# Verification and Certification Report

First periodic verification

Report for:

## Powerica Limited

Verification of CDM project for
Wind power project at Gujarat by Powerica Limited
(Ref 3632)

Monitoring Period:
18/09/2010 to 30/04/2011

| | | |
|---|---|---|
| LRQA Reference | : | CDM-MUM-0061752 version 02 |
| Date | : | 18/11/2011 |
| Work carried out by | : | Prabodha Acharya<br>Ankush Jain |
| Work verified by | : | Imran Ustad<br>Archak Pattanaik<br>Javier Vallejo Drehs |

LRQA
Business Assurance

# Contents

# 1 Executive Summary

Lloyd's Register Quality Assurance Limited has been contracted by Powerica Limited, representing the project participant (PP), to undertake the first periodic verification of the registered project activity "Wind power project at Gujarat by Powerica Limited" project reference number 3632 covering the monitoring period from 18/09/2010 to 30/04/2011. The verification has been performed by document review based on the Monitoring Report Version 01.1 dated 03/06/2011, on-site assessment and interviews with the stakeholders, resolution of outstanding issues and issuance of the verification report.

The project intends to reduce greenhouse gas (GHG) emissions by utilizing wind resource to generate electricity in the state of Gujarat, India by the installation of 09 wind turbine generators (WTG) in Kutch, Gujarat. The electricity generated by the project activity is being supplied to North East West North-East (NEWNE) Grid of India. It reduces the impact of power generation from the conventional fossil fuel based power plants, thereby leading to reduction of GHG emissions.

The fulfilment of the requirements as set forth in the Article 12 of the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC), the modalities and procedures for a CDM and relevant decisions of the Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol (COP/MOP) and the Executive Board of the CDM (CDM-EB) has been evaluated and the conformance to the verification requirements were confirmed based on the given information. A risk based approach was taken to conduct the verification, and corrective action requests (CARs), clarifications (CLs) and forward action requests (FARs) were issued for relevant actions by the PP.

The verification team identified, through the verification process, 02 CARs. The PP has taken actions and submitted to LRQA the revised monitoring report and supporting evidence. The verification team, through the verification process, confirmed that the emission reductions achieved by the project activity during the monitoring period are correctly calculated in the monitoring report Version 03.1 dated 29/08/2011 based on the approved monitoring methodology and the monitoring plan of the registered PDD. Therefore LRQA certifies the emission reductions amounting to 10,872 $tCO_2e$ and requests the CDM-EB to issue the CERs.

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## Abbreviations

| | |
|---|---|
| CAR | Corrective action request |
| CDM | Clean Development Mechanism |
| CDM-EB | Executive Board of Clean Development Mechanism |
| CDM M&P | Modalities and procedures for a clean development mechanism |
| CER | Certified Emission Reduction |
| CL | Clarification |
| COP/MOP | Conference of the Parties serving as meeting of the Parties to the Kyoto Protocol |
| ERs | Emission reductions |
| FAR | Forward action request |
| GETCO | Gujarat Energy Transmission Company Limited |
| GHG | Greenhouse gas |
| IPCC | Intergovernmental panel on climate change |
| KP | Kyoto Protocol of the United Nations Framework Convention on Climate Change |
| LR | Lloyd's Register |
| LRQA | Lloyd's Register Quality Assurance Limited |
| PDD | Project design document |
| PGVCL | Paschim Gujarat Vij Company Limited |
| PP | Project participant |
| $tCO_2e$ | Tonne of carbon dioxide equivalent |
| UNFCCC | United Nations Framework Convention on Climate Change |

# 2 Introduction

The project participant (PP) represented by Powerica Limited has contracted with Lloyd's Register Quality Assurance Limited (LRQA) to undertake the first periodic verification of the proposed project activity "Wind power project at Gujarat by Powerica Limited" covering the monitoring period from 18/09/2010 to 30/04/2011. This report summarises the findings through the verification process that has been conducted on the verification requirements of the CDM.

The verification has been undertaken by the team formed of the qualified personnel of LRQA as follows:

| | | |
|---|---|---|
| Prabodha Acharya | LRQA (India) | Team Leader, CDM Verifier, (Sector Expert) |
| Ankush Jain | LRQA (India) | Team Member, CDM Verifier, (Sector Expert) |
| Imran Ustad | LRQA (India) | Technical Reviewer, (Sector Expert) |
| Archak Pattanaik | LRQA (India) | Technical Reviewer - Trainee |
| Javier Vallejo Drehs | LRQA Ltd. | Decision Maker |

Personnel being engaged in a CDM project verification are qualified based on the established procedures of LRQA to assure the resource requirements that satisfy all the requirements of competence criteria of the CDM accreditation standard for operational entities. LRQA is designated as an operational entity and holds the full responsibility on decision-making regarding the verification in accordance with the accreditation requirements of the CDM-EB. The certificate of appointment of the team personnel is attached to this report.

## 2.1 Objective

Through the verification activities, the verification team was to confirm that:

1) the project activity has been implemented and operated as described in the validated and registered PDD and that all physical features of the project activity are in place

2) the monitoring report (MR) and other supporting documents provided are complete and verifiable, and in accordance with applicable CDM requirements

3) actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan (MP) and the approved methodology; and

4) the data is recorded and stored as per the monitoring methodology.

The verification followed the requirements of the current version of the CDM Validation and Verification Manual (CDM VVM) to ensure the quality and consistency of the verification work and the report.

## 2.2 Scope

The scope of verification was an independent and objective review of the monitored emission reductions (ERs) against the verification requirements of the CDM M&P. LRQA followed a risk-based approach in the verification, focusing on the identification of significant risks for implementation of the registered monitoring plan and the

resultant emission reductions. The verification statement shall become final after final review by the decision maker of LRQA Ltd.

## 2.3 GHG Project Description

| | |
|---|---|
| Project title | Wind power project at Gujarat by Powerica Limited |
| CDM reference | 3632 |
| Date of registration | 18/09/2010 |
| Applied methodology | AMS.I. D, Version 15 |
| Crediting period | 18/09/2010 to 17/09/2017 |
| Project location | Kutch district, Gujarat, India |
| Project participants | Powerica Limited |
| Monitoring period | 18/09/2010 to 30/04/2011 |

# 3 Methodology

## 3.1 Verification approach

LRQA's verification of the project documentation provided by the project participant was based on both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report submitted to LRQA. Qualitative information is made up of the information on internal management controls, calculation procedures, procedures for transfer of data, frequency of emission reports, and review and internal audit of calculations.

As well as the monitoring documentation provided by the project participants, LRQA also reviewed:

a) the registered PDD, including the monitoring plan and the corresponding validation report

b) previous verification reports, if any

c) the applied monitoring methodology

d) relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board

e) any other information and references relevant to the project's resulting emissions reductions.

LRQA also confirmed that the project participants have addressed FARs identified during validation.

## 3.2 Desk review

The verification was performed primarily based on the review of the monitoring report and the supporting documentation. This process included:

1) a review of data and information presented to verify their completeness

2) a review of the MP and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the QA/QC procedures, and

3) an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ERs.

The monitoring report version 01.1 dated 03/06/2011 was initially reviewed and LRQA requested the PP to present the supporting information and documents and such additional information and documents were also reviewed by LRQA. The documents reviewed by LRQA are listed in Appendix A.

Through the process of the verification, the revised monitoring report and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs issued by LRQA. The documents reviewed by LRQA are listed in Appendix A. LRQA reviewed the final version of the monitoring report Version 03.1 dated 29/08/2011 to confirm that all changes agreed had been incorporated.

