# VERIFICATION REPORT
# BEIJING GUOTOU ENERGY CONSERVATION COMPANY (BJGT)

## VERIFICATION OF THE ZHANGBEI MANJING WINDFARM PROJECT

### REPORT NO.BVC/CHINA-VR/8687/2012
REVISION NO.01

BUREAU VERITAS CERTIFICATION

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| Date of first issue: | Organizational unit: |
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| 22/10/2012 | Bureau Veritas Certification Holding SAS |
| Client: | Client ref.: |
| Beijing Guotou Energy Conservation Company (BJGT) | Mr. Yao Xi |

Summary:

Bureau Veritas Certification has conducted the 8th periodic verification of Zhangbei Manjing Windfarm Project, CDM Registration Reference Number 0233, owned by Beijing Guotou Energy Conservation Company (BJGT), which is located in Zhangbei County, Zhangjiakou City, Hebei Province, P.R.China, and applying the methodology AM0005 Version 01, on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions, and consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In summary, Bureau Veritas Certification confirms that the project is implemented as planned and described in the validated and registered project design documents. Installed equipments being essential for generating emission reduction run reliably and are calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions. The GHG emission reductions are calculated without material misstatements, and the emission reductions verified totalize 39,157 tons of $CO_2e$ for the monitoring period.

Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the valid and registered project baseline, approved revised monitoring plan and its associated documents.

| | |
|---|---|
| Reporting period: | 01/03/2012 - 31/08/2012 |
| Baseline emissions: | 39,157 t $CO_2$ equivalents. |
| Project emissions: | 0 t $CO_2$ equivalents. |
| Leakage emissions: | 0 t $CO_2$ equivalents. |
| Emission Reductions: | 39,157 t $CO_2$ equivalents. |


| Report No.: | Subject Group: |
|---|---|
| BVC-China/VR8687/2012 | CDM |
| Project title: | |
| Zhangbei Manjing Windfarm Project | |
| Work carried out by: | |
| Ms. Zhang Chen - Team Leader | |
| Internal Technical Review carried out by: | |
| Mr. Tim Wang Wei | |

| Date of this revision: | Rev. No.: | Number of pages: |
|---|---|---|
| 29/10/2012 | 01 | 31 |

**Indexing terms**

Work approved by:

Flavio Gomes

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## Abbreviations

| | |
|---|---|
| CAR | Corrective Action Request |
| CDM | Clean Development Mechanism |
| CER | Certified Emission Reductions |
| CL | Clarification Request |
| $CO_2$ | Carbon Dioxide |
| $CO_2e$ | Carbon Dioxide Equivalent |
| DOE | Designated Operational Entity |
| FAR | Forward Action Request |
| GHG | Green House Gas(es) |
| MoV | Means of Verification |
| MP | Monitoring Plan |
| MR | Monitoring Report |
| MRR | Monthly Reading Record |
| NCPG | North China Power Grid |
| PDD | Project Design Document |
| PLF | Plant Load Factor |
| PP | Project Participant |
| PPA | Power Purchase Agreement |
| UNFCCC | United Nations Framework Convention on Climate Change |
| VVS | Validation and Verification Standard |
| WTG | Wind Turbine Generator |

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# 1. INTRODUCTION

Beijing Guotou Energy Conservation Company (BJGT) has commissioned Bureau Veritas Certification to verify the emissions reductions of its CDM project Zhangbei Manjing Windfarm Project (hereafter called "**the Project**") at Zhangbei County, Zhangjiakou City, Hebei Province, P.R.China.

This report summarizes the findings of the verification of the Project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

## 1.1. Objective

The objective of CDM verification is to conduct a thorough, independent assessment of the registered project activities.

In carrying out its verification work, the DOE shall ensure that the project activity complies with the requirements of paragraph 62 of the CDM modalities and procedures. In particular, this assessment shall:

(a) Ensure that the project activity has been implemented and operated as per the registered PDD, and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;

(b) Ensure that the monitoring report and other supporting documents provided are complete in accordance with latest applicable version of the completeness checklist for requests for issuance of CERs, verifiable, and in accordance with applicable CDM requirements;

(c) Ensure that actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, and the approved methodology including applicable tool(s);

(d) Evaluate the data recorded and stored as per the monitoring methodology including applicable tool(s).

## 1.2. Scope

The verification scope is defined as an independent and objective review and ex-post determination of the monitored GHG emission reductions. The verification is based on the validated and registered project design document, the monitoring report, emission reduction calculation spreadsheet, and supporting documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations.

The verification is not meant to provide any consulting service towards the PPs. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project monitoring towards reductions in the GHG emissions.

