MONGOLIA'S FIRST WIND FARM – SALKHIT WIND FARM

Clean Energy

Innovating for success Newcom Group

COMPANY INTRODUCTION

- A renewable energy company developing and operating the first wind farm in Mongolia
- Established in 2004 as part of Newcom Group
- Investors:
  - Newcom LLC
  - General Electric Pacific PTE Ltd (GE)
  - European Bank for Reconstruction and Development (EBRD)
  - Netherlands Development Finance Company (FMO)
- Total investment cost 122 Million USD

Salkhit Windfarm Mongolia - 16/11/2012

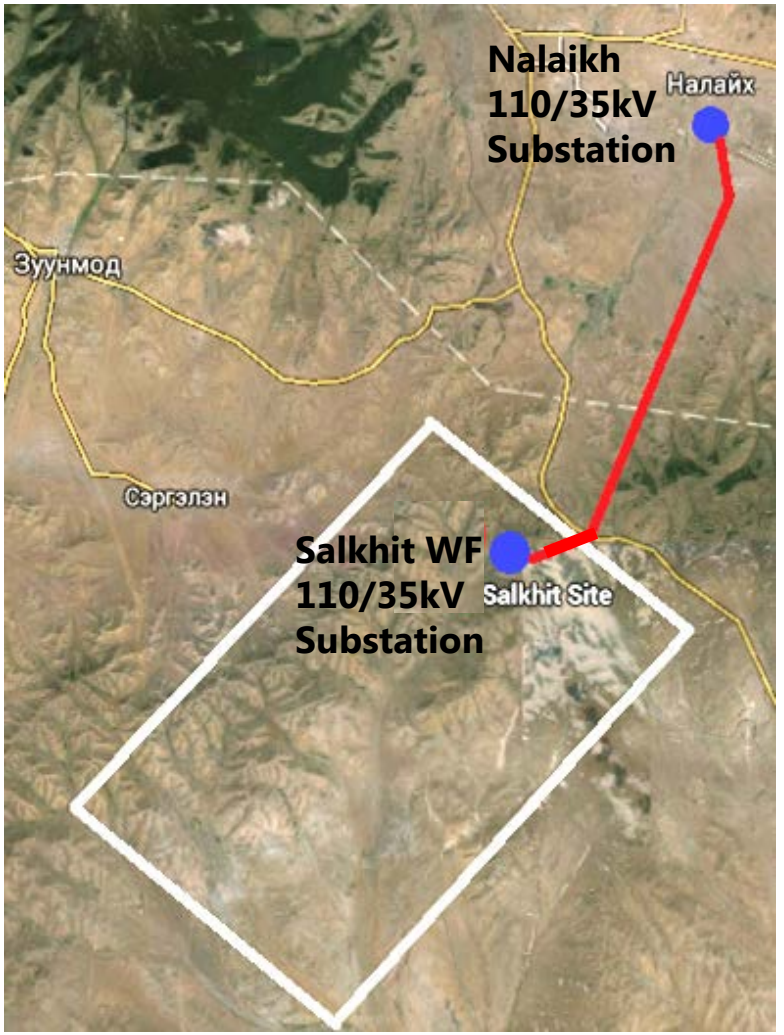
Green Energy

Newcom Group

COMPANY INTRODUCTION

STATISTICS

- Installed capacity **50 MW**
- WTG **GE 1.6-82.5 xle** (31 units)
- Annual production **168.5 mln kWh**
- Average wind speed **8.2 m/s**
  - Wind speed measurement since 2004
- Connected to the Grid through Nalaikh substation
- Early works since **2011**
- Major construction since **Apr 2012**
- Operations since **June 2013**



Clean Energy

Innovating for success
Newcom Group

PROJECT HIGHLIGHTS

Proud to be first...

