16.45 MW BUNDLED GRID CONNECTED RENEWABLE ENERGY PROJECT IN TAMILNADU, INDIA

South Asia

TÜV SÜD South Asia Pvt Ltd

Project Title	16.45 MW Bundled Grid Connected Renewable Energy Project in Tamilnadu, India
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Report Title	16.45 MW Bundled Grid Connected Renewable Energy Project in Tamilnadu, India
Client	Arvind. A. Traders
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Summary:

TÜV SÜD South Asia Pvt. Ltd. has performed the second verification of the aforementioned VCS project activity. The verification is based on the currently valid documentation of the VCS and United Nations Framework Convention on Climate Change (UNFCCC).

The Verification has been conducted for the monitoring period 19-October-2008 to 18-October-2014

The verification process includes three phases:

- Desk review of documents;
- Remote audit and follow-up interviews with the relevant personnel;
- Resolution of outstanding issues and the issuance of final verification report and opinion.

The project activity generates electricity from wind power. The capacity of the project is 16.45 MW. This project activity is located in Tirunelveli District, Tamilnadu. The project activity established a cluster of 13 nos. of Suzlon and NEG Micon make Wind Electricity Generators (WEGs) of different capacities of 0.75 MW, 1.25 MW and 1.65 MW, aggregating to a total installed capacity of 16.45 MW The generated power from this project is supplied to Indian grid.

The project has been implemented by six different companies and has been commissioned in 2005 and 2006 for all the 13nos. wind turbines.

The project has not been registered under any other mechanism. The start date of the project activity is 06-12-2005 (Commissioning Date for R.K .Textiles 1.65 MW WEG) which is the earliest commissioning date of this bundled project activity

2 Clarification Requests (CLs) have been raised during the course of verification process and has been successfully closed. No Corrective Action Request (CAR) and Forward Action Request (FAR) was raised during this monitoring period.

1 INTRODUCTION

1.1 Objective

TÜV SÜD has been commissioned by the aforementioned client to perform an independent verification assessment.

The objective of the verification work is to comply with the requirements of Verified Carbon Standards requirements. According to this assessment TÜV SÜD shall:

- ensure that the project activity has been implemented and operated as per the registered PDD, and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place,
- the project's baseline is assessed against "ACM0002 - Version 10"
- the project's monitoring plan is assessed against "ACM0002 - Version 10"
- ensure that the published MR and other supporting documents provided are complete, verifiable and in accordance with applicable VCS and CDM VVS requirements,
- ensure that the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology,
- evaluate the data recorded and stored as per the applicable requirements.
- assessment of the sustainability monitoring parameters as per the VCS requirements

1.2 Scope and Criteria

The scope of any assessment is defined by the underlying legislation, regulation and guidance given by relevant entities or authorities. In the case of VCS project activities, the scope is set by:

- VCS v4.0 requirements
- Clean Development Mechanism Validation and Verification Standard (VVS) for Project Activities v2.0
- Baselines and monitoring methodologies (including GHG inventories)
- Environmental issues relevant to the applicable sectoral scope
- Current technical and operational knowledge of the specific sectoral scope and information on best practice
- Stakeholder consultation and feedback

The verification process is not meant to provide any form of consulting for the project participant (PP). However, stated requests for clarifications, corrective actions, and/or forward actions may provide input for improvement of the project design.

1.3 Level of Assurance

The errors identified in the project are below the threshold limit of materiality and hence not material. The GHG emission reductions are calculated without material misstatements.

The VVB confirms that a reasonable level of assurance has been achieved during the verification process.

1.4 Summary Description of the Project

The project activity generates electricity from wind power. The capacity of the project is 16.45 MW, located in Tirunelveli District, Tamil Nadu. The project activity established a cluster of 13 nos. of Suzlon and NEG Micon make Wind Electricity Generators (WEGs) of different capacities of 0.75 MW, 1.25 MW and 1.65 MW, aggregating to a total installed capacity of 16.45 MW.

The capacities of the project activity of each project developers are given below

SL. No.	Name of the Company	Installed Capacity
1.	Arvind. A. Traders	7.5 MW (1.25 MW X 6 nos.)
2.	R. Aswatha	0.75 MW (0.75 MW X1 no.)
3.	Asian Handlooms	3.3 MW (1.65 MW X 2 no.)
4.	Allied Textiles	0.75 MW (0.75 MW X1 no.)
5.	Sri Rama Vilas Weaving Factory	1.25 MW (1.25 MW X1 no.)
6.	R.K. Textiles	1.25 MW (1.25 MW X1 no.)
		1.65 MW (1.65 MW X1 no.)

