

PERRY JOHNSON REGISTRARS



Voluntary Carbon Standard 2007.1

VERIFICATION REPORT

**KAMAL ENGINEERING
CORPORATION**

Bundled Grid Connected 2.9 MW Wind Power Project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd]

**VERIFICATION PERIOD:
02nd September 2009 to 31st January 2011
(both days included)**

Project No/ Rev. No.: V-2-I-01-S-0158-Ve/01

Verification Report

Name of Verification company:	Date of issue:
Perry Johnson Registrars CES Inc.	23/08/2011
Report Title:	Approved by:
Verification report – “Bundled grid connected 2.9 MW wind power project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd]”	Mathsy Kutty.
Client:	Project Title:
Kamal Engineering Corporation Contact person: Mr. S.K. Gupta Manager, Kamal Engineering Corporation	Monitoring report of “Bundled grid connected 2.9 MW wind power project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd]”, version 05 Date:18/07/2011
Summary:	
Kamal Engineering Corporation has commissioned Perry Johnson Registrars Carbon Emissions Services Inc. (PJR CES) for verification of the project – “Bundled grid connected 2.9 MW wind power project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd]” under Voluntary Carbon Standard (VCS). The verification involves independent review of the implementation of project as per VCS project document (PD) and its monitoring plan. The project activity involves installation of two wind turbine generators (WTG) of 1.65MW and 1.25MW capacity totaling to an installed capacity of 2.9 MW. The project activity is located across two states of India namely, Maharashtra and Tamil Nadu. The WTG installed in Maharashtra exports power to the integrated Northern Eastern Western North Eastern (NEWNE) grid of India. The WTG installed in Tamil Nadu exports power to Southern grid of India. A site visit and review of documentary evidences were made to verify the project operation. A number of Clarification Requests (CLs) and Corrective Action Requests (CARs) were issued which were subsequently resolved by the project proponent. In our opinion, the GHG emission reductions reported in the monitoring report version 05 dated 18/07/2011 are fairly stated. Based on the assessment, PJRCES is able to certify that the implementation of the project has resulted in GHG emission reduction of 5479 tCO₂ equivalent during the period 2nd September 2009 to 31st January 2011 (both days included). PJRCES’s opinion regarding the reported emission reductions for the period from 02nd September 2009 to 31st January 2011 (both days included) is based on the information sought and also reviews of 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. PJRCES’s verification/certification of GHG emissions is limited to this information evaluation. Issuance and utilization of certified GHG-emission reductions is beyond the scope of PJRCES.	
Report Number/ Revision Number	Number of pages
V-2-I-01-S-0158-Ve/01	33
Work carried out by:	Work Reviewed by:
Rohit Badaya, Tushar Chaudhari, Anjana Sharma	Mathsy Kutty – Independent Technical Reviewer.

Abbreviations

CAR	Corrective Action Request
CEA	Central Electricity Authority
CDM	Clean Development Mechanism
CES	Carbon Emissions Services
CL	Clarification Request
EB	Executive Board of the Carbon Emissions Services
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
kW	Kilo Watt
kWh	Kilo Watt-hour
MW	Mega Watt
NEWNE	Northern Eastern Western North-Eastern integrated electrical grid network of India
PD	Project Document
PJR CES	Perry Johnson Registrars Carbon Emissions Services Inc.
PP	Project Proponent
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
WTG	Wind Turbine Generator

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1 INTRODUCTION

Kamal Engineering Corporation “hereinafter referred to as the client, project proponent or project developer” contracted Perry Johnson Registrars Carbon Emissions Services Inc. (PJRCES) to perform verification of the project activity “Bundled grid connected 2.9 MW wind power project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd]” under the Voluntary Carbon Standard (VCS) 2007.1 for the period 02nd September 2009 to 31st January 2011 (both days included). The 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 or registered under a VCS approved GHG program.

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 2.9 MW wind power project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd]”.

The specific scope of the verification work involves:

- To verify that the project activity is implemented as per the project details of the validated project design document (PD)
- To assess whether the emissions reductions determined are in conformance with the monitoring plan of the VCS 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 VCS2007.1 standard including the criteria that the emission reductions are real, measurable, transparent and conservative. The approach adopted by PJR CES 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 PJR CES is free from any conflict of interest.

Request for issuance of Voluntary Carbon Units (VCUs), verified and certified by PJR CES, 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, PJR CES’s responsibility is limited only to verification and certification of the GHG emission reductions achieved during the specified period.

VCS VERIFICATION REPORT**1.3 VCS project Description**

The project activity is a renewable energy project with 1.65 MW capacity wind turbine generator (WTG) exporting power to NEWNE grid of India and 1.25 MW capacity WTG exporting power to Southern grid of India. The project details are as follows:

Project owner : Kamal Engineering Corporation

Location : Tirunelveli district in Tamil Nadu and Dhule district in Maharashtra, India

Title of the VCS PD : Bundled grid connected 2.9 MW wind power project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd] version 03 dated 11/12/2009.

