



Voluntary Carbon Standard 2007.1

VERIFICATION REPORT

Aryan Coal 15 MW Wind Power Project in Maharashtra, India

**VERIFICATION PERIOD:
28th March 2006 to 31st July 2009**

Project No/ Rev. No.: V-3-I-01-S-0033-Ve /01

Verification Report

Name of Verification company:	Date of issue:
Perry Johnson Registrars CDM Inc.	2010-12-20
Report Title:	Approved by:
Verification report – “Aryan Coal 15 MW Wind Power Project in Maharashtra, India”	Mathsy K
Client:	Project Title:
M/s Aryan Coal Benefications Pvt. Ltd	Monitoring report of “Aryan Coal 15 MW Wind Power Project in Maharashtra, India” Version : 05 Date : 2010-12-20
Summary:	
<p>M/s Aryan Coal Benefications Pvt. Ltd has contracted with Perry Johnson Registrars Clean Development Mechanism Inc.(PJRCDM) for verification of the project – “Aryan Coal 15 MW Wind Power Project in Maharashtra, India” 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.</p> <p>The project activity consists of twelve (12) no’s of M/s Suzlon Energy Ltd (S-70 Model) WTGs of installed capacity 1.25 MW kW each (1.25 MWx12 = 15 MW) in the Sangli district of Maharashtra state, India. Based on the assessment of the GHG emission reductions reported in the initial version of the monitoring report version 01 dated 15th September 2009, PJRCDM had requested responses from the project proponent through the means of Clarification Requests (CLs), Corrective Action Requests (CARs) and Forward Action Requests (FARs) issued in the draft verification report.</p> <p>In our opinion, the GHG emission reductions reported in the monitoring report final version 05, dated 20th December 2010 are fairly stated. Based on the assessment, PJRCDM is able to certify that the implementation of the project has resulted in GHG emission reduction of 67,673 tCO₂ equivalent during the period 28th March 2006 to 31st July 2009.</p> <p>PJRCDM’s opinion regarding the reported emission reductions for the given monitoring period, 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. PJRCDM’s verification/certification of GHG emissions is limited to this information evaluation.</p> <p>Issuance and utilization of certified GHG-emission reductions is beyond the scope of PJRCDM.</p>	
Report Number/ Revision Number	Number of pages
V-3-I-01-S-0033 -Ve/01	25
Work carried out by:	Work Reviewed by:
Ajay Verma	Mathsy K



Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
KWh	Kilo Watt hour
PD	Project Document
PJRCDM	Perry Johnson Registrars Clean Development Mechanism Inc.
PP	Project Proponent
MSEDCL	Maharashtra State Electricity Distribution Company Limited
NEWNE	North East West Northeast Grid
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
ACBPL	Aryan Coal Beneficiations Pvt. Ltd



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1 INTRODUCTION

M/s Aryan Coal Beneficiations Pvt. Ltd (ACBPL), hereinafter referred to as the “client” or “project proponent”, contracted Perry Johnson Registrars Clean Development Mechanism Inc. (PJRCDM) to perform the validation and verification of the project activity “*Aryan Coal 15 MW Wind Power Project in Maharashtra, India*” under the Voluntary Carbon Standard (VCS) 2007.1 for the period 28th March 2006 to 31st July 2009. The report describes the verification work undertaken. The validation of the project activity against the VCS 2007.1 requirements was completed on 19th November 2009.

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 validated 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 “*Aryan Coal 15 MW Wind Power Project in Maharashtra, India*”.

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 (PDD) or the VCS 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 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 wind turbine generators which are further exported to regional grid (NWENE) through Maharashtra State Electricity Distribution Company Limited (MSEDCL). The project activity comprises of twelve (12) WTGs owned by M/s Aryan Coal Benefications Pvt. Ltd (ACBPL). The Project activity has been installed in villages Ghatnandare in Sangli district of Maharashtra.

The WTGs are S-70 (1.25 MW) models by M/s Suzlon Energy Ltd

Project owner : M/s Aryan Coal Benefications Pvt. Ltd.
Location : Village Ghatnandare Sangli district of Maharashtra, India.

