



VERIFICATION AND CERTIFICATION REPORT

VERIFICATION AND CERTIFICATION OF CHENGDE HONGSONG WINDFARM PROJECT IN HEBEI PROVINCE CHINA

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DET NORSKE VERITAS



VERIFICATION AND CERTIFICATION REPORT

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DET NORSKE VERITAS AS

DNV Certification AS

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
<http://www.dnv.com>
Org. No: NO 945 748 931 MVA

Summary:

DNV Certification AS has performed a verification of emission reductions reported from the 'Chengde Hongsong Windfarm Project in Hebei Province China' (CHWP), managed by Hebei Hong-Song Wind Power Share Holding Ltd. for the third period 1 January 2007 to 31 December 2007. In our opinion the GHG emissions reductions reported for the project in the monitoring report dated 7 March 2008 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the baseline and monitoring methodology provided in the PROJECT DESIGN DOCUMENT (PDD) Version 1.2 of 21 December 2006.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the 'Chengde Hongsong Windfarm Project in Hebei Province China', a wind farm power project in Hebei Province, China, managed by Hebei Hong-Song Wind Power Share Holding Ltd. during the period 1 January 2007 to 31 December 2007 amount to 101 306 tCO₂ equivalent.

The verification of reported emission reductions is based on the information made available to us and the engagement conditions detailed in this report. DNV Certification AS can not guarantee the accuracy or correctness of this information. Hence, DNV Certification AS cannot be held liable by any party for decisions made or not made based on this report.

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Work verified by: Shuyong Sun			
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**Abbreviations**

BM	Build Margin
CEF	Carbon Emission Factor
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
N ₂ O	Nitrous oxide
NCPG	North China Power Grid
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	PROJECT DESIGN DOCUMENT
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention for Climate Change
VER	Verified Emission Reductions



1 INTRODUCTION

Carbon Resource Management Ltd. has commissioned Det Norske Veritas Certification AS to carry out the verification of emission reductions generated by the “Chengde Hongsong Windfarm Project in Hebei Province China” for the period 1 January 2007 to 31 December 2007. The report was carried out as per Voluntary Carbon Standard (VCS) version 01. This report contains the findings from the verification and a statement for the verified emission reductions.

1.1 Objective

Verification is the independent review and ex-post determination by the Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the project activity during a defined verification period.

1.2 Scope

The Verification scope is:

- Review of the calculation of the relevant grid carbon emission factor for the North China Power Grid (NCPG) and the additionality of the project activity.
- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan for the project activity,
- To evaluate the GHG emission reduction data and express a conclusion with a high level of assurance about whether the reported GHG emission reduction data is free from material misstatement,
- To verify that the reported GHG emission data is sufficiently supported by evidence.

The verification is meant to ensure that reported emission reductions are complete and accurate and is based on generation of renewable energy that replaces fossil-based electricity generation in the grid.

1.3 GHG Project Description

The project is located on Weichang County, Chengde City, Hebei Province of China. The project is a wind power plant. The proposed installed capacity is 51.3 MW consisting of 78 turbines of 600KW and 6 turbines of 750KW. The details of the turbines with respect to their numbers, type and model of the machines have been verified to be as per details provided in the PDD.

The electricity generated is supplied to NCPG (which is dominated by coal-fired power plants) under Power Purchase Agreements (PPA).

The project has accounted for emission reductions generated by the proposed project from 1 January 2007 to 31 December 2007. The projects emission reductions are determined by multiplying the net amount of electricity generated by the project by an estimated ex-ante fixed grid emission coefficient of 0.952tCO₂e/MWh.

Title of the project activity	:	Chengde Hongsong Windfarm Project in Hebei Province China
Location of the project activity	:	on Weichang County, Chengde City, Hebei Province of China



Verification period : 1 January 2007 to 31 December 2007
Project starting date : September 2004

2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project, including,

- The review of the calculation of the carbon emission factor for the NCPG
- The net electricity supplied by the project activity to NCPG multiplied by the estimated grid emission factor

Verification Team:

Mr. Tao Li	DNV Certification Beijing	Team leader, GHG Auditor
Mr. Shuyong Sun	DNV Certification Beijing	CDM Validator

Duration of verification:

Preparation – (monitoring report review baseline grid factor estimations etc.)	: 6-7 March 2008
Site visit	: 10-11 March 2008
Reporting	: 17 March~28 April 2008

2.1 Review of Documentation

The monitoring report /1/ and the monthly electricity generation receipts from Chengde City Power Supply Company on behalf of NCPG were assessed as a part of the verification. In addition the PROJECT DESIGN DOCUMENT /2/, in particular the baseline estimations and the monitoring plan contained in the PDD were also assessed.

