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# VERIFICATION REPORT

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## QINGDAO HUAWEI WINDPOWER COMPANY LIMITED VERIFICATION OF THE QINGDAO HUAWEI WINDPOWER PROJECT CHINA

REPORT No. 20070225

REVISION No. 01

## VERIFICATION REPORT

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|--|---|
| Date of first issue:<br>31.01.2007                     | Project No.:  |
| Approved by:<br><br>Kurt Seidel                        | Organisational unit:<br>TÜV Rheinland Immissionsschutz<br>und Energiesysteme GmbH |
| Client:<br>Qingdao Huawei Windpower Company<br>Limited | Client ref.:<br>c/o Mr. Bocking   |

### Summary:

TÜV Rheinland Emissionsschutz und Energiesysteme GmbH has performed a verification of the VER project: Qingdao Windpower. The verification is based on the currently valid documentation of the UN Framework Convention on Climate Change (UNFCCC).

The management of Qingdao Huawei Windpower Company Limited and Nordex are responsible for the preparation of the relevant data for the GHG emission reduction of the Qingdao windfarm project. The monitoring plan will be adapted to the guidelines in order to use all relevant data which are necessary for the calculation of the reduction of GHG emissions. The maintenance of records and reporting procedures which is prepared from the company WindGuard can be used for the GHG calculation as a cross-check. The GHG emission calculation is based on at the receipts of the grid owner for the period January 2004 to December 2006. The calculation and determination of GHG emission reductions from the project is in the responsibility of the management of the project. Installed equipment being essential for generating emission reduction runs reliably. The monitoring system is in place and the project is ready to generate GHG emission reductions. The verifier can confirm that the GHG emission reduction is calculated without material misstatements. Based on the information we have seen and evaluated we confirm the following statement:

Reporting period: From 01-01-2004 to 31-12-2006

Verified emission in the above reporting period:

Emission reductions: 59.918 t CO<sub>2</sub> equivalents

TÜV Rheinland Immissionsschutz und Energiesysteme GmbH used the Standard „Standard of Validation, Standard of Verification and Additionality TÜV RHEINLAND Standard GHG-VER-2006-01” for this project, which is equivalent to the standard “VER+”.

### Remarks:

The project client confirmed that all relevant GHG data will be integrated in the monitoring report.

|   |                |                        |
|---|----------------|------------------------|
| Report No.:<br>20070225                           | Subject Group: |                        |
| Report title:<br>“Qingdao Huawei Windpower ”      |                |                        |
| Work carried out by:<br>Ralf Kober<br>Nigel Zhang |                |                        |
| Work verified by:<br>Kurt Seidel                  |                |                        |
| Date of this revision:                            | Rev. No.:      | Number of pages:<br>13 |

### Indexing terms

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- Limited distribution
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**Abbreviations**

*Explain any abbreviations that have been used in the report here.*

|                   |   |
|-------------------|---|
| AM                | Approved Methodology                                  |
| ACM               | Approved Consolidated Methodology                     |
| CAR               | Corrective Action Request                             |
| CDM               | Clean Development Mechanism                           |
| CER               | Certified Emission Reduction                          |
| CHP               | Combined Heat and Power Generation                    |
| CL                | Clarification Request                                 |
| CO <sub>2</sub>   | Carbon Dioxide  |
| CO <sub>2</sub> e | Carbon Dioxide Equivalent                             |
| DNA               | Designated National Authority                         |
| DOE               | Designated Operational Entity                         |
| DR                | Document Review                                       |
| EA                | Economic Analysis                                     |
| EB                | Executive Board                                       |
| EIA               | Environmental Impact Assessment                       |
| ER                | Emission Reduction                                    |
| ERPA              | Emission Reduction Purchase Agreement                 |
| FAR               | Forward Action Request                                |
| FSR               | Feasibility Study Report                              |
| GHG               | Greenhouse Gas  |
| GWh               | Giga Watt Hours                                       |
| GWP               | Global Warming Potential                              |
| I                 | Interview   |
| IETA              | International Emissions Trading Organisation          |
| IPCC              | Intergovernmental Panel on Climate Change             |
| IRR               | Internal Rate of Return                               |
| JI                | Joint Implementation                                  |
| kW                | Kilo Watt   |
| kWh               | Kilo Watt Hours                                       |
| LoA               | Letter of Approval                                    |
| LoI               | Letter of Intent                                      |
| LSTHC             | Local Stakeholder Consultation                        |
| MoV               | Means of Verification                                 |
| MW                | Mega Watt   |
| MWh               | Mega Watt Hours                                       |
| NGO               | Non Government Organisation                           |
| NPV               | Net Present Value                                     |
| ODA               | Official Development Assistance                       |
| OSV               | On Site Visit   |
| PDD               | Project Design Document                               |
| QC                | Quality Control                                       |
| QA                | Quality Assurance                                     |
| SIcC              | Supplier Information to Client                        |
| t                 | Tonne   |
| VER               | Verified Emission Reduction                           |
| UNFCCC            | United Nations Framework Convention on Climate Change |

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### **Conversion Factors and Definitions**

*Insert and describe any conversion factors used in the report here. In addition, define any specific terminology used in the report.*

None

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## 1 INTRODUCTION

### 1.1 Objective

Qingdao Huawei Windpower Company Limited has commissioned an independent verification by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH (TÜV) for its VER project: Qingdao Huawei Windpower. Verification is the periodic independent review by the TÜV of the monitored reductions in GHG emissions during the defined verification period.