Title of the PDD : *Aryan Coal 15 MW Wind Power Project in Maharashtra, India*

Methodology used : AMS I D, version 14

VCS Crediting period : 28th March 2006 to 27th March 2016

Monitoring period under VCS : 28th March 2006 to 31st July 2009

Table 1: Project Details

Sr. No.	WTG No.	Capacity (MW)	Date of Commissioning	Village	District	State	Site Coordinates
1	G 13	1.25	30/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 10.4"N 74° 54' 23.8"E
2	G 14	1.25	30/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 21.5"N 74° 54' 22.1"E
3	G 15	1.25	30/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 34.5"N 74° 54' 12.7"E
4	G 17	1.25	30/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 11.8"N 74° 54' 04.7"E
5	G 18	1.25	30/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 21.8"N 74° 54' 59"E
6	G 19	1.25	30/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 33.3"N 74° 54' 56.1"E
7	G 21	1.25	30/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 0.1"N 74° 54' 49.4"E
8	G 22	1.25	30/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 11.4"N 74° 54' 44.2"E
9	G 27	1.25	29/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 22.8"N

							74° 54' 24.3"E
10	G 28	1.25	29/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 34.1"N 74° 54' 15.0"E
11	G 29	1.25	29/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 46.1"N 74° 54' 09.6"E
12	G 30	1.25	29/09/2005	Ghatnandare	Sangli	Maharashtra	17°10' 57.6"N 74° 54' 07.3"E

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 validated CDM PDD 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 2 below.

2 METHODOLOGY

2.1 General Approach

The project activity applies approved baseline and monitoring methodology AMS-I.D (version 14) categorised 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 :

Name	Role	Areas covered
Ajay Verma	GHG Auditor/Project Manager	Completeness check of monitoring report, desktop review, issuance and closure of findings, final verification report preparation
G Subramanyam	Validator	Site Visit
Mathsy Kutty	Technical	Independent review of the verification assignment.



Name	Role	Areas covered
	Reviewer	

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 was reviewed. A desktop review was 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 carried out by PJRCDM in the month of 12th August 2009. The actual operation of the project as described in the PD, the JMR sheets were reviewed and discussed during the site visit and issues identified in the desktop review of submitted documents were discussed.

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

Table 2: Personnel Interviewed

Name / Designation / Company	Interviewed on
Mr. Vivek Rajmani, Asst Manager Site Suzlon Energy Limited	<ul style="list-style-type: none"> ▪ Determination of net electricity generation ▪ Joint meter reading exercises ▪ Monitoring system
Ms. Poulomy Bhattacharjee, Assistant Manager, Deloitte Touche Tohmatsu India Private Limited	<ul style="list-style-type: none"> ▪ Invoices for electricity export ▪ Calibration practice

During the site visit, PJRCDM verified the actual operation of the project as described in the PD. The system of controller energy meters and joint energy meters used for

monitoring the sale of electricity sale to grid were examined. The monthly records for joint meter readings were 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; Corrective Action Requests (CAR) were raised. The non conformities could be related to lack of adherence to the VCS 2007.1 requirement, non-conformance to the monitoring plan of as defined in the VCS validated 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-1.

2.2.4 Determinations of the reductions in GHG Emissions

As per the applicable methodology 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 are determined as a multiple of net electricity generated and supplied to the grid by the renewable energy technology (EG_y in MWh), and an electricity grid emission factor calculated as per CDM EB guidance.

As per the VCS validated PD, the emission factor has been fixed *ex-ante*. For the current verification period, PJRCDM was able to verify the VER calculations based on the grid emission factor of 0.906 tCO₂/MWh.

Project emissions: As per methodology, there are no project emissions applicable and hence they have been considered as zero.

Leakage: 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 28th March April 2006 to 31st April 2009, the project activity has delivered 74694.48 MWh of net electricity to the grid. PJRCDM team was able to verify the generation data presented in the excel worksheets, which were further cross checked against the JMR sheets and invoices. The invoices serve as a credible source for cross verification, since the same is used

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for the payment by the MSDCEL to project proponent. Based on this, the net reduction in GHG emissions achieved by the project activity during the said monitoring period is equivalent to **67673** tCO₂e.

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 PJRCMDM.

2.2.5 Review of Additional Data from other Sources if appropriate

The validation report of the VCS validated project issued by PJRCMDM, dated 19th November 2009, the VCS validated PD, version 07 dated 2nd November 2009 were reviewed for any pending issues to be considered during verification.

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.

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 pending issues were identified from the discussion, findings and conclusions drawn from the current VCS Validation Report (version 01) issued by validating agency dated 19th November 2009.