2.2 Site Visits

In the period of 10-11 March 2008, DNV performed a site visit at Chengde Hongsong Windfarm Project in Hebei Province China. During this visit, DNV verified the actual implementation of the project as described in the PDD. The electricity meters and calibration records of the meters were checked and found to be in order. The electricity generated is hourly measured, monthly recorded and the net electricity generation is cross checked by the receipt from Chengde City Power Supply Company to be correct.

3 VERIFICATION FINDINGS

3.1 Project Implementation

The project has been implemented as planned. The 51.3 MW power plant comprised of turbines commissioned from 16 September 2004 to 12 May 2006. The commissioning certificates for the project were verified against the commissioning capacity details and found to be correct. DNV



has also verified the nameplate capacity of the turbines to be 600KW and 750KW. After the commissioning, the Project Test and Joint Inspection Report (PTJIR) /5/ for the project has been approved by local government, which proved that the project is constructed as planned and was able to satisfy the requirement of operation and environment protection as required in environment impact assessment (EIA).

3.2 Project Baseline

The CHWP applies the approved consolidated baseline methodology ACM0002 “*Consolidated baseline methodology for grid-connected electricity generation from renewable sources*” version 6 of 19 May 2006. Its applicability has been justified by DNV due to that i) the project is a wind power project and ii) is connected to an regional electricity grid (NCPG).

The baseline scenario is that an equivalent of electricity would, in the absence of the project activity, have been generated by the operation of grid-connected thermal power plants and by the addition of new generation sources.

In accordance with ACM0002 version 6, the electricity baseline emission factor is determined ex-ante as a combined margin, consisting of the weight average of the operating margin (OM) emission factor and the build margin (BM) emission factor.

So that the baseline of the project activity is the 110 000 MWh generated from the generating units multiplied by an ex-ante determined emission coefficient (measured in 0.952 tCO₂e/kWh), calculated based on the weighted average emissions of the current NCPG generation mix.

The application of the baseline methodology is transparent and conservative.

3.3 Project Additionality

The additionality of the project, as required by ACM0002, has been established using the “*Tool for the demonstration and assessment of additionality*” version 02 /9/ approved by the CDM-EB.

Step 0: Preliminary screening based on the starting date of the project activity.

The project commissioned in May 2006. The emission reductions have all been generated after 1 January 2000.

Step 1: Identification of the alternatives to the project activity consistent with the current laws and regulations.

The alternate baseline scenarios for the project activity have been suitably identified as,

- a) the project activity not undertaken as a project activity receiving revenues from sale of VCUs;
- b) the thermal or hydro and other kinds of power plant with the comparable capacity or electricity
- c) comparable capacity or electricity generation addition provided by North China Power Grid;
- d) continuation of the current situation (no project activity or other alternatives undertaken).

The only realistic and credible alternative for the project scenario is sufficiently demonstrated as comparable capacity or electricity generation addition provided by NCPG.

The project proponent has chosen to follow “Step 3 barrier analysis”.

Step 3: Barrier analysis.



This analysis shows that the project activity faces barriers that (a) prevent the implementation of this type of project activity; and (b) do not prevent the implementation of the alternatives.

Investment barriers:

International development aid, e.g. from the World Bank, Asian Development Bank and KfW, as well as government tariff support have been used in China since 1993 to encourage the development of the wind power industry in the country. However, in recent years, the provisions of such soft loans and subsidized government interest rates have gradually decreased, furthermore, for a windfarm project only with attractive financial expectation, can the commercial loan be obtained in time successfully.

The total investment cost per kW of the project is about 7500 RMB Yuan, which is double that of the thermal plant, furthermore the utilization hours of windfarm are about from 2000 to 2500 hours, which is about one third of that of the thermal plant.

All these factors above make the financial return rate of the investment and the ability of loan repayment of the project at a lower level.

For the project, additional VCU financing may enable the investment return to be competitive with other projects. Having a full realization of this, the developer of the windfarm project started the VCU application process aiming to obtain the additional funding to secure the project financially and institutionally.

Tariff barriers:

In the China Renewable Energy Law, which came into force on 1 January 2006, it is encouraged to develop the renewable energy project; however there is no measure that guarantees an on-grid tariff which can attract the windfarm developers.

In the Notice (dated 29 June 2006) issued by the Pricing Bureau of Hebei province, the on-grid tariff of the Chengde Hongsong windfarm is adjusted to 0.60 RMB/kWh (including VAT), which is much lower than the on-grid tariff 0.73 RMB/kWh proposed in the feasibility study. The total investment IRR of the windfarm based on this on-grid tariff is 6.29%, which is a great barrier to this windfarm project, as it is significantly below the 8% benchmark for energy sector projects.

Technological barriers:

The windfarm is located in a less economically developed region of China and skilled and properly trained labor to operate and maintain the technology is not available. Furthermore, Chengde Hongsong Windfarm is one of the first groups of large-scale projects to use domestically manufactured turbines to stimulate national economic development. Without enough related experience, the Project will face some technological barriers.