## 3.3 On-site assessment

An on-site assessment was conducted as a part of verification activity and involved:

1) an assessment of the implementation and operation of the CDM project activity as per the registered PDD

2) a review of information flows for generating, aggregating and reporting of the monitoring parameters

3) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the MP

4) a cross-check between information provided in the MR and data from other sources

5) a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PDD and the applied methodology

6) A review of calculations and assumptions made in determining the GHG data and ERs, and

7) An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.

The detail of the on-site assessment is as follows:

| Date | Location | Subjects covered | Persons interviewed |
|---|---|---|---|
| 14/06/2011 | Project site; and Vandhiya and Shikarpur substation | Opening meeting | 1. Parmeswaran, Deputy Manager, Vestas<br>2. Deepak Thakore, Powerica Ltd.<br>3. Manikandan, Powerica Ltd. |
| | | Project implementation and management | |
| | | Site tour | |
| | | Data management and reporting systems | |
| | | Data verification | |
| | | QA/QC, management systems | |
| | | Environmental and social issues | |
| | | Issues with local stakeholders | |

| | | | |
|---|---|---|---|
| | | Closing meeting | |
| 15/06/2011 | Powerica office | Project implementation and management<br>Project operation, Plant Load Factor<br>Requirements of Power Purchase Agreement (PPA)<br>Data archiving<br>Closing meeting | 1. Pradeep Gupta, Head – Wind division, Powerica Ltd.<br>2. Karunamoorthy, General Manager – Wind, Powerica Ltd.<br>3. Nargis Ali, Powerica Ltd. |

For details of all the findings of the desk review and site visit, please refer to the Verification Protocol and Findings in Appendix C.

## 3.4 Quality of evidence

When verifying the report emission reduction, LRQA ensured that there was a clear audit trail that contained the evidence and records that validate the stated figures. All source documents that form the basis for assumptions and other information underlying the GHG data are shown in Appendix A.

When assessing the audit trails, LRQA also examined:

1. whether sufficient evidence was available, both in terms of frequency and in covering the full monitoring period
2. the source and nature of the evidence
3. if comparable information was available from sources other than that used in the monitoring report, LRQA cross-checked the monitoring report against the other sources to confirm that the stated figures were correct. The sources and the data referenced are shown in Appendix A.

LRQA also assessed that the data collection system met the requirements of the monitoring plan as per the applied methodology.

## 3.5 Resolution of clarification and corrective action requests

LRQA, during this verification, identified issues related to the monitoring, implementation or operation of the proposed CDM project activity that could impair the capacity of the proposed CDM project to achieve emission reductions or influence the reporting of emission reductions. LRQA has identified, discussed and concluded these issues within the Verification Protocol and Findings – Appendix C.

LRQA has raised a Corrective Action Request (CAR) if one of the following occurred:

1. nonconformities with the monitoring plan or methodology were found in monitoring and reporting, or if the evidence provided to prove conformity was insufficient
2. mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions, and / or
3. issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

LRQA has raised a Clarification Request (CL) if information was insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

All CARs raised by LRQA during this verification have been resolved. If this was not completed, the ERs cannot be certified and recommended for issuance to the CDM Executive Board.

LRQA has raised a Forward Action Request (FAR) during this verification for actions where the monitoring and reporting require attention and / or adjustment for the next verification period. FARs do not relate to CDM requirements for issuance of ERs achieved during the subject monitoring period.

## 3.6 Internal quality control

The technical review by a qualified person independent from the verification team, and a review by an authorised decision maker are conducted before the submission of the verification report to the PP and before requesting the issuance of the verified ERs.

# 4 Verification protocol and conclusions

LRQA has undertaken this verification in accordance with the verification protocol (which is based on the Clean Development Mechanism Validation and Verification Manual Version 01.2). This section provides an overview of the verification activities and general conclusions. Further details in relation to each element of the protocol and to each finding are shown in Verification Protocol and Findings – Appendix C.

The protocol is structured based on the main verification requirements as follows:

- project implementation in accordance with the registered project design document
- compliance of the monitoring plan with the monitoring methodology
- compliance of monitoring with the monitoring plan
- assessment of data and calculation of greenhouse gas emission reductions.

## 4.1 Project implementation in accordance with the registered project design document

LRQA has, by means of a desk review and an on-site visit, assessed that all physical features of the proposed CDM project activity proposed in the registered PDD are in place, and that the project participants have operated the proposed CDM project activity as per the registered PDD.

During validation one FAR was issued in relation of the implementation of the project activity. This FAR was successfully closed as PP has submitted the commissioning certificates and Clearance from Chief Electrical Inspectorate. For details of the FAR and its closure, please refer to the section 1.2 of the Verification Protocol in Appendix C

For details of the implementation status of the project, the actual operation of the proposed CDM project activity, any information provided in the monitoring report that is different from that stated in the registered PDD[1], and any approvals of the necessary request of notification or request for approval of changes, please refer to the Verification Protocol in Appendix C.

[1] And has caused an increase in estimates of the emission reductions in the current monitoring period or is highly likely to increase the estimates of emission reductions in future monitoring periods

## 4.2 Compliance of the monitoring plan with the monitoring methodology

LRQA has verified that the validated monitoring plan is in accordance with the approved methodology applied by the proposed CDM project activity.

For details relating to this section, please refer to the Verification Protocol in Appendix C.

LRQA confirms that the monitoring plan is in accordance with the approved methodology applied by the proposed CDM project activity.

## 4.3 Compliance of monitoring with the monitoring plan

LRQA has confirmed that:

1. the monitoring plan and the applied methodology have been properly implemented and followed by the project participants
2. all parameters stated in the monitoring plan, the applied methodology and relevant CDM Executive Board decisions, have been sufficiently monitored and updated as applicable, including:
    a. project emission parameters
    b. baseline emission parameters
    c. leakage parameters
    d. management and operational system
3. the accuracy of equipment used for monitoring is in accordance with the relevant guidance provided by the CDM Executive Board and is controlled and calibrated in accordance with the monitoring plan
    a. monitoring results are consistently recorded as per approved frequency
    b. quality assurance and quality control procedures have been applied in accordance with the monitoring plan.

For details relating to this section, please refer to the Verification Protocol in Appendix C.

LRQA confirms that monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD.

The list in the Verification Protocol – Appendix C shows each parameter required by the monitoring plan, and clearly states how LRQA has verified the information flow (from data generation, aggregation, to recording, calculation and reporting) for these parameters, including the values in the monitoring report.

## 4.4 Assessment of data and calculation of greenhouse gas emission reductions

LRQA has determined whether:

1. a complete set of data for the specified monitoring period is available
2. information provided in the monitoring report has been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis
3. calculations of baseline emissions, proposed CDM project activity emissions and leakage, as appropriate, have been carried out in accordance with the formulae

and methods described in the monitoring plan and the applied methodology document

4. any assumptions used in emission calculations have been justified
5. appropriate emission factors, IPCC default values and other reference values have been correctly applied.

For details of whether data was not available because activity levels or non-activity parameters were not monitored in accordance with the registered monitoring plan, a description of LRQA cross-checked reported data, please refer to the Verification Protocol in Appendix C.

LRQA confirms that appropriate methods and formulae for calculating baseline emissions, projects emissions and leakage have been followed.

LRQA is of the opinion that all assumptions, emissions factors and default values that were applied in calculations have been justified.