The generated power from this project is supplied to Indian Grid The project leads to reduction of greenhouse gas emissions by replacing an equivalent amount of energy generated from fossil fuel intensive thermal power plants to meet the energy requirement.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The information provided by the project participants is assessed by applying the means of verification specified in the VCS v4, Toolkit and the VVS.

A competent assessment team is selected prior to the start of the verification. The team is selected to cover the technical area(s), sectoral scope(s) and relevant host country experience for evaluating the VCS project activity. Additionally, a competent Technical Reviewer or Technical Reviewer Team is appointed to conduct checks on quality and completeness.

The verification team performs first a desk review, followed by an remote assessment, which results in the formation of a draft report and a list of findings. The next step involves the evaluation of the findings through direct communication with the PPs and then finally the preparation of the verification report. This verification report and other supporting documents then undergo an internal quality control by the CB “Environment and energy” before submission to the VCS.

2.2 Document Review

The documents referred during the course of this verification are provided in Appendix 1.

2.3 Interviews

The VVB has not conducted the on-site inspection for this current monitoring period due to obligations imposed by COVID 19. However the VVB has ensured that reasonable level of assurance has been achieved as per Verra regulations on the relaxation of mandatory site visits by the VVB due to Covid-19. The VVB has conducted telephonic interviews and video calls to discuss with the client regarding the data and documents pertaining to the current verification period. The interviews and discussions were conducted successfully.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	A	Arvind	Project owner	27 April 2021	Implementation of the project, O&M activities, Metering arrangements, Calibrations, JMR, On-going LSC. etc. Plant technology Stakeholder issues	Eswar Murty
2	Sharma	Barun	EKI Energy Services Ltd PP representative	27 April 2021	VCS monitoring	Eswar Murty

2.4 Site Inspections

Please see 2.3

2.5 Resolution of Findings

The objective of this phase of the verification is to resolve the requests for corrective actions, clarifications, and any other outstanding issues which need to be clarified for TÜV SÜD`s conclusion on the achieved emission reductions. CL shall be raised if some clarification is required regarding project documentation. CAR shall be raised of some information is missing or the documents need some revision. FAR shall be raised if some information or data is to be checked during further verifications. Accordingly 2 CLs were raised during the course of verification. No CARs or FARs have been raised. All the CLs raised by TÜV SÜD are resolved during communication between the client and TÜV SÜD. To guarantee the transparency of the verification process, the concerns raised and responses that have been given are documented in detail

2 Clarification Requests have been raised during the course of Verification. No CAR or FAR has been raised. The CLs raised have been resolved and the same have been closed successfully by the VVB.

CL from this verification

CL ID	01	Section no.		Date:
Description of CL				

1. It is mentioned in the MR and the monitoring plan as per registered PD that calibration frequency of energy meters is once in 3 years. However, the submitted calibration certificates show only for 2008. PP to provide calibration certificates for the next dates and also update the calibration record in MR. 2. The meter test certificate submitted is not clear and mostly unreadable. PP to provide a readable document.

Project participant response	Date: DD/MM/YYYY
Calibration record has been submitted to DOE and same has been covering the MP.	
Documentation provided by project participant	
Updated MR. ER and calibration record	
VVB assessment	Date: DD/MM/YYYY
The revised MR, ER have been submitted and the details of calibration frequency is now addressed. The clear Calibration certificates have also been submitted. Hence the issue is closed.	

CL ID	02	**Section no.**		**Date:**
Description of CL				
The submitted JMRs do not include for Asian handlooms. PP to provide the same				
Project participant response				**Date:** DD/MM/YYYY
All the JMR has been submitted to DOE for review				
Documentation provided by project participant				
JMR's ,ER & MR				
VVB assessment				**Date:** DD/MM/YYYY
JMRs have been submitted for one of the project owner Asian Handlooms. Hence the issue is closed.				

2.5.1 Forward Action Requests

This is 2nd periodic verification of the project activity and no FAR was raised from validation or previous verification.

2.6 Eligibility for Validation Activities

This section is not applicable for present verification.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is registered under UNFCCC under Clean Development Mechanism program, Registration reference number is 3406.

