

WIND BASED POWER GENERATION BY MYTRAH ENERGY (INDIA) LIMITED (EKIESL-VCS-JANUARY-16-01)



Document Prepared By (individual or entity)

EPIC Sustainability Services Private Limited

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Summary:

Mytrah Energy (India) Limited has appointed EPIC Sustainability Services Private Limited to perform the first periodic verification of the emission reductions reported for the project titled “Wind Based Power Generation by Mytrah Energy (India) Limited (EKIESL-VCS-January-16-01)” (Project ID: PL1521) for the period from 21st February 2014 to 1st April 2016. The verification was based on the validated project design (PD) version 2.0 dated 10th February 2016., corresponding validation report and other supporting documents made available to the verification team by the client.

The project involves installation of 223 WTGs, with a total capacity of 233.1 MW in the state of Andhra Pradesh (44 nos x 0.85 MW each), Karnataka (112 nos x 0.85 MW each) and Tamilnadu (67 nos x 1.5 MW each), India. The project activity results in the reduction of GHG emission by displacing the grid electricity from the southern grid, a fossil fuel dominated grid.

The verification team identified, through the verification process, 05 CARs, 02 CRs and 1 FAR. The PP has taken actions and submitted to EPIC the revised monitoring report and supporting evidence. The verification team, through the verification process, confirmed that the emission reductions achieved by the project activity during the monitoring period are correctly calculated in the monitoring report, Version 4.0, dated 25th May 2017 based on the approved monitoring methodology, ACM 0002, version 16.0. Therefore, EPIC certifies the emission reductions amounting to 556,341 tCO₂e for the period 21st February 2014 to 1st April 2016 (both days inclusive).

Table of Contents

TABLE OF CONTENTS	PAGE
1.0 INTRODUCTION	4
1.1 Objective	4
1.2 Scope and Criteria	4
1.3 Level of Assurance	4
1.4 Summary of the Project Description	4
2.0 VERIFICATION PROCESS	5
2.1 Method and criteria	5
2.2 Document review	6
2.3 Interview	6
2.4 Site inspections	6
2.5 Resolution of Findings	7
2.5.1 Forward Action Requests	7
2.6 Eligibility of Validation activities	7
3.0 VALIDATION FINDINGS	7
3.1 Participation under Other GHG Programs	7
3.2 Methodology Deviations	7
3.3 Project description deviations	8
3.4 Grouped project	8
4.0 VERIFICATION FINDINGS	8
4.1 Project implementation status	8
4.2 Accuracy of GHG Emission Reductions and removal calculations	8
4.3 Quality of Evidences to determine GHG Emission Reductions and removals	12
4.4 Non-permanence Risk Analysis	12
5.0 SAFEGUARDS	12
5.1 No Net Harm	12
5.2 Local Stakeholder Consultation	12
6.0 VERIFICATION CONCLUSION	13
References	15
Appendix : Resolution of CAR/CRs	16

1 INTRODUCTION

1.1 Objective

EPIC Sustainability Services Private Limited (EPIC) has been contracted by Mytrah to undertake the (first periodic) independent verification of the project activity titled “Wind Based Power Generation by Mytrah Energy (India) Limited (EKIESL-VCS-January-16-01)”.

- To verify that the actual monitoring system and procedures are in full compliance with the system and procedures described in the monitoring plan of validated PD, version 2.0 dated 10th February 2016 as well as with the applicable methodology;
- To verify that the data reported were accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation; and
- To verify and certify GHG emission reduction reported for the project for the period from 21st February 2014 to 1st April 2016.

1.2 Scope and Criteria

The scope of the verification was the independent and objective review and ex-post determination of the monitored reductions in GHG emissions from the project activity during the monitoring period. The verification of this VCS project was based on the validated and registered project design document (PD), validation report and monitoring reports and supporting documents made available to the verification team. These documents were reviewed against the requirements of the VCS standard^[1] version 3.6, VCS guidelines, the CDM Modalities and Procedures, related rules and guidance, and the Validation and Verification standard^[2] Version 9.0. The verification is not meant to provide any consulting towards the client. However, stated request for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Level of Assurance

In line with VCS 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.