# 5 Making the monitoring report publicly available

In accordance with the "Procedures for making the monitoring report available to the public in accordance with paragraph 62 of the modalities and procedures for the CDM", the monitoring report Version 01.1 dated 03/06/2011 was made publicly available on the CDM website on 06/06/2011 at:
http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1270819651.34/iProcess/LRQA%20Ltd1307366165.58/view

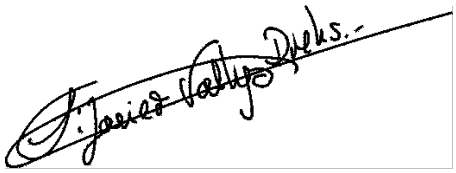
# 6 Certification report

LRQA has undertaken the first periodic verification of the proposed project activity "Wind power project at Gujarat by Powerica Limited" covering the monitoring period from 18/09/2010 to 30/04/2011 based on the requirements of CDM as set out in Article 12 of the Kyoto Protocol, the CDM M&P, the present annex, subsequent decisions made by the COP/MOP and CDM-EB, and the other rules applicable to the proposed project activity including the host country's legislation and its specific requirements for sustainable development.

Through the verification process, the verification team identified 02 CARs. The PP has taken actions to address the CARs and submitted to LRQA the revised monitoring report Version 03.1 dated 29/08/2011 and the other supporting evidence. All CARs have been appropriately closed before the issuance of the verification report.

The verification team is of the opinion that the proposed project activity has been implemented in accordance with the registered PDD, the MP with validated revision complies with the approved monitoring methodology, the monitoring complies with the MP and the monitored data and calculation of ERs are assessed and confirmed as correct. Therefore LRQA hereby certifies, and requests the issuance of, the reported ERs of "Wind power project at Gujarat by Powerica Limited" during the monitoring period of 18/09/2010 to 30/04/2011 amounting to 10,872 $tCO_2e$ to the CDM Executive Board.

**Decision Maker**



Date: 29/11/2011

Javier Vallejo Drehs

CDM Quality Manager

# 7 Appendices

## 7.1 Appendix A: List of documents reviewed

**Category A documents (documents from the PP)**

| | |
|---|---|
| 1 | Monitoring report Version 01.1 dated: 03/06/2011 and Version 03.1 dated: 29/08/2011 |
| 2 | Emission reduction spreadsheet Version 01 dated: 03/06/2011 and Version 02 dated: 29/08/2011 |
| 3 | Copy of supply agreement for nine Vestas 1650KW Wind turbine generators dated: 12th December 2009 and addendum dated: 26th February 2010 |
| 4 | Copy of erection and commissioning agreement for WTGs dated: 12th December 2009 and addendum dated: 26th February 2010. |
| 5 | Copy of service availability agreement for WTGs dated: 12th December 2009 |
| 6 | Copy of land sale deeds at Kutch, dated: 23rd December 2009 and for new locations dated: 18th February 2010. |
| 7 | Approval from Gujarat Energy Development Agency (GEDA), dated: 21/01/2010 and re-approval for new sites dated: 24/02/2010 |
| 8 | Copy of approval from Deputy Collector for purchase of land, dated: 26/03/2008, 11/04/2008, 17/12/2004 |
| 9 | Power Purchase agreement with GUVNL dated: 09th March 2010. |
| 10 | Commissioning certificate issued by GEDA, dated: 09/04/2010 |
| 11 | Initial inspection certificate issued by the office of chief electrical inspector dated: 16/03/2010 |
| 12 | Invoices for sale of electricity for the period |
| 13 | Certificate for share of electricity generated by wind farm at Shikarpur for the period |
| 14 | Certificate for share of electricity generated by wind farm at Vandhiya for the period |
| 15 | Service report issued by Vestas for maintenance records, dated: |
| 16 | Calibration certificate issued for the meters dated |
| 17 | Calibration certificate of Substation meter, reference dated |

**Category B documents (other documents referenced)**

| | |
|---|---|
| 1 | Registered project design document, Version 03.2 dated: 06/04/2010 |
| 2 | Registered Validation report (Ref: CDM-MUM-0061595), Version 1.2 dated: 07/04/2010 |
| 3 | Modalities of communication with CDM EB dated 17/03/2010 |
| 4 | Grid connected renewable electricity generation, version 15. |
| 5 | Tool to calculate the emission factor for an electricity system" Version 02 |
| 6 | CO2 Baseline Database for the Indian Power Sector, User Guide Version 5.0 |
| 7 | User guide version 05 CO2 baseline database for Indian power sector. |
| 8 | Clean Development Mechanism Validation and Verification Manual (Annex 3 of CDM-EB meeting 44, Annex 3 of CDM-EB meeting 51) |
| 9 | Procedures for making the monitoring report available to the public in accordance with paragraph 62 of the modalities and procedures for the CDM (Version 01) |
| 10 | Procedure for requests for issuance of CERs (Version 01.2) |

| | |
|---|---|
| 11 | Guidelines for completing the monitoring report form (CDM-MR) Version 01 |
| 12 | Guidelines on completeness check of requests for issuance |

## 7.2 Appendix B: Certificate of Appointment

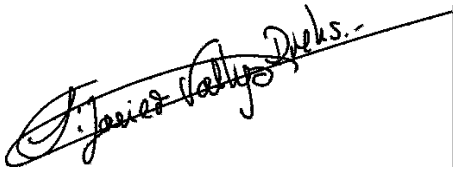
### Verification of “Wind power project at Gujarat by Powerica Limited”

We hereby certify that the following personnel have engaged in the verification process that has fully satisfied the competence requirements of the verification of the CDM project activity.

| **Name of Person** | **Assigned Roles** |
|---|---|
| Prabodha Acharya | Team Leader |
| Ankush Jain | Team Member |
| Imran Ustad | Technical Reviewer |
| Archak Pattanaik | Technical Reviewer – Trainee |
| Javier Vallejo Drehs | Decision Maker |

Signed by

**Decision Maker**



Date: 29/11/2011

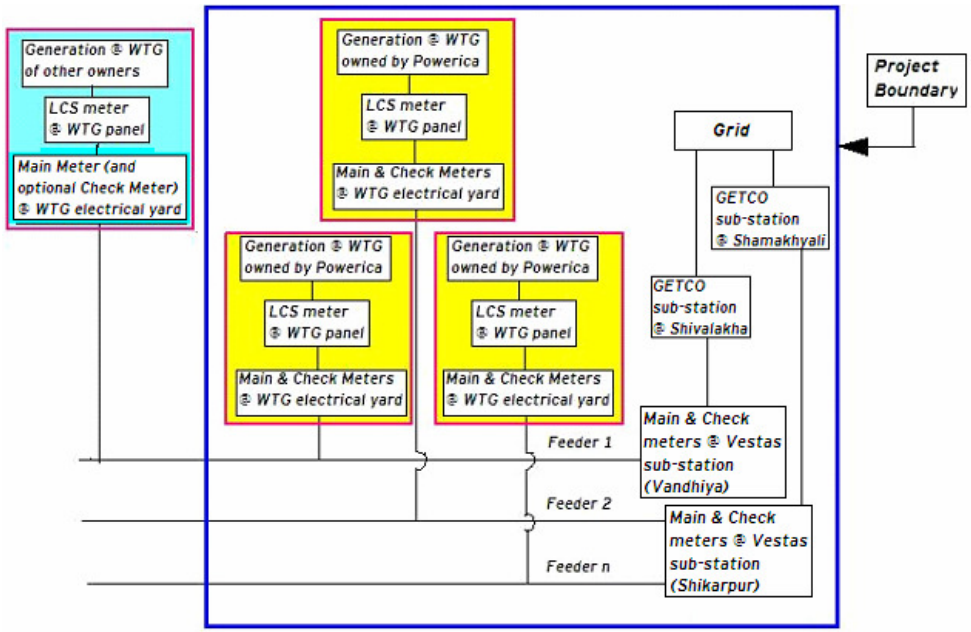
Javier Vallejo Drehs

CDM Quality Manager

## 7.3 Appendix C: Verification Protocol and Findings

| | Verified situation | Conclusion |
|---|---|---|
| **SECTION 1. Project implementation in accordance with the registered PDD** | | |
| **General description of the project** | | |
| 1.1. Does the MR provide general information of the project and is it as registered by CDM-EB? | Yes.<br>The project activity involves an installation of 9 Wind Turbine Generators (WTG) of total generating capacity of 14.85 MW (9×1.65MW) of Vestas make V82 WTG. The WTG units are installed in Kutch district in the state of Gujarat.<br>The description provided in the MR is consistent with the registered PDD. | ✓ |
| 1.2. Is there any open issue in the validation / previous verification including FARs? (CDM VVM para. 183) | Yes.<br>One FAR was raised referring to project implementation which requires commissioning certificate and clearance from Chief electrical inspectorate to be verified during verification. The PP has submitted the commissioning certificate and clearance from Chief electrical inspectorate. | ✓ |
| **Implementation status of the project activity** | | |