The project has not completed any CDM verification. The Current VCS verification is for period 19-October-2008 to 18-October-2014. PP has submitted the declaration for no double accounting and the ERs from the VCS project alone would be considered. The same has been verified by the audit team.

3.2 Project Description Deviations

There are no deviations with respect to the project activity during the current monitoring period.

3.3 Grouped Project

This is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project has been commissioned and the commissioning details of the project are provided below for all the 6 nos. companies.

Sl. No.	Name of Companies	Commissioning Date
1	Arvind. A. Traders	14.07.2006
2		14.07.2006
3		26.07.2006
4		16.09.2006
5		20.09.2006
6		20.09.2006
7	R. Aswatha	28.03.2006
8	Asian Handlooms	22.12.2005
9		27.12.2005
10	Allied Textiles	31.03.2006
11	Sri Rama Vilas Weaving Factory	29.08.2006
12	R.K. Textiles	14.07.2006
13		06.12.2005

The project has been registered under UNFCCC under Clean Development Mechanism program, Registration reference number is 3406. The project has not completed any CDM verification. The Current VCS verification is for period 19-October-2008 to 18-October-2014. The project proponent provided undertaking that there is no double accounting of emission reduction with any other GHG program during the current VCS monitoring period.

Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits. Also, the project activity is not availing any REC benefits and the same can be confirmed from publicly available link of REC generators.

The project participants obtained all clearances from stakeholders hence no legal risks are anticipated. The project activities contribution towards sustainable development in terms of society, environment, technology and economy (both direct and indirect impacts) are stated below:

The project has created employment opportunities in the project vicinity during erection & commissioning and thereby generating employment. There has been improvement in the local infrastructure like roads and also power supply. Since the energy generated is clean, there will be minimal pollution and Impact on land, air and water is minimum since there are no discharges or Emissions during the project lifetime. The project activity improves the supply of electricity with clean, renewable wind power while contributing to the regional/local economic development.

To verify the implementation of project activity, technical specifications of Turbine/Generator, onsite operation & maintenance, monitoring & management practices; assessment team has conducted Skype video call/telephonic interviews with onsite in-charge, O&M team and also had a detail discussion with the PP representative and reviewed third party statutory documents i.e. Technical specifications by manufacturer, Commissioning certificates, Complete set of JMRs covering monitoring period, breakdown log, O&M schedule, grievance register and other relevant records. Same are also cross-checked with photographs/videos submitted by PP for current monitoring period were found to be consistent with the description given in the registered VCS PD.

After telephonic/Skype interviews with concerned onsite persons, document reviews & site videos/photographs submitted by PP; assessment team concluded that the project activity is still implemented and operated in-line with the registered VCS PD & CDM PDD. There is no change in the project design or operation and monitoring practices at site which can alter the applicability or additionality of the project activity. In addition to the interviews with PP, assessment team have checked the commissioning certificate and JMRs and found that the project activity is implemented as per the VCS PD and Monitoring report submitted by the PP for current monitoring period. Assessment team therefore of the opinion that project is implemented as described in the registered PD and there is no change in monitoring practices as well as all monitoring parameters as envisaged in the VCS PD & MR. All the monitored values are supported by the evidences i.e. JMRs and found that information provided in the MR is inline with the submitted evidences.

The audit team has checked all the commissioning certificates of WTGs to confirm the location and the implementation of the project.

