



VERIFICATION REPORT CARBON RESOURCE MANAGEMENT LTD.

VERIFICATION OF THE ZHANGJIAKOU CHABEI WIND FARM PROJECT

REPORT No.BVC/CHINA-VR/8459/2012

REVISION No.01

BUREAU VERITAS CERTIFICATION

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VERIFICATION REPORT

Date of first issue: 29/09/2012	Organizational unit: Bureau Veritas Certification Holding SAS
Client: Carbon Resource Management Ltd.	Client ref.: Mr. Shi Lei

Summary:

Bureau Veritas Certification has conducted the 1st periodic verification of Zhangjiakou Chabei Wind Farm Project, CDM Registration Reference Number 4844, owned by CGN (Chabei) Wind Power Co., Ltd., which is located in Chabei District, Zhangjiakou City, Hebei Province, P.R.China, and applying the methodology ACM0002 Version 12.1.0, 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 221,015 tons of CO₂e for the monitoring period.

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

Reporting period:	27/05/2011 to 01/07/2012
Baseline emissions:	221,015 t CO ₂ equivalents.
Project emissions:	0 t CO ₂ equivalents.
Leakage emissions:	0 t CO ₂ equivalents.
Emission Reductions:	221,015 t CO ₂ equivalents.

Report No.: BVC-China/VR8459/2012	Subject Group: CDM	
Project title: Zhangjiakou Chabei Wind Farm Project		
Work carried out by: Ms. Li Yiting - Team Leader		
Internal Technical Review carried out by: Mr. Pin Tian		
Date of this revision: 16/10/2012	Rev. No.: 01	Number of pages: 28

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 ₂ e	Carbon Dioxide Equivalent
DOE	Designated Operational Entity
DRR	Daily Reading Record
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
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

Carbon Resource Management Ltd. has commissioned Bureau Veritas Certification to verify the emissions reductions of its CDM project Zhangjiakou Chabei Wind Farm Project (hereafter called “**the Project**”) in Chabei District, 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 or any approved revised 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 or any revised approved 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 67 sets of wind turbine generators (WTGs) of the type of 77/1500kW with a unit capacity of 1,500kW, providing a total installed capacity of 100.5MW. The annual expected net electricity supplied to North China Power Grid is 213,735MWh and the annual estimated emission reductions are 203,090tCO₂e.

Project title: Zhangjiakou Chabei Wind Farm Project
 UNFCCC ref number: 4844
 Registration Date: 27/05/2011
 Crediting Period: 27/05/2011 to 26/05/2018 (renewable)
 Changed from: 01/07/2011 to 30/06/2018
 Monitoring Period: 27/05/2011 to 01/07/2012
 Project Participants: China (Host country): CGN (Chabei) Wind Power Co., Ltd.
 The United Kingdom of Great Britain and Northern Ireland (Other country): Carbon Resource Management Ltd.
 Methodologies used: ACM0002 Version 12.1.0 Consolidated methodology for grid-connected electricity generation from renewable sources
 Location of the Project: in Chabei District, Zhangjiakou City, Hebei Province, P.R.China
 Central geo coordinates: Longitude: 114.8158° E,
 Latitude: 41.4569° N
 UNFCCC view page: <http://cdm.unfccc.int/Projects/DB/DNV-CUK1306154648.92/view>

[Post Registration Changes]

The crediting period of the Project is 27/05/2011 to 26/05/2018 (renewable) (changed from the original crediting period 01/07/2011 to 30/06/2018).

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. Li Yiting	☒	☒ 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. Pin Tian	☒	☐ 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 /7/. 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 20/08/2012 /4/ and emission reduction calculation spreadsheet version 02 dated 20/08/2012 /5/. 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 dated 17/07/2012 submitted by the project participant was also web hosted on the UNFCCC-CDM web site on 24/07/2012 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 including the monitoring plan /1/;
- (b) The validation report /2/
- (c) The applied monitoring methodology /6/;
- (d) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /7/;
- (e) Other information and references relevant to the project activity's resulting emission reductions /8//9/.