3.2 Project Implementation

The project activity involves the installation and operation of twelve (12) Wind Turbine Generators (WTGs) installed village Ghatnandare in Sangli district of Maharashtra, India by the clients. These WTGs are all manufactured by M/s Suzlon Energy Ltd are of 1.25 MW capacity.

The implementation of the project activity was as described in the VCS validated PD, checked against supportive documents presented. PJRCMDM was able to verify that there was no change in project design compared to the design presented in the VCS validated PD, version 07 dated 2nd November 2009.

3.3 Completeness of Monitoring

The GHG emission reductions are calculated based on the net electricity exported by the project activity to the grid. This is measured by the 0.2% accuracy class tri-vector meters (energy meters) installed at located at the sub-station and MSEDCL has used the controller data to arrive at individual export and import as per apportioning procedure in VCS validated PD. The main meter readings are the primary source while the check meter is used to determine the accuracy of meter readings, and the

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check meter readings would be used in the eventuality of main meter failing, if and when identified during yearly checks.

The JMR sheets of all the monthly readings for all the WTGs were checked and it has recorded in presence of MSEDCL representative and PP.

Complete data of electricity supply to the grid was available for the entire verification period (28th March 2006 to 31st July 2009) which was verified by PJRCDM.

3.4 Accuracy of Emission Reduction Calculations

PJRCDM assessed the different areas (as mentioned below) which can affect the accuracy of the final emission reduction calculations:

Net electricity supplied to the grid: The energy meter readings are noted monthly and these records will be archived for crosschecking yearly figures. However, monthly joint meter reading is taken jointly by the MSEDCL and PP. At the conclusion of each meter reading an appointed representative of the MSEDCL and the PP sign a document indicating the number of kilowatt-hours indicated by the meter.

Metering accuracy: The calibration of the meters is carried out every once a year. The portable standard meter is owned by the MSEDCL at its own cost and tested and certified from an accepted laboratory standard meter in accordance with electricity board standards.

As per requirement for monitoring plan of validated VCS PD. PP has provided latest calibration as can be seen from the table below:

WTG No.	According the JMR		Calibration record Available		
	Period	Connected to Substation and Feeder No	Calibration Date	Main Meter No	Check Meter No
G 13 G 14 G 15 G 17 G 18 G 19 G 21 G 22	01/04/06 till 27/06/ 06	kundlapur Feeder		NA	NA
	27/06/ 06 till 13/09/06	F-2; Ghatnandre		NA	NA
	13/09/06 till 01/02/07	F-5; Ghatnandre	Jun-06	4725792	NA
G 28 G 29 G 27 G 30	01/04/06 till 27/06/ 06	kundlapur Feeder		NA	NA
	27/06/ 06 till 13/09/06	F-2; Ghatnandre		NA	NA
	13/09/06 till 02/01/07	F-5; Ghatnandre	Jun-06	4725792	NA
G 13 G 14 G 15 G 17 G 18 G 19 G 21 G 22 G 27	01/02/07 till 01/11/ 07	F-5; Ghatnandre	Jun-07	4725792	4725787
			Sep-07	NA	NA
			Dec-07	NA	4725787
G 28 G 29 G 30	02/01/07 till 01/01/08	F-6; Ghatnandre	Jun-07	4725802	4725800
			Sep-07	4725802	4725800
			Dec-07	4725802	4725800
G 13 G 14 G 15 G 17	01/01/08 till 01/01/09	F-5; Ghatnandre	Jun-08	NA	4725787
			Sep-08	NA	NA

WTG No.	According the JMR		Calibration record Available		
	Period	Connected to Substation and Feeder No	Calibration Date	Main Meter No	Check Meter No
G 18 G 19 G 21 G 22			Dec-08	4725792	4725787
G 27 G 28 G 29 G 30	01/01/08 till 01/01/09	F-6; Ghatnandre	Jul-08	4725802	4725800
			Sep-08	NA	NA
			Dec-08	4725802	4725800
G 13 G 14 G 15 G 17 G 18 G 19 G 21 G 22	01/01/09 till 01/01/10	F-5; Ghatnandre	Jul-09	NA	NA
			Sep-09	NA	NA
			Nov-09	4725792	NA
G 27 G 28 G 29 G 30	01/01/09 till 01/01/10	F-6; Ghatnandre	Jul-09	NA	NA
			Sep-09	NA	NA
			Nov-09	4725802	NA

The meters are deemed to be working satisfactorily if the errors are within specifications i.e. ± 0.2 . It was noticed that the calibration for the WTGs was not available as per validated monitoring plan. However, the project proponent has applied a correction factor in line with the guideline from the EB (EB 52, Annex 60) as higher of the errors between calibration report and maximum applicable to the accuracy class of the meter. The correction period has been reviewed by PJRCMD as per below table and was deemed to be correct and conservative in line with the guideline from EB.