**Periodic Verification:** The objective of the periodic verification is to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; further more the periodic verification evaluates the GHG emission reduction data and expresses a conclusion with a high, but not absolute, level of assurance about whether the reported GHG emission reduction data is “free” of material misstatements; and verifies that the reported GHG emission data is sufficiently supported by evidence, i.e. monitoring records. If no prior initial verification has been carried out, the objective of the first periodic verification also includes the objectives of the initial verification.

The verification shall consider both quantitative and qualitative information on emission reductions. Quantitative data comprises the monitoring reports submitted to the verifier by the project entity. Qualitative data comprises information on internal management controls, calculation procedures, and procedures for transfer, frequency of emissions reports, review and internal audit of calculations/data transfers.

### 1.2 Scope

Verification scope is defined as an independent and objective review and ex post determination of the monitored reductions in GHG emissions by the verifier. The verification is based on the project design document including baseline. These documents are reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. The verifier has, based on the recommendations in the Validation and Verification Manual, employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of VERs.

The verification is not meant to provide any consulting towards the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

### 1.3 GHG Project Description

The objective of the Qingdao Huawei Windpower Project is to generate renewable electricity using wind power resources and to sell the generated output to the North China Power Grid. The project activity will generate greenhouse gas (GHG) emission reductions by avoiding CO<sub>2</sub> emissions from electricity generation by fossil fuel power plants that supply the North China Power Grid.

The project activity of Qingdao Huawei Windpower project by Qingdao Huawei Windpower Company Limited (QHW) is located near by Qingdao, one of the most developed regions of China. Shandong province as peninsula in middle-north China is especially exposed to ocean winds. It involves the installation of 12 wind turbine generators each with a capacity of 1300 kW and 3 turbines each with 250 kW capacity. The total installed capacity is 16.35 MW with

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originally planned annual net generation of 30.528 MWh. The implementation of the project was accomplished in November 2003.

This project is expected to be in operation for a period of 20 years.

For the calculation of the emission reductions of the project the production of one of the three 250 kW turbines has not been considered\*. This turbine was part of a pilot plant, that had been built in 1999, partly financed with a grant provided by the German Ministry for Economic Development and Cooperation in a so called Public-Private Partnership Program (total cost: 466 TEUR, PPP grand: 26%).

Therefore the VER-project consists of 14 wind turbines with a capacity of 16,1 MW.

The crediting period started in January 2004.

## 2 METHODOLOGY

The project assessment aims at being a risk based approach and is based on the methodology developed in the Validation and Verification Manual (for further information see [www.vvmanual.info](http://www.vvmanual.info)), an initiative of all Applicant Entities, which aims to harmonize the approach and quality of all such assessments.

In order to ensure transparency, a verification protocol was customized for the project, according to the Validation and Verification Manual. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results. The verification protocol serves the following purposes:

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

The verification protocol consists of four tables. The different columns in these tables are described in Figure 1.

The completed protocol is enclosed in Annex 1 to this report.

| Initial Verification Checklist – table 1       |  |   |   |
|--|--|---|---|
| OBJECTIVE                                      | Ref.   | COMMENTS  | Concl.(incl FARs/CARs)  |
| <i>The requirements the project must meet.</i> | <i>Gives reference to the legislation or agreement where the requirement is found.</i> | <i>Description of circumstances and further commendation to the conclusion.</i> | <i>This is either acceptable based on evidence provided (OK), or a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications</i> |

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\* [Turbine 0565 /QD01 according to reports from Deutsche WindGuard GmbH.](#)

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| Periodic Verification Checklist Table 1: Data Management System/Controls   |   |  |
|--|---|--|
| Expectations for GHG data management system/controls   | Score   | Verifiers Comments (including <i>Forward Action Requests</i> )   |
| The project operator's data management system/controls are assessed to identify reporting risks and to assess the data management system's/control's ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table. | A score is assigned as follows: <b>Full</b> all best-practice expectations are implemented. <b>Partial</b> a proportion of the best practice expectations is implemented <b>Limited</b> this should be given if little or none of the system component is in place. | <i>Description of circumstances and further commendation to the conclusion. This is either acceptable based on evidence provided (OK), or a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Verification report. The Initial Verification has additional Forward Action Requests (FAR). FAR indicates essential risks for further periodic verifications</i> |

| Periodic Verification Checklist Table 2: GHG calculation procedures and management control testing   |   |  |
|--|---|--|
| Identification of potential reporting risk   | Identification, assessment and testing of management controls   | Areas of residual risks  |
| Identification of potential reporting risks based on an assessment of the emission estimation procedures. Identification of key source data. Focus on those risks that impact the accuracy, completeness and consistency of the reported data. | Identification of the key controls for each area with potential reporting risks. Assessment of adequacy of the key controls and eventually test that the key controls are actually in operation. Internal controls include, Understanding of responsibilities and roles, Reporting, reviewing and formal management approval of data; Procedures for ensuring data completeness, conformance with reporting guidelines, maintenance of data trails etc. | <i>Identification of areas of residual risks, i.e. areas of potential reporting risks where there are no adequate management controls to mitigate potential reporting risks<br/>Areas where data accuracy, completeness and consistency could be improved are highlighted.</i> |

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| Periodic Verification Checklist Table 3: Detailed audit testing of residual risk areas and random testing  |  |  |
|--|--|--|
| Areas of residual risks  | Additional verification testing performed  | Conclusions and Areas Requiring Improvement (including FARs)   |
| <p>List of residual areas of risks of Periodic Verification Checklist Table 2 where detailed audit testing is necessary. In addition, other material areas may be selected for detailed audit testing.</p> | <p>The additional verification testing performed is described. Testing may include:</p> <ul style="list-style-type: none"> <li>• Sample cross checking of manual transfers of data</li> <li>• Recalculation</li> <li>• Spreadsheet 'walk throughs' to check links and equations</li> <li>• Inspection of calibration and maintenance records for key equipment</li> <li>• Check sampling analysis results</li> </ul> <p>Discussions with process engineers who have detailed knowledge of process uncertainty/error bands.</p> | <p>Having investigated the residual risks, the conclusions are noted here. Errors and uncertainties are highlighted.</p> |

## 2.1 Review of Documents

The monitoring report submitted by the client and additional background documents related to the project performance were reviewed. Following documents are reviewed.