2.2. Follow-up Interviews

On 09/08/2012, 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 CGN (Chabei) Wind Power Co., Ltd. were interviewed (see References). The main topics of the interviews are summarized in Table 1.

Table 1 Interview topics

Interviewed organization	Interview topics
CGN (Chabei) Wind Power Co., Ltd. (the Project Owner)	➤ Project Design and implementation ➤ Technical equipment, calibration and operation ➤ Monitoring Plan and management procedures ➤ Data uncertainty and residual risks (QA/QC) ➤ Environmental Impacts ➤ Compliance with National Laws and Regulations ➤ Monitored data and Monitoring Report ➤ 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 3 CLs.



The CLs 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 this is the 1st periodic 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 North China Power Grid according to the signed Power Purchase Agreement (PPA) /11/. 67 sets of wind turbine generators (WTGs) of the type of 77/1500kW with a unit capacity of 1,500kW, manufactured by Xinjiang Goldwind Science & Technology Co., Ltd., providing a total installed capacity of 100.5MW 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.

According to Construction permission of the Project /12/ and the Confirmation Letter from power grid /13/, the Project started construction in 08/2010. The first WTG of the Project started operation in 03/2011 and the Project started full operation in 05/2011.

Information provided in the monitoring report is in accordance with that stated in the registered PDD. Further analysis of monitored parameters as reported in the monitoring report compared to those estimated in the PDD is developed in section 3.6 of this report.

[Power System]

As shown in the diagram of the power system connection /10/ and described in monitoring report, the power generated by the wind turbines was delivered to the 220kV Project Site Substation, and then exported to 220kV Grid Substation, which connected to North China Power Grid.

[Metering System]

Two electricity meters were installed, of which:

The Main Meter and Backup Meter were installed at the Project Site Substation. Both of them can measure the bi-directional electricity flows including electricity exported to and imported from the grid via 220kV line.

Both two meters have been properly installed, maintained according to relevant standards.

**[Management and Operation]**

The PP has operated the Project as per the registered PDD. The monitoring organization has been set up and all monitoring staffs have been trained as per the CDM Monitoring & Management Manual /19//20/. CDM Monitoring & Management Manual and CDM monitoring internal training records have been provided and verified by Bureau Veritas Certification. Meter reading records of all the meters are based on continuous measurement and monthly recorded by the PP and the grid company. The grid company issues the records for sold electricity to the PP every month to confirm the electricity exported to and imported from the grid. Bureau Veritas Certification confirms that all the documents required by the monitoring plan have been stored. Bureau Veritas Certification has verified the documents and found the management and operations have been conducted by the PP in accordance with the registered PDD.



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 by the PP.
- Information provided in the MR is in accordance with that stated in the registered PDD.

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

Bureau Veritas Certification has verified the monitoring plan, including the data and parameters required to be monitored, measurement procedures, monitoring frequency and QC/QA procedures as described in the registered PDD.



Corresponding to the paragraph 232 of VVS version 02.0, Bureau Veritas Certification can confirm that the 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 monitoring plan contained in the registered PDD.

[Parameters and information flow]

The parameters required by the 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_{export, y}** Quantity of annual electricity exported to the grid by the Project.



(2) $EG_{import, y}$ Quantity of annual electricity imported from the grid by the Project.

(3) $EG_{facility, y}$ Quantity of net electricity generation supplied to the grid by the Project.

As the parameter $EG_{facility, y}$ represents net electricity supplied to the grid, electricity imported from the grid ($EG_{import, y}$) is subtracted from the electricity exported to the grid by the Project ($EG_{export, y}$) to obtain net electricity supplied to the grid ($EG_{facility, y}$).

As described above, two meters have been installed in accordance with the registered PDD. Bureau Veritas Certification has on-site checked the location of the meters against the diagram of power system connection /10/ of the Project and found that they are consistent. The calculated net electricity supplied to the grid by the Project per month is summed over the monitoring period.