## 1.3. GHG Project Description

The Project consists of 30 sets of Wind Turbine Generators (WTGs) with a unit installed capacity of 1.5 MW, providing a total installed capacity of 45MW. The annual expected electricity supplied to North China Power Grid (NCPG) is 108,000MWh and the annual estimated emission reductions are 97,848 $tCO_2e$.

| | |
|---|---|
| Project title: | Zhangbei Manjing Windfarm Project |
| UNFCCC ref number: | 0233 |
| Registration Date: | 23/03/2006 |
| Crediting Period: | 01/01/2006 - 31/12/2012 (renewable) |
| Monitoring Period: | 01/03/2012 - 31/08/2012 |
| Project Participants: | Beijing Guotou Energy Conservation Company (BJGT) (Host Party: P.R.China)<br>First Carbon Fund Ltd (Other Party: United Kingdom of Great Britain and Northern Ireland)<br>Vitol S.A. (Other Party: Switzerland) |
| Methodologies used | AM0005 Version 01 |
| Location of the Project: | Zhangbei County, Zhangjiakou City, Hebei Province, P.R.China |
| Geo coordinates: | Longitude: 114°32'E, Latitude: 41°08'N |
| UNFCCC view page: | http://cdm.unfccc.int/Projects/DB/DNV-CUK1136989231.92/view |

**[Post Registration Changes]**

A request for revision of the monitoring plan as described in the registered PDD has been approved by the Board on 19/10/2007.

## 1.4. Verification Team

The assessment team and internal technical reviewer team consist of the following personnel:

| FUNCTION | NAME | TA 1.2 | TASK PERFORMED* |
|---|---|---|---|
| **Team Leader** | Ms. Zhang Chen | ☒ | ☒**DR** ☒**SV** ☒**RI** ☐**TR** |
| **Team Member** | N.A. | ☐ | ☐**DR**☐**SV** ☐**RI** ☐**TR** |
| **Technical Specialist** | N.A. | ☐ | ☐**DR**☐**SV** ☐**RI** ☐**TR** |
| **Internal Technical Reviewer (ITR)** | Mr. Tim Wang Wei | ☒ | ☐**DR** ☐**SV** ☐**RI** ☒**TR** |
| **Specialist supporting ITR** | N.A. | ☐ | ☐**DR**☐**SV** ☐**RI** ☐**TR** |

*DR = Document Review; SV = Site Visit; RI = Report issuance; TR = Internal Technical Review

# 2. METHODOLOGY

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using Bureau Veritas Certification internal procedures.

In order to ensure transparency, a verification protocol was customized for the project, according to the version 02.0 of the Clean Development Mechanism Validation and Verification Standard, issued by CDM Executive Board at its 65th meeting on 25/11/2011 /10/. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from verifying the identified criteria. The verification protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent verification process where the verifier will document how a particular requirement has been verified and the result of the verification.

The completed verification protocol is enclosed in Appendix A to this report.

## 2.1. Review of Documents

The assessment of the project documentation provided by the project participant is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report (MR) version 02 dated 17/10/2012 /7/. Qualitative information comprises information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emissions reports, and review and internal audit of calculations.

The monitoring report version 01 submitted by the project participant was also web hosted on the UNFCCC-CDM web site on 21/09/2012 and thus, was available in the public domain.

In addition to the monitoring documentation provided by the project participants, the DOE reviews:

(a) The registered PDD, the approved revised monitoring plan, and the corresponding validation opinion /1/ /3/ /4/;

(b) The validation report /2/;

(c) Previous verification reports and corresponding monitoring reports /5/;

(d) The applied monitoring methodology /9/;

(e) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /10/;

(f) Other information and references relevant to the project activity's resulting emission reductions (e.g. IPCC reports, laboratory analysis or national regulations) /11//12/.

## 2.2. Follow-up Interviews

On 08/10/2012, Bureau Veritas Certification performed a site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Beijing Guotou Energy Conservation Company (BJGT) and China Energy Conservation and Environment Protection Group were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

| Interviewed organization | Interview topics |
|---|---|
| Beijing Guotou Energy Conservation Company (BJGT) (the Project Owner) | ➢ Project Design and implementation<br>➢ Technical equipment, calibration and operation<br>➢ Monitoring Plan and management procedures<br>➢ Monitoring data<br>➢ Data uncertainty and residual risks (QA/QC)<br>➢ GHG Calculation<br>➢ Environmental Impacts<br>➢ Compliance with National Laws and Regulations |
| China Energy Conservation and Environment Protection Group (the Consultant) | ➢ Monitoring Plan<br>➢ Monitored data and Monitoring Report<br>➢ GHG Calculations |

## 2.3. Resolution of Clarification, Corrective and Forward Action Requests

The objective of this phase of the verification is to resolve issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions prior to Bureau Veritas Certification's positive conclusion on the GHG emission reduction calculation.

Findings established during the verification can either be seen as a non-fulfillment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

A Corrective Action Request (CAR) is raised, if one of the following situations occurs:

(a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;

(b) Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;

(c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

(d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

A Clarification Request (CL) is raised, if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A Forward Action Request (FAR) is raised, for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in the verification protocol in Appendix A.

## 2.4. Internal Technical Review

The verification report underwent an Internal Technical Review (ITR) before requesting issuance of CERs for the project activity.

The ITR is an independent process performed to examine thoroughly that the process of verification has been carried out in conformance with the requirements of the verification scheme as well as internal Bureau Veritas Certification procedures.

The Team Leader provides a copy of the verification report to the reviewer, including any necessary verification documentation. The reviewer reviews the submitted documentation for conformance with the verification scheme. This will be a comprehensive review of all documentation generated during the verification process.

