Voluntary Carbon Standard 2007.1

VERIFICATION REPORT

M/s UIC Udyog Limited

Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India

VERIFICATION PERIOD:
05th February 2007 to 01st September 2009

Project No/ Rev. No.: V-3-I-01-B-0008-Ve/01

Verification Report

Name of Verification company:	**Date of issue:**
Perry Johnson Registrars CDM Inc.	2011-05-20
Report Title:	**Approved by:**
Verification report – "Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India"	Mathsy K
Client:	**Project Title:**
M/s UIC Udyog Limited	Monitoring report of "Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India" Monitoring period: 05th February 2007 to 01st September 2009 Version : 03 Date : 25 April 2011

Summary:

M/s Indian Wind Power Association has commissioned Perry Johnson Registrars Clean Development Mechanism Inc. (PJRCDM) on behalf of the investors in WTGs for the verification of the project – *"Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India"*. The verification involves independent review of the implementation of project as per VCS PD, conformance to applicable methodology, VCS 2007.1 requirements and guidelines, its monitoring plan and the verification of reduction in GHG emissions achieved by the project activity.

During verification, the implementation of the project activity as per design was checked. The project activity is installation and operation of six (6) WTGs, five (5) of which are 1.25 MW capacity and the sixth is 1.50 MW capacity by the investors, totaling an installed capacity of 7.75 MW in different villages of Indian states of Gujarat and Maharashtra. All the WTGs are connected to Northern Eastern Western North-Eastern regional grid in India.

In PJRCDM's opinion, the GHG emission reductions reported in the monitoring report version 03 dated 25 April 2011 are fairly stated. Based on the assessment, PJRCDM was able to certify that implementation of the project has resulted in reduction of GHG emissions of **29,774** tCO_2 equivalent during the period 05 February 2007 to 01 September 2009.

PJRCDM's opinion regarding the reported emission reductions for the said period is based on the review of information sought and publicly available information, where applicable.

ISO-14064 guidelines have been applied in principle to assess the key issues like accuracy, completeness and conservativeness of the information. PJRCDM's verification and certification of GHG emission reductions is limited to this information evaluation.

Issuance and utilization of certified GHG-emission reductions is beyond the scope of PJRCDM.

Report Number/ Revision Number	**Number of pages**
V-3-I-01-B-0008-Ve/01	28
Work carried out by:	**Work Reviewed by:**
Nauduri Siddhartha	Mathsy K

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
GHG	Greenhouse gas
GUVNL	Gujarat Urja Vikas Nigam Limited
HMIPL	M/s Hind Metals and Industries (P) Limited
IPCC	Intergovernmental Panel on Climate Change
kWh	Kilo Watt Hour
KNC	M/s Khatau Narbheram & Co.
MSEDCL	Maharashtra State Electricity Distribution Company Limited
NEWNE	Northern Eastern Western North-Eastern Grid
PD	Project Document
PJRCDM	Perry Johnson Registrars Clean Development Mechanism Inc.
UIC	M/s UIC Udyog Limited
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard

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1 INTRODUCTION

M/s UIC Udyog Limited, M/s Khatau Narbheram & Co and M/s Hind Metals and Industries (P) Limited (hereinafter referred to as client or project proponent (PP) and their acronyms) contracted Perry Johnson Registrars Clean Development Mechanism Inc. (PJRCDM) to perform the validation and verification of their project activity *"Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India"* under the Voluntary Carbon Standard (VCS) 2007.1. The Wind Turbine Generators (WTGs) were installed by the following entities: M/s UIC Udyog Limited (UIC), M/s Khatau Narbheram & Co. (KNC) and M/s Hind Metals and Industries (P) Limited (HMIPL). The validation of the project activity was concluded and a separate VCS 2007.1 validation report dated 06 November 2009, against the VCS PD version 03 dated 05 November 2009 was issued. Verification activity was for the period 05 February 2007 to 01 September 2009. The current report describes the verification work undertaken.

1.1 Objective

Verification under VCS is the independent *ex-post* quantification and certification of the greenhouse gas (GHG) emission reductions achieved by a project activity which has completed validation under VCS 2007.1 or registered under a VCS approved GHG program. The current project applies the methodologies and tools under CDM, which is one of the VCS approved GHG programs.

The above work is carried out through an independent assessment and a written assurance is provided on the GHG emission reductions achieved for the period specified.

1.2 Scope and Criteria

The scope of the verification covers independent objective review and *ex-post* determination of the monitored GHG emission reductions by the project activity *"Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India"*.

The specific scope of the verification work involves:

- To verify that the project activity is implemented as per the project details of the project document (PD)
- To assess whether the emissions reductions determined are in conformance with the monitoring plan of the PD and the approved methodology
- To express a conclusion whether reported data are accurate, complete, consistent, and transparent with a reasonable level of assurance and free of omission or material error, based on the review of the reported data and emission reduction calculations.