The monthly readings records (MRR) of the meters are based on continuous measurement and monthly recorded by the PP and grid company /14/. The readings of the main meter are measured continuously and frozen on monthly basis by the grid company, then the grid company issues records for sold electricity to the Project. 24:00 o'clock on the first day of every month is the cut-off time to calculate the monthly net electricity supplied to the grid by the Project. The reading records for 0:00 o'clock of 27/05/2011 and records for sold electricity for 27/05/2011 to 01/06/2011 have also been provided. Bureau Veritas Certification has verified the values provided in the monitoring report /4/ against the MRRs /14/ and the records for sold electricity /15/ and found the values are consistent with the evidences.

Parameters determined ex-ante:

(1) $EF_{grid, CM, y}$, combined margin emission factor

The emission factor of the 1st crediting period of the Project has been determined ex-ante in the registered PDD. The combined margin emission factor 0.9502 tCO₂e/MWh used in the monitoring report has been verified against the PDD and found them to be consistent.



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 monitoring plan contained in the registered PDD.
- All parameters required by the 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 registered monitoring plan requires that the metering equipment is calibrated and checked annually for accuracy by the qualified third party in accordance with relevant industry standards. The error resulting of the meters will not exceed 0.5%.



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	96212980	0.2S	09/10/2010	Yes	A
			09/07/2011	Yes	B
Backup Meter	96212981	0.2S	09/10/2010	Yes	A
			09/07/2011	Yes	B

Entity A: Measure Center of Zhangjiakou Power Supply Company, (Ji)FaJi(2008)D011 /17/

Entity B: North China Electric Power Research Institute, CNAS L0394 /18/

[Instrument accuracy]

Bureau Veritas Certification 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 monitoring plan and are in compliance with the industry standard *Technical Administrative Code of Electric Energy Metering (DL/T 448-2000)* /8/.

[Calibration frequency]

The calibration frequency fulfills the requirement as described in the monitoring plan and is in compliance with the national standard *Verification Regulation of Electrical Energy Meter with Electronics (JJG 596-1999)* /9/.



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 monitoring plan contained in the registered PDD.

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 $EG_{\text{facility},y}$. 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 ACM0002 Version 12.1.0 and the registered PDD, the emission reductions for the Project are calculated as the baseline emissions minus the project emissions. Hence the emission reduction is determined by the following formula:

$$ER_y = BE_y - PE_y$$

Where,

ER_y : Emission reductions

BE_y : Baseline emissions



PE_y: Project emissions

[Baseline emissions]

The baseline emissions are the EF_{grid,CM,y} (baseline emission factor) times the EG_{facility,y} (Net electricity supplied to the grid by the Project). Therefore,

$$BE_y = EF_{grid,CM,y} * EG_{facility,y}$$

EF_{grid,CM,y}: combined margin emission factor of the North China Power Grid, calculated ex-ante in the registered PDD as 0.9502 tCO₂e/MWh

EG_{facility,y}: Net electricity supplied to the grid by the Project

The EG_{facility,y} can be calculated as:

$$EG_{facility,y} = EG_{export,y} - EG_{import,y}$$

where

EG_{export,y} quantity of annual electricity exported by the project.

EG_{import,y} quantity of annual electricity imported by the project.

Bureau Veritas Certification has cross-checked the values from the meter reading records /14/ with the records for sold electricity /15/ for the period from 27/05/2011 to 01/07/2012, and found they are fully consistent with each other. The verified values are shown in the following Table 3 and Table 4.