- First wind farm in Mongolia
- First IPP
- First PPA
- First new power generation since 1984
- Largest renewable energy source
- Largest CDM registered project
- First renewable energy generator connected to grid
- First utility with a private investment

Clean Energy

Innovating for success Newcom Group

CONTRIBUTION TO SUSTAINABLE DEVELOPMENT

ECONOMIC BENEFIT:

- Introduced renewable energy as a viable business model
- Developed the first commercial scale wind project
- Raised project finance of 122 million USD
- Job creation
- Responsible tax payer

SOCIAL BENEFIT:

- Development of local expertise in power and renewable energy sector
- Cooperation with local subcontractors
- Support to local community development

ENVIRONMENTAL BENEFIT:

- Cut CO_2 emissions by 180 thousand tons annually
  - ERPA between Clean Energy LLC and Swedish Energy Agency has been entered in 8 April 2013
  - Agreed to sell 630,000 CERs until 31 August 2019.
- Reduce coal burning by 122 thousand tons annually
- Save 1.6 million tons of fresh water annually

Clean Energy

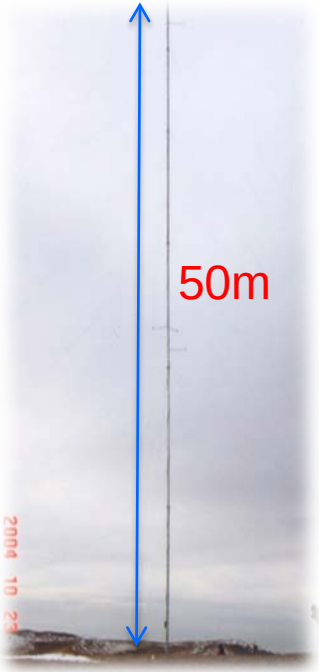
Innovating for success Newcom Group

DEVELOPMENT PHASE

WIND MEASUREMENT

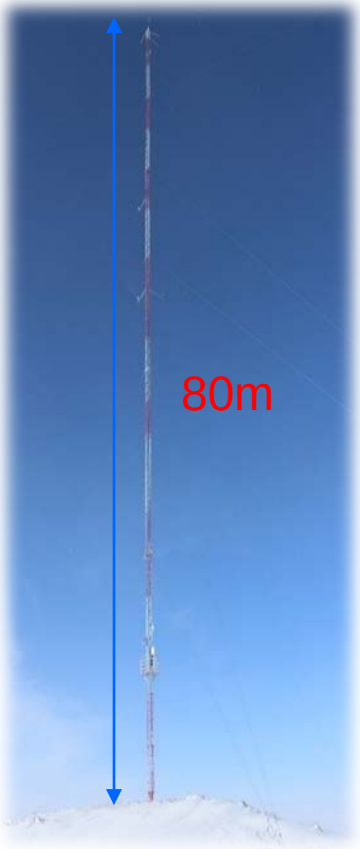
❑ 50m MAST

- Required 50m tower height
- 5 Stations
- More than 4 years' measurement
- Cooperation with local citizens



❑ 80m MAST

Wind Anemometers： at level 80mN , 80mW, 50mW, 39mW,
Wind Vanes： at level 78m , 39m
Temperature： 75m, 10m