Validation Report ID : V-3-I-01-S-0061-Ve/1.1, dated 11/12/2009

Methodology used : AMS I D, Version 13

VCS Crediting period : 28th March 2006 to 27th March 2016 (fixed)

Monitoring period in this report: 02nd September 2009 to 31st January 2011(both days included)

During the verification site visit, the schedule of installation of equipments and location under the project activity was found as follows:

WTG Location	Make	Capacity (MW)	Village/Town	District, State	Commissioning date
K-118	Suzlon	1.25	Devarkulam	Tirunelveli, Tamil Nadu	29 th March 2005
L-12	Vestas	1.65	Brahmanvel	Dhule, Maharashtra	08 th February 2006

The geographical coordinates of the site were

WTG installed in Maharashtra

Latitude: 21⁰ 09' 57.2" North

Longitude: 74⁰ 12' 28.7" East

WTG installed in Tamil Nadu

Latitude: 08⁰ 57' 18.3" North

Longitude: 77⁰ 35' 14.9" East

The renewable energy power generated from the project activity is supplied to the NEWNE grid and Southern grid of India.

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Carbon Emissions Services, Inc.

In line with the VCS 2007.1, crediting period start date has been considered after 28th March 2006. Accordingly, the monitoring period for the project activity under VCS is from 02nd September 2009 to 31st January 2011(both days included).

1.4 Level of assurance

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

This implies that, based on the process and procedures conducted, PJRCES should state whether 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 validated VCS PD and the approved methodology for information pertaining to GHG quantification, monitoring and reporting.

The verification work is carried out as per this requirement and details are presented in the Verification statement in section 4 below.

2 METHODOLOGY**2.1 General Approach**

The project activity applies approved baseline and monitoring methodology AMS I D (version 13) categorised under Sectoral scope 1- 'Energy Industries (renewable/non renewable sources)'. For verification, PJRCES'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 PJRCES were involved in these steps :

Name	Role	Areas covered
Anjana Sharma	Technical team leader / validator	Supervision of "completeness check of monitoring report, desktop review, site visit, issuance and closure of findings, report preparation."
Rohit Badaya	GHG Auditor	Completeness check of monitoring report, desktop review, site visit, issuance and closure of findings, report preparation
Mathsy Kutty	Technical Reviewer	Independent technical review

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 VCS2007.1 standard requirements is reviewed. A desktop review is further carried out to assess the following:

- the validated VCS PD with the monitoring plan
- the emission reduction calculation method used in the applied methodology and the VCS 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

An onsite visit was undertaken on 07/04/2011 for the WTG located in Tirunelveli (district), Tamilnadu (state), India and on 11/04/2011 for the WTG located in Dhule (district), Maharashtra (state), India. During the site visit, the auditor verified the actual operation of the project as described in the VCS PD and also discussed the issues identified during the desktop review of the documents provided by the project proponent.

List of personnel interviewed and issues discussed during the site visit is as provided below:

WTG located in Tamil Nadu (site visit)

Name, Designation	Affiliation	Interviewed on 07/04/2011
Mr. P. Subramanian, CRM Engineer	Suzlon Energy Limited	• Project technical skills • Monitoring system • Calibration practices • Joint Meter Readings • Generation records • Records and archiving
Mr. K.P. Pradvash, Engineer	OMS – SISL	
Mr. S.K. Gupta, Manager	Kamal Engineering Corporation	

WTG located in Maharashtra (site visit)

Name, Designation	Affiliation	Interviewed on 11/04/2011
Mr. D. Arul Murugan, Senior Engineer	Vestas Wind Technology	• Project technical skills • Monitoring system • Calibration practices • Joint Meter Readings • Generation records • Records and archiving
Mr. Ravi Mukund, Engineer	Vestas Wind Technology	
Mr. S.K. Gupta, Manager	Kamal Engineering Corporation	

During the site visit, PJR CES verified the actual operation of project as described in the VCS PD. In particular, the site visit covered the review of proof of title, roles and responsibilities and monthly generation records (issued from the state electricity utility company and O&M contractor). The calibration practice for the energy meters were also reviewed.

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, a list of non conformities, also called as Corrective Action Request (CAR) is raised. The non conformities could be related to lack of adherence to the VCS requirement, the monitoring plan of the validated/registered PD or where evidence provided is found insufficient to prove conformity. They could also be mistakes in applying data/assumptions and in calculation of emission reductions.

If information made available is insufficient to transparently arrive at the stated conclusion, a Clarification request (CL) is 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 requirements is checked along with a revised monitoring report. Closure of comments raised occurs only if the response provided and correction made fully complies with the stated requirements of the methodology applied.

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

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Summary of findings: Among the major findings, CL01 was raised as the present monitoring period provided in version 01 of the monitoring report covered a day which was already included in the 1st verification of the project activity. Further the monitoring period at various places in the monitoring report was found incorrect. The revised monitoring report mentions correct monitoring period in the VCS PD and CL 01 was successfully closed.