This implies that based on the process and procedures conducted EPIC should state whether the information in the PD is materially correct and is a fair representation of the of the actual project details, and is prepared in accordance with the VCS requirements and the applied CDM methodology for information pertaining to additionality, GHG quantification, monitoring and reporting.

1.4 Summary Description of the Project

The project activity is a grouped project, consisting of 223 Wind Turbine Generators (WTGs) installed in states of Andhra Pradesh, Karnataka and Tamilnadu, India. The intent of the Project Activity is to reduce GHG emission and promote sustainable development by use of renewable energy (Wind) for generation of power by bringing together a number of investors with small power requirements to invest into wind turbines. In the absence of the project activity, the equivalent amount of electricity would have been generated by the power plants connected with the southern grid which is predominantly based on fossil fuel.

Project Scenario: The project activity involves the installation of WTGs which reduces the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation from renewable and cleaner energy source i.e. Wind. The electricity thus generated is being supplied to the Southern regional grid. All the 223 WTGs involved in this project have commissioned and connected with the southern regional grid. The electricity thus generated is being supplied to the southern grid. The verification team has reviewed the commissioning certificates^{/3/} and power purchase agreements^{/4/} and energy wheeling agreements.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The verification process consists of the following phases:

- i) a document review of the project design documents, monitoring reports and preparation of verification protocol;
- ii) on-site visit to the project activity and interviews with project developer and project consultant; and
- iii) resolution of outstanding issues and the issuance of final verification report and opinion

In order to ensure transparency, a verification protocol was prepared for the project according to the VVS version 9.0 verification requirements and VCS Standard version 3.6. The verification protocol serves the following purposes:

- it organizes, details and clarifies the requirements that a VCS project is expected to meet;
- it ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The completed validation protocol is enclosed in Appendix of this report.

During the verification, non-fulfillment of the verification protocol criteria or identified risks to the fulfillment of project objectives were raised as either CAR or CR. Corrective Action Requests (CAR) were issued, where:

- i) mistakes had been made that directly impacted on the project results; or
- ii) CDM/VCS requirements had not been met; or
- iii) there was a risk that the project would not be accepted as a VCS project or that emission reductions will not be certified.

The Clarification Requests (CR) were issued where additional information was needed to clarify issues, and Forward Action Requests (FAR) for issues relating to project implementation that required review during the first verification of the project activity.

The following team members from EPIC are involved in identifying the following:

Name	Role	Components reviewed
Mr. R. Vijayaraghavan	Lead Auditor	Completeness check, desk review, onsite inspection, Interview with project representatives, issuance of findings, report preparation
Mr. A. Prabu Das	Technical Reviewer	Technical review

2.2 Document Review

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

1. a review of data and information presented to verify their completeness
2. a review of the Monitoring Plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the QA/QC procedures, and
3. an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ERs.

The monitoring report^{/5/}, Version 01, dated 23rd April 2016 was initially reviewed and further EPIC requested the PP to present the supporting evidences. Additional background information and documents related to the project performance were also reviewed by EPIC. Through the process of the verification, the revised monitoring report and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by EPIC. The documents reviewed by EPIC are listed in References section of this report. EPIC reviewed the final version (version 4.0 dated 25th May 2017) of the monitoring report^{/5/} to confirm that all changes agreed had been incorporated.

2.3 Interviews

After the review of the Project description and documents a site visit was carried out from 28th and 29th April (TN WTGs) and 12th May (AP WTGs) and 13th May 2017 (Karnataka WTGs). During the site visit physical inspection of the project components followed by interviews with the on-site personnel was carried out to verify the project details. A follow-up meeting was also conducted with the project representatives. The following persons were interviewed.