When performing an Internal Technical Review, the reviewer ensures that:

- The verification activity has been performed by the team by exercising utmost diligence and complete adherence to the CDM rules and requirements.
- The review encompasses all aspects related to the project which includes project design, baseline, additionality, monitoring plans and emission reduction calculations, internal quality assurance systems of the project participant as well as the project activity, review of the stakeholder comments and responses, closure of CARs, CLs and FARs during the verification exercise, review of sample documents.

The reviewer may raise Clarification Requests to the verification team and discusses these matters with Team Leader.

After the agreement of the responses on the Clarification Requests from the verification team as well as the PP(s), the finalized verification report is accepted for further processing such as uploading via the UNFCCC interface.

# 3. VERIFICATION CONCLUSIONS

In the following sections, the conclusions of the verification are stated.

The findings from the desk review of the original monitoring documents and the findings from interviews during the follow up visit are described in the Verification Protocol in Appendix A.

The Clarification, Corrective and Forward Action Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in Appendix A. The verification of the Project resulted in 2 CARs and 1 CL.

The CARs and CL were closed based on adequate responses from the Project Participant(s) which meet the applicable requirements. They have been reassessed before their formal acceptance and closure.

The number between brackets at the end of each section corresponds to the VVS paragraph.

## 3.1. Remaining issues from validation or previous verification (213)

All CARs and CLs raised were successfully closed during the validation stage and previous verification of the Project, no remaining issues were left.

## 3.2. Compliance of the project implementation with the registered project design document (228)

Bureau Veritas Certification has performed a site visit and found that the Project has been put into operation and the electricity generated is supplied to NCPG according to the signed Power Purchase Agreement (PPA) /15/. 30 sets of WTGs (Type: GE 1.5sle) with a unit capacity of 1.5 MW, providing a total installed capacity of 45MW /14/ have been in operation during the monitoring period.

No changes to the project design have been identified during this verification. The implementation and operation of the project activity have been conducted in accordance with the description contained in the registered PDD and approved revised monitoring plan.

According to Construction Commencement Report Form of the Project /16/, the Project started construction on 28/07/2004. As per WTGs operation log /17/, the Project started commissioning on 30/12/2005, and was put into full operation on 18/08/2006.

**[Power System]**

As shown in the diagram of the power connection system /13/, the Project exports electricity to and imports electricity from NCPG via Zhangbei 220kV substation, where the Project shares the main meter with Zhangbei Mijiagou 49.5MW Windfarm Project (CDM ref. 0845, hereafter called the Mijiagou Project)..

**[Metering System]**

There are three meters installed for the Project.

The main meter (M) was installed at 220kV substation of power grid to measure the total power generation to the grid and total power consumption of the two projects.

The Zhangbei Manjing meter (M1) was installed at the exit of 110kV project site substation to measure the electricity generation of the Project.

The Zhangbei Mijiagou meter (M2) was installed at the exit of 110kV Mijiagou project site substation to measure the electricity generation of the Mijiagou Project.

**[Management and Operation]**

The PP has operated the Project as per the registered PDD and the approved revised monitoring plan. The monitoring organization has been set up and all monitoring staffs have been trained. Meter reading records of all the meters are continuously measured and at least monthly recorded by the PP. The grid company issues the ETNs every month to confirm the electricity exported to and imported from the grid. CDM Monitoring & Management Manual /22/ and internal training records /23/ have been provided and verified by the verification team.

- Corresponding to the paragraph 228 of VVS version 02.0, Bureau Veritas Certification can confirm that:

- The implementation of the Project is consistent with the registered PDD.
- The Project is operated as per the registered PDD and the approved revised monitoring plan by the PP.
- Information (data and variables) provided in the monitoring report are consistent with that stated in the registered PDD and the approved revised monitoring plan.

## 3.3. Compliance of the monitoring plan with the monitoring methodology including applicable tool(s) (232)

The verification team has verified the approved revised monitoring plan, including the data and parameters required to be monitored, measurement procedures, monitoring frequency and QC/QA procedures as described in the approved revised monitoring plan.

- Corresponding to the paragraph 232 of VVS version 02.0, Bureau Veritas Certification can confirm that the approved revised monitoring plan is in accordance with the approved methodology including applicable tool(s) applied by the Project.

## 3.4. Compliance of monitoring activities with the monitoring plan (235-236)

Monitoring has been carried out in accordance with the approved revised monitoring plan.

**[Parameters and information flow]**

The parameters required by the approved revised monitoring plan and how Bureau Veritas Certification has verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters including the values in the monitoring report are described below:

***Parameters monitored:***

(1) EG_1 (equivalent to $EG_y$ in the registered PDD): calculated power generation from the Project

(2) E1: electricity generation metered from the Project site

(3) E2: electricity generation metered from the Zhangbei Mijiagou 49.5MW Windfarm Project site

(4) EG_total: total net electricity supplied to the grid of the two projects at the 220kV substation

EG_1 calculated by EG_total × E1/(E1+E2) is used for baseline emissions calculation.

As described above, the meters have been installed in accordance with the registered PDD. The verification team has checked on-site the location of the meters against the diagram of power connection system and found them to be consistent.

The readings of the meters are continuously measured and at least monthly recorded by the PP and the grid company. The cut-off time is 24:00 on the last day of each month during the monitoring period. The grid company provided the PP with the ETNs monthly to confirm the Monthly Reading Records (MRR) followed the PPA /15/.