CL 02 was raised as the value of the parameter “Net electricity supplied to the grid” was wrongly written under Section 3 of the monitoring report. However the correct value of “net electricity supplied” has now been provided in the revised monitoring report and CL 02 was successfully closed.

CAR 1 and CAR 2 was raised due to mismatch of “net electricity export” values with the evidences provided. Further there was a mismatch between the billing period as provided in the CER excel sheet and evidences. The calibration certificates were not submitted to the DOE. However the CAR1 and CAR 2 has now been successfully closed upon corrections provided in the revised monitoring report and submission of calibration certificates.

CL 3 was raised as there was difference between the emission reductions estimated in the registered VCS PD and during the present (2nd verification) verification of the project activity. It was not discussed in the monitoring report the reasons for the difference in emissions reductions. However the same has been discussed in the revised monitoring report. The PLF obtained for the present verification period has also been calculated in the revised CERs excel sheet and the same has been compared with the PLF specified in the registered VCS PD. Hence CL 3 was successfully closed.

CAR 3 was raised as the two spreadsheets were provided in the CERs excel sheet. It was not clear as to which excel sheet has to be considered. However a single and final excel sheet for the calculations has now been provided in the revised CERs excel sheet and the CAR 3 is now successfully closed.

2.2.4 Determinations of the reductions in GHG Emissions

The emission reductions ER_y by the project activity during the crediting period is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as follows:

1). Baseline Emissions: Baseline emissions (BE_y in tCO_2) are the product of the baseline emission factor (EF_y in tCO_2/MWh) and the electricity supplied by the project activity to the grid (EG_y in MWh).

The project activity consists of two WTGs located in two different states of India i.e Tamil Nadu and Maharashtra. Both these states of India are connected to two different regional power grids; Tamil Nadu forms part of Southern regional grid while the state of Maharashtra forms part of North East West North East (NEWNE) regional grid of India. Hence the emission factor of both these grids has been taken into consideration to arrive at the final emission reductions. As per the validated VCS PD, grid emission factor for both the grids has been fixed ex-ante. For the current verification period, PJRCES was able to verify the VCU calculations based on the following ex-ante fixed grid emission factors:

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- Southern grid: 0.931 tCO₂ / MWh
- North East West North East grid: 0.906 tCO₂/MWh

Net electricity supplied to the grid by both WTGs located in two different states has been verified from the “statement showing the energy generated through wind mill” issued by “TNEB” and the “electricity generation report” issued by MSEDCL for the WTGs located in the state of Tamil Nadu and Maharashtra respectively. The same is in line with the validated VCS PD. It has been confirmed that these JMR sheets are based on the readings from the calibrated meters located at the respective sub stations. Calibration of the main meter in case of WTG installed in Tamil Nadu and calibration of main and check meter in case of WTG installed in Maharashtra have been verified by the PJRCES.

2). Project Emissions: The project emissions have been considered as zero.

3). Leakage: No leakage has to be considered for the project activity.

4). Emission Reductions: $ER_y = BE_y - PE_y - L_y = BE_y$

The procedure for determining emission reductions from baseline, project and leakage emissions is found as per the algorithm and formulae of methodology AMS ID version 13 applied in the validated VCS PD.

During the period from 2nd September 2009 to 31st January 2011 (both days included), the total electricity exported to the grid by the WTG located in the state of Maharashtra is 2948.186 MWh and the WTG located in the Tamil Nadu exported 3016.708 MWh. The same has been verified from the Joint meter readings issued by the state electricity boards of the respective states which was further cross verified from the invoices raised by the project developer. Based on this net electricity generation and the ex-ante fixed grid emission factors, the emission reductions resulting from the project during the period from 2nd September 2009 to 31st January 2011 (both days included) have been calculated as 5,479 tCO₂e

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

2.2.5 Review of Additional Data from other Sources if appropriate

The VCS PD dated 11th December 2009 and VCS validation report dated 11th December 2009 issued by PJRCES was also reviewed for any issues to be taken into account during verification.

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 is sent to the technical reviewer. In this stage, the technical reviewer independently assesses 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 further issues are identified from the discussion, findings and conclusion from the validation report, dated 11th December 2009 of the VCS project. The project activity is in validation stage under CDM and registration status of the project activity shall be again checked during the next verification.

3.2 Project Implementation

The project activity involves installation of two wind turbine generators (WTGs) of 1.65MW and 1.25MW capacity totalling to an installed capacity of 2.9 MW. The project activity is located across two states of India namely Maharashtra and Tamil Nadu. At the time of verification of the project activity, both the WTGs were operating. PJRCES was also able to verify through site inspection and document review that there is no change in the project design compared to the design discussed in the VCS PD dated 11th December 2009.

3.3 Completeness of Monitoring

The project proponent has applied simplified approved methodology AMS I.D. version 13 to the project activity. As per the monitoring plan in the validated VCS PD, the only parameter that needs to be monitored is the net electricity supply from the WTGs to the respective grid. Grid emission factor of the respective grids have been fixed ex-ante as per the VCS PD dated 11th December 2009.