| | Verified situation | Conclusion |
|---|---|---|
| 1.3. Is the project location indicated as the same as the registered PDD? Confirm geographical coordinates | Yes.<br>The project activity is located in Bachau taluka, kutch district of Gujarat state in India. The geographic coordinates of each WTGs are as follows:<br><br>**WTG** / **Village** / **Latitude (°N)** / **Longitude (°E)** / **Sub-station**<br>VW42 / Lakhapar / 23°11'14" / 70°37'49" / Shikarpur<br>VW43 / Lakhapar / 23°11'03" / 70°37'33" / Shikarpur<br>VW45 / Lakhapar / 23°11'28" / 70°37'02" / Vandhiya<br>VW46 / Lakhapar / 23°11'38" / 70°36'43" / Vandhiya<br>VW47 / Lakhapar / 23°11'48" / 70°36'25" / Vandhiya<br>JW14 / Jangi / 23°10'42" / 70°32'44" / Vandhiya<br>JW15 / Jangi / 23°10'44" / 70°32'29" / Vandhiya<br>NM82-1 / Vandhiya / 23°11'36" / 70°35'47" / Vandhiya<br>NM82-2 / Vandhiya / 23°11'42" / 70°35'33" / Vandhiya<br><br>Verification team confirmed from the site visit that the location of the project activity including the coordinates is same as mentioned in the registered PDD. | ✓ |

| | Verified situation | Conclusion |
|---|---|---|
| 1.4. Is the project boundary described in the same way as the registered PDD? Please confirm each component based on the applied methodology. | Yes.<br>The project boundary includes the electricity generation equipment at the site and the transport through the electricity grid to the substation.<br>  <br><br>The description in the MR is consistent with the registered PDD and in accordance with the applied methodology, AMS.I.D, Version 15. | ✓ |

| | Verified situation | Conclusion |
|---|---|---|
| 1.5. Has on-site fossil fuel consumption, if any, been monitored? Is any emission source missed? Check the site lay-out and confirm through site tour. | Verification team confirmed from the physical inspection at site that no fossil fuel has been used. | ✓ |
| 1.6. Confirm contractors for equipment and installation works | Confirmed from the review of supply agreement and erection & commissioning agreement that contractor for equipment and installation is Vestas. | ✓ |
| 1.7. Confirm conformance with baseline and monitoring methodology - Applicability conditions. Please refer to the complete description of the applicability conditions and confirm that the project activity meets all the requirements. | All the applicability conditions of the applied methodology are being met by the project. Justification to the applicability conditions of the methodology has been provided below | ✓ |

| Applicability condition | Verified situation | Conclusion |
|---|---|---|
| This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit. | Confirmed that the project is connected to the NEWNE grid system through the review of PDD, validation report, Baseline CO2 database, Version 05 and during the site visit. | ✓ |

| Applicability condition | Verified situation | Conclusion |
|---|---|---|
| Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:<br>a. The project activity is implemented in an existing reservoir with no change in the volume of reservoir;<br>b. The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m2;<br>c. The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m2. | This requirement is not relevant to the project activity as it is not a hydro power plant. This has been confirmed from the review of registered PDD, validation report, commissioning certificate, technical agreements and during the site visit | ✓ |
| If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW | Confirmed from the review of PDD, Validation report, supply agreement that the project does not add any non-renewable components and does not involve co-firing. The total capacity of the project is 14.85MW as confirmed during the site visit. | ✓ |

| Applicability condition | Verified situation | Conclusion |
|---|---|---|
| Combined heat and power (co-generation) systems are not eligible under this category | Confirmed from the review of PDD, Validation report, supply agreement and during the site visit that the project is not a combined heat and power system. | ✓ |
| In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units | Confirmed from the review of PDD, Validation report, supply agreement and during the site visit that the project does involve addition of renewable energy generation units to an existing renewable power generation facility.<br>The total capacity of the project is 14.85MW. | ✓ |
| Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW | Confirmed from the review of PDD, Validation report, supply agreement and during the site visit that the project does not retrofit or modify existing renewable facility.<br>The total capacity of the project is 14.85MW. | ✓ |

<table>
<tr><th></th><th>Verified situation</th><th>Conclusion</th></tr>
<tr><td>1.8. Confirm use or not use of public funding and determine if there is no diversion of ODA to the project activity.</td><td>Confirmed from the interview of the PP that the project activity does not involve diversion of ODA</td><td>✓</td></tr>
<tr><td>1.9. Check data in the MR and in the PDD. Describe data and variables that are different from that stated in the registered PDD and caused an increase in emission reductions estimations.</td><td>Comparison of data in MR and in the registered PDD is as follows:
<table>
<tr><th>S. No.</th><th>Parameter</th><th>Symbol</th><th>Value in PDD</th><th>Actual value as in MR</th></tr>
</table>
</td><td>CAR-01 (Closed)</td></tr>
</table>

| | Verified situation | | | | | Conclusion |
|---|---|---|---|---|---|---|
| | 1. | Electricity exported to grid | $EG_y$ | 31,920 MWh/year | 11,787 MWh or 20,294 MWh/year (scaled up from 212(the monitoring of electricity starts from 01/10/2010 as per the monitoring plan) days of operation to 365 days in a year) | |
| | 2. | Electricity imported from grid | $EC_y$ | 0 MWh/year | 158.150 MWh | |
| | 3. | Emission reduction | tCO2e/ annum | 29,443 | 10,872 $tCO_2e$ or 18,719 $tCO_2e$/annum (scaled up from 212(the monitoring of electricity starts from 01/10/2010 as per the monitoring plan) days of | |

| | Verified situation | Conclusion |
|---|---|---|
| | <table><tr><td></td><td></td><td></td><td></td><td>operation to 365 days in a year)</td></tr></table><br>The electricity generation during the monitoring period is less, and resulted in lower emission reduction.<br>It was confirmed through the interview of Vestas officials that electricity has been imported during the monitoring period.<br><br>CAR-01 was initially raised as the figure of electricity import mentioned in the monitoring report was not matching with the invoices and records. The resolution is detailed in the findings section of this protocol. | |
| 1.10. By means of an on site visit:<br>Is the general information of the project provided and is it as registered by CDM-EB?<br>List each technical component and equipment and check design parameters and actual status of installation and / or operation.<br>Please check to ensure that all physical features of the proposed CDM project activity in the registered PDD are in place and the PP has operated the proposed CDM project activity as per the registered PDD.<br>It may include but not limited to: | The project activity involves an installation of 9 Wind Turbine Generators (WTG) of total generating capacity of 14.85 MW (9×1.65MW) of Vestas make V82 WTG. The WTG units are installed in Kutch district in the state of Gujarat.<br><br>Generation unit: Vestas V 82 Wind turbines<br>Capacity: 9.9 MW<br>Plant load factor: 14.75%<br>Date of operation: Different dates (18/03/2010 to 31/03/2010) from commissioning certificate | ✓ |

