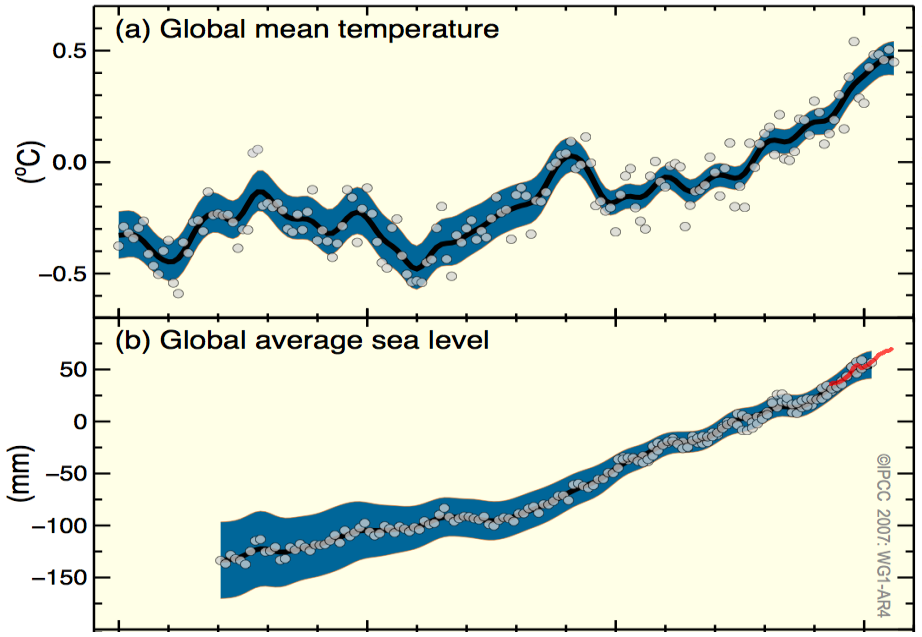
Experiences, achievements and issues of Renewable energy in the Mongolian energy sector

Why is renewable energy important?

Needs to reduce carbon emission

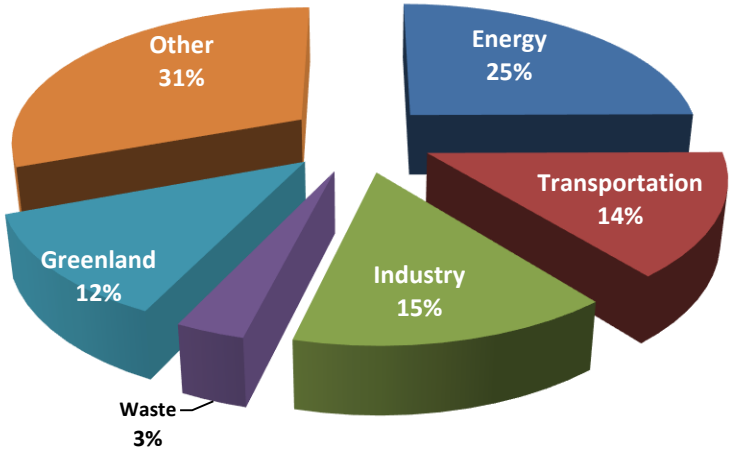
International trend



- About climate change UNFCCC - 1993
- Kyoto protocol – 1999
- Copenhagen agreement – 2009
- Cancun agreement– 2010
- Paris agreement COP21 – 2015
- COP26 Glasgow 22.7% -→ 27.2%