The monitoring plan consists of monitoring the energy generated by the project activity as measured by the installed meters. These energy meters used for monitoring are electronic trivector meters, which measure both the amount of electricity imported from and exported to the grid continuously.

In case of Maharashtra, since the WTG under the project are connected to the same feeder to which other WTGs are also connected, the energy generation of each WTG is arrived at based on the agreed procedures followed by the MSEDCL. The recording of the electricity fed to the state utility grid is carried out jointly at the incoming feeder of the state power utility (MSEB). The joint measurement is carried out once in a month in presence of both the parties (the developers' representative and officials of state electricity board). Both parties sign the recorded reading and a joint monitoring report is prepared.

The electricity fed by individual WTG to the grid is calculated by the apportioning procedure. The procedure takes into account apportioning of the total energy generated by each WTG connected to the feeder and the equivalent line losses of each WTG. Based on this calculations, the generation report is issued to the project participant. Based on this final invoices are raised by PP to MSEDCL. Hence emission reductions calculations have been sourced based on the generation report and invoices. The total export and import of each WTG have been

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monitored as part of monitoring plan. The data has been consolidated and emission reductions have been calculated based on these net generating figures.

In case of Tamil Nadu, the WTG is connected to the evacuation facility to supply electricity to the grid. The energy generation of each WTG is arrived at by recording the electricity by meter installed at the HT side of the step up transformer of the transformer yard at the WTG location. The joint measurement is carried out once in a month in the presence of both parties (the developer's representative and officials of the state power utility). The energy generation statement is then issued by Tamil Nadu electricity board based on which the emission reductions calculations are sourced.

PJRCES was able to verify in both the states, the net electricity supply from the WTGs to the grid is measured using the calibrated meters. Calibration certificates of the meters for the WTGs in both the states have been checked for the entire monitoring period. Accuracy class of the meters and the frequency of calibration was found to be in line with the monitoring plan of the VCS PD.

Complete data of electricity supply to the grid was available for the entire verification period which was verified by the PJRCES. Grid emission factor of the respective grids have been fixed ex-ante as per the VCS PD dated 11th December 2009.

The summary of completeness is found below:

Description of parameter	Source of data	Completeness check
Net electricity supplied to the grid	Energy generation report by the MSEDCL and energy generation statement by TNEB. Invoices raised by project participant to state grid.	Yes, available for the entire monitoring period duration as per plan of validated PD

Through the above assessment, the completeness of the monitoring system is checked and found in order.

3.4 Accuracy of Emission Reduction Calculations

The accuracy of the emission reductions for the project activity depends on the accuracy of energy meters at site, the readings taken thereof, data from records applied in monitoring report and the calculation of emission reductions.

PJRCES was able to verify in both the states, the net electricity supply from the WTGs to the grid is measured using the calibrated meters. Calibration certificates of the main meter in case of the WTG in Tamil Nadu and main meter and check meter in case of WTG in Maharashtra have been checked for the entire monitoring period. Accuracy class of the meters and the frequency of calibration was found to be in line with the monitoring plan of the VCS PD.

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As far as the accuracy in the data applied in the monitoring report and CERs excel sheet, Clarification (CL) and Corrective actions request (CAR) were sought during the verification process. CL 02 was raised as the value of the parameter “Net electricity supplied to the grid” was wrongly written under Section 3 of the monitoring report. However the correct value of “net electricity supplied” has now been provided in the revised monitoring report and CL 02 was successfully closed..

CAR 1 and CAR 2 were raised due to mismatch of “net electricity export” values with the evidences provided. Further there was a mismatch between the billing period as provided in the CER excel sheet and evidences. The mentioned in the evidences was not matching with the evidences provided. The calibration certificates was not submitted to the DOE. However the CAR1 and CAR 2 has now been successfully closed upon corrections provided in the revised monitoring report and submission of calibration certificates.

PJRCES was able to confirm correct value of this parameter is used in the emission reduction calculations. On review, it was observed that this parameter has been fixed ex-ante during the validation of the project activity (VCS PD dated 11th December 2009) and the same has to be used for ER calculations during the VCS crediting period of 10 years. Even during the validation stage, the said parameter was derived from the officially published latest data from Central Electricity Authority of India (CEA - <http://www.cea.nic.in/>) which authentic source of information. The OM and BM factors were verified as per CEA grid emission database version 04 and the calculation of combined margin using the weights for wind energy projects were provided in AMS I.D. methodology. Hence the chances of error in the data is very less. The accuracy of final emission reduction calculations were also reviewed and found Ok.

3.5 Quality of Evidence to Determine Emission Reductions

For net electricity supplied to the grid ($EG_{y,net}$), the monthly credit notes (energy generation reports) issued by MSEDCL for the WTG located in Maharashtra and credit notes (statement on energy generation) issued by TNEB for the WTG located in Tamil Nadu are used for comparing generation records in the monitoring report. The credit notes are signed official copies from state electricity board personnel. The records were further cross checked with the monthly invoices raised by the project proponent for payments against net electricity exported to the grid and found in order. The monitoring parameter “net electricity supplied to the grid” is monitored correctly as per the VCS PD monitoring plan. The grid emission factor was applied as per the combined margin of OM and BM – data for which was derived from the CEA grid emissions database version-4 and was in line with the monitoring plan.