Clean Energy

Innovating for success Newcom Group

ARCHEOLOGICAL STUDY

DEVELOPMENT PHASE

GEOTECHNICAL STUDY

Clean Energy

Innovating for success Newcom Group

DEVELOPMENT PHASE

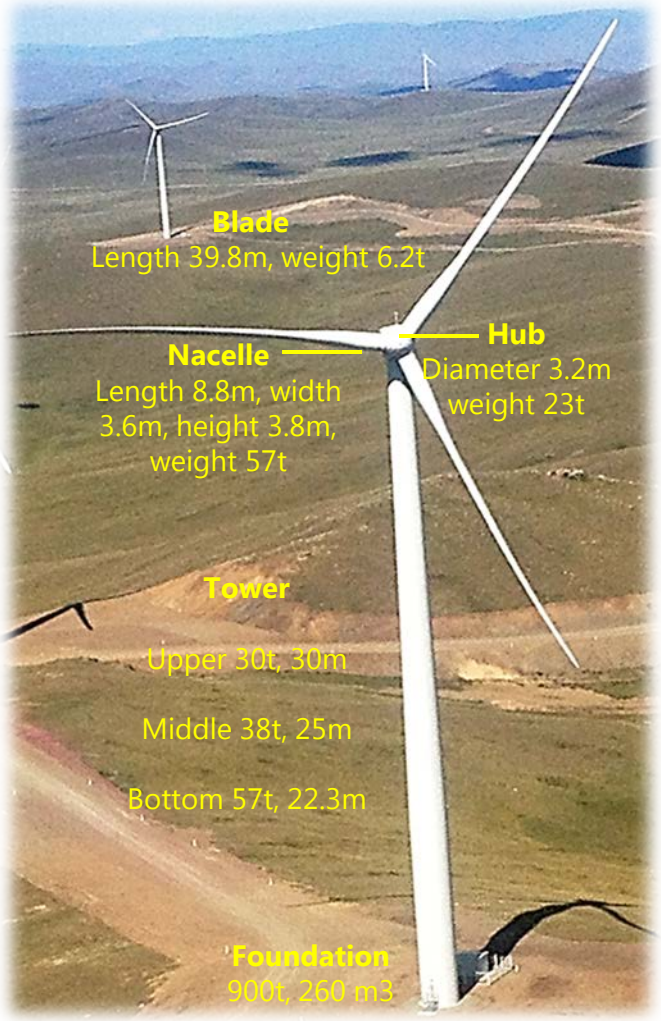
CONSTRUCTION OF THE 110kV TRANSMISSION LINE

Clean Energy

Innovating for success Newcom Group

CONSTRUCTION PHASE

WIND TURBINE GENERATOR



- 260 m^3 concrete per foundation
- 40 tons of rebar per foundation
- Insulated by bitumen and foam
- Earth backfilled and compacted – gravity foundation

Clean Energy

Innovating for success Newcom Group

CONSTRUCTION PHASE

TRANSPORTATION

- 600 heavy trucks and trailers for transportation
- 1300-2500 km for each WTG component
- 600 km dirt road through the Gobi desert

Clean Energy

Innovating for success Newcom Group

CONSTRUCTION PHASE

LIFTING CRANE

- 650 tons of lifting capacity
- The largest mobile crane in Mongolia

- Highly depends on weather condition
- 14 expats and 20 National for erection team
- 1-3 days for per one WTG erection

Clean Energy

Innovating for success Newcom Group

OPERATIONS PHASE-Newly Applied Technology

THE SALKHIT 110/35kV SUBSTATION

Clean Energy

Innovating for success Newcom Group

OPERATIONS PHASE-Newly Applied Technology

110 kV GAS INSULATED SWITCHGEAR

- Latest advanced technology in the Mongolian power sector
- Low space requirement
- High reliability
- Long service life
- Low maintenance cost

Clean Energy

Innovating for success Newcom Group

OPERATIONS PHASE-Newly Applied Technology

35 kV CABLE NETWORK

- Total Length – 27 km
- Largest MV cable network in Mongolia
- Low operational and maintenance cost
- Minimal environmental impact

- Before

- Now

Clean Energy

Innovating for success Newcom Group

OPERATIONS PHASE

SITE ROAD

- Building gravel roads for access to the site and roads between turbine locations
- 34 km of improved road over the hills