The project is assessed against the verification requirements of VCS 2007.1 standard including the criteria that the emission reductions are real, measurable, transparent and conservative. The approach adopted by PJRCDM verification team is risk-based, drawing on an understanding of the risks associated with reporting of GHG emissions data and the controls in place to mitigate these.

The work carried out by PJRCDM is free from any conflict of interest.

Request for issuance of Voluntary Carbon Units (VCUs), verified and certified by PJRCDM, shall be made by the project proponent to the VCS registry in accordance with the most recent version of the "*VCS Guidance Document: VCS Project Registration and VCU Issuance process*". In view of the above, PJRCDM's responsibility is limited only to verification and certification of the GHG emission reductions achieved during the specified period.

1.3 VCS project Description

The project activity is generation of electricity by six (6) wind turbine generators (WTGs), five (5) of which are 1.25 MW capacity and the sixth is of 1.50 MW capacity, totaling an installed capacity of 7.75 MW in different villages of Maharashtra and Gujarat, in India. The generated electricity was sold to respective state utilities, the Maharashtra State Electricity Distribution Company Limited (MSEDCL) and Gujarat Urja Vikas Nigam Limited (GUVNL), both of which form part of the Northern Eastern Western North-Eastern (NEWNE) Grid System. All the WTGs are M/s Suzlon Energy Limited make S 82 (1.5 MW) and S 70 (1.25 MW) machines and were commissioned between February and March 2007.

The baseline scenario as identified during validation continued as the project activity is connected to a grid system that is supplied by at least one fossil fuel fired power plant. The electricity generated by the project activity is displacing equivalent quantity of electricity that would have been produced by the grid mix of power plants, which are largely fired using fossil fuels.

The project location details are as follows:

Table 1: Project Details

№	WTG Owner	Location №	Installed Capacity (MW)	Commissioning Date	Village	Longitude	Latitude
1	M/s UIC Udyog Limited	K-537	1.25	2007/03/29	Akrale, Nadurbar, Maharashtra	74° 20′ 51.4″ E	21° 21′ 50.6″ N
2		K-539	1.25	2007/03/29		74° 21′ 19.8″ E	21° 22′ 35.4″ N
3		K-542	1.25	2007/03/31		74° 21′ 41.3″ E	21° 22′ 16.3″ N
4		K-543	1.25	2007/03/31		74° 22′ 05.9″ E	21° 22′ 26.0″ N
5	M/s Khatau Narbheram & Co.	W-55	1.50	2007/03/31	Arikhana, Kutchh, Gujarat	68° 52′ 51.3″ E	23° 05′ 00.3″ N
6	M/s Hind Metals and Industries (P) Limited	J-43	1.25	2007/02/05	Dusane, Dhule, Maharashtra	74° 24′ 18.6″ E	21° 10′ 24.5″ N

The project qualified the start date requirements under VCS 2007.1 as all the WTGs were commissioned later than January 2002. Further, in line with VCS 2007.1 requirements, the monitoring period starts from 05 February 2007, after the requirement date of 28 March 2006.

By implementing and operating the project activity the following GHG sources of emissions were reduced/ avoided:

Table 2: GHG Gases avoided by project activity

Project Equipment - Purpose	Baseline	Baseline GHG emission source reduced/ avoided
Wind Turbine Generators – generation of electricity by renewable means and exporting to NEWNE Regional grid in India	Generation of electricity by fossil fuel dominated grid connected power plants	CO_2 emissions from fossil fuels and other fuel fired grid connected

1.4 Level of assurance

In line with VCS 2007.1 requirements and as per ISO 14064-3:2006 paragraph A.2.3.2, a ***"reasonable level of assurance"*** is defined for the verification of the project.

This implies that, based on the process and procedures conducted, PJRCDM **confirms** that the GHG assertion in the monitoring report

- *is materially correct and is a fair representation of the GHG data and information, and*
- *is prepared in accordance with VCS requirements, the PD and the approved methodology for information pertaining to GHG quantification, monitoring and reporting.*

The verification work was carried out as per this requirement and details are presented in the Verification statement in section 2 below.

2 METHODOLOGY

2.1 General Approach

The project activity is operation of six WTGs, five of which are of 1.25 MW capacity and the sixth is 1.5 MW capacity installed in different villages of the Indian states of Gujarat and Maharashtra. The project activity applied approved baseline and monitoring methodology AMS-I.D (version 14) categorized under sectoral scope 01 'Energy industries (renewable - / non-renewable sources)'.

For verification of emission reductions, PJRCDM's approach involves broadly three steps:

1. Completeness check and desktop review of the monitoring report
2. Onsite inspection and issuance of findings from the audit
3. Resolution of the findings and preparation of the verification report

The following team members from PJRCDM were involved in these steps:

Table 3: Verification Team

Name	Role	Areas covered
Nauduri Siddhartha	Verifier	Completeness check of monitoring report, desktop review, site visit, issuance and closure of findings, report preparation
Mathsy K	Technical Reviewer	Independent review of the verification assignment.