The verification team has verified the values provided in the monitoring report and ER spreadsheet against the relevant documented evidences i.e. the MRRs /18/ and the ETNs /19/ and found them to be consistent with the evidences. The MRRs and the ETNs can cover this monitoring period from 01/03/2012 - 31/08/2012.

(5) $EF_y$: $CO_2$ emissions factor of the grid

(6) EF_OM: $CO_2$ emissions factor of the grid (operating margin)

(7) EF_BM: $CO_2$ emissions factor of the grid (build margin)

$EF_y = \omega_{OM} * EF\_OM + \omega_{BM} * EF\_BM$

$\omega_{OM}$ and $\omega_{BM}$ are 0.5 according to default weight factor.

The verification team confirms that the data used for $EF_y$ calculation are taken from the most recent data available including:

- 2006 IPCC Guidelines for Default Values /24/
- China Electric Power Yearbook (2008, 2009, 2010 and 2011) /25/
- China Energy Statistical Yearbook (2011) /26/

Moreover, the verification team has checked the calculated EF_OM and EF_BM for the Project with latest 2012 Notification on Determining Baseline Emission Factor of China's Grid published by National Development and Reform Commission (NDRC, China's DNA) /27/ and found the calculated EF_OM and EF_BM for the Project are more conservative than official publication.

✌ Corresponding to the paragraph 235 and 236 of VVS version 02.0, Bureau Veritas Certification can confirm that:

- The monitoring has been carried out in accordance with the approved revised monitoring plan.

- All parameters required by the approved revised monitoring plan have been sufficiently monitored and correctly listed. The monitored data for required parameters have been verified by checking the whole information flow.

## 3.5. Compliance with the calibration frequency requirements for measuring instruments (243)

The approved revised monitoring plan requires that the metering equipment are calibrated and checked annually.

During this monitoring period, the installed measuring instruments have been operating well and were duly calibrated. The calibration records are shown in Table 2 below.

Table 2 The calibration records of the meters、

| Meter ID | Serial number | Accuracy | Calibration date | Validity | Calibration entity |
|---|---|---|---|---|---|
| main meter (M) | 200407007Z0062 | 0.2S | 07/01/2012 | Yes | Zhangjiakou Power Grid Company Electricity Metrological Centre /21/ |
| Zhangbei Manjing meter (M1) | 30089907 | 0.5S | 02/11/2011 | Yes | |
| Zhangbei Mijiagou meter (M2) | 0007049D0145 | 0.5S | 02/11/2011 | Yes | |

**[Instrument accuracy]**

The verification team has verified the calibration records and the accreditation certificates of the calibration entity. All the meters meet the rated accuracy level as described in the approved revised monitoring plan and are in compliance with the industry standard *Technical Administrative Code of Electric Energy Metering (DL/T 448-2000)* /11/.

**[Calibration frequency]**

The calibration frequency fulfills the requirement as described in the approved revised monitoring plan and is in compliance with the national standard *Verification Regulation of Electrical Energy Meter with Electronics (JJG 596-1999)* /12/.

✌ Corresponding to the paragraph 243 of VVS version 02.0, Bureau Veritas Certification can confirm that:

- The calibration is conducted at the frequency as specified by the methodology and the approved revised monitoring plan.

## 3.6. Assessment of data and calculation of emission reductions (246)

A complete set of data for the specified monitoring period is available.

The critical parameter used for the determination of the Emission Reductions is the calculated power generation from the Project. The data pertaining to the above parameter are maintained in the identified records. All the data are in compliance with that stated in the Monitoring Report version 02.

As per the methodology AM0005 Version 01 and the registered PDD, project emissions are zero and leakage emissions do not need to be considered. Hence the emission reduction is determined by the following formula:

$ER_y = BE_y$

Where,

$ER_y$: Emission reductions

$BE_y$: Baseline emissions

**[Baseline emissions]**

The baseline emissions are the baseline emission factor times the calculated power generation from the Project. Therefore,

$BE_y=EF_y*EG_y=EF_y *EG\_1$

$EF_y$ is the baseline emission factor, determined ex-post as

$EF_y = \omega_{OM} * EF\_OM + \omega_{BM} * EF\_BM$

$= 0.5 * 0.9485\ tCO_2e/MWh + 0.5 * 0.4570\ tCO_2e/MWh$

$= 0.7027\ tCO_2e/MWh$

Where

EF_OM Operating Margin Factor, calculated to be 0.9485 $tCO_2e/MWh$;

EF_BM Build Margin Factor, calculated to be 0.4570 $tCO_2e/MWh$;

$\omega_{OM}$ Default weight factor is 0.5.

$\omega_{BM}$ Default weight factor is 0.5.

EG_1 (equivalent to $EG_y$ in the registered PDD) is calculated power generation from the Project, which can be calculated as:

EG_1= EG_total × E1/ (E1 + E2)

The verification team has cross-checked the values from the MRRs /18/ with the ETNs /19/ for the period from 01/03/2012 - 31/08/2012, which are found fully consistent with each other. Thus, only verified values are shown in the following table.