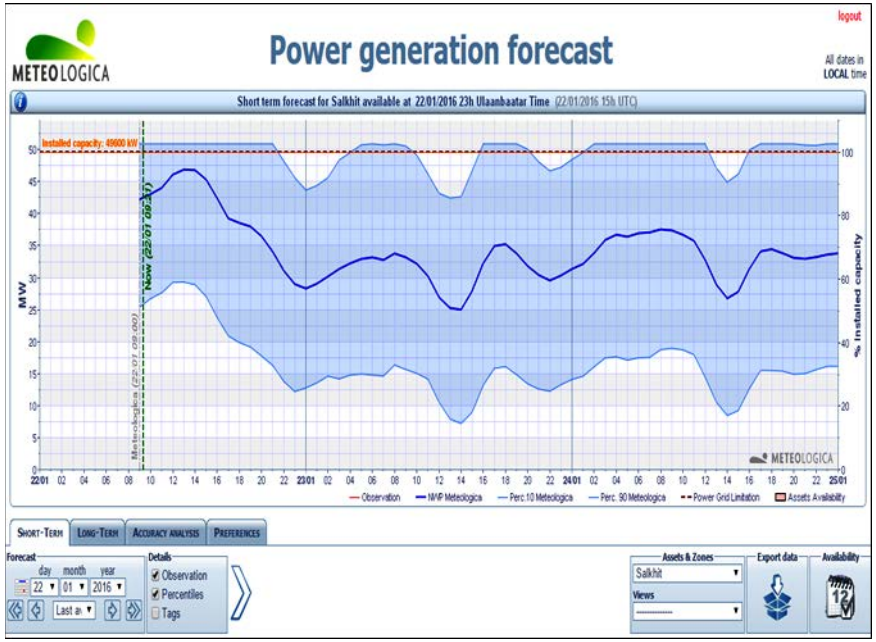
Clean Energy

Innovating for success Newcom Group

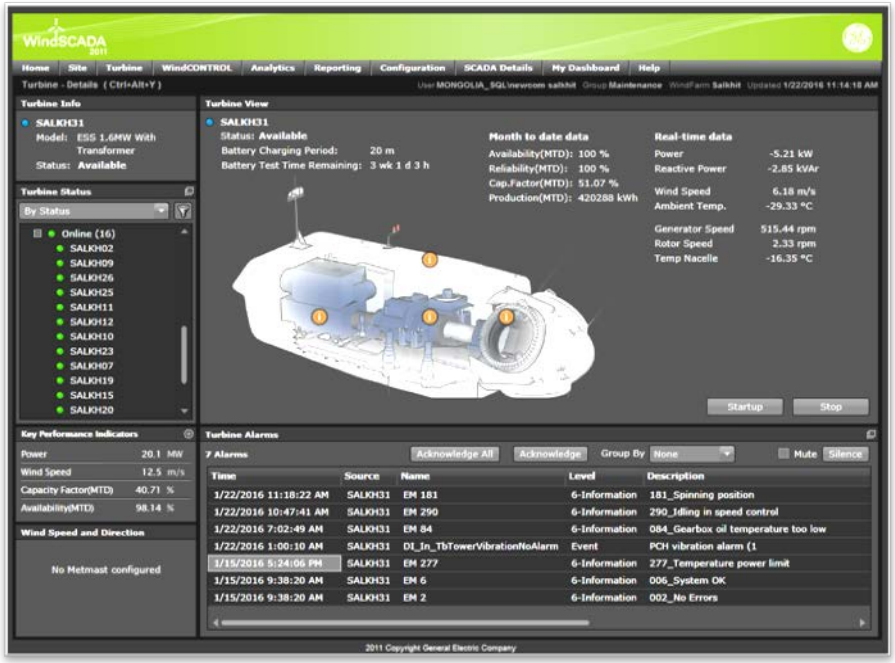
OPERATIONS PHASE-WIND FARM CONTROL SYSTEM

WINDSCADA SYSTEM

- Wind forecast monitoring screen



- GE Wind turbine SCADA



Clean Energy

Innovating for success Newcom Group

WORLD CLASS INDUSTRY STANDARDS TO MONGOLIA

STANDARDS

Health Safety and Environment, Quality

- International HSE standards for construction and operation period
  - ISO 14001 (Environment)
  - ISO 9001 (Quality)
  - OHSAS 18001 (Occupational Health and Safety)

Clean Energy

Innovating for success
Newcom Group

OPERATIONS PHASE

ENVIRONMENTAL AND SOCIAL RESPONSIBILITY

- 2006 Environmental assessment
- 2008 Detailed ESIA /by Black & Veatch/
- 2012 Update to ESIA /Sunny Trade LLC/
- 2012-2014 Bird and Bat monitoring /Evergreen Earth LLC/
- 2015-2017 Bird and Bat monitoring /Mongolian Ornithological Society/

At all stages of project implementation:

EQUATOR PRINCIPLES

Principle 1:	Review & Categorisation
Principle 2:	Social & Environmental Assessment
Principle 3:	Applicable Social & Environmental Standards
Principle 4:	Action Plan & Management System
Principle 5:	Consultation & Disclosure
Principle 6:	Grievance Mechanism
Principle 7:	Independent Review
Principle 8:	Covenants
Principle 9:	Independent Monitoring & Reporting
Principle 10:	EPFI reporting