| | Verified situation | Conclusion |
|---|---|---|
| • the actual capacity and output<br>• plant load factor<br>• type of feedstock<br>• operation of other components / units within the project boundary which could affect functioning of the project plant. | | |
| 1.11. Have responsibilities for monitoring been described and specified? | Yes.<br>The monitoring report clearly describes the responsibilities for monitoring. | ✓ |
| 1.12. Are the responsibilities and authorities for monitoring and reporting in line with those stated in the registered monitoring plan? | Yes.<br>During the site visit it was confirmed that the basic information related to electricity generation was made available to the PP by the Vestas. These figures are also available by the Vestas to the PP through a dedicated web portal. Further, monthly generation records were taken by GEDA officials and are made available to the PP through the Share certificate issued by GEDA.<br>At Powerica, the electricity generation records were checked through the dedicated staff for wind power division. Apart from the electricity generation, downtime study report was also done. These reports were verified at different levels in the organisation.<br>Team also confirmed that the monthly generation records were archived electronically.<br>Therefore, responsibilities and authorities for monitoring and reporting are in accordance with those stated in the registered PDD. | ✓ |
| 1.13. Check QA/QC, management systems. Are procedures described and specified in the MR? Are they consistently applied as | Yes.<br>The registered PDD describes the data to be measured continuously and recorded monthly, electronic data archiving, annual internal | ✓ |

| | Verified situation | Conclusion |
|---|---|---|
| described in the MP?<br>a. documented instructions, management manual<br>b. documentation<br>c. data archiving<br>d. monitoring report<br>e. cross-checking<br>f. energy balance analysis (as relevant)<br>g. internal audits / verification and management review | audits.<br>Team confirmed the documented instructions for operation and maintenance from the Vestas manual, electronic archiving of the data from the interview of the PP, further cross checking of data has been done through GEDA share certificates issued for billing.<br><br>The MR describes the monitoring system, monitoring procedures, data collection and reporting, responsibilities of relevant staff/departments, emergency scheme, calibrations that were implemented and QA/QC procedures. | |
| 1.14. Have the procedures for emergency and abnormal situations been established? | Yes.<br>Any emergency or accident will be immediately reported to the Shift in-charge at site. The project daily operations were also connected to its head office in Chennai where operations in-charge may intervene if required. If the problem cannot be resolved at the operations in-charge then assistance from shift in-charge at site will be sought. However, in case for further problems senior officials at vestas will coordinate to solve the problem.<br><br>The plant downtime records are also taken by the PP from its staff stationed at the site and analyzed.<br><br>During the monitoring period no emergency situation in monitoring has occurred. | ✓ |
| 1.15. Has the system for qualification and training been established as relevant for the monitoring and management activities? | Yes.<br>The registered PDD describes the procedure for training of personnel. | ✓ |

| | Verified situation | Conclusion |
|---|---|---|
| 1.16. Check the environmental report, license, permit and compliance to the local environmental legislation (if relevant). | The wind power project does not require any environmental report, license, permit or compliance report to be submitted. | |
| 1.17. Check contribution to sustainable development, comparing those expected in PDD and the actual status. | Monitoring of sustainable development indicators is not required by the Indian DNA.<br>The wind power project is located in a remote area will produce many social and economical benefits but may have only a slight impact on the environment. This is the case of the project activity. During the site visit, no negative impacts from the project activity have been identified, based on the verification team's local knowledge. | ✓ |
| 1.18. Check issues with local stakeholders, claims, complaints, etc. | No major conflicts with local stakeholders were identified during site visit. | ✓ |
| 1.19. If from the above assessment the conclusion is that the implementation or operation of the of the project activity does not conform with the description contained in the registered PDD, please conduct an assessment of the potential impacts of these changes using Part 2 of the Additional Verification activities at the end of this document and form MSBSF43853, Validation opinion changed from PDD. Refer to the corresponding section of the CDM & JI (UNFCCC) Verification and Certification Assessment procedure. | | |
| 1.20. If above requirement applies, please check any approvals of the necessary request of notification or request for approval of changes from the project activity as described in the registered PDD. | Not applicable | ✓ |

| | Verified Situation | Conclusion |
|---|---|---|
| **SECTION 2. Compliance of the Monitoring Plan with the Monitoring Methodology** | | |
| 2.1. Is the monitoring plan (registered) in accordance with the applied methodology? | Yes.<br>The monitoring plan as described in the registered PDD and MR is in accordance with the applied methodology, AMS.I.D, Version 15 | ✓ |
| 2.2. If the methodology provides different options (for example, use of default values or on-site measurements), has it specified which option is used? | Yes.<br>The methodology provides option, i.e. ex-ante or ex-post, for calculation of Grid emission factor. The registered PDD has selected ex-ante option and calculation results will be fixed in the first crediting period. | ✓ |
| 2.3. Is all data collected and archived according to the tables in the applied Monitoring Methodology and is this included in the Monitoring Plan? | Yes.<br>The monitoring plan in the registered PDD includes the measurement of net electricity supplied to the grid which is in accordance with the monitoring methodology. There is no other parameter identified by the monitoring methodology. | ✓ |
| 2.4. Check the calculation of emission reductions following the applied methodology:<br>• baseline emissions<br>• project emissions<br>• leakage<br>• emission reductions of the project. | The baseline emissions are calculated as product of net electricity supplied to the grid and combined margin emission factor of the connected grid system as per the applied methodology.<br>Project emissions and leakage emissions are considered nil as per the applied methodology. | ✓ |

| | Verified Situation | Conclusion |
|---|---|---|
| 2.5. List any monitoring aspect that is not specified in the methodology and check its compliance with the Monitoring Plan, for example:<br>• additional monitoring parameters<br>• monitoring frequency<br>• calibration frequency. | No such parameter has been listed in registered PDD. | ✓ |
| 2.6. If, from the above assessment, the conclusion is that Monitoring Plan is not in accordance to the Monitoring Methodology, please conduct an assessment of the potential impacts of these changes using Part 1 of the Additional Verification Activities at the end of this document and form MSBSF43854, Validation opinion Revision of MP form. Refer to the corresponding section of the CDM & JI (UNFCCC) Verification and Certification Assessment procedure: "Request for Revision of the Monitoring Plan". | | |
| 2.7. If above requirement applies, please check approval of the necessary request for revision of the Monitoring Plan. | Not applicable | ✓ |

| | Verified Situation | Conclusion |
|---|---|---|
| **SECTION 3. Compliance of Monitoring with the Monitoring Plan** | | |
| 3-1. Is the Monitored Data included in the Monitoring Report as per the Monitoring Plan?<br>3-2. Has the data been generated at the frequency required by the Monitoring Plan? | Yes.<br>The monitoring report presents the monthly data of electricity exports and imports in accordance with the recording frequency of Monitoring plan of the registered PDD (Version 03.2). | ✓ |

| | | |
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| 3-3. Has the monitoring been implemented in accordance with the monitoring plan contained in the registered PDD?<br>Confirm that the monitoring and reporting procedures have been implemented as documented and follow by PPs. | The monitoring plan requires measurement of electricity exported to the grid and electricity imported from the grid. The monitoring plan mentions annual calibration of the electricity meters.<br><br>The metering arrangement confirmed during the site visit includes WTG yard meter located at 33KV line for each of the nine WTGs and substation meter located at Vandhiya (220KV) and Shikarpur (132KV) substation for the electricity supplied by the whole wind farm.<br><br>It was confirmed that the information of the meters was consistent with that described in the MR through physical observation and document review.<br>The net electricity supplied to the grid is calculated through a two way measured procedure. First measurement of electricity exported/imported is done at the individual WTG yard meters, and second measurement is done at the substation meters of the wind farm. Net electricity exported/imported from the project activity is measured by apportioning of losses from the WTG to the substation. This apportioning procedure is also in accordance with the PPA. Team also confirmed that apportioning procedures as mentioned in the monitoring plan of the registered PDD has been correctly applied.<br><br>According to power purchase agreement, the net electricity delivered at the substation will be used for the financial transaction. The PPA also describes that certificate issued by GEDA for Generation share of wind turbine should be used for billing. | ✓ |