2.2 Means of Verification

2.2.1 Review of Project Documentation

On receipt of the monitoring report from the client, the completeness of information made available as per VCS 2007.1 standard requirements was reviewed. A desktop review was further carried out to assess the following:

- the validated VCS 2007.1 PD with the monitoring plan
- the emission reduction calculation method used in the applied methodology and the PD
- the monitoring report, including frequency of monitoring and the calculation of emission reductions for the period
- the documented operation and maintenance manual furnished by the project participant (where applicable)
- other external documents like grid emission factor, IPCC emission factor, etc. applied

A complete list of all documents reviewed is attached in Appendix I of this report.

2.2.2 Onsite Inspections

PJRCDM visited the sites of WTGs installation on 12 August 2009 and followed up with interviews and desk meetings with project participants. During these meetings, PJRCDM verified the actual operation of the project as described in the PD; checked the JMR sheets, Form Bs, controller data at Central Monitoring Stations and verified them against the invoices of payment for energy delivered by the PP to MSEDCL/GUVNL; the calibration records available with the PP; and discussed the

issues identified during desk review of submitted documents and observation on site visit.

The following table lists the personnel interviewed and issues discussed during the site visit:

Table 4: Personnel Interviewed

Name / Designation / Company	Interviewed on
Mr. Atul Site In-charge M/s Suzlon Energy Limited	Project technical details, monitoring system, calibration practice and frequency, maintenance of records including JMR sheets, invoices and calibration
Mr. Harish Khodiar O&M Engineer M/s Suzlon Energy Limited	
Mr. Rakesh Agarwal Analyst Deloitte Touche Tohmatsu India Pvt. Ltd	Monitoring Report, Emission reduction calculations

2.2.3 Review of Monitoring Results and Correct Application of Monitoring Methodology

Based on the site inspection and review of records including the monitoring plan and other documentation submitted, a list of non conformities Corrective Action Requests (CARs) and Clarification Requests (CLs) were raised. The non conformities, *inter-alia*, were related to lack of adherence to the VCS 2007.1 requirements, non-conformance to the monitoring plan of as defined in the PD or where evidence provided was found insufficient to prove conformity, mistakes in applying data/ assumptions and in calculation of emission reductions.

If information made available was insufficient to transparently arrive at the stated conclusion, a Clarification request (CL) was raised and communicated to the project proponent.

Observations may also be raised which are for the benefit of future verification period. These, however, have no impact upon the completion of the current verification activity.

On receipt of response from the project developer, the adequacy with compliance with VCS and CDM requirements was checked along with a revised monitoring report. Closure of comments raised occurred only when the response provided and correction made fully complied with the relevant requirements.

The list of CARs/ CLs raised and the response provided and reasons for closure are provided Appendix-1.

2.2.4 Determinations of the reductions in GHG Emissions

As per the applicable methodology, AMS-I.D., version 14, the emission reductions achievable by the project activity are calculated as a difference of baseline emissions

(BE_y) project emissions (PE_y) and emissions due to leakage (L_y) determined as follows.

Baseline emissions: The baseline emissions were determined as a multiple of net electricity generated and supplied to the grid by the renewable energy technology (EG_y in MWh), and the electricity grid emission factor calculated as per CDM EB guidance.

As per the VCS PD, the emission factor had been fixed *ex-ante* for the crediting period. PJRCDM was able to verify the grid emission factors used for NEWNE grid of India at 0.90 tCO_2/MWh. This was taken from the source indicated at the time of Validation, the Central Electricity Authority (CEA) database Version 04.

Project emissions: As the project activity is wind power based power generation, the methodology does not require estimation of project emissions and hence they have been considered as zero.

Leakage: Similarly, no leakage has to be considered for the proposed project activity.

Emission reductions: $ER_y = BE_y - PE_y - L_y = BE_y$

During the current monitoring period, i.e. from 05 February 2007 to 01 September 2009, the project activity has delivered approximately **34,808 MWh** of net electricity to the NEWNE regional grid. This was checked against the Joint Meter Reading (JMR) sheets and break-up sheets issued by MSEDCL. In Gujarat, the primary source of data is the Share of electricity certificates, issued by GVUNL. The sources are as confirmed against the validated monitoring plan in VCS PD. The validated PD, stated that the calibration would be carried out annually. However, owing to non-availability of these calibration certificates for the energy measurement devices, or unavailability of records, the PP has either chosen to forfeit the energy generated or has corrected the net energy delivered value in accordance to CDM EB guidelines given under EB 52, Annex 60. Hence the corrected net energy delivered for calculating emission reductions has been determined at **33,082 MWh**. The net reduction in GHG emissions achieved by the project activity during the said monitoring period, based on the corrected value of net energy delivered to grid and rounding down, is equivalent to **29,774 tCO_2e**.

