МОНГОЛ УЛСЫН ЗАСГИЙН ГАЗАР
ЭРЧИМ ХҮЧНИЙ ЯАМ

ADB ASIAN DEVELOPMENT BANK

# FIRST UTILITY-SCALE ENERGY STORAGE PROJECT

## 2023


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## USD 114.95M

ADB loan financing $100.0M
High-Level Technology Fund (grant) $3.0M
Government of Mongolia $11.95M

## 2020-2025

**The purpose of the project:**

Installation and handover into permanent operation of 80MW/200MWt installed capacity Battery Energy Storage System project.

**Scope of work:**

- Organized the selection of the contractor (EPC) for the design, supply and installation of the battery energy storage system, the contractor selected and ensure stable operation of the energy system by establishing, testing and adjusting, commissioning, and handing over the battery the energy storage system with an installed capacity of 80 MW/200 MWh next to the Songino substation in Songinohairkhan district of Ulaanbaatar city.
- A project management consulting company will be selected and the capacity building of the institute and organization will be organized by implementing consulting services.

**Total performance precentage: 21.5%**
**Utilization rate of loan: $10.21M** (9%)

**Components:**

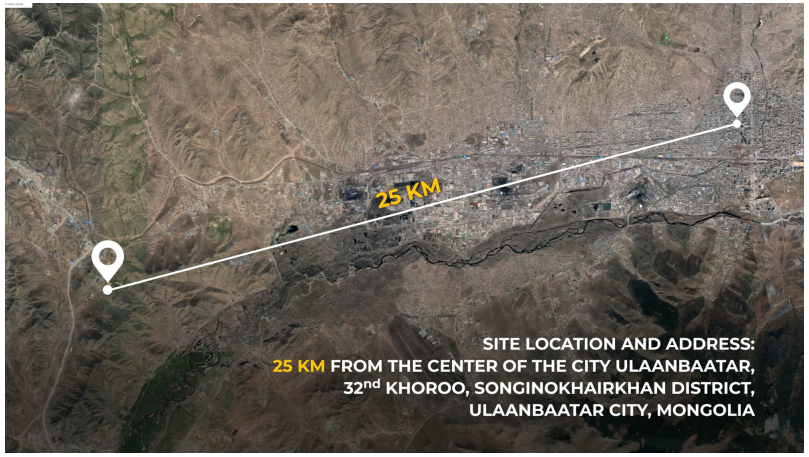
1. Engineering, procurement, and construction (EPC) contracts. $80,92M.
2. Project Management Consultant (PMC). $1,75M
3. Project Management Unit (PMU) .$1,36M,
4. Individual consultant, Procurement Specialist (International) - $0,90M,
5. Individual consultant, Battery Energy Storage System Specialist - $0,90M

## COMPLETION DATE

November **2023**

## PROJECT LOCATION

Area Songino substation
32th Khoroo,
Songinokhairkhan
district Ulaanbaatar




**OUTCOME:**

**Renewable energy capacity increased to 20% of total generation capacity by 2023 and 30% by 2030.**

- Renewable electricity penetration increased.
- Supply 58 gigawatt-hour of clean peaking power annually, and support the integration of an additional 859 gigawatt-hours of renewable electricity into the CES grid annually.

**OUTPUT 1:**

**Large scale advanced battery energy storage system installed.**

By 2023 80MW/200MWh of advanced BESS is installed.

**OUTPUT 2:**

**Institutional and organizing capacity enhanced.**

- The project will help strengthen the capacity of NDC and NPTG
- Developing BESS operation and maintenance O&M regulations to avoid reducing battery life through overcharging and discharging