Table 3 The verified EG_{export,y} (MWh)

Period	Meter reading records	Records for sold electricity	Verified EG _{export,y}
	A	B	C=min(A,B)
27/05/2011 0:00-01/06/2011 24:00	6,048.504	6,048.504	6,048.504
02/06/2011 0:00-01/07/2011 24:00	13,742.124	13,742.124	13,742.124
02/07/2011 0:00-01/08/2011 24:00	9,394.044	9,394.044	9,394.044
02/08/2011 0:00-01/09/2011 24:00	10,271.448	10,271.448	10,271.448
02/09/2011 0:00-01/10/2011 24:00	14,068.164	14,068.164	14,068.164
02/10/2011 0:00-01/11/2011 24:00	16,853.892	16,853.892	16,853.892
02/11/2011 0:00-01/12/2011 24:00	10,382.988	10,382.988	10,382.988
02/12/2011 0:00-01/01/2012 24:00	15,192.672	15,192.672	15,192.672
02/01/2012 0:00-01/02/2012 24:00	17,786.736	17,786.736	17,786.736

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02/02/2012 0:00-01/03/2012 24:00	24,963.048	24,963.048	24,963.048
02/03/2012 0:00-01/04/2012 24:00	24,416.436	24,416.436	24,416.436
02/04/2012 0:00-01/05/2012 24:00	26,103.132	26,103.132	26,103.132
02/05/2012 0:00-01/06/2012 24:00	22,956.912	22,956.912	22,956.912
02/06/2012 0:00-01/07/2012 24:00	21,257.016	21,257.016	21,257.016
Total	233,437.116	233,437.116	233,437.116

Table 4 The verified $EG_{import,y}$ (MWh)

Period	Meter reading records	Records for sold electricity	Verified $EG_{import,y}$
	D	E	F=max(D,E)
27/05/2011 0:00-01/06/2011 24:00	2.376	2.376	2.376
02/06/2011 0:00-01/07/2011 24:00	32.076	32.076	32.076
02/07/2011 0:00-01/08/2011 24:00	55.044	55.044	55.044
02/08/2011 0:00-01/09/2011 24:00	76.428	76.428	76.428
02/09/2011 0:00-01/10/2011 24:00	47.124	47.124	47.124
02/10/2011 0:00-01/11/2011 24:00	98.076	98.076	98.076
02/11/2011 0:00-01/12/2011 24:00	181.104	181.104	181.104
02/12/2011 0:00-01/01/2012 24:00	118.404	118.404	118.404
02/01/2012 0:00-01/02/2012 24:00	88.440	88.440	88.440
02/02/2012 0:00-01/03/2012 24:00	37.752	37.752	37.752
02/03/2012 0:00-01/04/2012 24:00	31.944	31.944	31.944
02/04/2012 0:00-01/05/2012 24:00	21.648	21.648	21.648
02/05/2012 0:00-01/06/2012 24:00	26.136	26.136	26.136
02/06/2012 0:00-01/07/2012 24:00	21.648	21.648	21.648
Total	838.200	838.200	838.200

$$EG_{facility,y} = EG_{export,y} - EG_{import,y}$$

$$= 233,437.116 - 838.200 = 232,598.916 \text{ MWh}$$

The baseline emissions of the Project are calculated as:



$$BE_y = EF_{\text{grid,CM,y}} * EG_{\text{facility,y}} = 0.9502 \text{ tCO}_2\text{e/MWh} * 232,598.916 \text{ MWh} = 221,015 \text{ tCO}_2\text{e}$$

[Project emissions]

The Project is a newly built wind power project, thus according to ACM0002 Version 12.1.0 the project emissions are zero.

[Leakage]

The Project is a newly built wind power project, thus according to ACM0002 Version 12.1.0 leakage of the project is not required to be considered.