- Monitoring reports from 2004 to 2006
- Calculation sheet of the GHG emission calculation
- Receipt of the Grid Net Company

## 2.2 Follow-up Interviews

On January 29, 2007 TÜV Rheinland Immissionsschutz und Energiesysteme GmbH performed interviews with project stakeholders to confirm selected information. The intention and the target

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of the audit were illustrated to the participants of the audit. Participants at the audit were the following persons:

**Verification team**

Lead auditor: Ralf Kober, TÜV Immissionsschutz und Energiesysteme GmbH

Auditor (s): Nigel Zhang and Anita Fing, TÜV Rheinland Beijing

**Interviewed persons:**

Mr Zhang Chang Zheng, Vice General Manager, Qingdao Huawei Windpower Company Limited

Mr Mason Ma, Technical Operation Manager, Qingdao Huawei Windpower Company Limited

Mr An Yongqiang, Finance Manager, Qingdao Huawei Windpower Company Limited

Mr Fabian, General Manager, Nordex Beijing

Mr Bocking, Commercial Manager&Prokurist

**Duration of verification**

Preparations: From 24-01-2007 to 26-01-2007

On-site verification: From 29-01-2007 to 31-01-2007

Reporting: From 19-02-2007 to 26-02-2007

**Interview topics**

- Project design and implementation
- Technical equipment and operation
- Monitoring plan
- Monitored data
- Data uncertainty and residual risks
- GHG calculation
- Environmental impacts
- Compliance with national laws and regulations

## 2.3 Resolution of Clarification, Corrective and Forward Action Request

The objective of this phase of the verification was to resolve the requests for clarification and any other outstanding issues which needed to be clarified for TÜV Rheinland Immissionsschutz und Energiesysteme GmbH's positive conclusion on the GHG emission reduction calculation. The Clarification Requests, raised by TÜV Rheinland Immissionsschutz und Energiesysteme GmbH were resolved during communication between the client and TÜV Rheinland Immissionsschutz und Energiesysteme GmbH. Forward Action Requests are indicated issues which do not effect the generation of emission reduction in the verified period, but shall be improved in order to ensure the reliability of future data. To guarantee the transparency of the

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verification process, the concerns raised and responses that have been given are summarized in chapter 3 below and documented in more detail in the verification protocol in Annex 1.

### **3 VERIFICATION FINDINGS**

In the following sections the findings of the verification are stated. The verification findings for each verification subject are presented as follows:

The findings from the desk review of the final monitoring report and the findings from interviews during the follow up visit are summarized. A more detailed record of these findings can be found in the Verification Protocol in Annex 1.

Where TÜV Rheinland Immissionsschutz und Energiesysteme GmbH identified issues that needed clarification or that represented a risk to the fulfillment of the project objectives, a Corrective Action Request or Forward Action Request, respectively, was issued. The Requests are stated, where applicable, in the following sections and are further documented in the Verification Protocol in Annex 1.

The verification of the project find out a few Forward Action Request.

In the context of Forward Action Requests the focus is on identification and prevention of risks that might have effects on the verification of future VERs. As a consequence, such aspects should receive a special focus during the next consecutive verification. A FAR may originate from lack of data sustaining claimed emission reductions. Forward Action Requests are understood as recommendation for future project monitoring; they are stated, where applicable, in the following sections and are further documented in the Verification Protocol in Annex 1.

By the next periodic verification the client has confirmed that the monitoring report will have adapted all relevant issues of the requested monitoring data.

#### **3.1 Remaining issues, CARs, FARs from previous validation**

Based on the validation report, the verification team identified no relevant missing steps.

#### **3.2 Project Implementation**

##### **3.2.1 Discussion**

The project has been implemented and operated since November 2003. The crediting period started at the January of 2004.

12 wind turbine generators each with a capacity of 1300 kW and 3 turbines each with 250 kW capacity. The total installed capacity is 16.35 MW with originally planned annual net generation 30.528 MWh.

This project is expected to be in operation for a period of 20 years.

For the calculation of the emission reductions of the project the production of one of the three

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250 kW turbines has had not been considered\*. This turbine was part of a pilot plant, that had been built in 1999, partly financed with a grant provided by the German Ministry for Economic Development and Cooperation in a so called Public-Private Partnership Program (total cost: 466 TEUR, PPP grant: 26%).

The system is running stable which could be confirmed during the on-site visiting. The net generated electricity of 63.171.705 kWh was submitted to the grid (excluding the turbine 0565). The main electricity meter is installed by the Grid Net Company.

The project boundary is defined according to the PDD.

The Grid Net Company is responsible for the installing, maintaining and inspecting of the meter. The meter was calibrated from the Grid net Company, but the calibrations documentation were not available during the onsite- assessment.

The sales receipts from the Grid Net Company are the most reliable data sources for the calculation of GHG emission reduction. It has been verified on-site that the data are complete for the whole monitoring period.