<table>
<tr>
<td>Means of verification</td>
<td>Referring to VCS v4 and p.360, p.361, p.363 and p.364 of CDM VVS PA, v2.0, the below tables provide a summary on the verification of each monitoring parameter listed in the registered monitoring plan.
<table>
<tr><td>Data / Parameter:</td><td>$EG_{facility, y}$</td></tr>
<tr><td>Data unit:</td><td>MWh</td></tr>
<tr><td>Description:</td><td>Quantity of net electricity generation supplied by the project plant/unit to the grid in year y</td></tr>
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<table>
<tr><td>Source of data used:</td><td>Monthly Joint Meter Reading (JMR) from TNEB</td></tr>
<tr><td>Means of verification/Comments:</td><td>This net electricity generation values are verified from the JMR.</td></tr>
<tr><td>Cross-check</td><td>Cross checked with invoices raised to TNEB.</td></tr>
</table>
Compliance with the calibration frequency requirements for measuring instruments
As per the registered monitoring plan, the meters are to be calibrated once in 3 years. The audit team has checked the calibration certificates and records of the monitoring equipment as given below and found that there is delay in calibration from January 2011 to November 2011. Accordingly PP has applied necessary correction factors for the delay, and the calculations are found to be conservative. The details of the calibration of meters is given in the table below.
</td>
</tr>
<tr>
<td>Conclusion</td>
<td>
The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD. All parameters were monitored and determined as per the registered monitoring plan. Referring to p.360, p.361, p.363 and p.364 of CDM VVS PA, v2.0, VVB confirms through video call and telephonic interviews and from the document review, the actual monitoring system complies with the registered monitoring plan. The substantiation of this conformity on information flow for these parameters including the values in the monitoring reports is reported in the above section.
During the verification, all relevant monitoring parameters of the registered monitoring plan have been verified with regard to the appropriateness of the verification method, the correctness of the values applied for ER calculation, the accuracy and applied QA/QC measures. After appropriate corrections, carried out by the project participant, it is confirmed that all monitoring parameters have been measured / determined without material misstatements and are in line with all applicable standards and relevant requirements.
All parameters required to be monitored are recorded at the intervals required by the registered monitoring plan and the applied methodology. On the basis of review of source and nature of available evidences and records, the verification team confirms the quality of evidence for emission reduction provided is sufficient as per CDM VVS PA, v2.0.
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</table>

Calibration of the meters

Make	Class	Serial No.	Calibration Date	Validity	Delay in days
Elster	0.5	04804679	30.08.2008 07.11.2011	29.08.2011 06.11.2014	70

Elster	0.5	04804672	30.08.2008 07.11.2011	29.08.2011 06.11.2014	70
Elster	0.5	04804717	19.11.2008 07.11.2011	18.11.2011 06.11.2014	
Elster	0.5	04804675	19.11.2008 07.11.2011	18.11.2011 06.11.2014	
Elster	0.5	04862825	19.11.2008 07.11.2011	18.11.2011 06.11.2014	
Elster	0.5	04862888	19.11.2008 07.11.2011	18.11.2011 06.11.2014	
Elster	0.5	04804527	05.01.2008 07.11.2011	04.01.2011 06.11.2014	301
Elster	0.5	04721952	28.03.2008 07.11.2011	27.03.2011 06.11.2014	221
Elster	0.5	04725655	28.03.2008 07.11.2011	27.03.2011 06.11.2014	221
Elster	0.5	04804537	14.10.2008 07.11.2011	13.10.2011 06.11.2014	24
Elster	0.5	04862789	19.11.2008 07.11.2011	18.11.2011 06.11.2014	
Elster	0.5	04804673	30.08.2008 07.11.2011	29.08.2011 06.11.2014	70
Elster	0.5	04721934	28.03.2008 07.11.2011	27.03.2011 06.11.2014	221

It has been observed that there was a delay in calibration of meters from 24 days to 301 days during the monitoring period. PP has applied the correction factor of 0.5% in the emission reduction calculations for the months January 2011 to November 2011 in acordance with the p.366 of CDM VVS. Hence the same is accepted by the audit team.

4.2 Safeguards

4.2.1 No Net Harm

The project do not have any negative environmental and social impacts.

4.2.2 Local Stakeholder Consultation

Local stakeholder consultation has been conducted at the time of project registration. As confirmed by PP during interviews, for on-going stakeholders' communication, PP has maintained feedback/complaint register at the site office. Local stakeholders can anytime lodge their grievances if any in the register over the operational lifetime of the project.

During current monitoring period no grievance was received. Further during the verification of the project, the issues related to stakeholders were discussed and there are no such issues reported during the current monitoring period from the stakeholders which could impact the project. Thus, assessment team is of the opinion that the ongoing stakeholder mechanism is adequate and appropriate."

4.3 AFOLU-Specific Safeguards

This section is not applicable as this project activity is a non-AFOLU project activity.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	The assessment of data and the calculation of baseline emission reduction in the MR and the ER excel sheet have been verified as per the following set of supporting documents: 1. Energy bills 2. Joint meter readings 3. VER spreadsheets 4. Sales Invoices
Conclusion	Calculations applied formulae and method for calculation of baseline emission are in accordance with the registered monitoring plan and are in line with the requirements of the applied methodology.

Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan
Conclusion	Project emissions are zero as per the requirement of the methodology and registered VCS PD.