[Emission reductions]

The emission reductions during the monitoring period from 27/05/2011 to 01/07/2012 are calculated as:

$$ER_y = BE_y - PE_y = 221,015 - 0 = 221,015 \text{ tCO}_2\text{e}$$

[Comparison of ERs]

The annual estimated emission reductions are 203,090 tCO₂e as per the registered PDD. The actual operation days of the Project in the monitoring period are 402 days. The corresponding estimate in the monitoring period are 223,677 (=203,090*402/365) tCO₂e. The actual emission reductions are less 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 monitoring plan contained in the registered PDD.
- 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 1st periodic verification of Zhangjiakou Chabei Wind Farm Project, CDM Registration Reference Number 4844, which is located in Chabei District, Zhangjiakou City, Hebei Province, P.R.China, and applying the methodology ACM0002 Version 12.1.0. 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 CGN (Chabei) Wind Power Co., Ltd. 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 monitoring plan contained in the registered PDD. 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 20/08/2012 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. 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 project's GHG emissions and resulting GHG emission reductions reported and related to the validated and registered project baseline, 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:	27/05/2011 to 01/07/2012	
Baseline emissions:	221,015	t CO ₂ equivalents
Project emissions:	0	t CO ₂ equivalents
Leakage emissions:	0	t CO ₂ equivalents
Emission Reductions:	221,015	t CO ₂ equivalents

Mr. Pin Tian
Internal Technical Reviewer
16/10/2012

Ms. Li Yiting
Team Leader
16/10/2012



5. REFERENCES

Documents reviewed:

- /1/ Registered PDD version 1.2 dated 21/02/2011, UNFCCC ref no.4844
- /2/ Validation Report revision 03, dated 09/05/2011
- /3/ Monitoring Report Version 01 dated 17/07/2012
- /4/ Monitoring Report version 02, dated 20/08/2012
- /5/ ER Calculation Spreadsheet version 02, dated 20/08/2012
- /6/ ACM0002 Version 12.1.0
- /7/ Validation and Verification Standard Version 02.0 dated 25/11/2011
- /8/ Technical Administrative Code of Electric Energy Metering (DL/T 448-2000)
- /9/ Verification Regulation of Electrical Energy Meter with Electronics (JJG 596-1999)
- /10/Diagram of power connection system of the Project
- /11/Signed Power Purchase Agreement (PPA) with grid company whose validity period cover this monitoring period
- /12/Construction permission of the Project
- /13/Confirmation Letter from power grid
- /14/Meter Reading Records of the Project
- /15/Records for sold electricity issued by the Grid Company
- /16/Calibration records
- /17/Certificate of metrological authorization to Measure Center of Zhangjiakou Power Supply Company, whose authorized certificates are No. (Ji)FaJi(2008)D011 with the valid period 18/02/2008 to 17/02/2011
- /18/Certificate of metrological authorization to North China Electric Power Research Institute, whose authorized certificates are CNAS L0394 with the valid period 29/06/2011 to 28/06/2014
- /19/CDM Monitoring & Management Manual
- /20/Internal Training Records and Qualification Certificate of Operation Staff

Persons interviewed:

CGN (Chabei) Wind Power Co., Ltd.

Ms. Li Binghua	CDM Project Manager
Mr. Yang Tao	CDM Project Manager
Ms. An Hehong,	CDM Project Manager



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

Ms. Li Yiting	Bureau Veritas Certification, China	Team Leader, Climate Change Lead Verifier, He holds a bachelor degree in Geology and a master degree in Structural Geology. He gained more than 2 years' technical experience in Petroleum Exploitation and Storage & Transportation sector and more than 3 year's experiences in coal mining sector in P.R China. He obtained the certificate of Climate Change Lead Verifier and Auditor for ISO 14001.
Mr. Pin Tian	Bureau Veritas Certification, China	Technical Reviewer, Climate Change Lead Verifier. He holds a MEng in Industrial Engineering and a MSc in Product Lifecycle Management. Before joining BV in 2009, he gained two years working experience in project management in various industrial sectors. He obtained the certificate of CDM Verifier, Lead Auditor for ISO 14001 and has successfully completed the course assessment for ISO 14064.