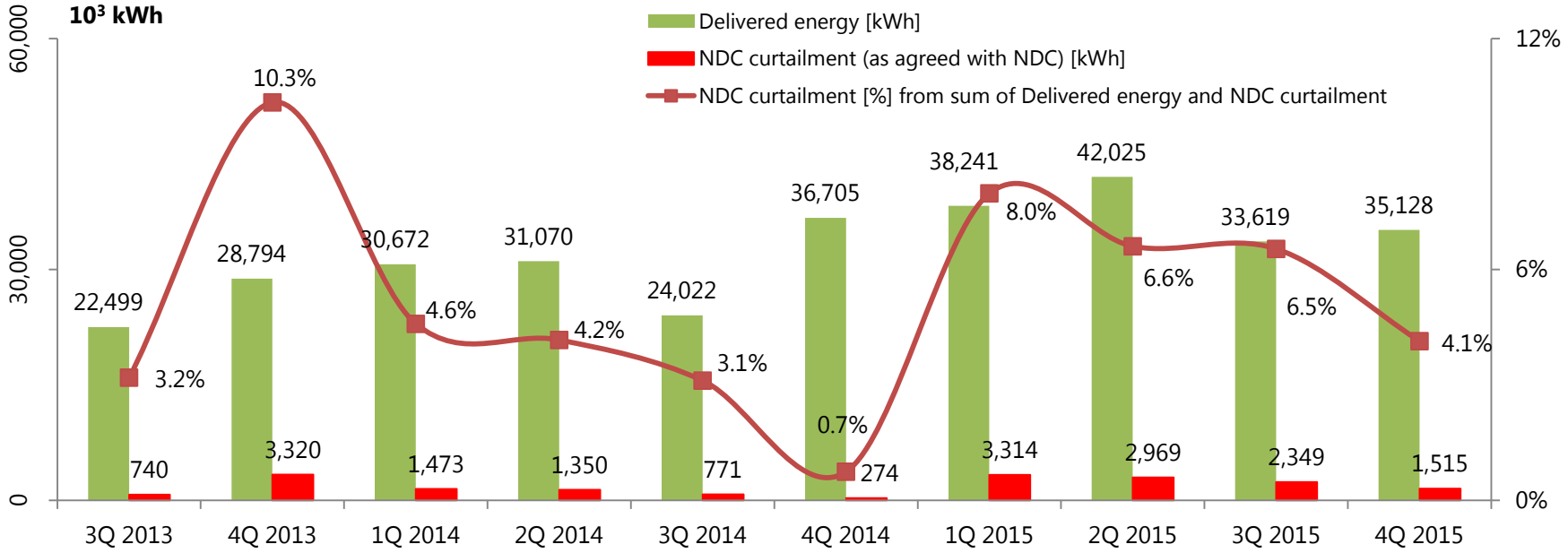
Clean Energy

Innovating for success Newcom Group

PERFORMANCE OF PREVIOUS YEARS

PRODUCTION

DELIVERED ENERGY AND NDC CURTAILMENT (QUARTERLY)



SUMMARY

Operation to date Delivered energy **322,774,254 kWh**, NDC curtailment **18,075,479 kWh** (5.3%)