Table 3 The verified $EG_y$ (EG_1) calculated power generation from the Project (MWh)

| Period | E1 | E2 | Electricity exported by the two projects | Total electricity imported by the two projects | EG_total | $EG_y$ (EG_1) |
|---|---|---|---|---|---|---|
| | A | B | C | D | E=C-D | F=E*A/(A+B) |
| 01/03/2012-31/03/2012 | 9,747.760 | 8,712.880 | 18,312.756 | 130.812 | 18,181.944 | 9,600.600 |
| 01/04/2012-30/04/2012 | 12,616.560 | 11,374.000 | 23,886.192 | 34.716 | 23,851.476 | 12,543.416 |
| 01/05/2012-31/05/2012 | 10,024.080 | 9,257.600 | 19,098.948 | 50.952 | 19,047.996 | 9,902.593 |
| 01/06/2012-30/06/2012 | 9,980.960 | 9,760.960 | 19,587.480 | 33.132 | 19,554.348 | 9,886.129 |
| 01/07/2012-31/07/2012 | 7,142.080 | 5,796.560 | 12,816.804 | 56.364 | 12,760.440 | 7,043.714 |
| 01/08/2012-31/08/2012 | 6,858.720 | 3,510.320 | 10,272.108 | 69.696 | 10,202.412 | 6,748.502 |
| Total | - | | | | | 55,724.954 |

The baseline emissions of the Project are calculated as:

$BE_y=EF_y*EG_y=EF_y*EG\_1=0.7027\ tCO_2e/MWh*\ 55,724.954\ MWh = 39,157\ tCO_2e$

**[Project emissions]**

The Project is a newly built wind power project, thus according to AM0005 Version 01 the project emissions are zero.

**[Leakage emissions]**

No leakage needs to be considered according to AM0005 Version 01.

**[Emission reductions]**

The emission reductions during the monitoring period from 01/03/2012 - 31/08/2012 are calculated as:

$ER_y = BE_y = 39,157\ tCO_2e$

**[Comparison of ERs]**

The annual estimated emission reductions are 97,848 tCO2e as per the registered PDD. The actual operation days of the Project in the monitoring period are 184 days. The corresponding estimate in the monitoring period are 49,326 (=97,848*184/365) tCO2e. The actual emission reductions are lower than the estimated value in the monitoring period.

✌ Corresponding to the paragraph 246 of VVS version 02.0, Bureau Veritas Certification can confirm that:

- Data used for the determination of the emission reductions are available and monitored in accordance with the approved revised monitoring plan.
- Information and data provided in the monitoring report have been cross-checked with other sources such as plant logbooks, inventories, purchase records, laboratory analysis.
- Appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed.
- Assumptions, emission factors and default values that were applied in the calculations have been justified.

# 4. VERIFICATION OPINION

Bureau Veritas Certification has performed the 8th periodic verification of Zhangbei Manjing Windfarm Project, CDM Registration Reference Number 0233, which is located in Zhangbei County, Zhangjiakou City, Hebei Province, P.R.China, and applying the methodology AM0005 Version 01. The verification was performed based on the requirements set by the CDM and relevant guidance provided by CMP and the CDM Executive Board.

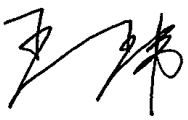
The verification consisted of the following three phases: i) desk review of the project design, the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

The management of Beijing Guotou Energy Conservation Company (BJGT) is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions of the project on the basis set out within the approved revised monitoring plan. The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of GHG emission reductions from the project, is the responsibility of the management of the project.

Bureau Veritas Certification has verified the project Monitoring Report version 02 dated 17/10/2012 for the reporting period as indicated below. Bureau Veritas Certification confirms that the project is implemented as described in the validated and registered project design documents and the approved revised monitoring plan. Installed equipments being essential for generating emission reductions run reliably and are calibrated appropriately. The monitoring system is in place and the Project is generating GHG emission reductions as a CDM project.

Bureau Veritas Certification can confirm that the GHG emission reductions are calculated without material misstatements. Our opinion relates to the projects' GHG emissions and resulting GHG emission reductions reported and related to the validated and registered project baseline, approved revised monitoring plan and its associated documents. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, Bureau Veritas Certification confirms the following statement:

| | |
|---|---|
| Reporting period: | 01/03/2012 - 31/08/2012 |
| Baseline emissions: | 39,157 t $CO_2$ equivalents |
| Project emissions: | 0 t $CO_2$ equivalents |
| Leakage emissions: | 0 t $CO_2$ equivalents |
| Emission Reductions: | 39,157 t $CO_2$ equivalents |