The above value of GHG emission reductions is based on completely monitored data, transparently presented, accurately measured and calculated, conservatively estimated and independently verified by PJRCDM.

2.2.5 Review of Additional Data from other Sources if appropriate

No pending issues that were to be considered during verification were identified in the validation report.

The other source of information was the CEA Database Version 04, available from the website, from which the emission factor for the grid was determined at the Validation and fixed *ex-ante*.

2.3 Internal Quality Control

On completion of the assessment by the GHG assessment team, the complete verification package including the verification report, monitoring report and supporting documents was sent to the Technical Reviewer. In this stage, the Technical Reviewer independently assessed the project with the VCS requirements before accepting/ rejecting the recommendation from the GHG assessment team.

3 VERIFICATION FINDINGS

3.1 Remaining issues, including any material discrepancy, from previous validation

No pending issues were identified from the discussion, findings and conclusions drawn from the VCS 2007.1 Validation Report (version 01) issued dated 06 November 2009 against the PD Version 03 dated 05 November 2009.

3.2 Project Implementation

The project activity involves the installation and operation of six WTGs, five of which are 1.25 MW and the sixth of 1.5 MW in different villages of Gujarat and Maharashtra, states in India. The WTGs are S 82 / 1.5 MW & S 70 / 1.25 MW models manufactured by M/s Suzlon Energy Limited.

The implementation of the project activity as described in the PD was checked against supportive documents presented and also available at the project site. PJRCDM was able to verify that the there was no change in project design compared to the design presented in the VCS PD.

Generation of electricity is entirely reliant on wind availability and it varies from region to region annually. The projected PLF for Maharashtra was at 20% and that achieved by the WTGs in the project activity varied from 10.70% to 20.74%. Hence, although few WTGs had achieved an annual PLF of 20.74%, it is fractionally higher (3.7%) than the estimated value and is still under the limit of 10% to which the financial viability of the project activity was tested for. Consequently the project activity continues to be additional.

3.3 Completeness of Monitoring

The GHG emission reductions are calculated based on the net electricity exported by the project activity to the grid. The client is monitoring the complete data and is available with them in the form of JMR and break-up sheets. Where unavailable, the client has chosen to not consider the generation for that particular month.

In Maharashtra the net energy is measured by common bulk meters located at the sub-station to which the WTGs of clients forming of part of the project activity and others as well are connected to. These electronic tri-vector energy meters measure

both the energy imported and exported by the grid. This is then divided among the WTGs based on the controller data. This step is called apportioning and is carried out by MSEDCL based on data provided by the monitoring team of the technology supplier, which is also the authorized representative of the client for taking the joint meter readings with Government representatives. The energy generated by the individual WTGs is continually monitored by the individual micro-processor based controllers present in each WTG.

In Gujarat there are separate energy meters at each WTG and several WTGs are connected to a common bulk energy meter. The JMR exercise is carried out for these sets of energy meters. The transmission losses are calculated as difference of sum of all WTG energy meter readings and bulk energy meter reading. These losses are distributed among the individual WTGs based on the controller readings. This value is represented in the share of electricity certificate issued by GVNL.

The transposition errors in the spreadsheet submitted were intimated and corrected by the client. The formulae and conversions were correctly applied.

3.4 Accuracy of Emission Reduction Calculations

Net electricity supplied to the grid: The energy delivered by the WTGs was measured continuously and monitored daily. The JMR sheets / break-up sheets of net energy delivered by the WTGs were the basis of determining the net energy delivered to the grid by the project activity.

The following table correlates the WTGs with the energy meters.

Table 5: WTGs, HT Sc. and Energy Meter numbers

№	WTG Owner	Location №	Main Energy Meter Number	Check Energy Meter Number	Accuracy class	Date of calibration			
						2007	2008	2009	2010
1	UIC	K-537	4860905	4860906	0.2s	2007/10/08	2008/05/27	2009/07/08	-
2		K-539							
3		K-542							
4		K-543							
5	KNC	W-55	GJB00674	GJB00676	0.5s	-	-	-	2010/09/27
6	HMIPL	J-43	4738075	4738076	0.2s	-	2008/05/27	2009/07/08	-

Metering accuracy: The accuracy of measurement of electricity delivered is determined by the equipment accuracy and the frequency of its calibration. The energy meters are of 0.2s and 0.5s class. The calibration frequency was defined as once in year.

