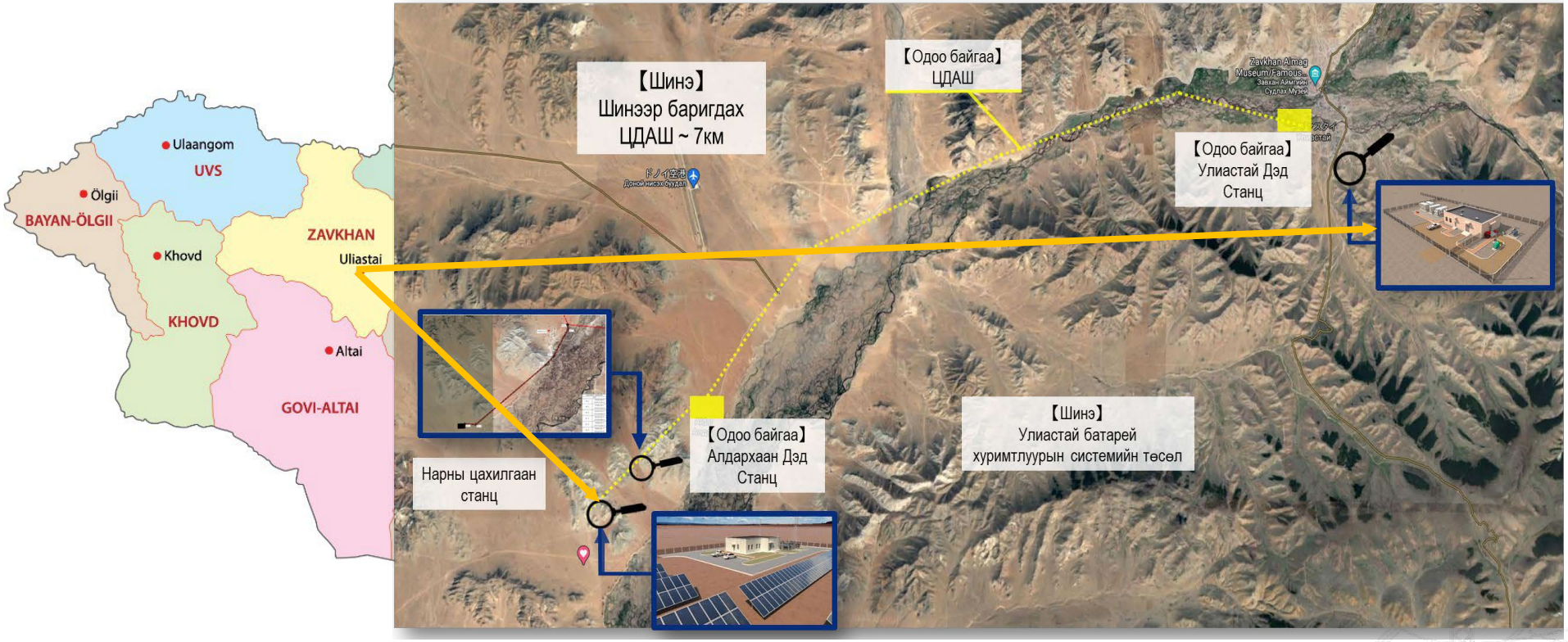
Project name	Upscaling Renewable Energy Sector Project
Subproject name	***A5: Uliastai 5 MW solar power plant and BESS***
Client	Ministry of Energy
Project financier	ADB, JCM
Grant	6 million USD
Loan	2.95 million USD
Contract date	2021.02.05
Contract amount	7,350,100.73 USD (5 million USD from Grant)
Disbursement	7,350,100.73 USD
Contractor	JGC HOLDINGS CORPORATION NGK INSULATORS, LTD. MCS интернэйшнл
Construction completion date	2022.11.26
User organization	Tashir Nogoon Erchim
Project implementation	100%
Results to be achieved	a). Annual production capacity of 10.1 million kWh. b). Reduction of 7,651.2 tons of greenhouse gases. c). 8-12 jobs.
Technical control	PMU, NEC