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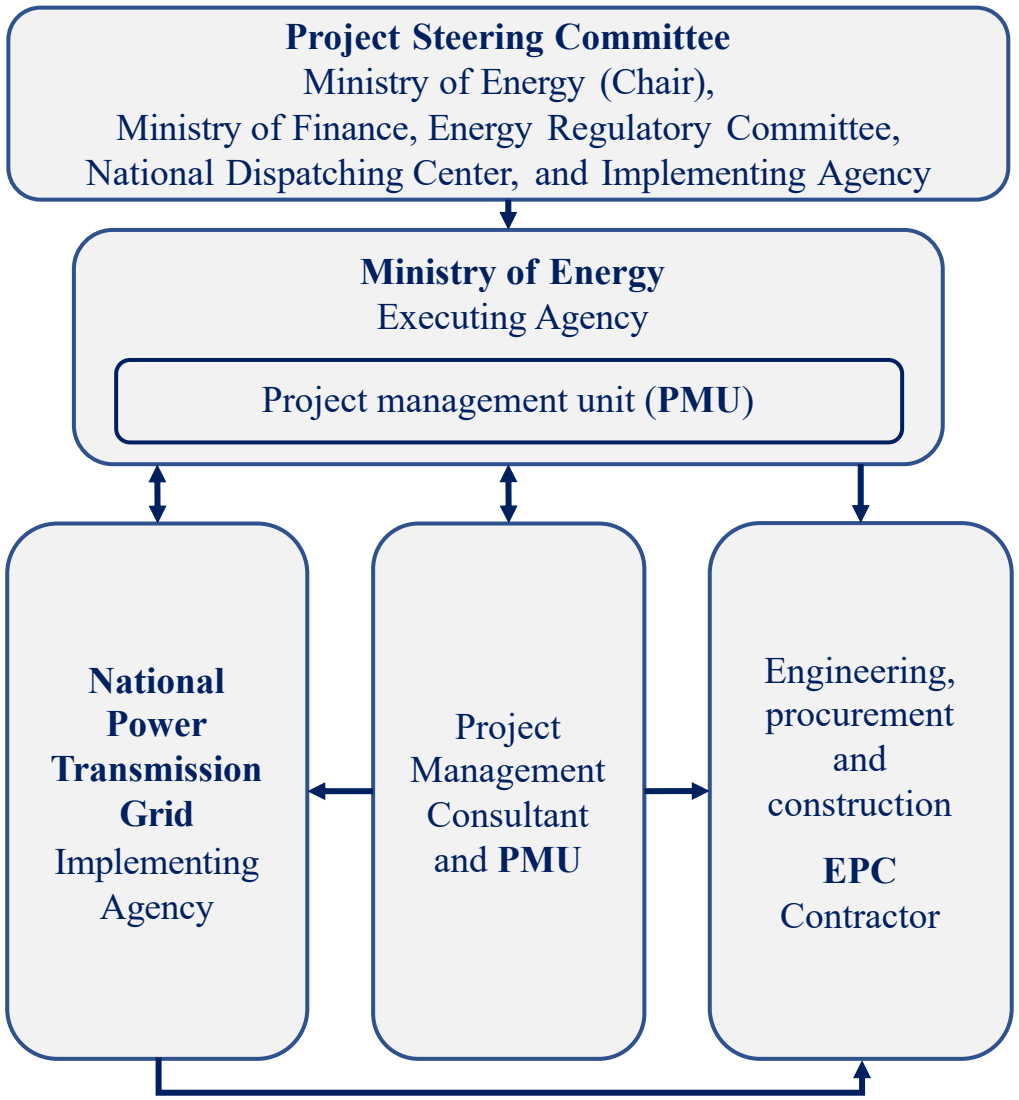
## PROJECT ORGANIZATION STRUCTURE




## PROJECT ORGANIZATION STRUCTURE

| GRID SYSTEM | ENVIRONMENT | SOCIAL |
|---|---|---|
| • Energy shifting<br>• Frequency regulation<br>• Voltage regulation<br>• Integrate additional renewable energy capacity into the CES grid.<br><br># Rated active power and energy capacity 80MW/200MWh<br>50Hz three-phase | **Decarbonizing the energy sector**<br>• The Government of Mongolia aims to reach the share of renewable energy in total installed capacity 30% by 2030, in line with the State Policy on Energy, 2015–2030.<br>• United Nations Framework Convention on Climate Change. 2016. Intended Nationally Determined Contribution (INDC) Submission by Mongolia.<br>• The project aims to expand the system's capacity to fully absorb renewable energy, which is otherwise curtailed. | Household consumers and businesses in urban areas powered by the CES, which is subject to electricity shortages, will be provided with reliable and uninterrupted power. |