Calibration of energy meters is not under the purview of the PP as all the energy meters are under the control of the respective state authorities. The energy meters were calibrated intermittently. As these calibration records did not indicate any error in measurement, the PP has applied the correction factor based on the accuracy class of the equipment, following the guidelines of EB 52, annex 60 Version 01 of

"Guidelines for Assessing Compliance with the Calibration Frequency Requirements." The PP has applied the correction factor for the following months:

Table 6: Period of applying correction factor

WTG Owner	Location №	Period of applying the correction factor
UIC	K-537, K-539, K-542, K-543	March – September 2007 and June 2009
KNC	W-55	March 2007 – August 2009
HMIPL	J-43	February 2007 – May 2008; June 2009

Based on this the net energy delivered by all the WTGs was revised from 34,808 MWh to 33,082 MWh. Furthermore client has rounded down while evaluating the emission reductions, and hence, the resulting net energy delivered, and consequently emission reductions, are conservative.

Value of grid emission factor: PJRCDM was able to confirm that this parameter was fixed *ex-ante* during the validation of the project and the same was used for ER calculations for the current monitoring period (MR Version 03 dated 25 April 2011). The parameter was derived from officially published latest database* from Central Electricity Authority of India, a subsidiary of Ministry of Power, Government of India, which is the authentic source of such information, at the time of validation.

The grid emission factor was determined as 0.90 tCO_2/MWh for the NEWNE grid in India.

The emission reductions achieved by the project activity are summarized below:

M/s UIC Udyog Limited K-537, K-539, K-542, K-543		
	Net Export	**ERs**
	MWh	tCO_2e
2007	5924	5331
2008	8962	8066
2009	8673	7806
	23,558	**21,203**

M/s Khatau Narbheram & Co. W-55		
	Net Export	**ERs**
	MWh	tCO_2e
2007	421	379
2008	2750	2475
2009	1936	1742
	5107	**4597**

M/s Hind Metals and Industries (P) Limited J-43		
	Net Export	**ERs**
	MWh	tCO_2e
2007	1155	1040
2008	1712	1540
2009	1549	1397
	4416	**3975**

3.5 Quality of Evidence to Determine Emission Reductions

The source of net energy generation, as defined in the PD, were the JMR sheets and energy break-up sheets, and the same were used by the client to determine $EG_{exp,net,i,y}$. PJRCDM was able to check and verify the values against these documents and invoices. The annual value of the energy exported was the summation of these monthly readings. These are deemed to be the most appropriate source of data for net energy exported, as the values denoted were jointly measured by the representatives of the PP and a Government representative and duly signed and acknowledged by both parties.

The emission factor for NEWNE regional grid to which the project activity exports power was determined as 0.90 tCO_2/MWh, a value fixed *ex-ante* during validation of the project activity and sourced from the official source for grid emission factors in India.

These practices meet the requirements of the applied methodology and approved monitoring plan as per in the validated VCS PD.

3.6 Management and Operational System

The clients have established and implemented procedures to monitor the project activity and its operation. These procedures cover management responsibilities, data monitoring and reviewing procedures and have provided with reports. All the daily and monthly records are archived in electronic copy and paper format.

[*] http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

4 VERIFICATION CONCLUSION AND CERTIFICATION STATEMENT

Perry Johnson Registrars CDM Inc. (PJRCDM) has carried out verification of the emission reductions achieved by the project "Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India" against the guidelines of VCS 2007.1. The project activity is generation of electricity by six (6) Wind Turbine Generators (WTGs) of M/s Suzlon Energy Limited make, five (5) of which are S 70/1.25 MW and the sixth is S 82/1.50 MW model. These WTGs are installed in different villages of Maharashtra and Gujarat, India. The total installed capacity is 7.75 MW. Verification was sought for the emission reductions achieved by the project within the period 05 February 2007 and 01 September 2009 under VCS 2007.1. The project had applied the version 14 of the small scale CDM methodology AMS-I.D "Grid connected renewable electricity generation" and the emission reductions are as reported in the version 03 of the monitoring report, dated 25 April 2011.

PJRCDM's approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate them. The assessment was based on review of supporting evidences and information provided, including other explanations where necessary to enable PJRCDM to provide ***reasonable assurance*** *that the reported amount of GHG emission reductions for the specified period is materially correct and fairly stated.*

Certification statement:

PJRCDM confirms that the project activity has been implemented as per the VCS registered PD and that the emission reductions presented in the monitoring report version 03 dated 25 April 2011 are correctly determined as per the VCS 2007.1 standard and AMS-I.D methodology, version 14. Based on the above information, PJRCDM confirms the following:

Name of the project	*Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India*
VCS 2007.1 PD	*Version 03 dated 05 November 2009*
VCS 2007.1 Validation Report	*Version 01 dated 06 November 2009*
Methodology	*AMS-I.D Version 14*
Monitoring Report	*Version 03 dated 25 April 2011*
Reporting period	*05 February 2007 to 01 September 2009*

Verified emission in the above reporting period

Project emissions	:	*0*	*tCO_2 equivalents*
Baseline emissions	:	*29,773*	*tCO_2 equivalents*
Emission reductions	:	*29,773*	*tCO_2 equivalents*