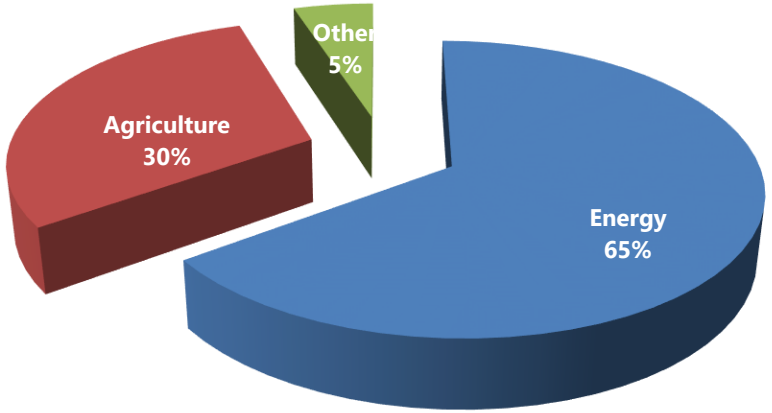
World carbon emission

-



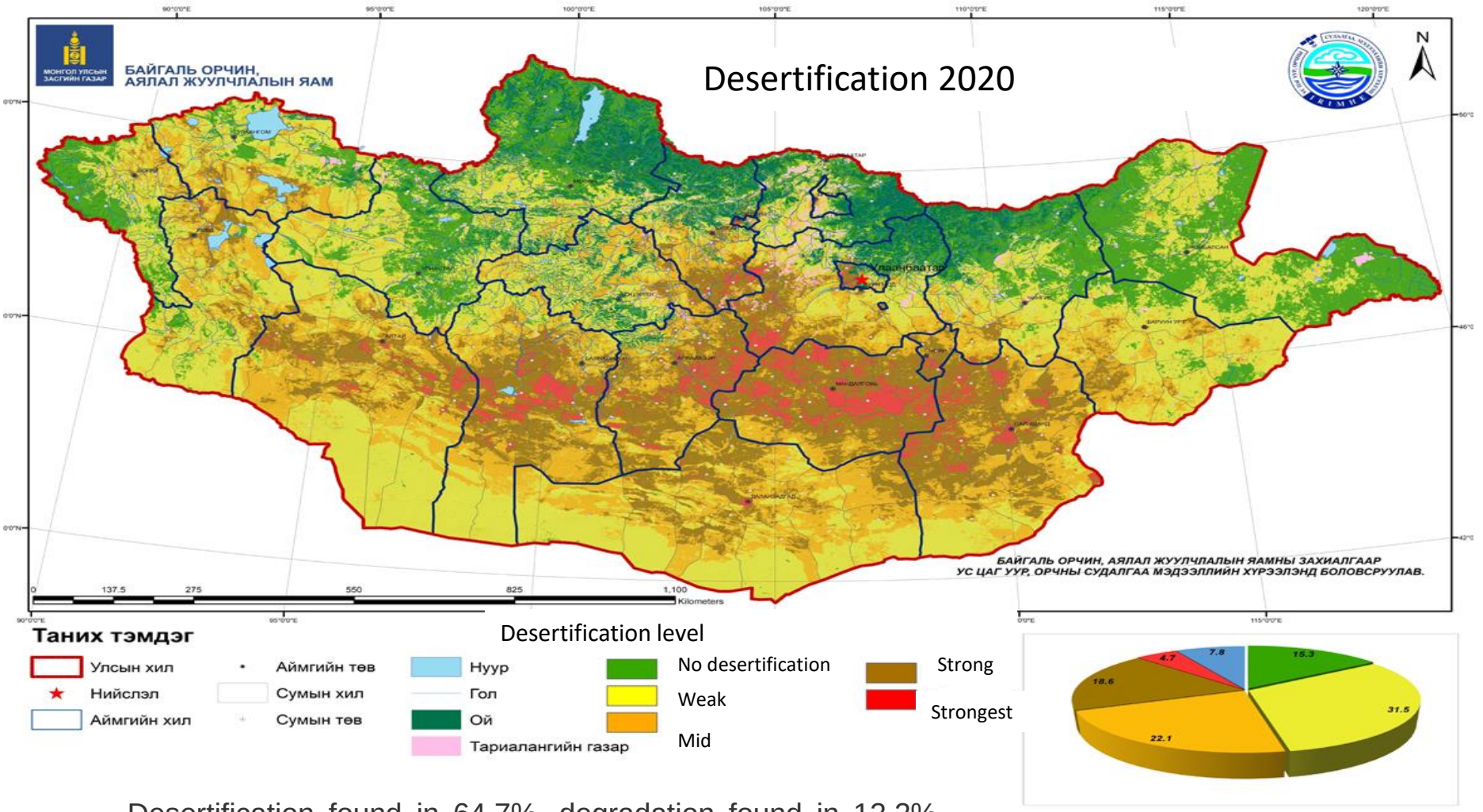
Mongolian carbon emission

-



Why is renewable energy important?

Desertification of Mongolia



Desertification found in 64.7%, degradation found in 12.2% from total territory.

