

# HANGJIN YIHEWUSU PHASE I 49.5MW WIND POWER PROJECT



Document Prepared By Climate Bridge Ltd.

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|                          |                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------|
| <b>Project Title</b>     | Hangjin Yihewusu Phase I 49.5MW Wind Power Project                                    |
| <b>Version</b>           | 02                                                                                    |
| <b>Report ID</b>         | N/A                                                                                   |
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| <b>Project ID</b>        | N/A                                                                                   |
| <b>Monitoring Period</b> | 28/12/2011 to 06/09/2012                                                              |
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## 1 PROJECT DETAILS

### 1.1 Summary Description of Project

The Hangjin Yihewusu Phase I 49.5MW Wind Power Project (hereinafter referred to as “**the project**”) is located in Hangjin County, Ordos City, in the western part of the Inner Mongolia Autonomous Region in China. The goal of the proposed project is to generate electricity from wind resources by using wind power generation technology, and to deliver the electricity to the North China Power Grid (NCPG).

The project was registered as a CDM project activity in UNFCCC on 07/09/2012.

The total installed capacity of the project is 49.5MW (33×1.5MW). The expected annual feed-in electricity is 117,784 MWh based on the registered PDD, which is finally transmitted to the NCPG.

The project operation started in 28/12/2011. The implementation of the project is consistent with the description of the registered PDD.

The net electricity supplied to the grid by the project in the monitoring period from 28/12/2011 to 06/09/2012 is 65,118.53 MWh. The total verified carbon units (VCUs) achieved in the monitoring period are 58,339 tCO<sub>2</sub>e.

### 1.2 Sectoral Scope and Project Type

The sectoral scope and activity type of the project is identified as follow:

Sectoral Scope 1: Energy industries (renewable-/non-renewable sources)

The project is not a grouped project.

### 1.3 Project Proponent

Table-1 Information of the project proponents

|                               |                                                                          |
|-------------------------------|--------------------------------------------------------------------------|
| <b>Roles/Responsibilities</b> | Project Owner                                                            |
| <b>Organization:</b>          | Inner Mongolia Guodian New Energy Co.,Ltd.                               |
| <b>Address:</b>               | Room 2, Guibin Building, Dianli Community, Jinchuan Development District |
| <b>Post fix/ZIP:</b>          | 010000                                                                   |
| <b>Country:</b>               | People's Republic of China                                               |
| <b>Telephone:</b>             | +86 0471 2653 722                                                        |
| <b>Fax:</b>                   | +86 0471 2653 799                                                        |

## 1.4 Other Entities Involved in the Project

|                               |                                                                                          |
|-------------------------------|------------------------------------------------------------------------------------------|
| <b>Roles/Responsibilities</b> | VER buyer                                                                                |
| <b>Organization:</b>          | Climate Bridge Ltd.                                                                      |
| <b>Address:</b>               | Walkers Chambers, 171 Main Street, PO Box 92, Road Town, Tortola, British Virgin Islands |
| <b>Post fix/ZIP:</b>          | VG1110                                                                                   |
| <b>Country:</b>               | UNITED KINGDOM                                                                           |
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| <b>FAX:</b>                   | +44 207 100 9963                                                                         |

## 1.5 Project Start Date

The project started on 28/12/2011.

## 1.6 Project Crediting Period

The project crediting period is from 28/12/2011 to 06/09/2012. The total crediting period is 254 days.

## 1.7 Project Location

The project is located in Hangjin County, Ordos City, in the western Inner Mongolia of China. The geographical coordinates of the centre of the project area are E 107.5411°, N 40.0589°.

## 1.8 Title and Reference of Methodology

The CDM consolidated baseline and monitoring methodology:

ACM0002- "Consolidated baseline methodology for grid-connected electricity generation from renewable source" (Version 12.3.0).