Year-wise emission reductions

05th February 2007 to 31st December 2007	:	*6750*	*tCO_2 equivalents*
01st January 2008 to 31st December 2008	:	*12,081*	*tCO_2 equivalents*
01st January 2009 to 01st September 2009	:	*10,942*	*tCO_2 equivalents*

Project Manager
PJRCDM

Site Program Manager
PJRCDM

APPENDIX I: DOCUMENTS REVIEWED

Sl. No.	Document reference
[01]	Monitoring report: "Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India", Version 03, dated 25 April 2011, and all previous versions
[02]	Emission reduction spreadsheet, Version 03, dated 25 April 2011, and all previous versions
[03]	Project Document: "Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India" Version 03, dated 05 November 2009
[04]	VCS Validation Report for "Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India" Version 01, dated 06 November 2009
[05]	Approved Small-scale Methodology – Indicative baseline and monitoring methodology AMS ID, version 14: "Grid connected renewable electricity generation"
[06]	CDM Executive Board: Validation and Verification Manual, version 01.1
[07]	Calibration records for the energy meters used to measure the energy delivered by the WTGs for the period 05 February 2007 to 01 September 2009
[08]	Joint meter readings and invoices for all the months and for all WTGs for the period 05 February 2007 to 01 September 2009
[09]	Version 01 of "Guidelines for Assessing Compliance with the Calibration Frequency Requirements", EB 52, Annex 60

APPENDIX II : RESOLUTION OF CARs AND CLs

Resolution of Corrective Action and Clarification Requests: - "Bundled grid-connected wind electricity generation project identified as Bundle E3 in Maharashtra and Gujarat, India"

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
CAR 1: As per the VCS PD, the calibration frequency of the main and check meter used for evacuation of electricity to the grid in both the states has been defined as annual. PJRCDM reviewed the calibration certificate provided for the 3 PPs i.e. KNC, UIC and HMIPL and observed the following: - **UIC:** a) Only one certificate is provided with validity from October 2007 to October 2008. Please clarify how this covers the entire monitoring period under consideration.		UIC: a) The annual calibration certificate covering the period 8th October 2007 to 31st August 2009 except June 2009 have been submitted to the validator. For the remaining duration of the crediting period, the net electrical energy exported to grid has been corrected in line with guidelines of EB 52 Annex 60 by applying the maximum permissible error of the instrument to the measured values as	UIC: a) The submitted documents were reviewed and as all the testing records indicate that the errors are within permissible limits, the PP has correctly applied the correction factor of maximum limit of error applicable to the energy meter class, issue is resolved.

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
		per the following algorithm:- Corrected net electricity exported for the monitoring period for which calibration certificates are not available = Gross electricity exported for the same period X (1- maximum permissible error) – Electricity imported from grid for the same period X (1+ maximum permissible error)	
b) In addition to above, provided certificate does not state anything about the meter numbers (main and check meter). The details regarding the meter no's and also the calibration dates (covering the entire monitoring period) to be included in the monitoring report.		b) The relevant details have been incorporated in the monitoring report submitted to the validator.	b) The submitted documents are dated October 2007, May 2008 and July 2009, essentially covering the monitored period from October 2007 to September 2009, except June 2009. The PP has applied the correction factor from March 2007 to October 2007 and for June 2009, hence has followed the latest CDM guidance, hence issue is resolved.
c) PP is also required to clarify if all the WTGs belonging to UIC connected to only one set of meters. If not, the calibration certificates of all the		c) All the WTGs belonging to UIC, *i.e.*, K537, K539, K542, K543, are connected to the same meter no.	c) As checked against the monthly break-up sheets issued by the MSEDCL, it is confirmed that all the

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
meters (main and check meter) to which individual WTGs belonging to UIC are connected to. **HMIPL:** a) Please clarify the feeder name/number to which the WTG J-43 is connected to. b) Please clarify how the provided certificate covers the entire monitoring period under consideration.		4860905 and calibration certificates for the same meter have been submitted to the validator. HMIPL: a) The WTG J-43 is connected to feeder Jamde 14 and the same can be verified from the Joint Meter Readings (JMRs) submitted to the validator. b) The annual calibration certificate covering the period June 2008 to 31st August 2009 except June 2009 have been submitted to the validator. For the remaining duration of the crediting period, the net electrical energy exported to grid has been corrected in line with guidelines of EB 52 Annex 60 by applying the maximum permissible error of the instrument to the measured values as	four WTGs are connected to the same energy meter at Nandurbar II, hence issue is resolved. a) As checked against the monthly break-up sheets issued by the MSEDCL, it is confirmed that all the four WTGs are connected to the same energy meter at Jamde 14, hence issue is resolved. b) The submitted documents are dated May 2008 and July 2009, essentially covering the monitored period from May 2008 to September 2009, except June 2009. The PP has applied the correction factor from February 2007 to May 2008 and for June 2009, hence has followed the latest CDM guidance, hence issue is resolved.