Clean Energy

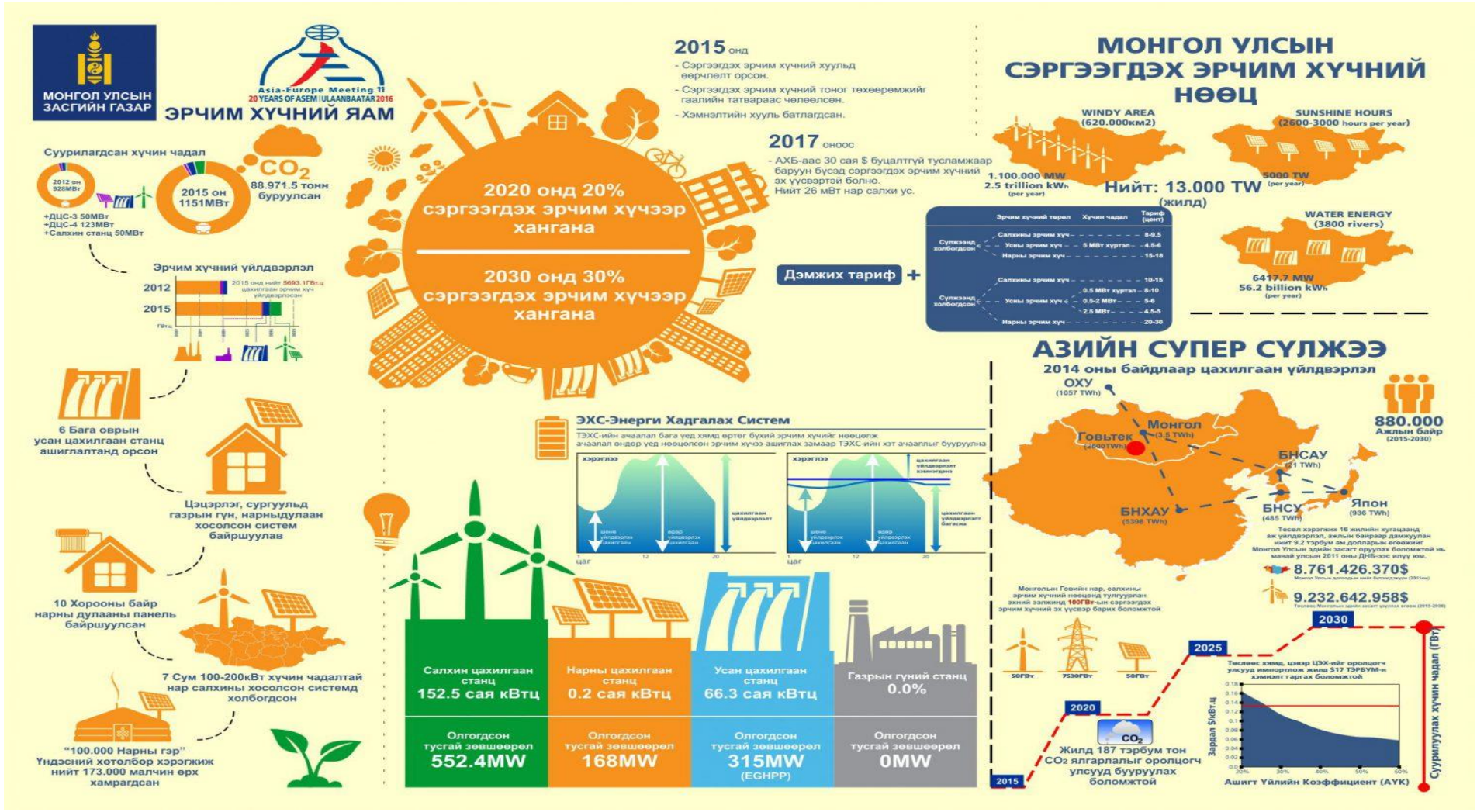
Innovating for success Newcom Group

COP 26 World Leaders Summit

President U.Khurelsukh attending COP26 World Leaders Summit

- In order to discharge of an obligation which obligated in Paris agreement, Mongolia which is one of country being affected by climate change we are proofing again to will work and use all possibilities and chances to encourage cooperated action to increase absorption of carbon emission and reduce carbon emission.
- In frame of document which determined Mongolian nation, we determined to reduce carbon emission CO2 which is major impact of climate change by 22.7% by year 2030.
- We are grateful to announce in this summit conference that there is chances to increase this percentage up to 27.2% by conducting new technology, innovation and by increasing required investment.