Records of annual calibration of energy meters undertaken by the state electricity grid operator were reviewed. Hence, the quality of the evidence provided is found to be relevant and credible and in line with the monitoring plan of the validated VCS PD.

3.6 Management and Operational System

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Kamal Engineering Corporation through their O&M contractors has established management procedures and implemented the systems to ensure that it is consistent as stated in the monitoring plan of the VCS PD.

The monitoring data is recorded monthly by the state electricity board and O&M contractor. Further, the O&M contractors perform regular checks on the electricity generation pattern from wind machines. The monitored data is reviewed at the end of every month.

The procedures cover management responsibilities, data monitoring procedures, training procedures, periodical audits, management reviews and corrective actions in case of any deviations effectively. Calibration process of the meters is undertaken by the state electricity board as per defined procedures and carried out periodically as per the electricity board's requirement. The calibration certificates of the energy meters used for data monitoring and recording were also verified during the site visit.

4 VERIFICATION CONCLUSION AND CERTIFICATION STATEMENT

Perry Johnson Registrars CES Inc. has performed verification under VCS of the project “ Bundled Grid connected 2.9 MW Wind Power Project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd.]”. The verification under VCS is sought for the period from 2nd September 2009 to 31st January 2011 (both days included). The project has applied the AMS I D small scale CDM methodology (version 13) and the emission reductions are as reported in the revised monitoring report version 05 dated 18th July 2011.

The project developer, Kamal Engineering Corporation, is responsible for preparation of the GHG emission reductions data as presented in the Monitoring Report Version 05 dated 18th July 2011. PJR CES is responsible for the independent GHG assessment and providing its opinion on the performance of emission reductions for the period 2nd September 2009 to 31st January 2011. The verification approach was based on the requirements of VCS 2007.1 standard and the AMS I D methodology (version 13).

PJRCES’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 the review of supporting evidences and information provided, including other explanations where necessary to enable PJRCES to provide reasonable assurance that the reported amount of GHG emission reductions for the specified period is materially correct and fairly stated.

CERTIFICATION STATEMENT:

PJRCES confirms that the project activity has been implemented as per the VCS PD and that the emission reductions presented in the monitoring report version 05 dated 18th July 2011 are correctly determined as per the VCS 2007.1 standard and AMS I D methodology, version 13. Based on the above information, PJR CES confirms the following:

Name of the project	“Bundled Grid connected 2.9 MW Wind Power Project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd.] ”
VCS PD details	VCS PD dated 11 th December 2009. Methodology AMS I D Version 13.

Reporting period (dd/mm/yyyy) : 02/09/2009 to 31/01/2011

Verified emission in the above reporting period:

Project emissions	: 0	tCO ₂ equivalents
Baseline emissions	: 5479	tCO ₂ equivalents
Emission reductions	: 5479	tCO₂ equivalents



Project Manager

PJRCES

Site Program Manager

PJRCES

APPENDIX I: DOCUMENTS REVIEWED

1.	Voluntary Carbon Standard 2007.1
2.	Monitoring Report: “Bundled Grid connected 2.9 MW Wind Power Project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd.]” dated 18/07/2011 (version 05) and previous versions.
3.	Project Description: “Bundled Grid connected 2.9 MW Wind Power Project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd.]” dated 11/12/2009.
4.	VCS Validation Report – “Bundled Grid connected 2.9 MW Wind Power Project in India by Kamal Engineering Corporation [Unit of KEC Industries Ltd.]” V-3-I-01-S-0061/01.1 dated 11/12/2009
5.	Approved small-scale methodology – Indicative baseline and monitoring methodology AMS ID, version 13: “Grid connected renewable electricity generation”
6.	CDM Executive Board: Validation and verification manual, version 1.2
7.	Excel worksheet for emission reduction calculations 05 dated 18/07/2011
8.	Calibration certificate of Serial No. 04760195 & 04760207 dated 22/09/2009
9.	Calibration certificate of Serial No. 04691356 dated 13/02/2010
10.	Invoices for the WTG (Loc No. - K118) for the complete monitoring period.
11.	Invoices for the WTG (Loc No. - L12) for the complete monitoring period.
12.	Central Electricity Authority CO ₂ grid emission factor database version 4, September 2008.