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
		per the following algorithm:- Corrected net electricity exported for the monitoring period for which calibration certificates are not available = Gross electricity exported for the same period X (1- maximum permissible error) – Electricity imported from grid for the same period X (1+ maximum permissible error)	
c) PJRCDM also requests PP to clarify the meter no's (main and check meter) to which the WTG J-43 is connected to. Please add the information regarding the calibration dates in the monitoring report (covering the entire monitoring period).		c) The relevant details have been incorporated in the monitoring report submitted to the validator.	c) The relevant information has been included in the revised MR, hence issue is resolved.
KNC: a) Certificate provided is dated 27 August 2008. Please clarify how this covers the entire monitoring period under consideration.		KNC: a) Calibration certificate covering the period 20/08/2008 to 19/08/2009, dated 27/08/2008 have already been	KNC: a) The PP has submitted the calibration record for the energy meter with serial number "GJU 04432." However this

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
		submitted to the validator. For the remaining duration of the crediting period, the net electrical energy exported to grid has been corrected in line with guidelines of EB 52 Annex 60 by applying the maximum permissible error of the instrument to the measured values as per the following algorithm:- Corrected net electricity exported for the monitoring period for which calibration certificates are not available = Gross electricity exported for the same period X (1- maximum permissible error) – Electricity imported from grid for the same period X (1+ maximum permissible error)	energy meter is located at the WTG (as responded in b) below) and not at the 220 kV Suthari S/S, which is used to measure the energy delivered by all WTGs, and whose readings are reported in the certificates issued by GEDA. Hence the PP is requested to clearly indicate the location of this energy meter and apply the correction factor applicable to the energy meter located at the Suthari S/S. Issue is open, refer CAR #1.1.
b) Further, the certificate provided is for the meter no. GJU 04432. PJRCDM also reviewed the JMR sheets provided and observed that the details have been provided PP wise for Suthri sub-station. However, this document does not state anything about the WTG identification. PJRCDM		b) The calibration certificate issued by Paschim Gujarat Vij Company Limited, dated 27/08/2008 pertains to the meter number GJU 04432 of the WTG owned by KNC. The Gujarat Energy Development Agency report	b) Since the energy meter is located at the WTG, and not at the Suthari 220 kV S/S, where GETCO measures the energy delivered by all WTGs and whose readings are reported in the

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
requests PP to provide the feeder diagram clearly showing the WTGs (with identification no.) connected to the feeder and also showing the metering point clearly stating the meter numbers for verification.		issued monthly mentions the net electricity export by the individual PP to the Suthri sub-station. A line diagram has been submitted to the validator.	certificates issued by GEDA. Hence the PP is requested to clearly indicate the location of this energy meter and apply the correction factor applicable to the energy meter located at the Suthari S/S. Issue is open, refer CAR #1.1.
CAR #1.1 For the WTG W-55 belonging to KNC, the PP has submitted the calibration record of the energy meter located at the WTG and applied the correction factor for the readings taken from the energy meter located at the S/S. The PP is requested to indicate the serial number of the energy meter located at the Suthar S/S which is being used to measure the energy delivered by the WTG, provide the calibration records for that meter and apply the correction factor accordingly.		The calibration records of the energy meter located at the Suthar S/S that is being used to measure the energy delivered by the WTG has been submitted to the validator.	The calibration records for the bulk energy meter have been submitted by the client, hence issue is resolved CAR is CLOSED.
CAR 2: Related to the emission reduction calculation sheets: PJRCDM reviewed the emission reduction excel sheet and also the	MR		

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
documentary evidence provided. Following points were observed which needs to be addressed by the project developer: 1. Controller reading needs to be added in the excel sheet provided. 2. For WTG W-55, gross export, import also needs to be stated in the excel sheet. 3. Details regarding the discrepancies in the data transfer and missing data are as provided below: **1) KNC (WTG W-55):** a) JMR copy has not been provided for the months from April to October		1. As per the VCS PD, the emission reduction calculation is based on the Joint Meter Reading issued by the state electricity board. However, as per the request of validator, sample generation data have been submitted. 2. The gross export and import data for the Suthri sub-station has been incorporated in the Emission Reduction excel sheet submitted to the validator. KNC: a) JMRs corresponding to entire monitoring period except for April-	1. The PP was requested to include the controller readings to analyze the vis-à-vis monthly generation as recorded at the WTG and as reported in the JMR. As the value reported in the JMR / break-up sheets is exceeding the corresponding month's generation, as given in the document submitted by the PP, further clarification is requested on the difference. Issue is open, refer CL #1. 2. Since the gross export/import data as reported in the GEDA certificates is used for estimating the net energy delivered by the WTGs, inclusion of the same was accepted, issue is resolved. KNC (WTG W-55): a) The PP has submitted the corresponding documents, and since