The documented evidence is provided from official files, including written document and feasibility study reports from the company that develops the project. This evidence is sufficient to demonstrate the additionality for wind power projects widely in China like the Chengde Hongsong Windfarm project.

As demonstrated in Sub-step 1a, comparable capacity or electricity generation addition provided by North China Power Grid is the alternative. The concrete plan can be the increase of the generation



output of the operating unit or building the new plant.

In fact, it is very common in the power grid to increase the generation output of some operating units to satisfy the load demand, and in 2005, 46 new generators (12 404MW) have been installed in North China Power Grid. That is to say, either to increase the generation output or to build the new power plant is needed and the actual choice, so there are no barriers that would prevent the implementation of the alternative.

It is obvious that the alternative is financially attractive and encouraged by the grid company and government policies and the barriers identified here therefore are not applicable to the alternative or baseline scenario

Step 4: Common practice analysis.

The common practice shows that there are only a few wind farms in Hebei Province. Zhangbei Huicailiang windfarm, which commissioned in December 1998, has a higher tariff of RMB 0.984 Yuan/kWh. Nowadays the windfarms in Hebei Province can only get a tariff of RMB 0.65 Yuan/kWh as per a document by the Price Bureau of Hebei Province. Other windfarms under construction in Hebei Province are also financially unattractive and facing the investment barrier as the proposed activity, thus are applying for VER projects.

Step 5: Impact of VCU revenues.

With the sales of VCUs, the investment return will increase and the investment risk will reduce directly.

In conclusion, all the steps above are satisfied, the project is not the baseline scenario, and the project activity is additional.

3.4 Completeness of Monitoring

The only monitoring indicator, i.e., the net electricity generation, has been monitored with calibrated energy meters as described in the monitoring plan of the PDD and monitoring report.

3.5 Accuracy of emission reduction calculations

An electricity meter, which can measure the electricity supplied to grid and self consumed at the same time, is installed by Chengde City Power Supply Company. The ownership of the meter have after commissioning been transferred to Chengde City Power Supply Company for future maintenance. The permissible limit for the meter is 0.5% accuracy class. Monthly meter readings are taken jointly by the parties on the 26th and the last day of every month at 24:00. At the conclusion of each meter reading an appointed representative of the Chengde City Power Supply Company on behalf of NCPG and Hebei Hong-Song Wind Power Share Holding Ltd. sign a document indicating the number of kilowatt-hours indicated by the meter. This is then forwarded by Chengde City Power Supply Company to Hebei Hong-Song Wind Power Share Holding Ltd. which clearly indicates the net electricity exported and which again becomes the basis for emission reduction calculations.

The meter is jointly inspected and sealed on behalf of the parties and is not interfered with by either party except in the presence of the other party or its accredited representatives. The general conditions set out for metering, recording, meter readings, meter inspections, test &



checking and communication are as per the PPA (power purchase agreement) with Chengde City Power Supply Company. Test and joint inspection reports have been verified.

3.6 Quality of evidence to determine emission reductions

The emission reductions ER_y by the project activity during a given year y is

$$ER_y = BE_y - EG_y * EF_y$$

Where EG_y is the net electricity supplied to the grid, EF_y is the CO_2 emission factor of the grid and BE_y is the baseline emissions.

The emission factor EF_y of the grid is represented as a combination of the Operating Margin and the Build Margin, and was fixed for the duration of the crediting period in the PDD.

The Operating Margin emission factor EF_{OMy} was calculated in the PDD as $0.984 tCO_2e/MWh$, The Build Margin emission factor EF_{BMy} was calculated as $0.859 tCO_2e/MWh$. The weights ω_{OM} and ω_{BM} are selected as 0.75 and 0.25, respectively, as stipulated by ACM0002 version 6.

The weighted average of Operating Margin and Build Margin emission factors is:

$$EF = \omega_{OM} * EF_{OM} + \omega_{BM} * EF_{BM} = 0.75 * 0.984 + 0.25 * 0.859 = 0.952 tCO_2e/MWh.$$

The combined margin of $0.952 tCO_2e/MWh$ is fixed *ex-ante* for the first crediting period.

The GHG calculations are complete and transparent, and their accuracy has been verified.

The total electricity generated is 106 663 MWh and the captive power by the project is 248 MWh. The net amount of electricity is 106 415 MWh and thus the claimed emission reductions of $101\,306 tCO_2e$ reported for the period 1 January 2007 to 31 December 2007 was verified by reviewing the presented electricity generation receipts of Chengde City Power Supply Company.