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					
1.a Has the implementation and operation of the project activity been conducted in accordance with the description contained in the registered PDD?	VVS	226	~~CL-1 Mode of the turbines should be clarified in A.1 of the MR.~~ The actual mode of the turbines is consistent with the registered PDD, so CL-1 is closed out. ~~CL-2 A diagram for installed technology, technical process and equipment should be provided in B.1 of the MR as per the MR guidelines.~~ The diagram for installed technology, technical process and equipment has been verified, so CL-2 is closed out. The project involves 67 wind turbines with capacity of 1500kW and total capacity of 100.5MW, which is consistent with the registered PDD.	CL-1 CL-2	OK
1.b Are all physical features of the project activity in the registered PDD in place?	VVS	227	Yes. The project involves 67 wind turbines with capacity of 1500kW and total capacity of 100.5MW, which is consistent with the registered PDD.	OK	OK
1.c Have the project participants operated the project activity as per the registered PDD or any approved revised PDD?	VVS	227	Yes. The project facilities and generation records of the turbines were managed as the registered PDD.	OK	OK
1.d Was an on-site visit conducted?	VVS	227	Yes.	OK	OK

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			The on-site visit was carried out By Ms. Li Yiting from Bureau Veritas Certification on 09/08/2012. The audit purpose and methodology was briefed in the opening meeting participated by the following persons. Ms. Li Binghua CDM Project Manager, CGN (Chabei) Wind Power Co., Ltd. Mr. Yang Tao CDM Project Manager, CGN (Chabei) Wind Power Co., Ltd. Ms. An Hehong, CDM Project Manager, CGN (Chabei) Wind Power Co., Ltd.		
1.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)					
2.a Is the monitoring plan of the project activity in accordance with the applied methodology including applicable tool(s)?	VVS	229	Yes. The monitoring plan is in accordance with the applied methodology ACM0002 (version 12.1.0).	OK	OK
2.b Is the project implementation in accordance with the provisions of the registered PDD and/or an approved revised PDD?	VVS	230	Yes.	OK	OK
3 Compliance of monitoring activities with the registered monitoring plan					
3.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 PDD36 or any	VVS	233	Yes. The monitoring of parameters have been implemented in accordance with the monitoring plan contained in the registered PDD.	OK	OK

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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
accepted revised monitoring plan?					
3.b Has the monitoring plan been properly implemented and followed by the project participants?	VVS	234	Yes. The monitoring team has been set up and functions. All monitoring staffs have been trained and the training records have been provided and verified satisfactory. The monitoring procedures are in place and function well. All parameters indicated in the MP have been measured and recorded in the respective documents both in paper form and electronic form. The QA/QC procedures are in place and function well.	OK	OK
3.c Have all parameters stated in the monitoring plan and relevant Board decisions been monitored and updated as applicable, including:	VVS	234			
3.c.i Project emission parameters?	VVS	234	As per ACM0002 version 12.1.0, project emissions of wind power projects is zero.	OK	OK
3.c.ii Baseline emission parameters?	VVS	234	$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y}$	OK	OK
3.c.iii Leakage parameters?	VVS	234	As per ACM0002 version 12.1.0, leakage of wind power projects is not required to be considered.	OK	OK
3.c.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	Yes. PP has the responsibility of overall monitoring, which has established a monitoring team for monitoring of power generation and maintenance and operation of the wind power station as well as associated metering systems and auxiliaries. The responsibilities and the procedures are included in the Monitoring and Management Manual and have been verified. Responsibilities have been allocated to the well-	OK	OK

VERIFICATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
			trained monitoring staff as per the registered PDD. All the records related to generation, maintenance have been satisfactorily maintained. The records and all relevant paper based information are collected and archived by the operation department for internal audit. The QA / QC procedures are part of management system and management reviews are evidently taking place to discuss the various aspects like generation, trouble shooting, Government policies etc.		
3.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	Yes. The accuracy of all the meters is 0.2S, which fulfills the requirement of the MP and the relevant local standard. All meters were annually calibrated as per the provided calibration certificates, which was consistent with the registered MP.	OK	OK
3.e Are monitoring results consistently recorded as per approved frequency?	VVS	234	Yes. The parameter was continuously measured and recorded on the monthly basis.	OK	OK
3.f Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or the revised monitoring plan?	VVS	234	Yes. The QA/QC procedures have been documented in the Monitoring and Management Manual and applied in accordance with the MP.	OK	OK
4 Compliance with calibration frequency requirements for measuring instruments					
4.a Is the calibration of those measuring equipments that have an impact on the claimed emission reductions	VVS	237	~~CL-3 The calibration record in 2011 for backup meter should be provided. The certification to the~~	CL-3	OK