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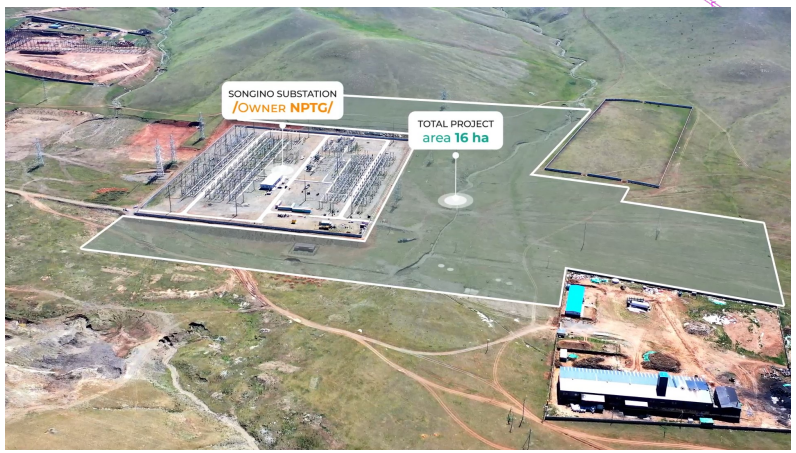
## GENERAL STRUCTURE OF FACILITY

- Battery Sotrage
- New substation

BESS will be connected to the 110 kV Busbar of the Songino substation through a 110 kV overhead line.


## GENERAL PLANNING

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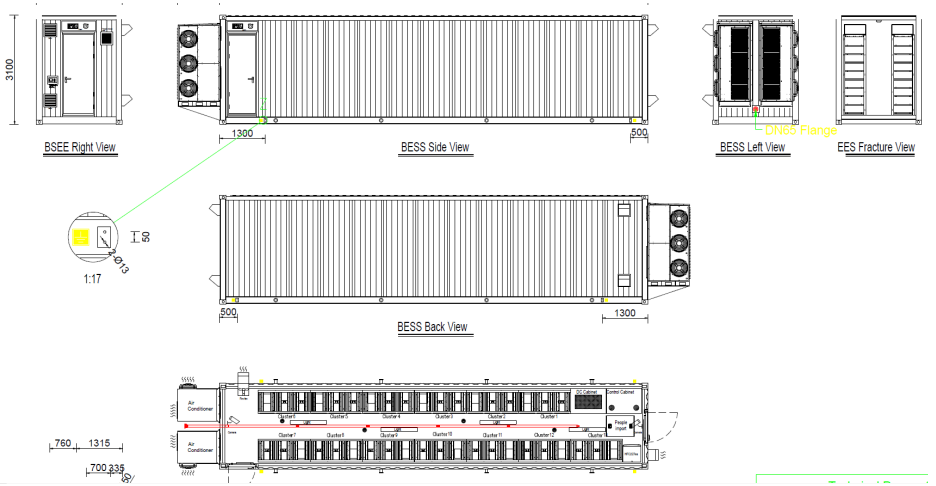
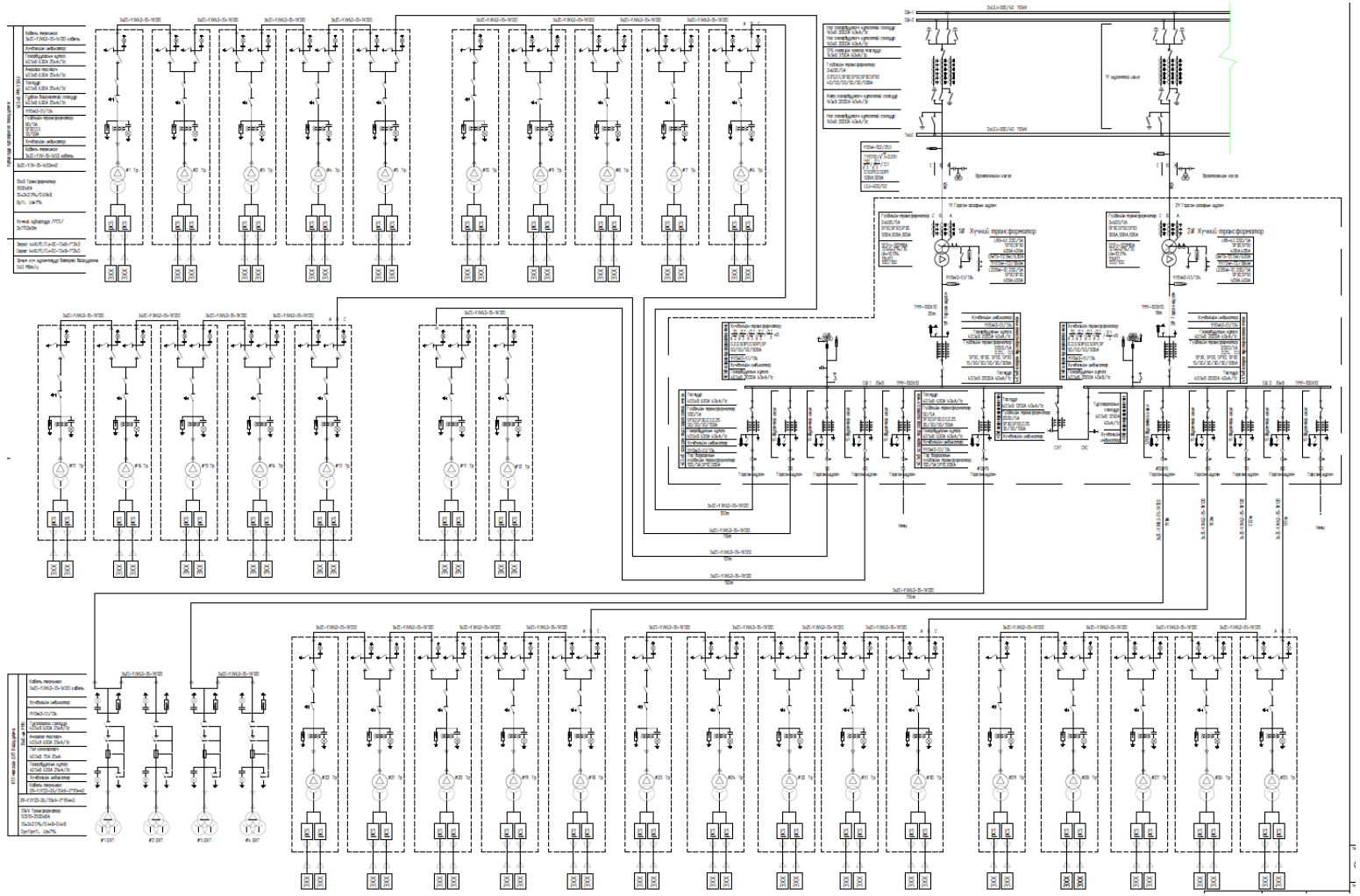
## BATTERY STORAGE