2015 Delivered energy **149,012,556 kWh**, NDC curtailment **10,146,834 kWh** (6.4%).

2014 Delivered energy **122,468,214 kWh**, NDC curtailment **3,868,044 kWh** (3.1%).

2013 Delivered energy **51,293,484 kWh**, NDC curtailment **4,060,601 kWh** (7.3%)

Clean Energy

Innovating for success Newcom Group

Innovating for success
Newcom Group

Clean Energy

WIND FOR FUTURE

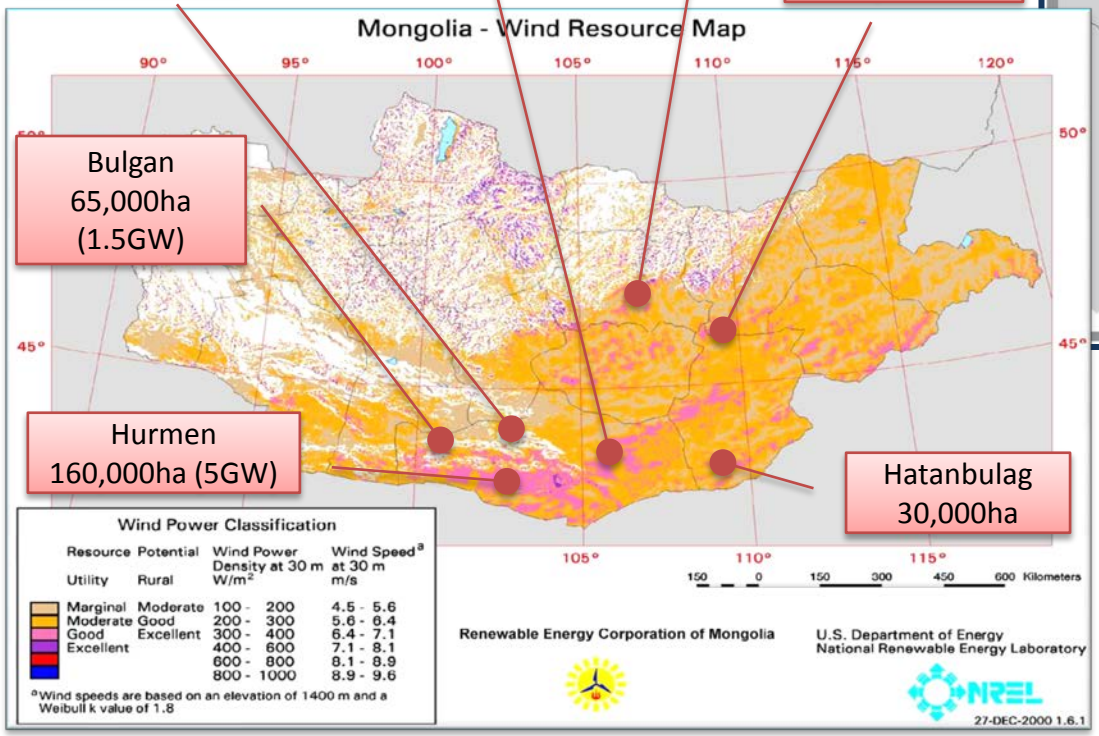
Wind Farms study

Tsogt tsetsi
7,000ha(250MW)
aver 8.1m/s 3year

Salkhit
12,000ha (50MW)
aver 7.5m/s 6year

Hanhongor
10,000ha

Altanshiree
10,000ha

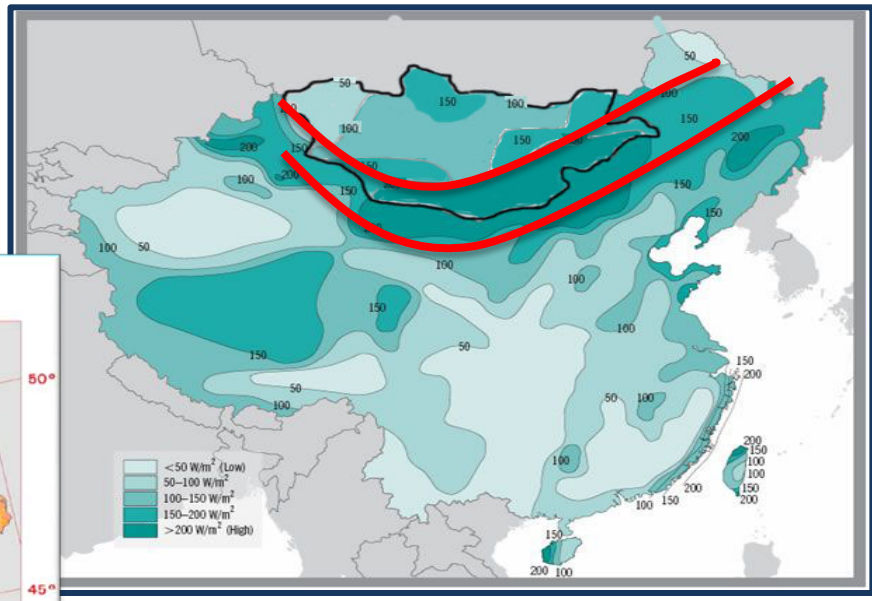


Bulgan
65,000ha
(1.5GW)

Hurmen
160,000ha (5GW)

Hatanbulag
30,000ha

Tremendous wind potential



8,100 TWh of annual wind resource or 40% of world's annual electricity generation

Thank you for your attention

Contact information:
Tel: +976 – 7011 1331
Fax: +976 – 7011 1341
Email: contact@cleanenergy.mn
Web: www.cleanenergy.mn