ULIASTAI 5 MW SOLAR, 3600 KW/H BESS

Borkh 5MW solar power plant in Aldarkhaan soum

Tsengeg 3.6MW/h battery storage system in Uliastai soum

ULIASTAI 5 MW SOLAR, 3600 KW/H BESS



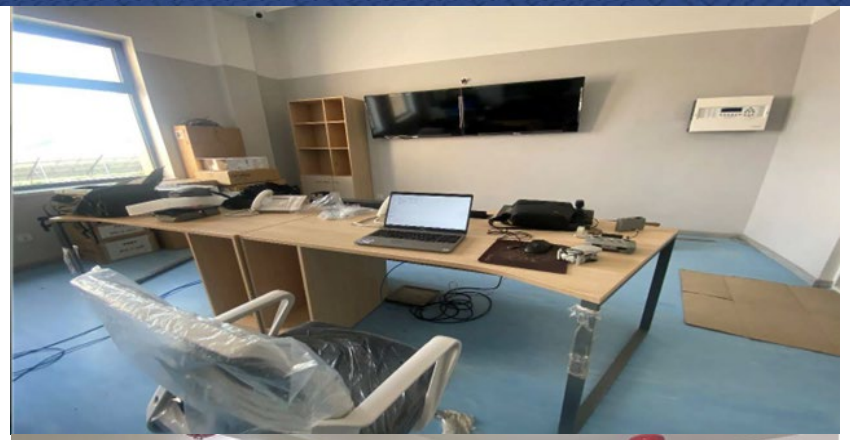
Uliastai battery storage system: Zavkhan aimag Uliastai soum, 6th village, Uguumur 5th section.

Aldarkhaan 5MW solar power plant: Zavkhan aimag Aldarkhaan soum 6th village, west of Tsakhir. Located 7 km from the soum

ULIASTAI 5 MW SOLAR, 3600 KW/H BESS

Station capacity	5 MW
Number of solar power generators	SUNTECH 540W x 10192=5,503,680
Total number of inverters	1375kVA x 4 units
Related substation	Aldarkhaan 35/0.4 kW substation
Length of OPL	7.8 km with a voltage of 35 kV
Average annual energy production	8.8 MW/h

ULIASTAI 5 MW SOLAR, 3600 KW/H BESS



Battery system capacity	3.6 MW/h
Battery type	NAS battery
Inverter numer	660 kVA x 1 unit
Related substation	Uliastai 110/35/10 kW substation
Line connection	35 kW 0.15 km
Energy production	1.3 MW/h

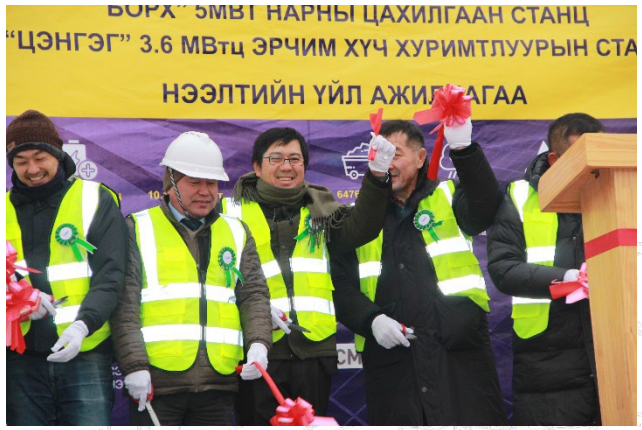
ULIASTAI 5 MW SOLAR, 3600 KW/H BESS

State Commission and Opening Ceremony

Technical Commission
2022.10.28

State Commission
2022.11.25

Opening Ceremony
2022.11.26



ULIASTAI 5 MW SOLAR, 3600 KW/H BESS

№	Project name	Start	Finish	Total energy produced /kWh/	Energy supplied to the system /kWh/	Domestic energy consumption /KWh/
1	Uliastai 5 MW solar power plant and 3.6 MW/h BESS	2023.01.01	2023.12.31	9,943,993.9	9,368,666.4	575,327.5
		2024.01.01	2024.12.31	10,366,928.8	9,821,327.20	825,806.20
		2025.01.01	2025.12.31	10,889,858.3	10.451,549.6	508,544.4

Thank you for your attention.