Name & Designation	Company	Details of Interview
Mr. Senthil Kumar (TN) Mr. Saravanan (TN) Mr. Sadanand Patil (Karnataka) Mr. Yusuf Patel (AP)	Mytrah	Technical Details, Monitoring system, calibration frequency, Grid connectivity & power evacuation system / Infrastructure. Power Purchase Agreement, Overall Project management.

2.4 Site Inspections

During the site visit, the actual on-site practices adopted and followed for the operation of the project were compared with the description given in the monitoring report. The grid-connectivity, metering practices, calibration and level of accuracy were examined. The archived data of the energy generated was also reviewed.

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

- 1) an assessment of the implementation and operation of the VCS project activity as per the registered PD
- 2) a review of information flows for generating, aggregating and reporting of the monitoring parameters

- 3) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan
- 4) a cross-check between information provided in the MR and data from other sources
- 5) a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PDD and the applied methodology
- 6) A review of calculations and assumptions made in determining the GHG data and ERs, and
- 7) An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

Resolution of Clarification and Corrective Action Requests

The objective of this phase of the verification was to resolve the corrective action requests and clarifications and any other outstanding issues which needed to be clarified prior to EPIC positive conclusion on the monitoring report and the project design. During the validation process five CARs, two CRs and one FAR were raised.

All the CARs and CRs were resolved during this phase. In order to ensure the transparency of the validation process, the concerns raised and responses that were given are summarized in Appendix of this report and documented in more detail in the Appendix. All the corrective actions have been incorporated into the monitoring report.

Internal quality control

A Technical Reviewer is appointed to review the final draft verification report and the final verification report. The comments made by the Technical Reviewer are taken into consideration and incorporated in the final report. The final report (after resolutions of all findings) is then submitted to the Head – Operations for review and approval.

2.5.1 Forward Action Requests

There is one FAR raised during this verification process.

2.6 Eligibility for Validation Activities

EPIC has accredited for validation and verification for the scopes 1-11 and 13-15 by CDM UNFCCC and as well as by the VCS board.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is not applied under any other GHG program like CDM, GS, hence not applicable. Since electricity from 45 MW (30 WTGs of 1.5 MW) of Tamilnadu WTGs is claiming REC credit for this monitoring period, hence equivalent amount of electricity is not claiming VCS credit.

3.2 Methodology Deviations

There is no methodology deviation involved.

3.3 Project Description Deviations

The verification team has observed calibration certificates for the project activity is not available. Refer section 4.2 for details. But the PP has applied suitable error (0.2%) for the delayed period. Since the deviation does not affect additionality and conservativeness in the calculation of the overall emission reductions, the verification team has accepted this deviation.

3.4 Grouped Project

The project activity is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The verification based on the onsite observation, found that there is no material discrepancies between the project implementation and the project description^[6] and its corresponding validation report^[7]. The verification team checked the status of monitoring plan the completeness of monitoring system and found no discrepancies between the actual monitoring system and the monitoring plan set in the validated project description. PP has provided an undertaking letter that there will not be any double counting. The verification team was able to conclude the project has been implemented as described in the validated project description.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

Emission Reductions of the project (ER_y)	As per para 61 of the applied methodology, emission reductions are calculated as follows. $ER_y = BE_y - PE_y - LE_y$ Where BE_y - Baseline emissions in year y PE_y - Project emissions in year y LE_y - Leakage emissions in year y The verification of the same is detailed below.
Baseline emissions in year y (BE_y)	As per para 46 of the applied methodology, baseline emissions include only CO ₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows. $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ Where $EG_{PJ,y}$ - Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y $EF_{grid,CM,y}$ - Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"