Mr. Tim Wang Wei
Internal Technical Reviewer
29/10/2012

Ms. Zhang Chen
Team Leader
29/10/2012

# 5. REFERENCES

**Documents reviewed:**

/1/ Registered PDD version 3.3 dated 08/12/2005, UNFCCC ref no.0233
/2/ Validation Report version 01, dated 02/01/2006
/3/ Revised monitoring plan of the Project approved on 19/10/2007
/4/ Validation opinion of the revised monitoring plan
/5/ Verification Reports of the previous periodic verifications
/6/ Monitoring Report version 01, dated 06/09/2012
/7/ Monitoring Report version 02, dated 17/10/2012
/8/ ER Calculation Spreadsheet
/9/ AM0005 Version 01 dated 14/04/ 2004
/10/ Validation and Verification Standard Version 02.0 dated 25/11/2011
/11/ Technical Administrative Code of Electric Energy Metering (DL/T 448-2000)
/12/ Verification Regulation of Electrical Energy Meter with Electronics (JJG 596-1999)
/13/ Diagram of power connection system of the Project
/14/ Technical Agreement of Wind Turbine Generators Purchase Contract
/15/ Signed Power Purchase Agreement (PPA) with the Grid Company
/16/ Construction Commencement Report Form of the Project
/17/ WTGs operation log
/18/ Monthly Reading Records of the Project
/19/ The ETNs issued by the Grid Company
/20/ Calibration Certificates
/21/ Accreditation certification of Zhangjiakou Power Grid Company Electricity Metrological Centre: (JI) FaJi (2010) D011 valid from 14/02/2010 to 13/02/2012
/22/ CDM Monitoring & Management Manual
/23/ Internal Training Records and Qualification Certificate of Operation Staff
/24/ 2006 IPCC Guidelines
/25/ China Electric Power Yearbook (2008 to 2011)
/26/ China Energy Statistical Yearbook (2011)
/27/ 2012 Notification on Determining Baseline Emission Factor of China's Grid published by National Development and Reform Commission
http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2975.pdf

**Persons interviewed:**

Beijing Guotou Energy Conservation Company (BJGT)
/1/ Mr. Han Baojun Deputy Manager
/2/ Mr. Yao Xi CDM Project Manager
China Energy Conservation and Environment Protection Group
/3/ Ms. Lv Xin CDM Project Manager

## 6. CURRICULA VITAE OF THE DOE'S VERIFICATION TEAM MEMBERS

| | | |
|---|---|---|
| Ms. Zhang Chen | Bureau Veritas<br>Certification, China | Team Leader, Climate Change Lead Verifier,<br>She holds Master Degree in Environmental Economics and Environmental Engineering. Before joining BV in 2010, she has gained experiences in project financing evaluation, policy cost-benefit analysis and environmental management. She obtained the certificate of CDM Verifier and ISO 14001 Lead Auditor, and received training in ISO 14064. |

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|---|---|---|
| Mr. Tim Wang Wei | Bureau Veritas<br>Certification, China | Technical Reviewer, Climate Change Lead Verifier.<br>He holds a Master Degree in Environmental Science. Before joining BV in Feb.2009, he gained 4 and a half years of working experience in engineering and EIA for manufacturing enterprise in P.R. China. He obtained the certificates of CDM Lead Verifier and ISO14001 Lead Auditor in Bureau Veritas. |

# APPENDIX A: CDM PROJECT VERIFICATION PROTOCOL

**Table 1 Verification requirements based on the Clean Development Mechanism Validation and Verification Standard (Version 02.0)**