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| | Billing is done once in a month. For billing the data is recorded in presence of representative of the PP and State Grid Body. Further, the apportioned electricity certificate is issued by the relevant department of the State Grid bBody in accordance with the provisions of the PPA.<br><br>During the on-site verification, QA/QC procedures were identified which demonstrate that: operation management regulations of the power plant were in place; all meters were calibrated; electricity data was crosschecked; data was archived electronically; emergency procedures were in place; and all operational staff were trained before taking up positions. The verification team thus confirmed that the monitoring of the project activity has been implemented in accordance with the monitoring plan in the registered PDD. | |
| 3-4. Have types of measurement instrumentation used been described and specified? | Yes.<br>Calculation of net electricity supplied to the grid is done considering monitoring of electricity at two different points: at the WTG and at the connected substation.<br><br>The project activity involves nine WTGs connected to two different substations. The WTGs VW42 and VW43 are connected to Shikarpur substation; and WTGs VW45, VW46, VW47, JW14, JW15, NM01 and NM02 are connected to Vandhiya substation.<br><br>As per the local monitoring practices, the net electricity supplied by an individual machine to the grid is calculated by apportioning of losses. This calculation is based on electricity measurement at 33KV side of individual WTGs and at the connected substation of the whole wind farm. | ✓ |

| | | |
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| | In accordance with the monitoring plan in the registered PDD, the electricity measurement is done in two folds: at WTG and at common pooling substation. Tri-vector bi-directional energy meters are installed at each WTG yard and the connected pooling substation.<br><br>The verification team confirmed through the on-site assessment and the review of evidence that the installation of the measuring devices has been completed and the equipment has been operated and maintained in a normal operating condition. During this monitoring period, there have been no emergency situations relating to the installed meters that have led to them exceeding the allowable tolerance or otherwise malfunctioning. The appropriateness of the measuring equipment was confirmed with reference to the requirements of the applicable local regulations and by comparison with the application to similar CDM project activities.<br><br>It was confirmed that the information of the meters was consistent with that described in the MR through physical observation and the document review. | |

| | | |
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| 3-5. Is the accuracy of equipment used for monitoring sufficient and regularly controlled and calibrated in line with the registered monitoring plan?<br>Check relevance of maintenance and calibration included in the monitoring plan.<br>Check relevance of laboratory analysis if included in the monitoring plan. | The accuracy of individual meter of WTG is 0.5s and substation meter is 0.2s.<br>The individual WTG meters were calibrated on 11-12/03/2010 and 11/07/2011. The calibration report dated 11/07/2011 presents that the error in measurement is within the permissible limits.<br>CAR-02 was initially raised as the name of the agency for calibration was not consistent and calibration of the meters was not valid for the full monitoring period. . The resolution is detailed in the findings section of this protocol. | CAR-02 (Closed) |
| 3-6. Check that responsibilities and authorities for monitoring and reporting are in line with the monitoring plan.<br>Are the monitoring results consistently recorded, reviewed and approved as stated in the PDD? | The registered PDD (Version 03.2) clearly describe the monitoring of the responsibility of monitoring is with PP. PP has authorized Vestas for O&M duties at site through service and availability agreement.<br>During the site visit, monitoring and reporting procedures were confirmed with the relevant staff and through the document review.<br>Please refer to the 3-3 above. | ✓ |
| 3-7. Reporting period: Defined?<br>If a monitoring period of a parameter more / less than a year is applied, check if the monitoring is in a complete and consistent manner? | Yes.<br>The monitoring period for the project activity is for 225 days less than one year.<br>The electricity export and import is recorded and reported monthly. The monitoring of these parameters has been done considering the period where full months fall in this period. Therefore, the monitoring is in a complete and consistent manner with the monitoring plan. | ✓ |

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| 3-8. If the monitoring plan includes the determination of environmental and / or social indicators, have the sustainable development indicators been monitored in accordance with the registered monitoring plan? | Not applicable | ✓ |
| 3-9. Check monitoring of Environmental and Social indicators (if relevant)<br>• implementation of measures<br>• monitoring equipment<br>• quality assurance procedures<br>• external data. | Not applicable | ✓ |

| | | | |
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| 3-10. If, from the above assessment, the conclusion is that the MR deviated from the MP, please send a request for deviation in the suitable form published by the CDM-EB. Refer to the corresponding section of the CDM & JI (UNFCCC) Verification and Certification Assessment procedure. | **A request for deviation is not suitable if any of the following are True. If so, a request for revision of the Monitoring Plan is mandatory, (see 2.6).** | | |
| | | YES | NO |
| | The monitoring plan is not in accordance with the monitoring methodology applied by the project activity | N/A | N/A |
| | The request would result in revisions to the approved methodology | N/A | N/A |
| | The request would result in a change in default parameter values other than those given in the approved methodology. | N/A | N/A |

## Monitoring Parameters and Calibration Checklist:

Complete the following table for each parameter:

| Data / Parameter (as in the MP) | | $EG_y$ <Electricity exported to grid> | $EC_y$ <Electricity imported from grid> |
|---|---|---|---|
| Value | Ex ante | | 0 |
| | Ex-post | 11945 | 158 |
| Measuring frequency | | Continuously | Continuously |
| Reporting frequency | | Monthly | Monthly |
| Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology? | | Yes | Yes |
| Recording (Manually / electronically / …) | | Manually and electronically | Manually and electronically |
| QA/QC How are values verified? (Cross-checked, double-checked,…) | | Invoices prepared by the PP | Invoices prepared by the PP |
| Type of Monitoring Equipment and Identification number or Reference in the PDD | | Monitoring equipment: Electronic tri-vector | Monitoring equipment: Electronic tri-vector |
| Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices? | | Yes.<br>Accuracy of the substation meter (main/check) is stated as 0.2s in the PDD which was confirmed from the site visit<br><br>Accuracy of the main and check meter at the WTG transformer yard is stated as 0.5s in the PDD, which was confirmed from the site visit. | Yes.<br>Accuracy of the substation meter (main/check) is stated as 0.2s in the PDD which was confirmed from the site visit<br><br>Accuracy of the main and check meter at the WTG transformer yard is stated as 0.5s in the PDD, which was confirmed from the site visit. |
| Period of operating time | | Individual meters are operational since: 31/03/2010 | Individual meters are operational since: 31/03/2010 |
| Instrument type | | Bi-directional trivector energy meter | Bi-directional trivector energy meter |