Calculation of leakage GHG emissions

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan
Conclusion	Leakage emissions are not applicable according to the applied methodology and registered VCS PD.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	No lack of evidence and missing data were detected during this monitoring period. All values as per the monitoring plan were crosschecked by the verification team against basic monitored data and the calculations were found to be correct. The verification team confirms that all assumptions, emission factors and default values have been correctly justified. All the emission factors, application of maximum permissible errors and default values are explicitly mentioned in the monitoring report. Hence the VVB confirms that the methods and formulae used to obtain the emissions are appropriate. No reporting risks have been identified for the data reported. Troubleshooting procedure, maintenance and calibration of monitoring equipment, monitoring measurements and reporting, record handling and maintenance, reviewing monitored data are available at the plant. All the monitored data are archived partially in electronic and paper form. The data will be kept for the whole crediting period and 2 years after the last crediting period thereby meeting the requirement of the monitoring plan.
Conclusion	The formulae and the methods referred in the MR and the emission reduction calculation spread sheet comply with the methods described in the registered PDD. No lack of evidence and missing data were detected during this monitoring period. All values as per the monitoring plan were crosschecked by the verification team against basic monitored data and the GHG emission calculation is found correct.

	TUV SUD confirms that all assumptions, emission factors and default values have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report. Calculations applied formulae and method for calculation of GHG emission are in accordance with the registered monitoring plan and are in line with the requirements of VCS, the applied methodology and p. 372, p.373 of CDM VVS PA ver 2.0.

4.6 Non-Permanence Risk Analysis

Not applicable

5 VERIFICATION CONCLUSION

The VVB confirms that

- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the project is operated as planned and described in the project design document approved by the VCS;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the monitoring plan in Monitoring Report is as per the VCS PD and monitoring plan approved by the VCS;
- the approved monitoring plan in the approved VCS DD is as per the applied methodology;
- There is an audit trail that contains the evidence and records that validate the stated figures.

Based on the information we have seen and evaluated, we confirm that the project activity achieved the verified amount of reductions in anthropogenic emissions by sources of greenhouse gases that would not have occurred in the absence of the project activity

Verification period: From 19 October 2008 to 18 October 2014

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2008	4654	0	0	4654
2009	38,807	0	0	38,807
2010	34,910	0	0	34,910
2011	30,453	0	0	30,453

2012	37,485	0	0	37,485
2013	24,954	0	0	24,954
2014	22,355	0	0	22,355
Total	**193,618**	**0**	**0**	**193,618**

The emission reductions estimated as per the PDD are 219,208 tCO2 e where as the ERs in the current monitoring period are 193,618 tCO2 e. Hence there is a 11.67% decrease in the ERs from the estimated ones in the PDD. The ex-post ERs were higher than the ex-ante ERs for year 2009 and 2012 because the generation of electricity depends upon many other climatic conditions, however the overall ERs were less than the estimated ones. Hence it is conservative and could be accepted.

APPENDIX 1: <DOCUMENTS REVIEWED>

No.	Author	Title	References to the document
1.	UNFCCC	CDM VVS for PA v2.0	-
2.	UNFCCC	Methodology ACM0002 Ver.10	-
3.	Verra	VCS Standard v4.0	-
4.	VCS	Final VCS PD	Version 02 11/02/2009
5.	Arvind Traders	Final Monitoring report	Version 02 06/09/2021
6.	Arvind Traders	Revised Emission Calculation sheet version 02	Version 02 06/09/2021
7.		The operational lifetime of the project activity from the manufacturer=(Technical specifications)	Manufacturer technical specifications
8.		Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in VCS: Verified Carbon Standard www.v-c-s.org	Reference link is provided.
9.	NA	Tools/ guidelines used in the project activity • Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50 • Tool to calculate the emission factor for an electricity system • Glossary of CDM terms version 07 • VCS verification report template version 4.0	UNFCCC CDM web site
10.		JMR records for the complete monitoring period	JMR records
11.		Invoices for the complete monitoring period	Invoice
12.	PP	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period and double counting	-
13.	PP	Commissioning Certificates for all the individual WTGs	
14.	NA	Break down details of the complete monitoring period	Log sheet

15.	NA	Teams and telephonic interviews carried out with PP as part of remote audit due COVID-19 situation in India	NA
16.	NA	Calibration certificate of all energy meters	2008-14
17.	NA	Site photographs	-
18.	NA	GPS Coordinates	-
19.	NA	Single line diagram for metering arrangements	-
20.	PP	Grievance register at the plant	
21.	Arvind Traders	No double counting declaration	27/08/2021

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