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
2007 and also for January 2008.		October 2007 and January 2008 have been submitted to the validator. Hence, net electricity exported to the grid for the same period has not been considered in emission reduction calculations.	they were unable to provide the supportive documents for the period stated, they have not accounted for those months' generation, which is deemed conservative, hence issue is resolved.
b) Generation record is not available for the period from 03 July 2007 to 25 July 2007. Please explain the reason for the same.		b) The net electricity exported to the grid for the month of July 2007 has not been considered in emission reduction calculations	b) The PP has not accounted for the said period, and hence issue is resolved.
2) <u>UIC:</u> a) Import reading was found to be incorrect for the month of December 2008. b) Generation record for the period from 01 May 2007 to 03 May 2007 is missing. Please explain the reason for the same. c) Monitoring period has to be redefined considering the end date in the JMR for the month of August 2009.		UIC: a) The correct import reading of K542 for month of December 2008 can be verified from JMR which is 935. b) The generation record corresponding to the period 01 May 2007 to 03 May 2007 has not been considered in the emission reduction calculation. c) The monitoring period has been redefined as per the JMR.	UIC: a) Necessary correction made, issue is resolved. b) The PP has not accounted for the said period, hence issue is resolved. c) The monitored period has been restricted to 1st September 2009, hence issue is resolved.

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
3) **HMIPL**: JMR copies need to be provided for all the months considered in the current monitoring period.		HMIPL: The JMRs for all the months considered in the current monitoring period have been submitted to the verifier.	HMIPL: The JMR copies have been provided by the PP, hence issue is resolved. CAR is OPEN, refer CL #1
CAR #3 The MR should also include the comparison of achieved ERs to those estimated.	MR	A comparison of the estimated emission reduction and the emission reduction achieved has been included in the monitoring report.	As the ERs delivered by the project activity are comparable to the estimated values, and the excess generation by the WTGs of M/s UIC Udyog Limited in the year 2008 is only 3.7%, which is within the limit of 10% variation to which the project's additionality was checked against, the verification team concludes that the project activity continues to be additional; issue is resolved CAR is CLOSED.
CL #1 The controller readings, as presented as evidence by the PP, report the monthly generation at values different from those used in JMR sheets, which on occasions exceed the generation recorded at controller (e.g., June 2007 for J-43). The	Controller readings and JMR sheets	The generation record at the controller represents the electricity generated by the WTG from 00:00 hrs of the 1st day of every month to the 00:00 hrs of the 1st day of next month. However, depending upon the date and time of joint meter	As there is a difference between the dates of taking the controller readings, the explanation provided by the client was accepted and issue resolved; CL #1 is CLOSED and consequently, CAR #2 is also CLOSED.

Draft report clarification requests and corrective action requests by verification team	Reference	Summary of project owner response	Verification team conclusion
PP is requested to clarify on the differences.		reading by the respective state electricity board which does not always coincide with the measuring period of controller, the JMR value may vary from the controller data.	

APPENDIX III: LIST OF PARAMETERS

List of parameters covered during the verification period under consideration *(mention the verification period)* and details regarding the monitoring and reporting practices.

S.No.	Monitoring and reporting practice/Parameter	EG_y
1.	Monitoring and reporting frequency as verified during the site visit.	Electricity supplied by the WTGs in the project activity to NEWNE regional grids of India, EG_y, is monitored daily, measured and reported monthly
2.	Monitoring equipment verified during the site visit.	Tri-vector energy meters Accuracy of 0.2 class in Maharashtra Accuracy of 0.5 class in Gujarat
3	Calibration frequency and other details verified during the site visit.	Calibration frequency as defined in PD: once in a year As consolidated in Table 5 of the Verification Report. The reference standard meters are of 0.1 accuracy class. The calibration dates are summarized in Table 5. There were intermittent periods for which calibration was not covered. Later calibrations did not indicate the energy meters were operating beyond permissible error limits. Hence the PP has applied a correction factor corresponding to the accuracy class of the energy meters for the intervening period from export and import values as per EB 52 Annex 60 guidance and therefore, the net energy delivered values and consequently the emission reductions are more conservative.
4.	The above parameters are in line with the MP agreed in the PD.	No but net electricity delivered to grid corrected with maximum error percentage applicable for the energy meters, hence acceptable.
5	The above parameters are in line with the monitoring methodology applied for the proposed project.	No but net electricity delivered to grid corrected with maximum error percentage applicable for the energy meters, hence acceptable.
6	Calibration entity and if the same is in line with the monitoring plan as agreed in the registered PDD.	**Gujarat**: Paschim Fujarat Vij Company Limited **Maharashtra**: Testing Division, Maharashtra State Electricity Transmission Co. Ltd., Dhule No specific entity was identified during validation and hence acceptable