<table>
<tr><th>Data / Parameter<br>(as in the MP)</th><th>$EG_y$ <Electricity exported to grid></th><th>$EC_y$ <Electricity imported from grid></th></tr>
<tr><td>Manufacturer, model and serial number</td><td>Total 18 energy meters are installed, 2 (main and check) for all 9 WTGs. The details are as follows:<br><br><table><tr><th>WTG number</th><th>Main meter</th><th>Check meter</th></tr><tr><td>VW47</td><td>GJU56180</td><td>208320686</td></tr><tr><td>JW15</td><td>GJU56181</td><td>208190837</td></tr><tr><td>JW14</td><td>GJU56182</td><td>208320447</td></tr><tr><td>NM01</td><td>GJU56183</td><td>208200823</td></tr><tr><td>NM02</td><td>GJU56178</td><td>208320646</td></tr><tr><td>VW46</td><td>GJU56184</td><td>208320647</td></tr><tr><td>VW45</td><td>GJU56185</td><td>208320616</td></tr><tr><td>VW42</td><td>GJB03625</td><td>208320448</td></tr><tr><td>VW43</td><td>GJU56186</td><td>208320620</td></tr></table><br>Main meters are manufactured by Secure Meters<br>Check meters are manufactured by Wallaby Metering systems<br><br>Vandhiya Substation:<br>Serial number: GJ-0671-A<br>Shikarpur substation:<br>Serial number: GJ-2136-A<br>Substation meters are manufactured by Secure meters<br><br>All the above meters are tri vector bi-directional meters</td><td>Total 18 energy meters are installed, 2 (main and check) for all 9 WTGs. The details are as follows:<br><br><table><tr><th>WTG number</th><th>Main meter</th><th>Check meter</th></tr><tr><td>VW47</td><td>GJU56180</td><td>208320686</td></tr><tr><td>JW15</td><td>GJU56181</td><td>208190837</td></tr><tr><td>JW14</td><td>GJU56182</td><td>208320447</td></tr><tr><td>NM01</td><td>GJU56183</td><td>208200823</td></tr><tr><td>NM02</td><td>GJU56178</td><td>208320646</td></tr><tr><td>VW46</td><td>GJU56184</td><td>208320647</td></tr><tr><td>VW45</td><td>GJU56185</td><td>208320616</td></tr><tr><td>VW42</td><td>GJB03625</td><td>208320448</td></tr><tr><td>VW43</td><td>GJU56186</td><td>208320620</td></tr></table><br>Main meters are manufactured by Secure Meters<br>Check meters are manufactured by Wallaby Metering systems<br><br>Vandhiya Substation:<br>Serial number: GJ-0671-A<br>Shikarpur substation:<br>Serial number: GJ-2136-A<br>Substation meters are manufactured by Secure meters<br><br>All the above meters are tri vector bi-directional meters</td></tr>
<tr><td>Specific location</td><td>Individual meters are provided on 33KV line at the WTG</td><td>Individual meters are provided on 33KV line at the WTG</td></tr>
<tr><td>Calibration dates</td><td>Different dates</td><td>Different dates</td></tr>
<tr><td>Company performing the calibration</td><td>Paschim Gujarat Vij Nigam Limited, a sister company of GETCO[2]</td><td>Paschim Gujarat Vij Nigam Limited, a sister company of GETCO[2]</td></tr>
<tr><td>Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?</td><td>Yes</td><td>Yes</td></tr>
</table>

[2] http://www.pgvcl.com/

| Data / Parameter (as in the MP) | $EG_y$ <Electricity exported to grid> | $EC_y$ <Electricity imported from grid> |
|---|---|---|
| Is calibration valid for the whole reporting period? | No. The initial calibration of the meters was valid till 11/03/2011, however, actual calibration of the meters was conducted on 11/07/2011. The Guideline for delayed calibration has been applied for the period when the meters were not calibrated. | No. The initial calibration of the meters was valid till 11/03/2011, however, actual calibration of the meters was conducted on 11/07/2011. The Guideline for delayed calibration has been applied for the period when the meters were not calibrated. |
| Maintenance | Individual meters of the WTGs are being maintained by the PP, bulk meter is being maintained by GETCO | Individual meters of the WTGs are being maintained by the PP, bulk meter is being maintained by GETCO |
| Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions? | Yes. The net electricity exported to the grid was jointly taken by the representative of the PP and government agency. Based on the apportioning electricity a share certificate was issued by GEDA. This is also used for billing. Verification team confirmed from the review of the share certificate, invoices and measurement readings that correct data has been transferred. Further, for calculation of the emission reductions only the net electricity generation is required to be monitored. Therefore, it can be concluded that correct data has been transferred for reporting of emission reduction. | Yes. The net electricity exported to the grid was jointly taken by the representative of the PP and government agency. Based on the apportioning electricity a share certificate was issued by GEDA. This is also used for billing. Verification team confirmed from the review of the share certificate, invoices and measurement readings that correct data has been transferred. Further, for calculation of the emission reductions only the net electricity generation is required to be monitored. Therefore, it can be concluded that correct data has been transferred for reporting of emission reduction. |
| Key reporting risks | Low risk<br>The meter is also the resettlement meter for the grid company and the PP. It was installed, maintained and calibrated according to the relevant industry standard. | Low risk<br>The meter is also the resettlement meter for the grid company and the PP. It was installed, maintained and calibrated according to the relevant industry standard. |

| | Verified situation | Conclusion |
|---|---|---|
| **SECTION 4. Assessment of data and calculation of GHG reductions** | | |
| 4-1. Have calculations of baseline emissions, proposed CDM project activity emissions and leakage, as appropriate, been carried out in line with the formulae and methods described in the monitoring plan and the applied methodology document? | According to the registered PDD and the MR, the baseline emissions for the project activity has been calculated as:<br>$BE_y=(EG_y - EC_y) * EF_y$<br>(11945 – 158) × 0.9224<br>= 10,872<br>$EF_y$ is the baseline emission factor which has been determined ex-ante in the registered PDD as 0.9224 tCO2e/MWh. The emission factor will not change during the fixed crediting period from 18/09/2010 to 17/09/2017 and is thus applicable for this monitoring period.<br>$EG_y$ and $EC_y$ refer to electricity exported to the grid and imported from the grid respectively. | ✓ |
| 4-2. Has the calculation tool been correctly documented? Check its consistency and formulae.<br>• baseline emissions<br>• project emissions<br>• leakage<br>• emission reductions of the project. | PDD refers to "*Tool to calculate the emission factor for an electrical system*" (Version 02) for calculation of baseline grid emission factor calculations. The stepwise for the tool has been verified as follows:<br><br>**Step 1 of *the tool*** requires identification of the relevant electric power system. In line with the requirements specified in *the tool*, the PP has used a regional grid definition applicable for large countries like India with layered dispatch systems. Historically, the Indian power system was divided into five independent regional grids, namely Northern, Eastern, Western, Southern, and North-Eastern. Each grid covered several states. Since August 2006 however, all regional grids except the Southern Grid have been integrated and are operating in synchronous mode, i.e. at the same frequency. The project activity is | ✓ |

| | Verified situation | Conclusion |
|---|---|---|
| | located in NEWNE Grid and hence its selection for the purpose of estimation of baseline emission factor is considered appropriate. Therefore, LRQA confirms the applicability of Step 1 of *the tool*.<br><br>**Step 2 of the tool** gives PP an option to include off-grid power plants in the project electricity system. PP has chosen only grid power plants for analysis.<br><br>**Step 3 of *the tool*** requires selecting an operating margin method. Of the four methods provided in *the tool* for calculating the operating margin ($EF_{grid,OM,y}$), the PP has selected the simple OM method. *The tool* specifies that the simple OM method can only be used if the low-cost/must-run resources constitute less than 50% of total grid generation on average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.<br><br>The Simple OM method selected by the PP is justified and appropriate as the average proportion of low-cost/must run resources as average of 5 years (2004-05: 16.8, 2005-06: 18.0%, 2006-07: 18.5%, 2007-08: 19.0%, and 2008-09: 17.3%) is less than 50%. Low operating cost/must run resources include hydro, wind, low-cost biomass and nuclear<br><br>The tool provides two options – (i) ex-ante option and (ii) ex-post option in calculating the simple OM. The PP has chosen the ex-ante option for determining the OM. This choice of ex-ante option which is based on a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for | |