<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

# 2 IMPLEMENTATION STATUS

## 2.1 Implementation Status of the Project Activity

The implementation status of the project is shown as below:

Table-2 Table of Project Implementation Status

| Date       | Project implementation status |
|------------|-------------------------------|
| 26/02/2009 | Construction starting date    |
| 28/12/2011 | Operation starting date       |
| 07/09/2012 | CDM Registration date         |

Table-3 The key parameters of wind turbines are as below:

|                    |           |
|--------------------|-----------|
| Type               | WD82-1500 |
| Unit Capacity      | 1500kW    |
| Quantity           | 33        |
| Rotor Diameter     | 82m       |
| Rated Wind Speed   | 10.5 m/s  |
| Rated Voltage      | 690V      |
| Operation Lifetime | 20 years  |

The operation of the project fully followed the instruction of the monitoring plan from the beginning of electricity generation. No events or situations that may impact the applicability of the methodology during this monitoring period happened.

The net electricity supplied by the project during this monitoring period from the operation start date to the day before the registration date (from 28/12/2011 to 06/09/2012) is 65,118.53MWh. VCUs achieved for this monitoring period are 58,339 tCO<sub>2</sub>e.

## 2.2 Project Description Deviations

There are some differences compared with the CDM monitoring plan in the registered PDD. The name of the substation where the meter Ms and Ms' actually locate is named Kubuqi Substation, instead of Balagong Substation that was described in the registered PDD. Balagong is the name of the location. The correction does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario.

The location of the meter M<sub>i</sub> (unidirectional meter) measured the electricity imported from the 10kV backup power line for emergencies, is located in the on-site substation in the project site, instead of the Yihewusu Substation that was described in the registered PDD. The meter is owned by the grid company and this change of location of meter is beyond project proponents' control. During the monitoring period, only in the first month after the operation of the project, some electricity (30.060 MWh) was imported from this backup power line, no electricity was imported in other months of the monitoring period. This change does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario.

## 2.3 Grouped Project

The project is not a grouped project.

## 3 DATA AND PARAMETERS

### 3.1 Data and Parameters Available at Validation

|                        |                                                                                   |
|------------------------|-----------------------------------------------------------------------------------|
| Data Unit / Parameter: | $EF_{grid,CM,y}$                                                                  |
| Data unit:             | tCO <sub>2</sub> e/MWh                                                            |
| Description:           | Baseline emission factor                                                          |
| Source of data:        | Calculated according to the procedure outlined in B.6.1 of the registered CDM PDD |
| Value applied:         | 0.8959                                                                            |
| Purpose of the data:   | Calculation of baseline emissions                                                 |
| Any comment:           | N/A                                                                               |

### 3.2 Data and Parameters Monitored

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Unit / Parameter:                                           | $EG_{facility,y}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Data unit:                                                       | MWh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Description:                                                     | Quantity of net electricity delivered to the grid by the proposed project                                                                                                                                                                                                                                                                                                                                                                                                                |
| Source of data:                                                  | Monitoring electricity meter                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Description of measurement methods and procedures to be applied: | Calculated based on $M_s$ and $M_i$                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Frequency of monitoring/recording:                               | Continuous measurement, monthly recording                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Value monitored:                                                 | 65,118.53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Monitoring equipment:                                            | <p>Main meter <math>M_s</math> to record <math>EG_{net,m_s,y}</math></p> <p>Type: ZMQ202C, bi-directional meter</p> <p>Serial number: 96913470 Accuracy: 0.2s</p> <p>Calibration Frequency: yearly</p> <p>Calibration Validity: 17/12/2011~16/12/2012</p> <p>Calibration Entity: Power Metering Centre of Inner Mongolia Electric Power Research Institute.</p> <p>Back-up meter <math>M_s'</math> to record <math>EG_{net,m_s',y}</math></p> <p>Type: ZMQ202C, bi-directional meter</p> |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | Serial number: 96867840 Accuracy: 0.2s<br>Calibration Frequency: yearly<br>Calibration Validity: 17/12/2011~16/12/2012<br>Calibration Entity: Power Metering Centre of Inner Mongolia Electric Power Research Institute<br><br>Meter $M_I$ to record $EG_{imp, m_I, y}$<br>Type: DSSD566, unidirectional meter<br>Serial number: 07301011037610 Accuracy: 0.5s<br>Calibration Frequency: yearly<br>Calibration Validity: 23/09/2011~22/09/2012<br>Calibration Entity: Power Metering Centre of Inner Mongolia Electric Power Research Institute |
| QA/QC procedures to be applied: | The meters are calibrated annually by the independent qualified party.<br>Cross check measurement results with records for sold and purchased electricity.                                                                                                                                                                                                                                                                                                                                                                                      |
| Calculation method:             | $EG_{facility, y} = EG_{net, m_s, y} - EG_{imp, m_I, y}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Any comment:                    | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