The receipts from the Grid net Company about the electricity output and the value money were send to the QHW monthly. QHW controlled these receipts with their data from the computer system. The computer-monitoring system collected all relevant data from the wind farm in a daily file. These data were submitted to the office of QHW and to Nordex and WindGuard. Based on these data the WindGuard Company issued the monthly report of the windfarm. The recording, collection, validation of data are proved during the on-site audit.

The quality of the electricity data were ensured by proving the data from the Grid Net Company and by the own data from the computer system.

### **3.3 External data**

The internal parameter that needs from the computer system is the net electricity supplied to the grid and the external data from the Grid Net Company were investigated monthly.

At the windfarm, the computer system has to backup the "daily electricity generation record sheet". These data were controlled by the technical manager. The monthly records of the windfarm were send to the WindGuard Company to prepare the monthly report about the windfarm. The staffs were trained on the quality assurance procedures.

For the calculation of the GHG emission reduction were used the data from the Grid Net Company and the fixed emission factor from the China DNA.

#### **3.3.1 Findings**

The calibration documents from the meter of the Grid Net Company were not available during the on site audit.

#### **3.3.2 Conclusion**

The calibration documents should be integrated in the Monitoring report for the next verification audit.

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\* [Turbine 0565 /QD01 according to reports from Deutsche WindGuard GmbH.](#)

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### **3.4 Environmental and Social Indicators**

No environmental and social indicators are defined in the monitoring plan. Hence the question is not applicable.

#### **3.4.1 Findings**

At the on site audit at the windfarm the audit team noticed that the oil for the turbines and the rubbish from the maintenance aren't correctly stored.

#### **3.4.2 Conclusions**

QHW will store the Oil and rubbish in containers correctly regarding the environmental regulations. In general project owner complies with the related social and environmental standards which could be confirmed during the onsite assessment.

### **3.5 Management and Operational System**

#### **3.5.1 Discussion**

The procedures of data recording, checking, archiving and reporting are transparent and understandable.

The staff of QHW and WindGuard were educated and trained in handling the computer system, collection of data and reporting. The necessary procedures have been defined in the internal documents. Routines for the archiving of data are defined and documented. The calculation of the GHG emission reduction is transparent, because of the fixed emission factor.

#### **3.5.2 Findings**

The data from the windfarm monitoring report were in different documents and tables, this option wasn't conformed to the CDM standard of monitoring reporting.

#### **3.5.3 Conclusion**

In future the monitoring report should involve all relevant data for GHG emission reduction.

The project client confirmed that all relevant GHG data will be integrated in the monitoring report.

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## 4 REFERENCES

### Category 1 Documents:

- /1/ PDD of the project
- /2/ Validation Report
- /3/ Monitoring Report
- /4/ Calculation table of the GHG emission reduction

### Category 2 Documents:

- /5/ Environmental Impact Study and certificate of the EIA
- /6/ Approval for the grid connection
- /7/ Registration of the wind power company (QHW)
- /8/ Contract with the Power supply company
- /9/ Receipts of the monthly electricity amount

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## Annex 2:

Emission Reductions of 16,4 MW wind power project "Qingdao Huawei Windpower", 2004 to 2006

| Year  | 2004       | 2005       | 2006       | Sum Total |
|---|------------|------------|------------|-----------|
| Feeding into the Grid, Power sales data from the grid company [kWh] | 19.063.236 | 25.068.000 | 19.967.100 |           |
| Turbine 0565 (QD01) [kWh]   | 302.884    | 326.202    | 297.545    |           |
| Feeding into the Grid without turbine 0565 (QD01) [kWh]             | 18.760.352 | 24.741.798 | 19.669.555 |           |
| Emission factor 0,9485 [ kg CO <sub>2</sub> e/kWh]                  | 0,9485     | 0,9485     | 0,9485     |           |
| Emission reduction [t]  | 17.794,19  | 23.467,60  | 18.656,57  | 59.918,36 |

TÜV Immissionsschutz und Energiesysteme GmbH confirms for the period January 2004 to December 2006 a total emission reduction of 59.918,36 tonnes.

TÜV Immissionsschutz und Energiesysteme GmbH used the Standard „Standard of Validation, Standard of Verification and Additionality TÜV RHEINLAND Standard GHG-VER-2006-01” for this project, which is equivalent to the standard “VER+”.

### Initial Verification Checklist

| OBJECTIVE  | Ref. | COMMENTS   | Concl.(incl FARs/CARs) |
|--|------|--|------------------------|
| <b>A. Opening Session</b>  |      |  |                        |
| <b>A.1. Introduction to audits</b>   |      | Participants at the audit were the following persons:<br>Verification team:<br>Mr Ralf Kober, TIE<br>Mr Nigel Zhang, TÜV Rheinland Beijing<br>Interviewed persons:<br>Mr Zhang Chang Zheng, Vice General Manager, Qingdao Huawei Windpower Company Limited<br>Mr Mason Ma, Technical Operation Manager, Qingdao Huawei Windpower Company Limited<br>Mr An Yongqiang, Finance Manager, Qingdao Huawei Windpower Company Limited<br>Mr Fabian, General Manager, Nordex Beijing, Mr Bocking |                        |
| <b>A.2. Clarification of access to data archives, records, plans, drawings etc.</b>                                      |      | The verifcator team got open access to all required plans, data, records, drawings and to all relevant facilities.   |                        |
| <b>A.3. Contractors for equipment and installation works</b><br><br><i>Who has installed the equipment? Who was con-</i> |      | <i>The turbines of the wind farm were installed by the project company and by Nordex. The operation started in January 2004 for the crediting period .</i>   |                        |