| | Verified situation | Conclusion |
|---|---|---|
| | validation, was found acceptable in view of the availability of the requisite data vintages.<br><br>**Step 4 of *the tool*** requires the calculation of the operating margin emission factor according to the selected method. 'Selected method' in this context is the 'simple OM' chosen in Step 2. In validating Step 3, LRQA confirmed the calculations with respect to the OM emission factor for the last three years for the Southern Grid and arrived at the following summary:<br><br>**Year** \| **Absolute emissions (including imports)** \| **Net Generation (including imports)** \| **Specific emissions ($tCO_2$/GWh)** \| **Specific emissions ($tCO_2$/MWh)**<br>2008-09 \| 430,502,442 \| 427,700 \| 1006.553 \| 1.0065530<br>2007-08 \| 410,083,778 \| 410,124 \| 999.902 \| 0.9999017<br>2006-07 \| 388,067,225 \| 384,805 \| 1008.479 \| 1.0084789<br><br>$EF_{gridOM}$ = (1.0065530×427,700+0.9999017×410,124+1.0084789×384,805)/(427,700+410,124+384,805) = 1.0049 $tCO_2$/MWh | |

| | Verified situation | Conclusion |
|---|---|---|
| | **Step 5 of *the tool*** requires the identification of the cohort of the power units to be included in the build margin. The CEA database has selected the set of power capacity additions in the electricity system that comprises 20% of the system generation (in MWh) and these have been built most recently. The calculations are based on generation, fuel consumption and fuel quality data obtained from the power stations.<br><br>In validating this step, LRQA confirmed that<br>(i) the identified power capacity additions comprise 20% of the system generation for the year under consideration.<br>(ii) none of the considered power capacity additions considered under (i) above have been built more than ten years earlier.<br><br>**Step 6 of *the tool*** requires calculation of the build margin emission factor.<br>The CEA database provides a BM value for the NEWNE grid of 0.7133. As part of validation of Step 5 of the tool, LRQA confirmed through independent calculations the BM for the year 2007-08 as per the following summary: | |

| **Year** | **Absolute emissions $tCO_2$** | **Net Generation GWh** | **Specific emissions ($tCO_2$/MWh)**<br><br>**BM** |
|---|---|---|---|
| 2007-08 | 69,297,387 | 102,589 | 0.6752 |

| | Verified situation | Conclusion |
|---|---|---|
| | **Step 7 of *the tool*** requires calculation of the combined margin emission factor as per the following equation:<br><br>$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$<br><br>According to the guidance on selecting alternative weights in *the tool,* the default weights applicable for wind projects are $w_{OM} = 0.75$ and $w_{BM} = 0.25$ for the first and subsequent crediting period have been applied,<br><br>The baseline grid emission factor has been calculated as;<br>EFy = 0.9224 $tCO_2e/MWh$ | |
| 4-3. Is a complete set of data available during the specified monitoring period? If only partial data is available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, opt to either make the most conservative assumption theoretically possible in finalizing the verification report, or raise a request for deviation, if appropriate. Refer to the corresponding section of the CDM & JI (UNFCCC) Verification and Certification Assessment procedure. | To calculate emission reduction of the project activity, the parameters $EF_{Grid,CM,y}$, has been determined ex-ante in the registered PDD.<br><br>The net electricity supplied to the Grid (EGy) is calculated by deducting imports from gross exports. Electricity exports and imports are calculated through apportioning of losses at the substation end. Further, the project activity is connected to two different substations located at Vandhiya and Shikarpur. | ✓ |

| | Verified situation | Conclusion |
|---|---|---|
| 4-4. Has information provided in the monitoring report been cross-checked with other sources such as plant log books, inventories, purchase records, laboratory analysis?<br>Please describe how LRQA has cross-checked reported data. | During on-site verification, for purpose of data cross-checking, the team has reviewed the actual bills/invoices of electricity sale, SLDC Share certificate, and Joint meter reading records.<br>Also please refer section 3.1 above for data cross checking.<br><br>Through these approaches, the verification team confirmed that the data for calculation of emission reduction in the MR and Emission reduction spreadsheet submitted on 29/08/2011 were fully substantial. | ✓ |
| 4-5. Have any assumptions used in emission calculations been justified? | Not applicable | |
| 4-6. Have appropriate emission factors, IPCC default values, and other reference values been correctly applied? | The emission factor has been determined ex-ante in the registered PDD. It will not change during the first crediting period and it is applicable for this verification. | ✓ |

# Findings[3]

| | | | | | |
|---|---|---|---|---|---|
| **1. Grade / Ref:** | CAR 01 | **2. Date:** | 23/06/2011 | **3. Status:** | Closed |
| **4. Requirement** | | CDM M&P para 62 (a), Para 204 of VVM (Version 01.2) | | | |
| **5. Nature of the Issue Raised:** | | | | | |
| It was confirmed during the site visit that a total of 158,150 kWh of electricity was imported during the monitoring period i.e 18/09/2010 to 30/04/2011. However, the monitoring report (MR) Version 01.1 dated 03/06/2011 states "**ECy "** i.e electricity import from grid as 0 during the monitoring period. | | | | | |
| **6. Nature of responses provided by the project participants:** | | | | | |
| The revised Monitoring report now includes the electricity exports, imports and net exports. | | | | | |
| **7. Assessment of such responses:** | | | | | |
| Verification team confirms that the electricity exports, imports and net exports have been presented in the monitoring report. Validation team confirms the exports and imports figures from the invoices. | | | | | |
| **8. References to resulting changes in the monitoring report or supporting annexes:** | | | | | |
| Monitoring report Section E.1 and emission reduction spreadsheet | | | | | |

[3] Explanation of the Findings Log structure:
1. Grading and Sequential Number of the finding 2. Date of Original Finding 3. New, Open, Closed 4. Requirement (VVM, PDD-CDM, etc) 5. Reference to Workbook
6. Details of PP's response 7. Evaluation from the Verification team 8. List of changes made as a result of the finding

| | | | | | |
|---|---|---|---|---|---|
| **1. Grade / Ref:** | CAR 02 | **2. Date:** | 23/06/2011 | **3. Status:** | Closed |
| **4. Requirement** | | CDM M&P para 62 (a), Para 204 of VVM (Version 01.2) | | | |
| **5. Nature of the Issue Raised:** | | | | | |

1. The registered monitoring plan and the MR Version 01.1 dated 03/06/2011 states that the electricity meters calibration will be conducted by GETCO whereas the calibration certificate has been issued by PASCHIM GUJARAT VIJ CO. LTD.
2. The validity of the calibration for each meter used to monitor EGy and ECy has not been provided in the MR Version 01.1 dated 03/06/2011. The last calibration for the electricity meter monitoring EGy and ECy has been conducted on 12/03/2010 having annual calibration frequency which means the calibration is valid till 11/03/2011, which does not cover the monitoring period.

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| **6. Nature of responses provided by the project participants:** | |

Paschim Gujarat Vij Company Limited is a subsidiary of the state grid company, Gujarat Urja Vikas Nigam Limited and operating in the western region of the state. GETCO and PGVCL are sister concerns, and latter is the concerned department with necessary infrastructure and responsibility for calibration. The monitoring report has been revised to remove the inconsistency.
There has been a delay in calibration of the meters than specified in the monitoring plan. The revised emission reduction spreadsheet applies the delayed calibration guideline. The date of the current calibration has now been included in the revised monitoring report.

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| **7. Assessment of such responses:** | |

Verification team confirms that the revised monitoring report not does not include that calibration of the meters is done by GETCO. Team also confirms that PGVCL is a government entity, having responsibility of calibration with required infrastructure in that region. Team confirmed the description from the interview of the Vestas O&M team, GETCO officials and PGVCL website.
Verification team confirms from the calibration reports that the meters were recalibrated on 11/07/2011. The revised monitoring report also correctly mentions this date. The PP has correctly applied the maximum permissible error in calculation of emission reduction in accordance with the “Guidelines for assessing compliance with the calibration frequency requirements” (Version 01).

| 8. References to resulting changes in the monitoring report or supporting annexes: | |
|---|---|
| Monitoring report section A.1, D.2, E.1, E.4 and emission reduction spreadsheet | |