| Battery type | | Lithium Ion |
|---|---|---|
| Installed Power | МВт | 80 |
| Capacity | МВт.ц | 200 |
| Rated power of PCS | МВт | 1,725 |
| Number of PCS | set | 64 |
| Container capacity | MWh | ~3.5 |
| Number of containers | set | >64 |
| Container size | m | 12.2 x 2.4 x 2.9 |
| Main Transformers | sets | 2 |
| Rated Power of Main Transformers | MVA | 100 |




## SINGLE LINE DIAGRAM



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## CONSTRUCTION WORKS

**Extend:**

Outgoing line 110kV 2 circuits for 220/110/35kV Songino substation.

**New substation:**

- 64 battery compartments
- 32 inverter boost compartments
- 2 new sets of 110/35kV 100MVA main transformer
- 4 new sets of 35/0.4kV 2.5MVA auxiliary transformer
- 35kV Switchgear (35kV energy storage outgoing line 9
- circuit, transformer outgoing line 2circuit…)
- Relay protection, SCADA
- 35kV cable
- Battery Management System, Energy Management System
- Main control building
- Road, fence, drainage

## BESS KEY PRODUCT——BATTERY

| No. | Item | Model 5 |
|---|---|---|
| 1 | Application | Energy Storage |
| 2 | Cell Model | 54174200 |
| 3 | Nominal Capacity | 210Ah |
| 4 | Nominal Voltage | 3.2V |
| 5 | IR | ≤0.3mΩ |
| 6 | Mass | ~4500g |
| 7 | Rated Ratio | 0.5C / 1C |
| 8 | Cycle life (25°C@100%DOD) | >5000 |


## BESS KEY PRODUCT——POWER CONVERSATION SYSTEM / PCS/

### Main Functions

- On-grid Charging
- On-grid Discharging
- PQ control
- VF control
- Droop control
- VSG control/Grid-Forming

### Protection Functions

- AC over/under voltage protection
- AC over/under frequency protection
- AC over current protection
- DC over voltage protection
- Reversed polarity protection
- Inverter overheating protection

# THANK YOU