| OBJECTIVE  | Ref. | COMMENTS   | Concl.(incl FARs/CARs) |
|--|------|--|------------------------|
| <i>tracted for planning etc.?</i>  |      |  |                        |
| <p><b>A.4. Actual status of installation works</b><br/><i>Project installation should be finished at time of initial verification in so far as the project should be ready to generate emission reductions afterwards.</i></p>                   |      | <i>The turbines of the wind farm were installed and in operation.</i>  |                        |
| <p><b>B. Open issues indicated in validation report</b><br/><i>Especially in projects which are not yet registered at CDM-EB or JI-SB, there might be some outstanding issues which should have been indicated by the validation report.</i></p> |      |  |                        |
| <p><b>B.1. Missing steps to final approval</b></p>   |      | Based on the validation report, the verification team identified no missing steps.   |                        |
| <p><b>C. Implementation of the project</b><br/><i>This part is covering the essential checks during the on-site inspection at the project's site, which is indispensably for an initial verification</i></p>                                     |      |  |                        |
| <p><b>C.1. Physical components</b><br/><i>Check the installation of all required facilities and equipment as described by the PDD.</i></p>   |      | Electricity will be produced by 15 turbines and supplied to the North China Power Grid via a 110 kV step-up station and a 220 kV transformer station. The main electricity meter is installed at the 220 kV substation.            |                        |
| <p><b>C.2. Project boundaries</b><br/><i>Check whether the project boundaries are still in compliance with the ones indicated by the PDD.</i></p>  |      | The project boundary is defined according to the PDD.  |                        |
| <p><b>C.3. Monitoring and metering systems</b><br/><i>Check whether the required metering systems have been installed. The meters have to comply with ap-</i></p>  |      | The Power Grid Company is responsible for installing, maintaining and inspecting one of the two electricity meters. One meter with an accuracy is installed at the Qingdao Windfarm Plant for monitoring the electricity delivered |                        |

| OBJECTIVE  | Ref. | COMMENTS   | Concl.(incl FARs/CARs) |
|--|------|--|------------------------|
| <i>appropriate quality standards applicable for the used technology.</i>   |      | to the grid and one main meter at the 220 kV substation for the monthly billing.   |                        |
| <b>C.4. Data uncertainty</b><br><i>How will data uncertainty be determined for later calculations of emission reductions? Is this in compliance with monitoring and metering equipment?</i>  |      | The net power which is determined by the electricity supplied is the base data for the calculation of the emission reduction. The sales receipt of the imported power issued by the power company is the most reliable data sources. It has been verified on-site that the data are complete for the whole period.                                       |                        |
| <b>C.5. Calibration and quality assurance</b><br><i>Check how monitoring and metering systems are subject to calibration and quality assurance routines</i><br><i>a) with installation</i><br><i>b) during future operation</i>                                |      | The calibration of the main meter is executed by the Power Grid Company. The meter of the windfarm is not calibrated, because this meter will be use only for cross-checking the data from the Power grid Company. The Windfarm has also computer based system for each turbine in order to record the data about the produced electricity, running time |                        |
| <b>C.6. Data acquisition and data processing systems</b><br><i>Check the eligibility of used systems.</i>  |      | Every month the Power Grid Company send to the Windfarm Company the receipt of the produced electricity and the reimbursement. The Windfarm company monitored the own data from the Nordex software tool monthly.  |                        |
| <b>C.7. Reporting procedures</b><br><i>Check how reports with relevance for the later determination of emission reductions will be generated</i>   |      | As described above, the net electricity delivered to the grid is the basis for the calculation of the emission reduction. Herefore, the copies of the monthly invoice have to be sent to the project company for validation and archiving.   |                        |
| <b>C.8. Documented instructions</b><br><i>Check whether the personnel performing tasks with sensitivity for the monitoring of emission reductions have access and knowledge of documented instructions, forming a part of the project's management system.</i> |      | At the moment there is no description of the important documents, but the computer system registrated all data from the windfarm and the project company achieved all important information about he windfarm. During the verification audit all important documentations were proofed.  |                        |

| OBJECTIVE  | Ref. | COMMENTS  | Concl.(incl FARs/CARs) |
|--|------|---|------------------------|
| <p><b>C.9. Qualification and training</b><br/><i>Check whether the personnel performing tasks with sensitivity for the monitoring of emission reductions has the appropriate competences, capabilities and qualifications to ensure the required data quality.</i></p>   |      | <p>The operating and maintaining training of turbines is provided by QHW on site and by Nordex in Germany.</p>  |                        |
| <p><b>C.10. Responsibilities</b><br/><i>Check whether all tasks required to gather data and prepare a monitoring report with the necessary quality have been allocated to responsible employees.</i></p>   |      | <p>QHW is responsible for the monitoring of the on-site operation. QHW, is accountable for establishing and monitoring related processes.</p>   |                        |
| <p><b>C.11. Troubleshooting procedures</b><br/><i>Check whether there are possibilities of redundant data monitoring in case of having problems with the used monitoring equipment. Such procedures may reduce risks for the buyers of emission reductions (e.g. the Client)</i></p>                                 |      | <p>According to the monitoring report, they use the data from the computer system for cross-checking the data of the Grid Ned company. For the calculation of the emission reduction they use the data of the Grid net company.</p> |                        |
| <p><b>D. Internal Data</b><br/><i>Identifying the internal GHG data sources and ways in which the data have been collected, calculated, processed, aggregated and stored should be part of initial verification to assess accuracy and reliability of the internal GHG data..</i></p>                                |      |   |                        |
| <p><b>D.1. Type and sources of internal data</b><br/><i>Acquire information on type and source of internal GHG data, which is used in calculations of emission reductions. E.g..” continuous direct measurements”, “site-specific correlations”, “periodic direct measurements”, “use of models” and/or “use</i></p> |      | <p>The internal parameter form the computer system will be used for the monthly reporting. For the calculation of the emission reduction they use the data of the Grid net company</p>  |                        |