	The verification of the same is detailed below.																														
Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y ($EG_{PJ,y}$)	As per para 47 and 48 of the applied methodology, if the project activity is the installation of a Greenfield power plant, $EG_{PJ,y}=EG_{facility,y}$ Where $EG_{facility,y}$ -Quantity of net electricity generation supplied by the project plant/unit to the grid in year y Since the project activity is installed in greenfield facility, the verification team has accepted the same as correct. The verification of the same is detailed below.																														
Quantity of net electricity generation supplied by the project plant/unit to the grid in year y ($EG_{facility,y}$)	For Andhra Pradesh (AP): As per the monitoring plan, JMR Reading^{/8/} is to be taken at the secondary side of the step up transformer installed at the substation at a particular date. The verification team has observed it is recorded every month. Based on the JMR readings, PP raises monthly energy bill/statement^{/8/} based on the JMR at the end of each calendar month. The calibration is done once in 5 years. The verification team has checked the calibration details^{/9/} and there is some calibration delay for the meters. The verification team has observed that the error of 0.2% is applied to get the conservative value during the delay period and also found that meters are working with the intended accuracy. For Karnataka (KAR): The validation team has observed that only parameter to be monitored is the Quantity of net electricity supplied to the grid as a result of the implementation of the VCS project activity in year y. As per the onsite observation, the validation team has confirmed that parameter is calculated from electricity export, import and transmission loss. The electricity is measured by two way energy meters of an accuracy class of 0.2 which are calibrated periodically by officials from the BESCOM/KPTCL. The export, import and transmission loss are recorded monthly by BESCOM officials in the in the B-Form. PP has raised invoices based on B-forms. The validation team has checked the JMR readings recorded at 33 KV metering location and Net Electricity supplied to the Grid is calculated as follows. $EG_{BL,KN,y} = EG_{Export,KN} -115\%* EG_{Import,KN} -TE_{KN}$ The same was crosschecked with invoices^{/8/} and found to be exactly matching. Hence accepted by the verification team. The verification team has checked the calibration details^{/9/} and there is some calibration delay for the meters. The verification team has observed that the error of 0.2% is applied to get the conservative value during the delay																														
<table><tr><th>Year</th><th colspan="2">$EG_{facility,y}$</th></tr><tr><td rowspan="4">2014</td><td>AP</td><td>68,278 MWh</td></tr><tr><td>KAR</td><td>96,725 MWh</td></tr><tr><td>TN</td><td>47,062 MWh</td></tr><tr><td>Total</td><td>212,064 MWh</td></tr><tr><td rowspan="4">2015</td><td>AP</td><td>70,946 MWh</td></tr><tr><td>KAR</td><td>162,071 MWh</td></tr><tr><td>TN</td><td>86,334 MWh</td></tr><tr><td>Total</td><td>319,350 MWh</td></tr><tr><td rowspan="4">2016</td><td>AP</td><td>9,819 MWh</td></tr><tr><td>KAR</td><td>22,650 MWh</td></tr><tr><td>TN</td><td>2,831 MWh</td></tr><tr><td>Total</td><td>35,299 MWh</td></tr></table> QA/QC: For AP: 0.2% error is applied for export/import for the period from 21st Feb 2014 to 20th March 2015 due to non-availability of calibration certificate. For Karnataka: 0.2% error is applied for generation for the period from 21st Feb 2014 to 1st January 2015 due to non-availability of calibration certificates. For TN: 0.2% error is applied for generation for the entire monitoring period due to non-availability of initial calibration certificates.	Year	$EG_{facility,y}$		2014	AP	68,278 MWh	KAR	96,725 MWh	TN	47,062 MWh	Total	212,064 MWh	2015	AP	70,946 MWh	KAR	162,071 MWh	TN	86,334 MWh	Total	319,350 MWh	2016	AP	9,819 MWh	KAR	22,650 MWh	TN	2,831 MWh	Total	35,299 MWh	
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	period and also found that meters are working with the intended accuracy. For Tamilnadu (TN): The verification team based on the on-site visit confirmed that net electricity supplied to the grid by each WTG is measured through the meter readings of the energy meters installed by electricity board, which have facility to record export and import of energy. The team has checked the electronic archiving of all the monitored data^{/8/}. The main meters will be calibrated as per as per guidelines provided by CEA. As per the PD, the accuracy class of the main meters is not inferior to 0.5s and the calibration frequency is 5 years. The verification team has observed that the accuracy class of the meters is 0.2s. The verification team has found that some of the WTGs is having calibration delay. PP has applied 0.2% error to all the WTGS covering the monitoring period and hence conservative. The monitoring frequency for EGy matches with that of the methodology, viz. hourly measurement and monthly recording. The cross checking is provided through the use of the invoices receipts^{/8/}. Project participant has included a few other variables in the monitoring plan (Total electricity imported, Total electricity Exported) to account for the uncertainty where the dates of the recorded data may not coincide with the verification period. The verification team therefore agrees that the project activity meets all the applicability conditions and all other stipulations of the validated PD. The reliability of the evidence, and the source and nature of the evidence is checked the requirements of the validated PD and found exactly matching. The verification team has checked the JMR sheets, invoices, VER sheet and monitoring report and found that the information flow from data generation and aggregation, to recording, calculation and final transposition into the monitoring report are being followed as per the validated PD and hence accepted by the verification team.
Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y ($EG_{PJ,y}$)	As per para 47 and 48 of the applied methodology, if the project activity is the installation of a Greenfield power plant, $EG_{PJ,y}=EG_{\text{facility},y}$