As per requirement of from the EB (EB 52, Annex 60) PP has applied correction factor in periods mentioned in table below:

WTG NO.	Correction factor applied for the Period
G13 G14 G15 G17	From April 2006 till Sep 2006 and July 2009
G18 G19 G21 G22	From March 2006 till Sep 2006 and July 2009
G27 G28 G29 G30	From March 2006 till Sep 2006

Value of grid emission factor: PJRCMD was able to confirm that this parameter was fixed *ex-ante* during the validation of the project (Validation Report Version 01 dated 19th November 2009 and VCS validated PD Version 07 dated 2nd November 2009) and the same was used for ER calculations for the current monitoring period. Even during validation, the parameter was derived from officially published latest database¹ from Central Electricity Authority of India, a subsidiary of Ministry of Power, Government of India, which is the authentic source of such information.

The emission factor for the Southern grid to which the project activity exports power to is determined as 0.906 tCO₂/MWh.

¹ <http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>



3.5 Quality of Evidence to Determine Emission Reductions

The source of net energy generation, as reported in the validated PD, is the JMR sheets, and the same were used by the client to calculate the EG_y. PJRCDM was able to check and verify the values. The annual value of the energy exported was the summation of these monthly readings. The JMR sheets 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 (MSEDCL/EB official), duly signed and acknowledged by both parties.

The emission factor for the Southern grid to which the project activity exports power to is determined as 0.906 tCO₂/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 validated in the VCS PD.

PJRCDM was able to verify that the calculations are based on the authentic data from the joint meter reading sheets issued by the state electricity boards of respective states. The excel sheet used to calculate the monthly emission reduction figure were all tracked, checked and found to be consistent. Some errors were found in data transfer which were communicated to the project developer and the excel sheet was corrected accordingly

3.6 Management and Operational System

The clients have established and implemented procedures to monitor the project activity and it's operation as per the validated PD. These procedures cover management responsibilities, data monitoring and reviewing procedures and have provided with reports.

All monthly records are archived in electronic copy and paper format.

4 VERIFICATION CONCLUSION AND CERTIFICATION STATEMENT

Perry Johnson Registrars CDM Inc. (PJRCDM) has carried out verification of the emission reductions achieved by the project “Aryan Coal 15 MW Wind Power Project in Maharashtra, India” against the guidelines of VCS 2007.1. The project activity is generation of electricity by twelve (12) Wind Turbine Generators (WTGs) of 1.25MW capacities installed in village, Ghatnandare in Sangli district of Maharashtra, India.

Verification was sought for the emission reductions achieved by the project within the period 28th March 2006 to 31st July 2009. The project has 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 05 of the monitoring report, dated 20th December 2010.

*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 validated PD and that the emission reductions presented in the monitoring report version 05 dated 20th December 2010, are correctly determined as per the VCS2007.1 standard and AMS-I.D methodology, version 14. Based on the above information, PJRCDM confirms the following:

<i>Name of the project</i>	<i>“Aryan Coal 15 MW Wind Power Project in Maharashtra, India”</i>
<i>VCS PD</i>	<i>Version 01 dated 19th November 2009</i>
<i>Methodology</i>	<i>AMS-I.D Version 14</i>
<i>Monitoring Report</i>	<i>Version 05 dated 20th December 2010</i>
<i>Reporting period</i>	<i>28th March 2006 to 31st July 2009</i>

Verified emission in the above reporting period:

<i>Project emissions</i>	<i>:</i>	<i>0</i>	<i>tCO₂ equivalents</i>
<i>Baseline emissions</i>	<i>:</i>	<i>67673</i>	<i>tCO₂ equivalents</i>
<i>Emission reductions</i>	<i>:</i>	<i>67673</i>	<i>tCO₂ equivalents</i>

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Total Year-Wise emission reductions:

<i>Period</i>	<i>Emission Reductions(tCO2e)</i>
<i>28th March 2006- 31st December 2006</i>	16953
<i>1st January 2007 – 31st December 2007</i>	19053
<i>1st January 2008 – 31st December 2008</i>	17306
<i>1st January 2009 – 31st July 2009</i>	14361
<i>28th March 2006– 31st July 2009</i>	<i>67673</i>

Ajay Kr Verma

Project Manager
PJRCDM

U. Dhyani

Site Program Manager
PJRCDM



APPENDIX I: DOCUMENTS REVIEWED

- /1/ Monitoring Report: “Aryan Coal 15 MW Wind Power Project in Maharashtra, India” version 05, dated 20th December 2010 and the previous versions.
- /2/ Final validated Project Design: “Aryan Coal 15 MW Wind Power Project in Maharashtra, India” Version 01 dated 19th November 2009.
- /3/ VCS Validation Report – “Aryan Coal 15 MW Wind Power Project in Maharashtra, India” Version 01 dated 19th November 2009
- /4/ Approved Small-scale Methodology – Indicative baseline and monitoring methodology AMS ID, version 14: “Grid connected renewable electricity generation”
- /5/ CDM Executive Board: Validation and Verification Manual, version 01.1
- /6/ Emission reduction excel worksheet, ‘Verification Excel Sheet.xls’
- /7/ Calibration Certificates for WTGs Number G-13, G-14, G-15, G-17,G-18,G-19,G-21, G-22, G-27,G-28,G-29 and G-30 form 28th March 2006 to 31st July 2009.
- /8/ Joint meter Reading for each WTGs Number G-13, G-14, G-15, G-17,G-18,G-19,G-21, G-22, G-27,G-28,G-29 and G-30 form 28th March 2006 to 31st July 2009.
- /9/ Invoice for each WTGs Number G-13, G-14, G-15, G-17,G-18,G-19,G-21, G-22, G-27,G-28,G-29 and G-30 form 28th March 2006 to 31st July 2009.



APPENDIX II : RESOLUTION OF CARs AND CLs

Draft report clarification requests and corrective action requests by verification team	Ref. To the section of the monitoring report	Summary of project owner response	Verification team conclusion
<p>CAR#1:</p> <p>1.As per monitoring report the project activity emission reductions are totally based on the net electricity supplied by the individual WTG through the meter. PP is requested to provide the calibration certificate for each meter (Main meter and check meter) as per their start dates with mentioned frequency as per the verification period.</p> <p>2. PP is requested to prepare a table in MR which clearly shows the Feeder Number, WTG connection period, Meter Number, Date for main meter and check meter of all WTGs.</p> <p>3. PP is requested to include the discussion over the monitoring parameters, measurement of procedures to be applied, QA/ QC procedures in detail in monitoring report.</p>		<p>1. Calibration records of all the relevant meters used to evacuate the power generated by the project WTGs have been provided herewith.</p> <p>2. Feeder details showing the WTGs (with identification no.) connected to the feeder along with the meter no. have been incorporated in the revised MR ver. 02 Sec 5.2.</p> <p>3. The discussions over the monitoring parameters in detail have been incorporated in the revised MR ver. 02 Sec 5.</p> <p>PP 2nd Response;</p> <p>1. The main meter as well as check</p>	<p>PJRCDM 2nd Response:</p> <p>1) PJRCDM has reviewed the provided calibration certificates for all WTGs for chosen monitoring periods and applied the correction factor as per EB guidance for periods for which calibration certificates are not available. It is found to be Ok.</p> <p>2) PJRCDM has reviewed the emission reduction sheet and found that PP has applied the correction factor as per the Guidelines as individually on import and export as follows;</p> <p>For G13 G14 G15 G17: take the correction factor from April 2006- Sep 2006 and July 2009.</p> <p>For G18 G19 G21 G22: take the correction factor from March 2006-Sep 2006 and July 2009.</p> <p>For G27 G28 G29 G30: take the correction factor from March 2006-Sep 2006.</p>