### 3.3 Description of the Monitoring Plan

#### Monitoring equipment

The main meter  $M_s$  (bi-directional meter) measured the electricity delivered to NCPG is installed at the Kubuqi Substation in Balagong Town, and the back-up meter  $M_s'$  (bi-directional meter) is installed next to the main meter  $M_s$ . The meter  $M_I$  (unidirectional meter) measured the electricity imported from the 10kV backup power line for emergencies is installed at the on-site substation in the project site. The accuracy of meter  $M_s$  and  $M_s'$  is 0.2s, and the accuracy of meter  $M_I$  is 0.5s. The meters are calibrated yearly to ensure the accuracy of the readings during the monitoring period. The calibration reports are available for the verification.

The electricity generated from the project is boosted from 35 kV to 220kV and is transported to the 220KV Kubuqi Substation that is connected to NCPG. The project power line diagram is shown as below.

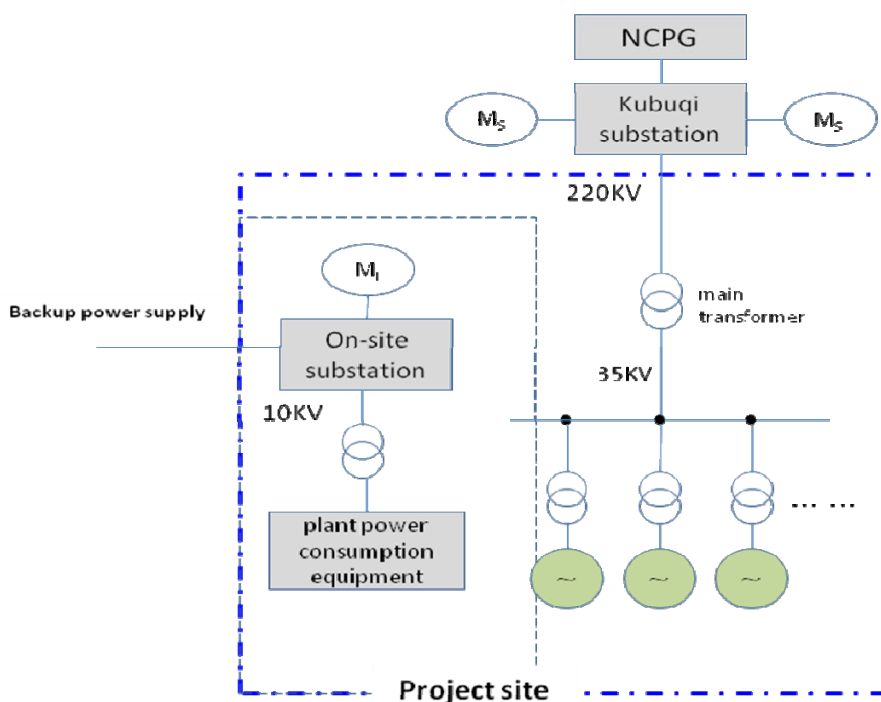


Figure-1 Diagram of grid connection

### Organizational structure and responsibility

The monitoring organizational structure is shown as below:

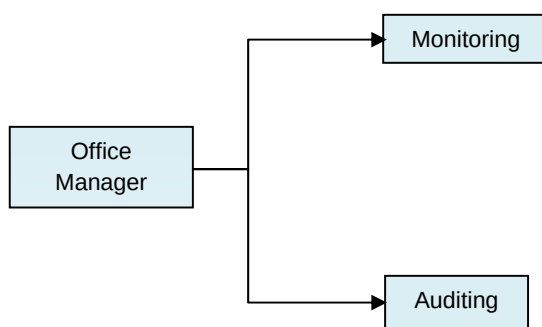


Figure-2 Monitoring Organizational Structure Diagram

The key responsibilities of each role are described as follows:

A CDM manager is appointed who has the overall responsibilities of monitoring the project. The measurement of the electricity exports and imports are carried out by the monitoring officers. In addition, the project developer will designate internal verifiers who are responsible for the internal verification of the measurement, the collection of electricity records, and the calculation of the emission reductions.

**Data collection procedures**

The operation log, records for sold and purchased electricity and other data reports related to emission reduction calculation are kept for the verification. As no error occurred during this monitoring period, the back-up meter  $M_s'$  is not used and the records of the main meter  $M_s$  are the main data source for the emission reduction calculation.

Reading records of the main meter  $M_s$ , including the reading records of electricity supplied by the project and the reading records of electricity supplied by NCPG, were provided by the grid company monthly and were confirmed by the project owner, and records for sold and purchased electricity were issued accordingly.

The meter  $M_l$  is used to measure the electricity imported from the 10kV backup power line for emergencies. During the monitoring period, only in the first month after the operation of the project, some electricity was imported from this backup power line. The reading records were provided by the grid company and were confirmed by the project owner, and records for purchased electricity were issued by the grid company accordingly.

**Quality assurance and quality control**

The meters were calibrated in accordance with the relevant national and industrial regulations by Power Metering Centre of Inner Mongolia Electric Power Research Institute to ensure the operation of the meters.

Although no meters operate abnormally during this monitoring period, procedures in case of emergency were also established. The backup meter  $M_s'$  was installed and can be used when main meter  $M_s$  operates abnormally.

To guarantee the normal operation, the whole monitoring team received training based on each specific work, including procedure for data reading, collection, quality assurance and quality control, equipment maintenance, normal calibration and emergency dealing.

## 4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

### 4.1 Baseline Emissions

The baseline emissions ( $BE_y$ ) can be calculated as follows:

$$BE_y = EG_{\text{facility}, y} \times EF_{\text{grid}, \text{CM}, y}$$

Where

- $BE_y$  = baseline emission in year  $y$  ( $\text{tCO}_2\text{e}$ )
- $EG_{\text{facility}, y}$  = net electricity generated from the project in year  $y$  (MWh)
- $EF_{\text{grid}, \text{CM}, y}$  = grid emission factor in year  $y$  ( $\text{tCO}_2\text{e}/\text{MWh}$ )

The baseline emissions for this monitoring period are shown as below:

Table-4 Net Electricity Supplied from 28/12/2011 to 06/09/2012

| Monitoring Period |                        | Electricity Exported<br>$EG_{\text{exp}, \text{Ms}, y}$ (MWh)<br>A | Electricity Imported                       |                                            | Net electricity<br>Supplied<br>$EG_{\text{facility}, y}$ (MWh)<br>A-(B+C) |
|-------------------|------------------------|--------------------------------------------------------------------|--------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------|
|                   |                        |                                                                    | $EG_{\text{imp}, \text{Ms}, y}$ (MWh)<br>B | $EG_{\text{imp}, \text{Ml}, y}$ (MWh)<br>C |                                                                           |
| 2011              | 28/12/2011-31/12/2011  | 37.960                                                             | 11.320                                     | 9.440                                      | 17.200                                                                    |
|                   | <b>Subtotal (2011)</b> | <b>37.960</b>                                                      | <b>11.320</b>                              | <b>9.440</b>                               | <b>17.200</b>                                                             |
| 2012              | 01/01/2012-25/01/2012  | 1,819.600                                                          | 96.380                                     | 20.620                                     | 1,702.600                                                                 |
|                   | 26/01-25/02            | 3,486.870                                                          | 105.400                                    | 0                                          | 3,381.470                                                                 |
|                   | 26/02-25/03            | 6,075.490                                                          | 41.530                                     | 0                                          | 6,033.960                                                                 |
|                   | 26/03-25/04            | 13,280.240                                                         | 17.110                                     | 0                                          | 13,263.130                                                                |
|                   | 26/04-25/05            | 11,145.270                                                         | 28.850                                     | 0                                          | 11,116.420                                                                |
|                   | 26/05-25/06            | 10,584.770                                                         | 24.910                                     | 0                                          | 10,559.860                                                                |
|                   | 26/06-25/07            | 7,774.520                                                          | 47.050                                     | 0                                          | 7,727.470                                                                 |
|                   | 26/07-25/08            | 8,549.400                                                          | 25.500                                     | 0                                          | 8,523.900                                                                 |
|                   | 26/08-06/09            | 2,803.660                                                          | 11.140                                     | 0                                          | 2,792.520                                                                 |
|                   | <b>Subtotal (2012)</b> | <b>65,519.820</b>                                                  | <b>397.870</b>                             | <b>20.620</b>                              | <b>65,101.330</b>                                                         |
| <b>Total</b>      |                        | <b>65,557.780</b>                                                  | <b>409.190</b>                             | <b>30.060</b>                              | <b>65,118.530</b>                                                         |

So the baseline emissions for **2011** are:

$$BE_y = EG_{\text{facility}, y} \times EF_{\text{grid}, \text{CM}, y} = 17.200 \text{ MWh} \times 0.8959 \text{ tCO}_2\text{e}/\text{MWh} = \mathbf{15 \text{ tCO}_2\text{e}}$$

For **2012** are:

$$BE_y = EG_{\text{facility}, y} \times EF_{\text{grid}, \text{CM}, y} = 65,118.530 \text{ MWh} \times 0.8959 \text{ tCO}_2\text{e}/\text{MWh} = \mathbf{58,324 \text{ tCO}_2\text{e}}$$

For the entire monitoring period are:

**15+58,324=58,339 tCO<sub>2</sub>e.**

## 4.2 Project Emissions

There are no expected project emissions from a wind farm project as per the CDM consolidated baseline and monitoring methodology ACM0002 Version 12.3.0. Thus,  $PE_y = 0$

## 4.3 Leakage

No leakage needs to be considered as per the CDM consolidated baseline and monitoring methodology ACM0002 Version 12.3.0.

## 4.4 Summary of GHG Emission Reductions and Removals

According to ACM0002 Version 12.3.0, the emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Table-5 Emission Reduction Calculation

|                                                    |                                |
|----------------------------------------------------|--------------------------------|
| Baseline emissions for year 2011                   | <b>15 tCO<sub>2</sub>e</b>     |
| Baseline emissions for year 2012                   | <b>58,324 tCO<sub>2</sub>e</b> |
| Total baseline emissions for the monitoring period | <b>58,339 tCO<sub>2</sub>e</b> |
| Total project emissions                            | 0 tCO <sub>2</sub> e           |
| Total emission reductions                          | <b>58,339 tCO<sub>2</sub>e</b> |

## 5 ADDITIONAL INFORMATION

The estimated annual emission reductions are **105,520 tCO<sub>2</sub>e** as per registered PDD. The actual emission reductions during this monitoring period are 58,339 tCO<sub>2</sub>e. The monitoring period is from 28/12/2011 to 06/09/2012 which includes 254 days, thus the estimated emission reductions during this monitoring period are 73,430 tCO<sub>2</sub>e (105,520 tCO<sub>2</sub>e/365d\*254d). Therefore, the actual value is less than the estimated emission reductions of the registered CDM-PDD during this monitoring period.