| OBJECTIVE   | Ref. | COMMENTS  | Concl.(incl FARs/CARs) |
|---|------|---|------------------------|
| <i>of default emissions factors”.</i>   |      |   |                        |
| <p><b>D.2. Data collection</b><br/><i>How is data collected and processed? What are the means of quantifying emissions from the different data sources?</i></p>   |      | <p>Each month, the readings are recorded by the power company and send it to the QHW. QHW cross-checked these data with there own calculation from the computer system. The data from the computer system was checked daily through the technical manager from QHW.</p> |                        |
| <p><b>D.3. Quality assurance</b><br/><i>Does internal data collection underlie sufficient quality assurance routines?</i></p>   |      | <p>The main meter form the Grid Net Company had the Chinese standard. Moreover, the reading of the main meter needs to be cross-checked by that of the computer system at the windfarm. The staff is trained on the quality assurance procedures.</p>                   |                        |
| <p><b>D.4. Significance and reporting risks</b><br/><i>Assess the significance and reporting risks related to the different internal data sources. Potential reporting risks may be related to the calculation methods, accuracy of data sources and data collection and/or the information systems from which data is obtained. The significance of and risks associated with the data source indicate the level of verification effort required at a later stage.</i></p> |      | <p>Referring to the description above, the chances of misstatement are hereby low.</p>  |                        |
| <p><b>E. External Data</b><br/><i>Especially for data of baseline emissions there might be the necessity to include external data sources. The access to such data and a proof of data quality should be part of initial verification. If it is deemed to be necessary, an entity delivering such data should be audited.</i></p>   |      |   |                        |
| <p><b>E.1. Type and sources of external data</b><br/><i>Acquire information on type and source of external data, which is used in calculations of emission re-</i></p>  |      | <p>According to the approved methodology the emission factor of North China Grid is fixed for the crediting period.</p>   |                        |

| OBJECTIVE   | Ref. | COMMENTS  | Concl.(incl FARs/CARs) |
|---|------|---|------------------------|
| <i>ductions</i>   |      |   |                        |
| <p><b>E.2. Access to external data</b><br/><i>How is data transferred? How can reproducibility of data set be ensured?</i></p>  |      | <i>Not relevant</i>   |                        |
| <p><b>E.3. Quality assurance</b><br/><i>Does external data underlie any quality assurance routines?</i></p>   |      | <i>Not relevant</i>   |                        |
| <p><b>E.4. Data uncertainty</b><br/><i>Is it possible to assess the data uncertainty of external data? Are such routines included in reporting procedures?</i></p>  |      | <i>Not relevant</i>   |                        |
| <p><b>E.5. Emergency procedures</b><br/><i>Are there any procedures which will be applicable if there is no access to relevant external data?</i></p>   |      | <i>Not relevant</i>   |                        |
| <p><b>F. Environmental and Social Indicators</b><br/><i>A Monitoring Plan may comprise environmental and/or social indicators which could be necessary to monitor for the success of the project activity.</i></p>  |      |   |                        |
| <p><b>F.1. Implementation of measures</b><br/><i>A project activity may demand for the installation of measures (e.g. filtering systems or compensation areas), which are exceeding the local legal requirements. A check of the implementation or realization of such measures should be part of the initial verification.</i></p> |      | <p>No environmental and social indicators are defined in the monitoring plan. Hence the question is not applicable.</p> |                        |

| OBJECTIVE   | Ref. | COMMENTS   | Concl.(incl FARs/CARs) |
|---|------|--|------------------------|
| <p><b>F.2. Monitoring equipment</b><br/><i>Check where necessary whether the required metering systems have been installed. The meters have to comply with appropriate quality standards applicable for the used technology.</i></p>  |      | See chapter F.1.   |                        |
| <p><b>F.3. Quality assurance procedures</b><br/><i>What quality assurance procedures will be applied for such data?</i></p>   |      | See chapter F.1.   |                        |
| <p><b>F.4. External data</b><br/><i>Check the quality, reproducibility and uncertainty of external data.</i></p>  |      | See chapter F.1.   |                        |
| <p><b>G. Management and Operational System</b><br/><i>In order to ensure a successful operation of a Client project and the credibility and verifiability of the ERs achieved, the project must have a well defined management and operational system.</i></p>                              |      |  |                        |
| <p><b>G.1. Documentation</b><br/><i>The system should be documented by manuals and instructions for all procedures and routines with relevance to the quality of emission reductions. The accessibility of such documentations to persons working on the project has to be secured.</i></p> |      | The procedures of data recording, checking, archiving and reporting are clearly defined, but not clearly defined to calculate the emission reduction. This point will be integrated in the next monitoring report. |                        |
| <p><b>G.2. Qualification and training</b><br/><i>The system should describe the requirements on qualification and the need of training programs for all persons working on the emission reduction pro-</i></p>  |      | The staffs were trained by Nordex.   |                        |