APPENDIX II : RESOLUTION OF CARs AND CLs

Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
CL 01 The following issues have been identified with respect to the monitoring period mentioned in the monitoring report. The monitoring period as per the MR submitted is from 01/09/2009 – 31/03/2011, however 01/09/2009 has already been included during first VCS verification of the project activity. Please clarify.	Section 1	<u>PP's Response1</u> During last monitoring period no data of 01.09.2009 has been included at all because it is joint meter reading date done for the generation and its invoicing up to August 2009 by us to the MSEDCL .For September month of 2009 , now we have included it because this month generation has not been earlier considered by us. Vide page no 35 of submitted scanned invoices this aspect is very much clear. Because no joint meter reading can ever be taken in the night at 00.00 hours , it is always taken on the morning of next day itself , which is 1st day of each month for the reading of previous month . Thus it has not been already included . Collapse of date is only due to the prevalent system of joint metering as already above stated . Even we change date of monitoring period from 1st to 2nd September 2009 it will not affect actual meter reading at all . Hence to avoid confusion we are amending monitoring period as from 2nd September to 31st Jan 2011 in all	<u>DOE Assessment 1</u> The monitoring period for first verification was from 28th March 2006 to 01st September 2009. Since the date 1st September 2006 has already been included in 1st verification of the project activity hence the same shall not be considered for the 2nd verification of the project activity.

VCS VERIFICATION REPORT



Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
		the revised documentation . <u>PP's Resposne2</u> Billing period in the CER excel sheet revised. <u>PP's Resposne3</u> Desired Correction effected. <u>PP's Reponse4</u> Correction effected	<u>DOE Assessment 2</u> The start of monitoring period has been revised from 1st September 2009 to 2nd September 2009 in the revised VCS monitoring report. However emission reductions are still being claimed from 1st September 2009 in the revised emission reduction excel sheet. Hence PP is requested to revised the excel sheet submitted to the DOE. <u>DOE Assessment 3</u> The corrections have not been provided in the excel sheet for the WTG located in Maharashtra. Please correct it. <u>DOE Assessment 4</u>

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
Section 1 of the monitoring report states monitoring period from 28/03/2006 to 03/11/2009 which is not correct. Please clarify. The monitoring period for second verification of project activity is from September 2009 to 31st January 2011. However the monitoring period mentioned in the MR is from September 2009 to March 2011. Please clarify.		<u>PP's Response1</u> Monitoring period has been corrected from 28.03.2006 to 03.11.2009 to 01.09.2009 31.01.2011. Actually it clerical mistake. Corrected monitoring report is being sent along with this replied DVR. Pl see page no 1 and 3 of the revised MR.	The corrections have now been provided in the revised emission reduction excel sheet for the WTG located in the Maharashtra. The issue is closed. <u>DOE Assessment 1</u> The monitoring period for present verification has been revised in the MR. The issue is closed. CL 01 is closed.

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
CL 02 The value of parameter “Net electricity supplied to the grid” has been provided on yearly basis (5460 MWhr) but shall be based on the total monitored value during the monitoring period in the table under Section 3 of the MR.	Section 03	<u>PP’s Response1</u> In the section 3 of the MR net electricity supplied to the grid” has been provided on yearly basis has been changed from 5460 to 5687 as per MS-excel sheet calculation to cover the monitored value during the monitoring period. <u>PP’s Response2</u> Required changes/correction have been effected in the concerned documents <u>PP’s Response3</u> All the required corrections now has been made in the enclosed monitoring report as revised excel sheet.	<u>DOE Assessment 1</u> The net electricity generation value of “5687” provided in the revised MR is not as per the revised CER excel sheet submitted to the DOE. <u>DOE Assessment 2</u> The corrections have not been provided in the revised MR. The net electricity value of “5687” provided in the revised MR is actually “total baseline emissions” as per the provided CERs excel sheet. <u>DOE Assessment 3</u> The net electricity generation value has now been revised as per the revised excel sheet. The issue is closed.

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
			CL 02 is closed.
CAR 1 The following issues have been identified with respect to the WTG located at Tirunelveli, Tamil Nadu (Loc - K-118) The net export value used in the CERs excel sheet is 517129 MWhr (June 2010) while it is 517122 MWhr as per the statement provided by the TNEB and the invoices raised. Please clarify.	Section 5.2 and CERs excel sheet	<u>PP's Response1</u> Required changes/correction have been effected in the concerned documents <u>PP's Response2</u> Required changes/correction have been effected in the concerned documents	<u>DOE Assessment 1</u> PP has not revised "net export value" in the revised MR. Further "net export value" has been mentioned at two places in the excel sheet, hence PP to revise at both the places in excel sheet. <u>DOE Assessment 2</u> The corrections have been made in the excel sheet. However the corrections have not been made in the revised monitoring report.