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Draft report clarification requests and corrective action requests by verification team	Ref. To the section of the monitoring report	Summary of project owner response	Verification team conclusion
		<p>meter are maintained and calibrated by the MSEDCL on a annual basis and the same has been mentioned in the revised MR.</p> <p>2. Correction factor have been applied as per the Guidelines as individually on import and export values.</p> <p>4 Controller data have been provided by the PP.</p>	<p>It is found to be Ok.</p> <p>3) The discussion has been included about the monitoring parameters which show the monthly measurement of electricity, measure to ensure the uncertainties. It is found to be Ok.</p> <p>4) As the apportioning is based on the controller data reading, after reviewing the the controller , it is found to be ok..</p> <p>This CAR#1 is closed.</p>
<p>CAR#2 :</p> <p>1. PP is requested to mention meter accuracy in monitoring period.</p> <p>2. PP is requested to correct the PP name on 13th page of monitoring report</p> <p>3. It is requested to remove the blank pages from monitoring report.</p>		<p>Meter accuracy details have been incorporated in the revised MR ver. 02.</p> <p>Necessary correction has been made.</p> <p>PP 2nd Response;</p> <p>4. The district name have been corrected as Sangli in the revised</p>	<p>PJRCDM 2nd Response;</p> <p>1) Meter accuracy of class 0.2 % is mentioned by PP and the same has been verified with the provided calibration certificates and found okay. OK</p> <p>2) PPs Name as Aryan Coal Beneficiation Pvt. Ltd. has been corrected. OK</p> <p>3) Blank pages have been removed. OK</p>

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Draft report clarification requests and corrective action requests by verification team	Ref. To the section of the monitoring report	Summary of project owner response	Verification team conclusion						
		MR. 5. The main meter as well as check meter are maintained and calibrated by the MSEDCL on a annual basis and the same have been mentioned in the revised MR.	4) PP has revised the MR and added the details of district name correctly as Sangali in MR.OK. 5) PJRCDM has reviewed the provided calibration certificates for all WTGs for chosen monitoring periods and applied the correction factor as per EB guidance for periods for which calibration certificates are not available. It is found to be Ok.. This CAR#2 is closed.						
<p>CAR #3 :</p> <p>PP is requested to rectify the following errors:</p> <p>1. For G 13, G 14, G 15 & G 17 export reading found incorrect for Jan 2008.</p> <p>2. For G 28, G 29, G 30 export unit are not matching between invoice copy and breakup sheet for Dec 2006. Please justify.</p>		<p>1. Export reading for G 13, G 14, G 15 & G 17 - Jan 2008- have been corrected.</p> <p>2. Values according to the JMR:</p> <table border="1" data-bbox="994 1219 1603 1332"> <thead> <tr> <th>Import (KWh)</th> <th>Export(KWh)</th> <th>Net (KWh)</th> </tr> </thead> <tbody> <tr> <td>201770.7</td> <td>2344.4</td> <td>199426.3</td> </tr> </tbody> </table>	Import (KWh)	Export(KWh)	Net (KWh)	201770.7	2344.4	199426.3	<p>PJRCDM 2nd Response;</p> <p>1). PJRCDM has revised the revised emission reduction sheet and found that for G 13, G 14, G 15 & G 17 export data has been revised. OK</p> <p>PJRCDM has revised the revised emission reduction sheet and found that for G 28, G 29, G 30 net generation data has been</p>
Import (KWh)	Export(KWh)	Net (KWh)							
201770.7	2344.4	199426.3							