| OBJECTIVE  | Ref. | COMMENTS  | Concl.(incl FARs/CARs) |
|--|------|---|------------------------|
| <i>ject. Performed training programs and certificates should be archived by the system.</i>  |      |   |                        |
| <p><b>G.3. Allocation of responsibilities</b><br/><i>The allocation of responsibilities should be documented in written manner.</i></p>  |      | Is documented.  |                        |
| <p><b>G.4. Emergency procedures</b><br/><i>The system should contain procedures which provide emergency concepts in case of unexpected problems with data access and/or data quality.</i></p>                        |      | The data from the computer system were backed up and monthly the data were archived by QHW, Nordex and WindGuard.   |                        |
| <p><b>G.5. Data archiving</b><br/><i>The system should provide routines for the archiving of all data which is required for verifying the project's performance in the context of consecutive verifications.</i></p> |      | Routines for the archiving of data are defined and documented.  |                        |
| <p><b>G.6. Monitoring report</b><br/><i>The system includes procedures for the calculation of emission reductions and the preparation of the monitoring report.</i></p>  |      | <p>The monitoring report involved only the data from the computer system.</p> <p>In future the Monitoring report should involve the data from the Grid Net Company and the calculation of the GHG emission reduction.</p> |                        |
| <p><b>G.7. Internal audits and management review</b><br/><i>The system includes internal control procedures, which allow the identification and solution of problems at an early stage.</i></p>                      |      | An internal audit is not necessary, because Nordex and WindGuard cross-checked the Data from QHW.   |                        |

**Table 1: Data Management System/Controls**

The project operator’s data management system/controls are assessed to identify reporting risks and to assess the data management system’s/control’s ability to mitigate reporting risks. The GHG data management system/controls are assessed against the expectations detailed in the table. A score is assigned as follows:

- Full - all best-practice expectations are implemented.
- Partial - a proportion of the best practice expectations is implemented
- Limited - this should be given if little or none of the system component is in place.

| Expectations for GHG data management system/controls   | Score | Verifiers Comments (including <i>Forward Action Requests</i> )  |
|--|-------|---|
| <b>1. Defined organisational structure, responsibilities and competencies</b>  |       |   |
| <p><b>1.1. Position and roles</b></p> <p><i>Position and role of each person in the GHG data management process is clearly defined and implemented, from raw data generation to submission of the final data. Accountability of senior management must also be demonstrated.</i></p> |       | <p>The positions and roles:<br/>                     Mr Zhang Chang Zheng, Vice General Manager<br/>                     Mr Mason Ma, Technical Operation Manager<br/>                     Mr An Yongqiang, Finance Manager<br/>                     Nordex Mr Bocking, Mr Fabian</p> |
| <p><b>1.2. Responsibilities</b></p> <p><i>Specific monitoring and reporting tasks and responsibilities are included in job descriptions or special instructions for employees.</i></p>   |       | <p>The responsibilities are clearly defined</p>   |

| Expectations for GHG data management system/controls  | Score | Verifiers Comments (including <i>Forward Action Requests</i> )   |
|---|-------|--|
| <p><b>1.3. Competencies needed</b><br/><i>Competencies needed for each aspect of the GHG determination process are analysed. Personnel competencies are assessed and training programme implemented as required.</i></p>  |       | <p>The required documents were shown to the verifier and appointed staff is totally aware of the reporting procedures.</p>   |
| <b>2. Conformance with monitoring plan</b>  |       |  |
| <p><b>2.1. Reporting procedures</b><br/><i>Reporting procedures should reflect the monitoring plan content. Where deviations from the monitoring plan occur, the impact of this on the data is estimated and the reasons justified.</i></p>   |       | <p>The monitoring report based on the Data from the computer system, that data can be used for cross-checking the data from Grid Net Company</p>   |
| <p><b>2.2. Necessary Changes</b><br/><i>Necessary changes to the monitoring plan are identified and changes are integrated in local procedures as necessary.</i></p>  |       | <p>For the GHG emission report following points have to be changed:</p> <ul style="list-style-type: none"> <li>➤ Integration of the data from the Grid Net company</li> <li>➤ Calculation sheet of the GHG</li> </ul>  |
| <b>3. Application of GHG determination methods</b>  |       |  |
| <p><b>3.1. Methods used</b><br/><i>There are documented description of the methods used to determine GHG emissions and justification for the chosen methods. If applicable, procedures for capturing emissions from non-routine or exceptional events are in place and implemented.</i></p> |       | <p>The calculations reflect the methodology with a fixed parameter of emission factor for the crediting period.</p>  |
| <p><b>3.2. Information/process flow</b><br/><i>An information/process flow diagram, describing the entire process from raw data to reported totals is developed.</i></p>  |       | <p>The data and information were correct achieved.</p> <p>In future following data should be integrated in the information system.</p> <ul style="list-style-type: none"> <li>➤ Integration of the data from the Grid Net company</li> <li>➤ Calculation sheet of the GHG</li> </ul> |

| Expectations for GHG data management system/controls   | Score | Verifiers Comments (including <i>Forward Action Requests</i> )   |
|--|-------|--|
| <p><b>3.3. Data transfer</b><br/><i>Where data is transferred between or within systems/spreadsheets, the method of transfer (automatic/manual) is highlighted - automatic links/updates are implemented where possible. All assumptions and the references to original data sources are documented.</i></p> |       | <p>The data of the net electricity generated have been received from the electricity invoiced and have been cross checked with the monthly reporting from the computer system of the power company. The data sources for the calculation of the emission factor are were fixed for the crediting period and the sources of the data are from the China DNA. All the quoted information are reviewed by the audit team.</p>             |
| <p><b>3.4. Data trails</b><br/><i>Requirements for documented data trails are defined and implemented and all documentation are physically available.</i></p>  |       | <p>All the relevant data have been verified.</p>   |
| <b>4. Identification and maintenance of key process parameters</b>   |       |  |
| <p><b>4.1. Identification of key parameters</b><br/><i>The key physical process parameters that are critical for the determination of GHG emissions (e.g. meters, sampling methods) are identified.</i></p>  |       | <p>The critical parameters for the determination of the GHG emissions are:</p> <ol style="list-style-type: none"> <li>1) The differences between the data from the Grid Net Company and the Computer system of the QHW are caused by of the energy consumption of the windfarm.</li> <li>2) The separation of one turbine from the Windfarm, the turbine wasn't integrated in the PDD, because of the financial sponsoring.</li> </ol> |
| <p><b>4.2. Calibration/maintenance</b><br/><i>Appropriate calibration/maintenance requirements are determined.</i></p>   |       | <p>The main meter from the Grid Net Company should be calibrated, but the documents were not available.</p>  |
| <b>5. GHG Calculations</b>   |       |  |