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
The month of August 2009 has been considered in the excel sheet which is not included in the monitoring period of the 2nd verification of the project activity. Please clarify.		<u>PP's Response3</u> The net export value in the monitoring report now has been revised and in the excel sheet. <u>PP's Response1</u> Now Correction have also been made in the monitoring period . <u>PP's Response2</u> First of all month mentioned as August 2008 in this CAR should be August 2009 for which we submit our clarification as under . During last first verification generation for August-2009 was included as a invoice period from 15.07.2009 to 17.08.2009 , which is the routine period	<u>DOE Assessment 3</u> The net export value in the monitoring report is revised and is as per the excel sheet. The issue is closed. <u>DOE Assessment 1</u> The monitoring period that has been considered for 2nd verification of the project does not include month of August 2009 and hence no electricity generation for month of August 2009 would be considered in the 2nd verification of the project activity. <u>DOE Assessment 2</u> The monitoring period considered for the project activity does not cover the month of August 2009 and hence no electricity generation and emission reductions would

VCS VERIFICATION REPORT

Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
PP is requested to provide calibration certificate dated 13/02/2010 as per the monitoring report and demonstrate that calibration has been carried out as per the		around the middle of each month covering two months in the reading cycle .So it has been partly covered 1st and second certification accordingly .But it is not any double accounting/consideration at all. <u>PP's Response3</u> Since we have already stated the In Tamil Nadu there is always a collapse of two months for reading for one month since the commission of WTG as a established practice of meter reading such partial data of two month generations will always sustain to book the monthly net generation of WTG . But it is not any double accounting/consideration at all. Thus in previous 1st verification this data has not been taken into account and now it is being taken as September, 2009. <u>PP's Response1</u> Calibration certificate dated 13/02/2010 as per the monitoring report and demonstrate that calibration has been carried out as per the frequency defined in the registered VCS PD.has already been provided to you	be claimed for the month August 2009. <u>DOE Assessment3</u> The month of August 2009 has not been considered in the revised calculations in the CERs excel sheet. The electricity generation data has now been considered from 2nd September 2009 onwards till the end of monitoring period. The issue is closed. <u>DOE Assessment1</u> The calibration certificate dated 13/02/2010 has been provided however the calibration certificate for the duration from 1.09.2009 till 12/02/2010 has

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
frequency defined in the registered VCS PD.		vide page no. S-72 of the bunch of scanned invoices and further copies of it were also verified to the during site visit to the verifier by us. Calibration has been conducted as per its frequency OF THREE YEARS mentioned in registered VCS PDD AT PAGE NO 31 TO 33 IN THE SECTION 3.3. <u>PP's Response2</u> Required previous and latest calibration certificates for both locations are being again sent herewith	not been submitted. <u>DOE Assessment2</u> The calibration certificates for the duration from 01.09.2009 till 12.02.2010 for the meters have now been provided to the DOE. The issue is closed. CAR 1 is closed.
CAR 02 The following issues have been identified with respect to the WTG located at Dhule, Maharashtra, (Loc-L12)	Section 5.2 and CERs excel sheet	<u>PP's Response1</u> Desired Corrections made in the revised excell sheet .	<u>DOE Assessment 1</u> The billing period for October is (01.09.2010 to 01.10.2009) and November (01.10.2009 to 03.10.2009) in the revised excel sheet and hence not correct.

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
The billing period mentioned for October 2009 and November 2009 in the excel sheet is not correct. Please correct.		<u>PP's Response2</u> Desired Corrections made in the revised excel sheet . <u>PP's Response3</u> Desired Corrections made in the revised excel sheet . <u>PP's Response4</u>	Further the monitoring period is limited till 31.01.2011 however the generation data up to 03.02.2011 has been considered in calculations in the excel sheet provided. <u>DOE Assessment 2</u> The corrections have not been provided in the revised excel sheet. <u>DOE Assessment 3</u> The billing period for October 2009 is (02.09.2009 to 01.10.2009) and for November 2009 (1.10.2009 to 03.10.2009) in the revised excel sheet is not as per the generation report from MSEDCL submitted to the DOE. Please revise the same. <u>DOE Assessment 4</u>

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
PP is requested to provide calibration certificate dated 20/08/2010 as mentioned in the monitoring report and demonstrate that calibration has been carried out as per the frequency defined in the registered VCS PD.		Desired Correction made in the revised excel sheet . <u>PP's Response1</u> Calibration certificate dated 20/08/2010 has already been submitted to you vide the scanned bunch of invoices vide its page no. V-36 and originally shown during the site visit to your verifier to demonstrate that calibration has been carried out as per the frequency defined in the registered VCS PD. <u>PP's Response2</u> Required previous and latest calibration certificates for both locations are being again sent herewith	The billing period for the month of October 2009 and November 2009 has now been corrected in the excel sheet and issue is closed. <u>DOE Assessment 1</u> The calibration certificate dated 20/08/2010 has been submitted however the calibration certificate for the duration from 01.09.2009 till 19/08/2010 has not been submitted. <u>DOE Assessment 2</u> The calibration certificate has been submitted to the DOE. The issue is closed.
CL 03 PP is requested to include the	Monitoring Report	<u>PP's Response1</u> As per following data there is no any major variation	<u>DOE Assessment 1</u> The discussion has not been