VCS VERIFICATION REPORT



Draft report clarification requests and corrective action requests by verification team	Ref. To the section of the monitoring report	Summary of project owner response	Verification team conclusion																		
<p>3. For G13, G 14, G 15 & G 17 export unit are not matching between invoice copy and breakup sheet for October 2007. Please justify.</p>		<p>Values according to the Invoice:</p> <table border="1" data-bbox="994 443 1601 555"> <thead> <tr> <th>Import (KWh)</th> <th>Export(KWh)</th> <th>Net (KWh)</th> </tr> </thead> <tbody> <tr> <td>201770.4</td> <td>2344.4</td> <td>199426.0</td> </tr> </tbody> </table> <p>The above difference could be due to typographical error however for emission reduction calculation we have considered the JMR values.</p> <p>3. Values according to the JMR:</p> <table border="1" data-bbox="994 778 1601 858"> <thead> <tr> <th>Import (KWh)</th> <th>Export(KWh)</th> <th>Net (KWh)</th> </tr> </thead> <tbody> <tr> <td>150943.6</td> <td>2257.6</td> <td>148686.0</td> </tr> </tbody> </table> <p>Values according to the Invoice:</p> <table border="1" data-bbox="994 896 1601 976"> <thead> <tr> <th>Import (KWh)</th> <th>Export(KWh)</th> <th>Net (KWh)</th> </tr> </thead> <tbody> <tr> <td>150943.6</td> <td>2257.6</td> <td>148685.96</td> </tr> </tbody> </table> <p>The above difference could be due to typographical error however for emission reduction calculation we have considered the JMR values.</p> <p>PP 2nd Response;</p> <p>1. Export reading for G 13, G 14, G 15 & G 17 - Jan 2008 is</p> <p>Values according to the JMR:</p>	Import (KWh)	Export(KWh)	Net (KWh)	201770.4	2344.4	199426.0	Import (KWh)	Export(KWh)	Net (KWh)	150943.6	2257.6	148686.0	Import (KWh)	Export(KWh)	Net (KWh)	150943.6	2257.6	148685.96	<p>revised. OK</p> <p>3) PJRCDM has revised the revised emission reduction sheet and found that for G13, G 14, G 15 & G 17 export data has been revised. OK.</p> <p>This CAR#3 is closed.</p>
Import (KWh)	Export(KWh)	Net (KWh)																			
201770.4	2344.4	199426.0																			
Import (KWh)	Export(KWh)	Net (KWh)																			
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Draft report clarification requests and corrective action requests by verification team	Ref. To the section of the monitoring report	Summary of project owner response			Verification team conclusion						
		<table border="1"> <tr> <td>Import (KWh)</td> <td>Export (KWh)</td> <td>Net (KWh)</td> </tr> <tr> <td>137261.7</td> <td>2033.7</td> <td>135228.0</td> </tr> </table>	Import (KWh)	Export (KWh)	Net (KWh)	137261.7	2033.7	135228.0			
Import (KWh)	Export (KWh)	Net (KWh)									
137261.7	2033.7	135228.0									
<p>CAR#4:</p> <p>PP is requested to provide the invoice copy fo</p> <p>1. G13, G 14, G 15 & G 17 for the period Dec 2007 to April 2008.</p> <p>2. G18, G 19, G 21, G 22 & G 27, G 28, G</p>				<p>Values according to the Invoice:</p> <table border="1"> <tr> <td>Import (KWh)</td> <td>Export (KWh)</td> <td>Net (KWh)</td> </tr> <tr> <td>137262</td> <td>2034</td> <td>135228</td> </tr> </table> <p>For emission reduction calculation we have considered the JMR values.</p> <p>2) For G 28, G 29, G 30, the net generation value as 201770.4 have been considered.</p> <p>3) For G13, G 14, G 15 & G 17 the export value as 141685.96 have been considered.</p>	Import (KWh)	Export (KWh)	Net (KWh)	137262	2034	135228	<p>1) PJRCDM has reviewed the invoices and found that G13, 14, 15 & 17 months of February-2007 export data has taken from breakup sheet which is higher than invoice value. PP has taken net electricity generation based on invoice which is conservative. It so found to be OK.</p>
Import (KWh)	Export (KWh)	Net (KWh)									
137262	2034	135228									

VCS VERIFICATION REPORT



Draft report clarification requests and corrective action requests by verification team	Ref. To the section of the monitoring report	Summary of project owner response	Verification team conclusion
29, G 30, for the month December 2007.		PP Response: 1. The matching of export value in Feb 08 & Mar 08 invoice is due to a typographical error. The correct value is 149671.8 present in the JMR which has been taken under considered. PP has also provided an undertaking for the same. PP 2 nd Response: The discrepancy in the JMR and Invoice export value for the month of Feb 2007 is due to a typographical error. However for a conservative approach export data from the invoice have been considered for calculation and the same have been incorporated in the ER calculation spreadsheet.	2) All invoices were received and found OK. This CAR#4 is closed.
CL#1: PP is requested to justify as there is no net generation for machine G18, G 19, G 21 & G 22 from Jan 2008 to April 2008.		Reason for no net generation for machine G18, G 19, G 21 & G 22 from Jan 2008 to April 2008 could be due to maintenance. There forth, for emission reduction calculation we have considered the JMR values.	PJRCDM has reviwed the controller generation record provided by the O&M contractor and found that during the period of Jan 2008 to April 2008 WTGs was not working. It is found to be OK. This CL#1 is closed.