Renewable energy resource and policy



Clean Energy

Innovating for success Newcom Group

First wind farm

Highlights and achievements

Environment, community benefit

- Every year: cutting 180 thousand tons CO2
  saving 1.6 million tons fresh water
  reducing 122 thousand tons coal
- First big CDM project which is registered in UNFCCC
- 3,843 people of 18 companies involved in this project

For energy sector development

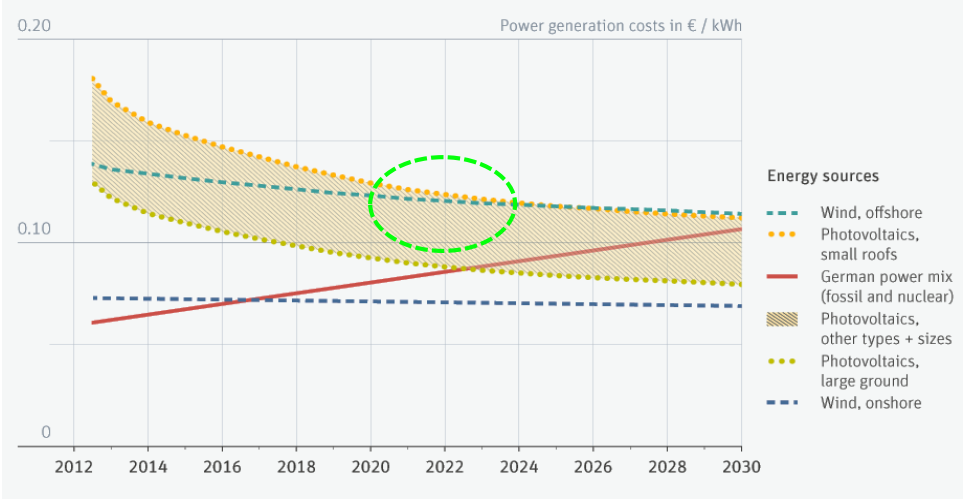
- First government and private partnership (PPP)
- First private energy producer (IPP)
- First electricity power purchase agreement (PPA)

Evaluability

- Became the first project in Mongolia to receive an international project finance award : Asia-Pacific Renewable Deal of 2012 in Renewables from Project Finance Magazine
- Green Award 2012, Ministry of Environment and Green Development
- The Best Project of 2013 in Mongolian Energy sector, Ministry of Energy
- Green Investor 2013 , Mongolian National Chamber of Commerce and Industry
- Development Impact Honors 2014, US Ministry of Finance
- National Quality Award 2014, Mongolian Chamber of Commence
- The Best Technology Innovator 2016, Tuv province