The energy generated and emission reductions claimed for the proposed period were as shown in the following table:

Period	Power Generated MWh	*Power Consumed MWh	Net Power Supplied MWh	Emission Reductions (tCO ₂ e)
Jan-07	14 143	27	14 116	13 438
Feb-07	13 314	6	13 308	12 669
Mar-07	10 519	19	10 500	9 996
Apr-07	10 028	12	10 016	9 535
May-07	10 118	7	10 111	9 626
Jun-07	3 124	29	3 095	2 946
Jul-07	2 240	34	2 206	2 100
Aug-07	3 887	32	3 855	3 670
Sep-07	2 762	33	2 729	2 598
Oct-07	9 922	24	9 898	9 423
Nov-07	12 844	9	12 835	12 219
Dec-07	13 762	16	13 746	13 086
Total	106 663	248	106 415	101 306



*To be conservative, the invoiced number of Power Consumed is adopted.

Sufficient evidence was presented for the reported net electricity generation.

3.7 Management System and Quality Assurance

Monitoring and reporting of electricity generation is part of normal operations of Hebei Hong-Song Wind Power Share Holding Ltd. The quality of meter readings is assured through calibration of electricity meters and through cross checking of readings between the meter and the receipts.

The Hebei Hong-Song Wind Power Share Holding Ltd. has applied its management system to the wind source for power generation process.

4 VERIFICATION STATEMENT

DNV Certification AS has performed a verification of emission reductions reported for the “Chengde Hongsong Windfarm Project in Hebei Province China” managed by Hebei Hong-Song Wind Power Share Holding Ltd. for the period 1 January 2007 to 31 December 2007.

In our opinion the GHG emissions reductions reported for the project in the monitoring report of 7 March 2008 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the baseline and monitoring methodology provided in the PDD Version 1.2 of 21 December 2006.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the ‘Chengde Hongsong Windfarm Project in Hebei Province China’, managed by Hebei Hong-Song Wind Power Share Holding Ltd. during the period 1 January 2007 to 31 December 2007 amount to 101 306 tCO₂ equivalent.

The verification of reported emission reductions is based on the information made available to us and the engagement conditions detailed in this report. DNV Certification AS cannot guarantee the accuracy or correctness of this information. Hence, DNV Certification AS cannot be held liable by any party for decisions made or not made based on this report.



Beijing, 28 April 2008

A handwritten signature in black ink that reads 'Tao Li'.

Tao Li
Project Manager
Climate Change Services
DET NORSKE VERITAS AS

Beijing, 28April 2008

A handwritten signature in black ink that reads 'Shuyong Sun'.

Shuyong Sun
Technical Manager
Climate Change Services
DET NORSKE VERITAS AS



REFERENCES

Category 1 Documents:

Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the initial verification conclusions, and are usually further checked through interviews with key personnel.

- /1/ Monitoring Report of Chengde Hongsong Windfarm Project in Hebei Province China dated 7 March 2008.
- /2/ PROJECT DESIGN DOCUMENT for Chengde Hongsong Windfarm Project in Hebei Province China, Version 1.2 of 21 December 2006.
- /3/ The project feasibility study report
- /4/ The project environmental impact assessment report by Hebei Province Engineering Consulting Institute and the approval letter by Environmental Protection Bureau of Hebei Province.
- /5/ Project Test and Joint Inspection Report in May 2006
- /6/ Power Purchase Agreement between Hebei Hong-Song Wind Power Share Holding Ltd. and Chengde City Power Supply Company on behalf of North China Power Grid.

Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents have been used to cross-check project assumptions and confirm the validity of information given in the Category 1 documents and in verification interviews.

- /7/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /8/ ACM 0002 Approved methodology, "Consolidated methodology for grid-connected electricity generation from renewable sources", version 06. 19 May 2006
- /9/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, version 02 of 28 November 2005
- /10/ Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135MW or below, Issued by State Council Office, decree No. 2002-6
- /11/ The Temporary Stipulation of the Construction Management of Small Scale Units of Fuel-fired Power Generation of August 1997
- /12/ State Power Corporation of China. *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*. Beijing: China Electric Power Press, 2003



- /13/ State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003
- /14/ The guidance for deviation in use of methodology AM0005 by several project activities in China by EB. <http://cdm.unfccc.int/Projects/Deviations>
- /15/ the statistics by State Electricity Regulatory Commission (SERC) on newly built thermal plants in 10th "Five-Year Plan" period 2000-2005, and NDRC official website <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2006/20061215144747182.pdf>

Persons interviewed:

Persons interviewed during the initial verification, or persons contributed with other information that are not included in the documents listed above.

- /16/ Mr. He Zhiyuan, Engineer, Hebei Hong-Song Wind Power Share Holding Ltd.
- /17/ Mr. Sun Cuiqing, Senior Manager, Carbon Resource Management Ltd.
- /18/ Mr. Shi Xiangfeng, Senior Manager, Carbon Resource Management Ltd.

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