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Draft report clarification requests and corrective action requests by verification team	Ref. To the section of the monitoring report	Summary of project owner response	Verification team conclusion
<p>CL#2:</p> <p>PP is requested to mention an yearly PLF for each WTG machine.</p>		<p>Yearly actual PLF calculation for all the WTG machines has been provided.</p>	<p>PJRCDM has reviewed the emission reduction sheet and found to be OK.</p> <p>This CL#2 is closed.</p>
<p>CL#3:</p> <p>The site visit for the project is carried out on 12 August 2009, however PP has considered the emission reduction upto 31 Aug 2009. PP is requested to consider the emission reduction as per the site visit date.</p>		<p>The dates of monitoring period have been corrected as per the JMR sheet and have been taken from 1st April 06 till 31 July 2009.</p> <p>PP 2nd Response: The start date of monitoring period has been considered in line with the date mentioned in VCS PD i.e. 28 March 2010.</p>	<p>PJRCDM has reviewed the revised MR and found to be OK.</p> <p>This CL#3 is closed.</p>
<p>CAR#5</p> <p>PJRCDM has revised the emission reduction sheet and found that controller data is more than net export data as following:</p> <ol style="list-style-type: none"> For WTGs G13,G14,G15, G17, G18,G19,G21 and G22 for months of June-2007,June-2008, June-09, July-2006, September-2006, 		<p>As justified by the technology provider the variation in the monthly controller generation value and the net export data is due to :</p> <ol style="list-style-type: none"> The generation data at the controller is recorded automatically at 12:00 AM of the start of the month i.e. on 1st of each month and closes at 12:00 PM midnight at the end 	<p>PJRCDM has reviewed the undertaking letter provided by O&M and technology supplier. It has found that controller data and JMR data difference is because of data recording time difference. It is supported by undertaking form O&M service provider. It is found to be Ok.</p> <p>This CAR#5 is closed.</p>

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Draft report clarification requests and corrective action requests by verification team	Ref. To the section of the monitoring report	Summary of project owner response	Verification team conclusion
<p>February-2007, May-2007 & August-2008.</p> <p>2. For WTGs G27, G28, G29 and G30 for months of June-2007, June-2008, June-2009, July-2006, February-2007, May-2007, August-2008 and December-2008.</p> <p>Please clarify.</p>		<p>month i.e., 30/31st of each month.</p> <p>2. The EB reading is taken by the electricity Board Engineers. Therefore the timing and dates are not fixed which leads to reading being taken on 1-2 days after the end of the month i.e., 30/31st of each month. In these specific months the controller reading shall be less.</p> <p>Also the justification from technology provider regarding the same is attached herewith.</p>	
<p>CL#4:</p> <p>Please add details of time periods for which correction factor applied in the monitoring report.</p>		<p>PP Response:</p> <p>Details of time periods for which correction factor have been applied is been incorporated in the revised monitoring report.</p>	<p>PP has added details of correction factor applied periods in monitoring report and it is found to be OK.</p> <p>This CL#4 is closed.</p>

APPENDIX III: LIST OF PARAMETERS

List of parameters covered during the verification period under consideration (28th March 2006 to 31st July 2009) and details regarding the monitoring and reporting practices.

S.No.	Monitoring and reporting practice/Parameter	Parameter 1
1.	Monitoring and reporting frequency as verified during the site visit.	<i>The monthly meter reading is taken jointly by the Maharashtra State Electricity Distribution Company Limited and PP. At the conclusion of net generation for each WTGs an appointed representative of the Maharashtra State Electricity Distribution Company Limited (MSEDCL) and the PP sign a document indicating the number of Kilowatt-hours indicated by the meter.</i>
ion2.	Monitoring equipment verified during the site visit.	<i>Energy meter Accuracy of main and check meter: 0.2 class</i>
3	Calibration frequency and other details verified during the site visit.	<i>Once in a year. The calibration activity is in the control of the MSEDCL. The calibration was not carried out during this certain period. However, the test reports were submitted by the PP for the entire period and applying the principles of conservativeness, the PP has adjusted the total generation from the WTG against the maximum permissible error of the meter as per EB guidance.</i>
4.	The above parameters are in line with the MP agreed in the validated PDD.	<i>Yes. See discussion above.</i>
5	The above parameters are in line with the monitoring methodology applied for the proposed project.	<i>Yes. See discussion above.</i>
6	Calibration entity and if the same is in line with the monitoring plan as agreed in the validated PDD.	<i>Meter testing has been carried out by the state electricity Boards i.e. Maharashtra State Electricity Distribution Company Limited (MSEDCL). The calibration entity is in line with the monitoring plan as mentioned in the VCS PD.</i>