FUTURE

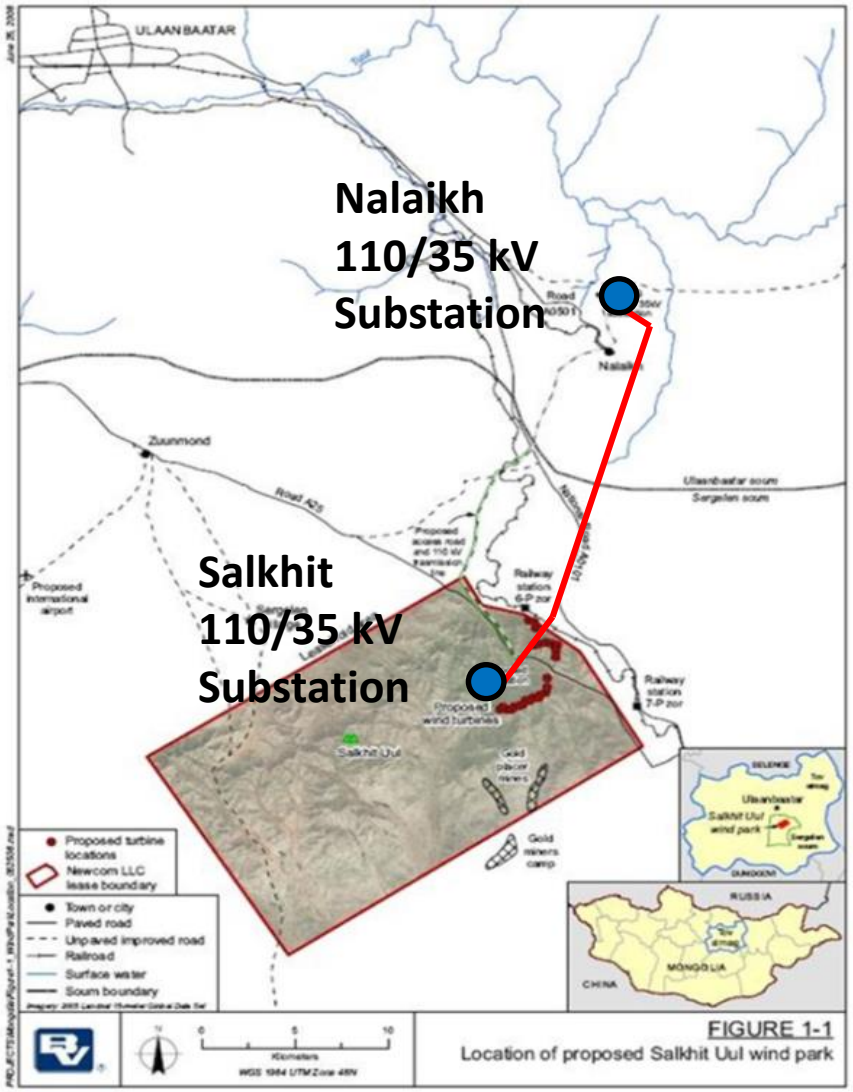
Renewable energy



Salkhit wind farm

About project

- Initial investment **122 mln USD**
  - Senior Loan (EBRD) **42.4 mln USD**
  - Senior Loan (FMO) **42.4 mln USD**
  - Equity **37.2 mln USD**
- Shareholder: Newcom Group
  100 % owned by local company
- Installed capacity **50MW**
  - WTG **GE 1.6-82.5 xle** (31 units)
  - Annual production P50 **169 mln kWh**
  - Average wind speed **8.1 m/s**



TIMELINE

- ✓ 2004 : Wind Measurement Study
- ✓ 2011 : Early work has been started
- ✓ 2012 : Major construction started
- ✓ 2013 : Grid Connection – Commencement
- ✓ 2013 : June – Mongolian First Wind Farm
- ✓ 2017 : Installation fault recorder
- ✓ 2018 : Installation Rogowski coil

Clean Energy

Innovating for success Newcom Group

Salkhit wind farm

Construction

Project phases

- **Wind resource study 2004 – 2012**
  For 8 years study result: average wind speed – 8.12 m/s

- **Construction 2011 – 2013**
  Totally 18 companies, 3500 people worked.
  Transported equipment and parts from factory to project site through 2000km by 600 trucks.