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
discussion related to the difference between estimated yearly emission reductions (as mentioned in the validated VCS PD) and actual emission reductions (as stated in the monitoring report / excel sheet). Reasons for the same needs to be clearly stated in the monitoring report.	version 1	in the estimated data of registered PDD and actual data , because in wind power sector sole input is wind and which based on natural seasonal and regional trend .	included in the revised monitoring report. Both estimated and actual PLF will also be compared in the discussion.
		Complete yearly data figures from monitoring report has been considered to arrive at REVISED data . Exell sheet for calculation of PLF is being attached and revised data as desired is as under :	
		PLF CALCULATION DURING THE MONITORING PERIOD_:	
		SUZLON	
		VESTAS TOTAL	
		STANADRD PLF AS PER	
		REGSITERED PDD 25.29% 20% 22.28%	
		STD AVERAGE MONTHLY	
		GENRATION AT 230771 240900 471671	
		Actual AVG MONTHLY generation: 191641 186403 378044	
		Actual AVG PLF 21.00% 15.47% 17.86%	
		100 % GENERATION 912500	

Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
		1204500 2117000	<u>DOE Assessment 2</u> PP has not considered electricity generation data of the complete monitoring period for the calculation of PLF. Further It is also not clear how the PLF have been calculated. Please provide the PLF calculations in the excel sheet. <u>DOE Assessment 3</u> The PLF calculations have been provided in the CER excel sheet. However for the calculation of PLF, the controller data has been considered for the WTG in Maharashtra and net export data has been considered for the WTG in Tamil Nadu. PP is requested to be consistent in using the data for the calculation of PLF.
		<u>PP's Resposne2</u> Your observation that export data has been considered in case Tamli Nadu WTG is being again elaborated as under to close the issue. PLF calculation sheet provided as per enclosed exell sheet. <u>PP's Response3</u> There is total net generation considered during the monitoring period is 3016708 as against the export data which is 3257892. Actually this export data is itself WTG generation data which taken from TNEB meter very near to WTG .In Tamil Nadu there is no DISTANCE between meter reading and WTG location. But in Maharashtra this distance is more than 35 kms . Further support for the GROSS data taken for Tamil Nadu WTG is already with you along with NET GENERATION DATA . Thus gross export data has been taken which is consistent with Maharashtra	

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
		data . Further actual PLF achieved is different due to hereditary reasons of low or high PLF in the wind power sector i.e. unpredicted regional and seasonal wind pattern .This has also been mentioned in the revised monitoring report. <u>PP's Response4</u> Desired Correction made in the revised excel sheet .	Further the PLF achieved in 2nd verification is different from what mentioned in registered VCS PD. PP is requested to include reason for deviation in the value of PLF in the monitoring report. The issue is open. <u>DOE Assessment 4</u> For the WTG installed in the project activity in the state of Tamil Nadu, the metering of the generated electricity takes place near the WTG yard. Hence the export data which has been considered for the calculation of the PLF is acceptable to the DOE. The reasons for the low PLF in the current monitoring period has now been included in the revised monitoring report. CL 03 is closed.

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Draft report clarification requests and corrective action requests by verification team	Reference to corresponding section in MR	Summary of project owner response	Verification team conclusion
CAR 3 PP has provided two similar spreadsheets for CERs calculation. PP is requested to provide single revised spreadsheet for CERs calculation.	CERs excel sheet	<u>PP's Response1</u> Extra sheet deleted and single sheet provided.	<u>DOE Assessment 1</u> The excel sheet has been revised and only one spreadsheet has now been provided. The issue is closed.

APPENDIX III: LIST OF PARAMETERS

List of parameters covered during the verification period under consideration (2nd September 2009 to 31st January 2011) and details regarding the monitoring and reporting practices.

S.No.	Monitoring and reporting practice/Parameter	Description
1.	Monitoring and reporting frequency as verified during the site visit.	Monthly joint meter reading for net electricity supplied to the grid. Readings undertaken jointly by state electricity board personnel and O&M contractor on monthly basis. The readings are presented in the monthly signed official joint meter reading reports.
2.	Monitoring equipment verified during site visit.	Energy Meter : Tri-vector Energy Meters. Accuracy of main and check meter in the state of Tamil Nadu : 0.5 class Maharashtra: 0.5 class
3.	Calibration frequency and other details verified during the site visit.	Calibration frequency: Once in three years. <u>For the WTG installed in the state of Tamil Nadu:</u> Date of commissioning of WTG: 29 th March 2005 Dates of calibration of the meter (meter no – 04691356): 1 st calibration : 11 th February 2008. 2 nd calibration: 13 th February 2010 <u>For the WTG installed in the state of Maharashtra:</u>

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		Date of commissioning of WTG: 08th February 2006 Dates of calibration of the main meter (meter no – 04760195) and check meter (meter no. 04760207): 1st calibration : 15th July 2008. 2nd calibration: 22 September 2009.
4.	The above three parameters are in line with the monitoring plan mentioned in the validated VCS PD.	Yes
5.	The above three parameters are in line with the monitoring methodology applied for the proposed project.	Yes
6.	Calibration entity and if the same is in line with the monitoring plan as agreed in the validated VCS PD.	Meter calibration/annual testing has been carried out by the respective state electricity Boards i.e. Tamil Nadu Electricity Board and Maharashtra State Electricity Transmission Corporation Ltd. Testing Division, Dhule. The calibration entity is in line with the monitoring plan as mentioned in the VCS PD.