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| ***1 Compliance of the project implementation with the registered project design document*** | | | | | |
| a Has the implementation and operation of the project activity been conducted in accordance with the description contained in the registered PDD? | VVS | 226 | Yes.<br>During the site visit, it was found that all physical features of the project activity in the registered PDD are in place and that the project participants have operated the project activity as per the registered PDD, which are detailed below. | OK | OK |
| b Are all physical features of the project activity in the registered PDD in place? | VVS | 227 | Yes.<br>All facilities and equipments including 30 sets of wind turbine generators with unit capacity of 1.5 MW are in place and in generation during the monitoring period. The project activities had been put into operation and operated as per the registered PDD. | OK | OK |
| c Have the project participants operated the project activity as per the registered PDD or any approved revised PDD? | VVS | 227 | Yes.<br>The Project is operated by Beijing Guotou Energy Conservation Company (BJGT) (the PP). The PP has operated the CDM project activity as per the registered PDD. The construction of the Project started on 28/07/2004; the first turbine put into | OK | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | operation on 30/12/2005 and all the turbines put into operation on 18/08/2006. The electricity generated has been delivered properly to the grid as per the Power Purchase Agreement (PPA) signed with the grid company. | | |
| d Was an on-site visit conducted? | VVS | 227 | Yes.<br>The on-site visit of the 8th periodic verification was conducted on 08/10/2012 by Ms. Zhang Chen, Climate Change Lead Verifier of Bureau Veritas Certification (China).<br>The following persons are interviewed:<br>Mr. Han Baojun, Deputy Manager, Beijing Guotou Energy Conservation Company (BJGT)<br>Mr. Yao Xi, CDM Project Manager, Beijing Guotou Energy Conservation Company (BJGT)<br>Ms. Lv Xin, CDM Project Manager, China Energy Conservation and Environment Protection Group | OK | OK |
| e If not, justify the rationale of the decision. | VVS | 227 | N.A. | OK | OK |
| ***2 Compliance of the monitoring plan with the monitoring methodology including applicable tool(s)*** | | | | | |
| a Is the monitoring plan of the project activity in accordance with the applied methodology including applicable tool(s)? | VVS | 229 | Yes.<br>The approved revised Monitoring Plan (MP) is in accordance with the methodology AM0005 Version 01 applied by the CDM project activity. | OK | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| b Is the project implementation in accordance with the provisions of the registered PDD and/or an approved revised PDD? | VVS | 230 | Yes.<br>The project implementation is in accordance with the provisions of the registered PDD. | OK | OK |
| ***3 Compliance of monitoring activities with the registered monitoring plan*** | | | | | |
| a Have the monitoring of parameters related to the GHG emissions reductions in the project activity been implemented in accordance with the monitoring plan contained in the registered PDD or any accepted revised monitoring plan? | VVS | 233 | Yes. | OK | OK |
| b Has the monitoring plan been properly implemented and followed by the project participants? | VVS | 234 | Yes.<br>The approved revised MP and the methodology AM0005 Version 01 have been followed by the PP. | OK | OK |
| c Have all parameters stated in the monitoring plan and relevant Board decisions been monitored and updated as applicable, including: | VVS | 234 | | - | OK |
| i Project emission parameters? | VVS | 234 | Yes.<br>The Project is a newly built wind power project, thus the project emissions of the project are zero according to the AM0005 Version 01. | OK | OK |
| ii Baseline emission parameters? | VVS | 234 | Baseline emission parameters include:<br>1) EG_1 (equivalent to EGy): calculated power generation from the Project<br>2) E1: electricity generation metered from the | ~~CL 1~~ | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | Project site<br>3) E2: electricity generation metered from the Zhangbei Mijiagou 49.5MW Windfarm Project site<br>4) EG_total: total net electricity supplied to the grid of the two projects at the 220kV substation<br>EG_1 calculated by EG_total × E1/(E1+E2) is used for baseline emissions calculation.<br>The electricity generation of the Project was monitored by Zhangbei Manjing meter (M1) installed at the exit of 110kV project site substation.<br>The electricity generation of the Zhangbei Mijiagou 49.5MW Windfarm Project (CDM ref. 0845) was monitored by Zhangbei Mijiagou meter (M2) installed at the exit of 110kV Mijiagou project site substation.<br>The total net electricity supplied to the grid of the two projects is calculated by total electricity exported minus total electricity imported, which are monitored by main meter (M) installed at 220kV substation of power grid.<br>5) $EF_y$: $CO_2$ emissions factor of the grid<br>6) EF_OM: $CO_2$ emissions factor of the grid (operating margin) | | |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | 7) EF_BM: $CO_2$ emissions factor of the grid (build margin)<br>$EF_y = \omega_{OM} * EF\_OM + \omega_{BM} * EF\_BM$<br>$\omega_{OM}$ and $\omega_{BM}$ are 0.5 according to default weight factor<br>~~CL-1 A copy of the data source relevant for $EF_y$ calculation is required to be provided as evidence.~~<br>CL-1 is closed after copies of official statistics in China have been provided and it is found that correct values have been adopted in $EF_y$ calculation. | | |
| iii Leakage parameters? | VVS | 234 | Yes.<br>According to the registered PDD and the methodology AM0005 Version 01, no leakage needs to be considered. | OK | OK |
| iv Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan? | VVS | 234 | The monitoring team has been set up and responsible for the implementation of the monitoring plan. Responsibilities have been allocated to the well-trained staff as per the approved revised MP. The CDM Monitoring and Management Manual has been provided and verified.<br>The QA / QC procedures are part of management system and are documented in management procedures. | OK | OK |

| | CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|---|
| d | Is the equipment used for monitoring in accordance with section 4. below and is controlled and calibrated in accordance with the monitoring plan, the applied methodology, the Board guidance, local/national standards, or as per the manufacturer.s specification? | VVS | 234 | The accuracy of all the monitoring meters is in compliance with the approved revised MP and in accordance with the industry standards.<br>The meters were installed, maintained and calibrated annually in line with the revised monitoring plan. | OK | OK |
| e | Are monitoring results consistently recorded as per approved frequency? | VVS | 234 | Yes.<br>All the parameters are continuously measured and at least monthly recorded, which complies with the approved frequency. The monthly records are used to calculate the monthly emission reductions.<br>$EF_y$, EF_OM and EF_BM are calculated based on latest official statistics. | OK | OK |
| f | Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or the revised monitoring plan? | VVS | 234 | Yes.<br>The QA/QC procedures have been documented in the CDM Monitoring and Management Manual and applied in accordance with the approved revised MP. | OK | OK |
| ***4 Compliance with calibration frequency requirements for measuring instruments*** | | | | | | |
| a | Is the calibration of those measuring equipments that have an impact on the claimed emission reductions conducted by the project participants at a frequency specified in the applied monitoring methodology and/or the monitoring plan? | VVS | 237 | Yes.<br>The calibration of measuring equipments has been conducted in accordance with the approved revised MP. | OK | OK |

| | CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|---|
| b | During verification of a certain monitoring period, has the calibration been delayed and has the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available)? | VVS | 238 | No. | OK | OK |
| c | If yes, is the following conservative approach adopted in the calculation of emission reductions? | VVS | 238 | N.A. | OK | OK |
| | i Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error; or | VVS | 238 | N.A. | OK | OK |
| | ii Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment. | VVS | 238 | N.A. | OK | OK |
| d | Has the error has been applied: | VVS | 239 | N.A. | OK | OK |
| | i In a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed emission reductions? | VVS | 239 | N.A. | OK | OK |
| | i Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment. | VVS | 239 | N.A. | OK | OK |

| | CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|---|
| e | In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, prior to finalizing verification, were the project participants requested to conduct the required calibration have the project participants calculated the emission reductions conservatively using the approach mentioned in item "c" above? | VVS | 240 | N.A. | OK | OK |
| f | Is it possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, guidance provided by the Board, and/or the registered monitoring plan? | VVS | 241 | Yes. | OK | OK |
| g | If no, were the requirements for post registration changes, in section of E of the VVS, followed? | VVS | 241 | N.A. | OK | OK |
| h | Do the monitoring methodology or the monitoring plan specify any requirements for calibration frequency for measuring equipments? | VVS | 242 | Yes.<br>The approved revised MP requires that the metering equipment are calibrated and checked annually.<br>The meters have been calibrated annually by the qualified testing institute which is in compliance with the approved revised MP and relevant standards. | OK | OK |
| i | If no, are the equipments calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification?. | VVS | 242 | N.A. | OK | OK |
| j | If neither local/national standards nor the manufacturer's specification are available, were | VVS | 242 | N.A. | OK | OK |

| | CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|---|
| | international standards used? | | | | | |
| ***5 Assessment of data and calculation of emission reductions*** | | | | | | |
| a | Were the data and calculations of GHG emission reductions achieved by/resulting from the project activity by the application of the selected approved methodology assessed? | VVS | 244 | Yes. | OK | OK |
| b | Is a complete set of data for the specified monitoring period is available? (If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the DOE shall either raise a CAR for the project participants to comply with the requirements of appendix 1 of the Project standard or submit a request for deviation prior to submitting request for issuance, if appropriate). | VVS | 245 | Yes.<br>A complete set of data include reading records of the installed meters from 01/03/2012 - 31/08/2012 and ETNs from 01/03/2012 - 31/08/2012, which can cover the monitoring period have been provided to Bureau Veritas Certification. | OK | OK |
| c | Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis? | VVS | 245 | ~~CAR-1 The electricity exported and imported to achieve EG_total have not been listed.~~<br>CAR-1 is closed after the monitored values of electricity exported and imported by the two projects have been listed in the monitoring report and are found consistent with MRRs and ETNs. | ~~CAR-1~~ | OK |
| d | Have calculations of baseline emissions, and project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan and the applied methodology document? | VVS | 245 | As per methodology AM0005 Version 01 and the registered PDD, project emissions are zero and leakage emissions do not need to be considered.<br>Emission reductions are being determined using the formula as given in the Section E of the PDD. | ~~CAR-2~~ | OK |

| | CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|---|
| | | | | $ER_y = BE_y$<br>The baseline emission is determined by the following formula as per the methodology:<br>$BE_y = EG_y * EF_y$<br>The calculated power generation from the Project as EG_1 (equivalent to $EG_y$)= EG_total × E1/ (E1 + E2).<br>~~CAR-2 The calculation of baseline emissions has been rounded up instead of being rounded down, which is not conservative.~~<br>CAR-2 is closed after the baseline emissions have been rounded down correctly and the baseline emissions have been changed from 39,158 $tCO_2$ to 39,157 $tCO_2$. | | |
| e | Have any assumptions used in emission calculations been justified? | VVS | 245 | No.<br>There are no assumptions in emission calculations. | OK | OK |
| f | Have appropriate emission factors, IPCC default values and other reference values been correctly applied? | VVS | 245 | Yes.<br>The baseline emission factor in the monitoring report is 0.7027$tCO_2$/MWh, calculated ex-post applying the most recent data available including<br>• 2006 IPCC Guidelines for Default Values<br>• China Electric Power Yearbook (2008, 2009, 2010 and 2011) | OK | OK |

| CHECKLIST QUESTION | Ref. | § | COMMENTS | Draft Concl | Final Concl |
|---|---|---|---|---|---|
| | | | • China Energy Statistical Yearbook (2011) | | |

**Table 2 Resolution of Corrective Action / Forward Action / Clarification Requests.**

| Draft report clarifications and corrective action requests by verification team | Reference to checklist question in Periodic Verification Checklist | Summary of project owner response | Verification team conclusion |
|---|---|---|---|
| CAR-1 The electricity exported and imported to achieve EG_total have not been listed. | 5.c | The electricity exported and imported to achieve EG_total have been added to the MR and the ER spreadsheet. | The verification team confirms that the monitored values of electricity exported and imported by the two projects have been listed in the monitoring report and are found consistent with MRRs and ETNs<br>Thus, CAR-1 is closed. |
| CAR-2 The calculation of baseline emissions has been rounded up instead of being rounded down, which is not conservative. | 5.d | The baseline emissions have been rounded down. | The verification team confirms that the baseline emissions have been rounded down correctly and the baseline emissions have been changed from 39,158 $tCO_2$ to 39,157 $tCO_2$<br>Thus, CAR-2 is closed. |
| CL-1 A copy of the data source relevant for EFy calculation is required to be provided as evidence. | 3.c.ii | A copy of the data source relevant for $EF_y$ calculation is provided to DOE as evidence, including copies of China Energy Statistics Yearbook 2011 and China Electric Power Yearbook 2008-2011. | The verification team confirms that copies of official statistics in China have been provided and it is found that correct values have been adopted in $EF_y$ calculation.<br>Thus, CL-1 is closed. |