- **On 20th of June 2013, connected to the central grid of electricity**







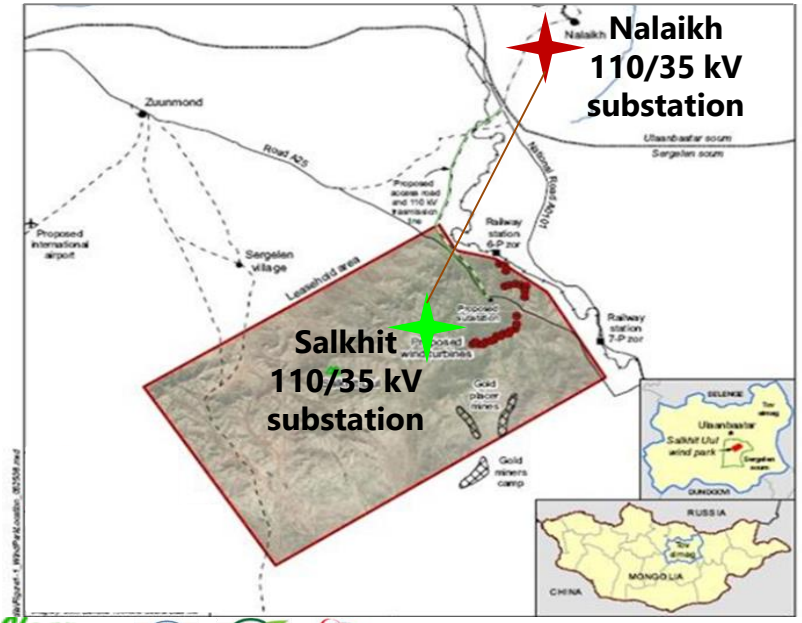

Salkhit wind farm

Main part – Wind turbine

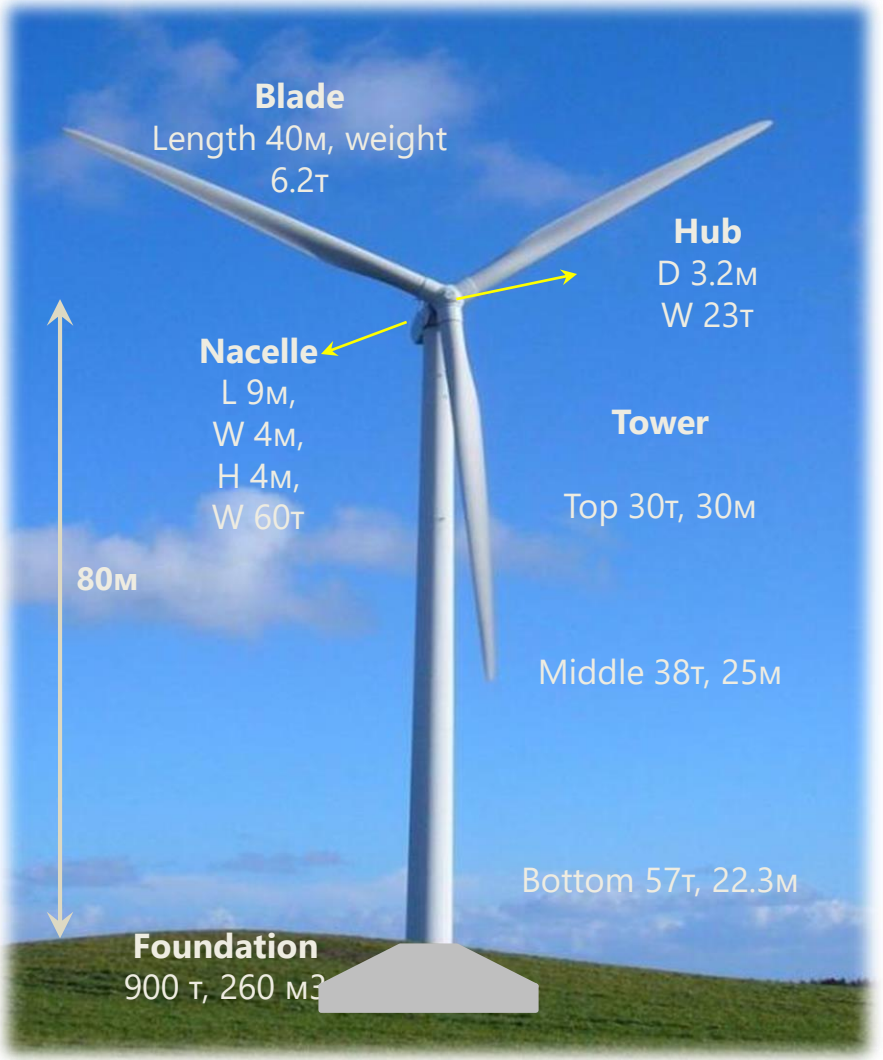
Technical parameters

Installed capacity	**50 MW**
Model	**GE 1.62-82.5 xle**
Number of turbines	**31 units**
Average wind speed	**8.12 m/s**
Production for year	**169.6 mln kWh**

ДАМЖУУЛАХ СҮЛЖЭЭНД ХОЛБОГДСОН



Wind turbine over dimension



Salkhit wind farm

Other electrical equipment

GAS INSULATED SWITCHGEAR (GIS)

Installed gas insulated switchgear in Mongolia.

Other 110/35kV substation

Gas insulated switch gear 110/35kV substation

35kV underline cable line

Longest underground 35kV cable network for reduce risk and hazard to damage animal, keep nature view and reduce maintenance cost.

35kV over head transmission line

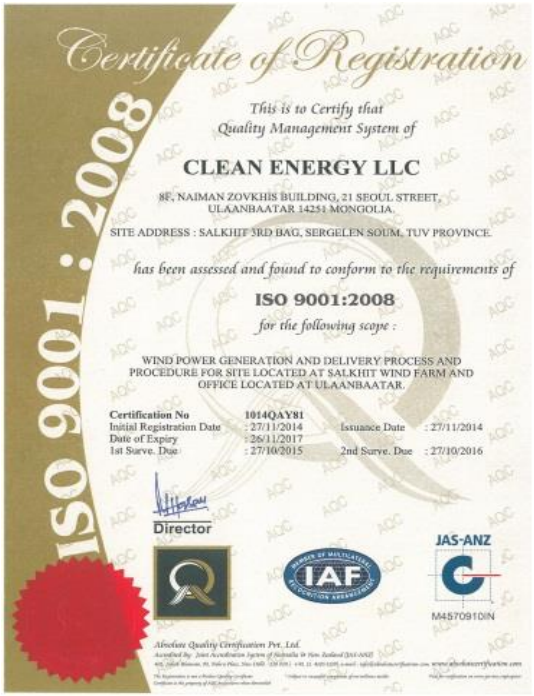
35kV underground cable network of Salkhit wind farm