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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
conducted by the project participants at a frequency specified in the applied monitoring methodology and/or the monitoring plan?			~~calibration entity should be provided.~~ The main meter and backup meter have been calibrated on 09/10/2010 and 09/07/2011. Hence this CL is closed.		
4.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
4.c If yes, is the following conservative approach adopted in the calculation of emission reductions?	VVS	238			
4.c.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
4.c.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
4.d Has the error has been applied:	VVS	239			
4.d.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	VVS	239	N/A.	OK	OK

VERIFICATION REPORT

CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
calibration test, if the error is beyond the maximum permissible error of the measuring equipment.					
4.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
4.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	~~Pending on CL-3.~~ The main meter and backup meter has been calibrated on 09/10/2010 and 09/07/2011.	~~Pending~~ g	OK
4.g If no, were the requirements for post registration changes, in section of E of the VVS, followed?	VVS	241	N/A.	OK	OK
4.h Do the monitoring methodology or the monitoring plan specify any requirements for calibration frequency for measuring equipments?	VVS	242	Yes. The metering equipment is calibrated annually for accuracy by a qualified third party in accordance with industry standard.	OK	OK
4.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
4.j If neither local/national standards nor the manufacturer's specification are available, were international standards used?	VVS	242	N/A.	OK	OK
5 Assessment of data and calculation of emission					

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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
reductions					
5.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
5.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. A complete set of data for the monitoring period has been provided.	OK	OK
5.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	Yes. The reading records have been crosscheck with the records for sold electricity and found consistent.	OK	OK
5.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 ACM0002 version 12.1.0, the baseline emission is calculated as follows: $BE_y = EF_{grid,CM,y} * EG_{facility,y}$ According to ACM0002 (Version 12.1.0), for the project is a renewable energy project activity, project emissions is 0, and leakage is not considered.	OK	OK
5.e Have any assumptions used in emission calculations been justified?	VVS	245	There are no assumptions in emission calculations.	OK	OK
5.f Have appropriate emission factors, IPCC default values and other reference values been correctly	VVS	245	Yes.	OK	OK



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CHECKLIST QUESTION	Ref.	§	COMMENTS	Draft Concl	Final Concl
applied?			The combined margin emission factors in the first crediting period is 0.9502 tCO ₂ /MWh.		

**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
CL-1 Mode of the turbines should be clarified in A.1 of the MR.	1.a	The mode of the turbines is 77/1500kW, which is manufactured by Xinjiang Goldwind Science & Technology Co., Ltd. The relevant technical specification has been clarified in A.1 of the MR.	The actual mode of the turbines is consistent with the registered PDD, so CL-1 is closed out.
CL-2 A diagram for installed technology, technical process and equipment should be provided in B.1 of the MR as per the MR guidelines.	1.a	The diagram for installed technology, technical process and equipment has been provided in B.1 of the MR.	The diagram for installed technology, technical process and equipment has been verified, so CL-2 is closed out.
CL-3 The calibration record in 2011 for backup meter should be provided. The certification to the calibration entity should be provided.	4.a	The main meter and backup meter has been calibrated on 09/10/2010 and 09/07/2011. The calibration record in 2011 for backup meter has been provided to the verifier. The certification to the calibration entity has been provided to the verifier.	The calibration record in 2011 for backup meter has been verified and found to be consistent with the information in the MR, so CL-3 is closed out.