Year	$EG_{PJ,y}$	
2014	AP	68,278 MWh
	KAR	96,725 MWh
	TN	47,062 MWh
	Total	212,064 MWh
2015	AP	70,946 MWh
	KAR	162,071 MWh
	TN	86,334 MWh
	Total	319,350 MWh
2016	AP	9,819 MWh

	<table><tr><td>KAR</td><td>22,650 MWh</td></tr><tr><td>TN</td><td>2,831 MWh</td></tr><tr><td>Total</td><td>35,299 MWh</td></tr></table>	KAR	22,650 MWh	TN	2,831 MWh	Total	35,299 MWh			
KAR	22,650 MWh									
TN	2,831 MWh									
Total	35,299 MWh									
Combined margin CO2 emission factor for grid connected power generation in year y ($EF_{grid,CM,y}$) =0.9817 tCO2e/MWh	It is ex-ante parameter and is fixed for the entire crediting period including this monitoring period and hence accepted by the verification team.									
Baseline emissions in year y (BE_y)	As per para 46 of the applied methodology, baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows. <table><tr><td>Year</td><td>BE_y</td></tr><tr><td>2014</td><td>208,183 tCO2e</td></tr><tr><td>2015</td><td>313,505 tCO2e</td></tr><tr><td>2016</td><td>34,653 tCO2e</td></tr></table> $BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$		Year	BE_y	2014	208,183 tCO2e	2015	313,505 tCO2e	2016	34,653 tCO2e
Year	BE_y									
2014	208,183 tCO2e									
2015	313,505 tCO2e									
2016	34,653 tCO2e									
Project emissions (PE_y)	As per para 35 of the applied methodology, for most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation $PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$ Where $PE_{FF,y}$ -Project emissions from fossil fuel consumption in year y $PE_{GP,y}$ -Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y $PE_{HP,y}$ -Project emissions from water reservoirs of hydro power plants in year y The verification of the same is detailed below.									
Project emissions from fossil fuel consumption in year y ($PE_{FF,y}$) =0 tCO2e	Since there is no fossil fuel consumption, emission due to fossil fuel consumption is zero.									
Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y ($PE_{GP,y}$) =0 tCO2e	Since the project activity is wind project and not geothermal project, emissions due to the release of non-condensable gases in operating geothermal project is zero.									
Project emissions from water reservoirs of hydro power plants in year y ($PE_{HP,y}$) =0 tCO2e	Since the project activity is wind project and not hydro project, emissions from water reservoirs of hydro power plant is zero.									
Project emissions (PE_y) = 0 tCO2e	As per para 35 of the applied methodology, for most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation $PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$									
Leakage emissions (LE_y) = 0 tCO2e	As per para 60 of the applied methodology, no leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected. Hence leakage is									

		zero.
Emission Reductions of the project (ER _y)		As per para 61 of the applied methodology, emission reductions are calculated as follows. $ER_y = BE_y - PE_y - LE_y$
Year	ER _y	
2014	208,183 tCO ₂ e	
2015	313,505 tCO ₂ e	
2016	34,653 tCO ₂ e	
Total	556,341 tCO ₂ e	

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

Refer section 4.2 of this report.