| Expectations for GHG data management system/controls   | Score | Verifiers Comments (including <i>Forward Action Requests</i> )  |
|--|-------|---|
| <p><b>5.1. Use of estimates and default data</b><br/><i>Where estimates or default data are used, these are validated and periodically evaluated to ensure their ongoing appropriateness and accuracy, particularly following changes to circumstances, equipment etc. The validation and periodic evaluation of this is documented.</i></p>   |       | <p>For the calculation of the GHG emission reduction was used a fixed emission factor from the China DNA for the crediting period.</p>  |
| <p><b>5.2. Guidance on checks and reviews</b><br/><i>Guidance is provided on when, where and how checks and reviews are to be carried out, and what evidence needs to be documented. This includes spot checks by a second person not performing the calculations over manual data transfers, changes in assumptions and the overall reliability of the calculation processes.</i></p> |       | <p>See Initial verification</p>   |
| <p><b>5.3. Internal verification</b><br/><i>Internal verifications include the GHG data management systems, to ensure consistent application of calculation methods.</i></p>   |       | <p>The audit team did verify the following parameters:</p> <ul style="list-style-type: none"> <li>• Invoices of electricity supplied and electricity purchased from the grid</li> </ul>                                     |
| <p><b>5.4. Internal validation</b><br/><i>Data reported from internal departments should be validated visibly (by signature or electronically) by an employee who is able to assess the accuracy and completeness of the data. Supporting information on the data limitations, problems should also be included in the data trail.</i></p>   |       | <ul style="list-style-type: none"> <li>• All data were in compliance with the figures stated in the monitoring report.</li> </ul> <p>Not verified were the calibration documents from the meter of the Grid Net Company</p> |
| <p><b>5.5. Data protection measures</b><br/><i>Data protection measures for databases/spreadsheets should be in place (access restrictions and editor rights).</i></p>   |       | <p>The data measured on site are recorded manually. The original records are kept at the windfarm and a complete copy is archived by Nordex. The computer system data was achieved by QHW and Nordex.</p>                   |
| <p><b>5.6. IT systems</b><br/><i>IT systems used for GHG monitoring and reporting should be tested and documented.</i></p>   |       | <p>The IT system is based on standard PC with the control software from Nordex.</p>   |

**Table 2: GHG calculation procedures and management control testing**

| Identification of potential reporting risk   | Identification, assessment and testing of management controls   | Areas of residual risks   |
|--|---|---|
| <p>Potential reporting risks based on an assessment of the emission estimation procedures can be expected to occur in the following fields of action:</p> <ol style="list-style-type: none"> <li>1. raw data collection</li> <li>2. calculation methods</li> <li>3. data transfer</li> </ol> <p>Key source data applicable to the project assessed are hereby:</p> <ul style="list-style-type: none"> <li>• Metering records for electricity production</li> <li>• Invoices from the grid company</li> </ul> <p>Appropriate calibration and maintenance of equipment resulting in a high accuracy of data supplied should be in place.</p> <p>It is hereby needed to focus on those risks that impact the accuracy, completeness and consistency of the reported data. Risks are weakness in the GHG calculation systems and may be the manual transfer of data and manual calculations.</p> | <p>Regarding the potential reporting risks identified, the following mitigation measures have been observed during the document review and the on site mission:</p> <p>Raw data collection:</p> <p>All data are metered and cross checked. The meters have a national standard, but the calibration documents were not available.</p> <p>Key source data for this parameter are:</p> <ul style="list-style-type: none"> <li>• Meter readings</li> <li>• Invoices for electricity supply</li> </ul> <p>The allocation of responsibilities is documented in a written form.</p> <p>Calculation methods:</p> <p>The reporting procedures based on the data from the computer system. The following data are not integrated in the monitoring report:</p> <ul style="list-style-type: none"> <li>➤ Data from the Grid Net Company</li> <li>➤ Calculation of the GHG</li> </ul> <p>Data transfer:</p> <p>The data transfer was checked and verified.</p> | <p>No residual risks are detected during the document review and site visiting.</p> |

**Table 3: Detailed audit testing of residual risk areas and random testing**

| Areas of residual risks   | Additional verification testing performed  | Conclusions and Areas Requiring Improvement<br>(including <i>Forward Action Requests</i> )  |
|---|--|---|
| <p>No residual risks are detected during the document review and site visiting.</p> | <p>There has been a complete check of data transferred from readings and invoices to the calculation tool. No additional verification testing is required.</p> | <p>Forward Action Requests:</p> <ul style="list-style-type: none"> <li>Integration of the data from the Grid Net company in the Monitoring report</li> <li>Integration of the GHG emission calculation in Monitoring report</li> <li>The calibration document from the meter of the Grid Net Company should be existing</li> <li>A clear calculation and documentation of the not involved turbine for this VER project has to be in place</li> </ul> |