Salkhit wind farm

Standards

Health Safety and Environment, Quality

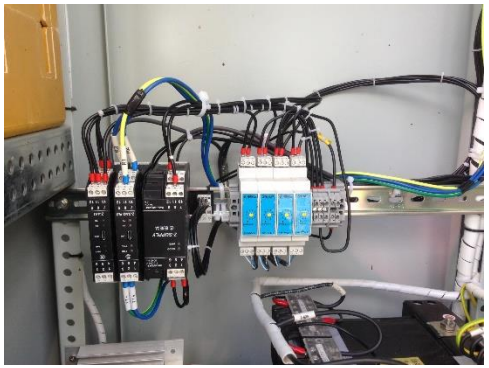
- International HSE standards for construction and operation
- ISO 14001 (Environment) – i.e. Bat and Bird Study/ Ornithology research
- ISO 9001 (Quality)
- OHSAS 18001 (Occupational Health and Safety)



Salkhit wind farm

Technical issues

- We are facing some challenges in operation and there is needs to train our engineers and technicians for handle this challenges.



- We were facing with difficult to solve single phase to ground fault damage.
- Salkhit wind farm is developing monitoring system to monitor single phase to ground current leakage and open breakers before damage spread to other parts.

- In year 2019, 2020 Salkhit wind farm faced difficulties of main bearing issues.
- Salkhit wind farm is successfully replaced issued main bearings in Mongolia first time with foreign team.

Salkhit wind farm

CER production

For reduce carbon emission

Since first operation, Salkhit wind farm produced 963,826 tons CERs and reduced carbon emission by 963,826 tons CO2 and sold to 15 countries.

Way to encourage the private renewable energy producers

CONCLUSION BASED ON SALKHIT WIND FARM EXPERIENCE

	IMPACT FROM GOVERNMENT	IMPACT FROM OTHERS
TARIFF	To encourage sustainable operation	To determine tariff based on true market assessment
FIRECT INVESTMENT FROM FOREIGN	To encourage to make power purchase agreement which meet with standard for running projects and new projects	From positive side, to impact balance of macro economic and foreign investment based on possibilities of sector
OPERATION	Follow renewable energy law	According to this law, to achieve goal to produce energy 20% in 2023, 30% in 2030 from renewable energy.
FINCANCIAL RESPONSIBILITY	To guarantee a sustainable tariff for foreign investing banks	Appropriate spending of investment, being competent and introduce Mongolian energy sector to the world.
ACKNOWLEDGE OF PUBLIC	To encourage to people to know renewable energy benefits	Let people know renewable energy information which include benefits, how it produce energy

Energy regulatory commission achievements and issues

1. ERC achieved to goal to compound legal environment to power purchase agreement for private sector

2. Operating with policy to release tariff regulation

3. ERC is regulating private sector renewable energy producers and state-owned producers

4. ERC achieved to goal to compound legal environment of market price

5. ERC conducted electronic service which receive report and application etc.,

6. ERC achieved to goal to compound Legal environment of power purchase agreement for house holds and other authorities

Energy sector finance and economy, tariff

- If compare income of first half of this year with last year, income is increased but cause of government paying energy payment, people using electricity free are increasing debt and receivable of energy sector.
- Energy sector has limited possibilities to conduct new technology, replace old equipment and could not extend installed capacity, government could not establish new power source cause of government regulating energy price.
- There is needs to government encourage to private sector for discharge of an obligation under investment and loan agreement.

https://online.fliphtml5.com/bvaja/djic/?fbclid=IwAR1q_XDktuDVlnJTwq_YwuZnME7f_EGHw_D4p1Hh3qlccy6Kt9RC-YEPlA0#p=6

Thank you for attention

Contact:
Tell: +976 - 75951331
Fax: +976 - 70111341
Web: www.cleanenergy.mn