4.4 Non-Permanence Risk Analysis

Not applicable for a renewable energy project.

5 SAFEGUARDS

5.1 No Net Harm

Since the contract/ agreement with EPIC is prior to 19th April 2017, this section is not to be verified. However, there is no negative impact exist for this project as identified by the PP.

5.2 Local Stakeholder Consultation

Since the contract/ agreement with EPIC is prior to 19th April 2017, this section is not to be verified.

6 VERIFICATION CONCLUSION

EPIC Sustainability Services Private Limited has been engaged by Mytrah to perform the first periodic verification of the VCS project "Wind Based Power Generation by Mytrah Energy (India) Limited (EKIESL-VCS-January-16-01)" for the period from 21st February 2014 to 1st April 2016.

The verification was based on the validated PD, the baseline and monitoring methodology (ACM 002 Version 16.0), the Monitoring Report, emission reduction spread sheets and other supporting documents made available to EPIC verification team by the project participant. The management of TASMA was responsible for the preparation and reporting of GHG emissions data, and the reported GHG emissions reduction on the basis set out within the project monitoring plan.

It is the responsibility of EPIC verification team to express an independent GHG verification opinion on the GHG emissions from the project for the monitoring period starting from 21st February 2014 to 1st April 2016 and on the calculation of GHG emission reductions from the project based on the verified emissions for the same period.

The verification was carried out in accordance with the requirements of the Validation and Verification standard Version 9.0 and VCS Standard 3.6. As a result of the verification, the verification team confirms that for the reporting period:

- all operations of the project were implemented as described in the registered PD, (project ID: PL 1521) ,
- the monitoring plan is in accordance with the approved monitoring methodology, ACM002 version 16.0 applied by the project activity.

- the monitoring has been carried out in accordance with the validated PD version 2.0 dated 10th February 2016.
- the monitoring aspects (i.e. additional monitoring parameters, monitoring frequency and calibration frequency) were in place and functional, with the installed equipment essential for generating emission reduction operating appropriately and the calibration of all the equipment had been carried out accordingly and appropriate adjustments had been made when there were delays in the calibration, and
- the GHG emission reductions achieved were calculated correctly on the basis of approved monitoring methodology ACM002 version 16.0.

We have verified that the information included in the final monitoring report (version 4.0, dated 25th May 2017) was correct and that the emission reductions achieved had been determined correctly. In our opinion, the GHG emission reductions for the period from 21st February 2014 to 1st April 2016 stated in the latest revised monitoring report for the project are fairly stated.

The verifier confirms that the GHG emission reductions were calculated without material misstatements for the whole monitoring period. Our opinion is based on the project's GHG emissions and resulting GHG emission reductions reported, and, to the valid and registered project baseline and monitoring documents. We confirm the following:

Verification period: From [21-February-2014] to [1-April-2016]

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

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
Year 2014	208,183	0	0	208,183
Year 2015	313,505	0	0	313,505
Year 2016	34,653	0	0	34,653
Total	556,341	0	0	556,341

Prepared by :		Approved by:	
	(R. Vijayaraghavan) Verification Team Leader		(K. Sudheendra) Head-Operations

REFERENCES

1	VCS Standard version 3.6
2	Validation and verification Standard version 9.0
3	Commissioning Certificates
4	Power Purchase Agreements/ Energy Wheeling agreements
5	Monitoring report Version 1.0 and its related documents Monitoring report Version 4.0 and its related documents
6	Registered PD
7	Corresponding Validation report
8	JMR records and Invoices
9	Calibration certificates.

APPENDIX :**TABLE : VERIFICATION REQUIREMENTS BASED ON CDM VALIDATION AND VERIFICATION STANDARD VERSION 9.0**

	Checklist Questions	Comments by verifier	Conclusion
	Compliance of the project implementation with the registered project design document		
1	Was an on-site visit conducted for this verification? If no, please justify the rationale of the decision. (Refer VVS 262)	The verification team visited physically to the sites and found that all the machines were commissioned as on date. The team also visited substations which are at the windmill site itself. The electricity supplied to Southern grid or used the grid for captive use.	OK
2	Are all physical features of the VCS project activity proposed in the registered PDD in place? (Refer 262)	The physical features, as required by the registered PDD, include power generation facility i.e. WTGs and energy meters. The verification team was able to confirm that all physical features of the proposed project activity matches with that mentioned in the registered PD. Unique identification number matches with that mentioned in the PDD. Evidence for there will not be any double counting is not provided.	CAR-1
3	Have the project participants operated the proposed VCS project activity as per the registered PDD or any approved revised PDD? (Refer VVS 262 and 265)	It has implemented and operated the project as per the registered PDD. This was also evident from the invoices and JMR reports available at substations provided by the PP.	OK
4	For this monitoring period, what is the status of the implementation of the project? For project activities that consist of more than one	All the windmills are commissioned.	OK

	Checklist Questions	Comments by verifier	Conclusion
	site, the DOE shall describe the status of implementation and starting date of operation for each site. (Refer VVS 263 (a))		
5	For project activities with phased implementation, what is the progress of the proposed project activity achieved in each phase under verification. If the phased implementation is delayed, describe the reasons and present the expected implementation dates; (Refer VVS 263 (a))	All the windmills are commissioned.	
6	Describe the actual operation of the project activity. (Refer VVS 263 (b))	All the windmills are commissioned. The verification team based on the on-site visit confirmed that net electricity supplied to the grid by each WTG is measured through the meter readings of the energy meters installed by electricity board, which have facility to record export and import of energy. The team has checked the electronic archiving of all the monitored data. The main meters will be calibrated as per as per guidelines provided by CEA. The accuracy class of the main meters is 0.2s and the calibration frequency is 5 years.	
7	Any information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD or any approved revised PDD? (that has caused an increase in estimates of the emission reductions in the current monitoring period or is highly likely to increase the estimates of	It is found that the JMR readings are dated 5 th or 15 th of each month. How the electricity exported is calculated for the month of December is not clear. PP is requested to take corrective action.	CAR-2

	Checklist Questions	Comments by verifier	Conclusion
	emission reductions in the future monitoring) (Refer VVS 263 (c))		
	Compliance of the monitoring plan with the monitoring methodology including applicable tool(s)		
	The monitoring plan of the proposed VCS project activity shall comply with the applied methodology.		
8	For monitoring aspects that are not specified in the methodology and where applicable the standardized baseline, particularly in the case of small-scale methodologies (e.g. additional monitoring parameters, monitoring frequency and calibration frequency), these should be brought to the attention of the Board issues which may enhance the level of accuracy and completeness of the monitoring plan. (Refer VVS 266)	Not applicable	OK
	Compliance of monitoring activities with the registered monitoring plan.		

	Checklist Questions	Comments by verifier	Conclusion
	Determine whether the monitoring of parameters related to the GHG emissions reductions in the project activity has been implemented in accordance with the monitoring plan contained in the registered PDD or any accepted revised monitoring plan.		
9	Is the monitoring plan of the VCS project activity complying with the methodology applied by the registered VCS project activity or an approved revised PDD? (Refer VVS 268)	Yes. Monitoring plan and applied methodology have been properly implemented and duly followed by PP. Net electricity export to the grid is calculated based on the export and import data available from the JMR and invoices.	OK
10	Has the monitoring plan been properly implemented and followed by the project participants? (Refer VVS 269 (a))	Yes. Monitoring plan and applied methodology have been properly implemented and duly followed by PP	OK
11	Have all parameters stated in the monitoring plan, and relevant CDM Executive Board decisions been sufficiently monitored and updated as applicable, including: (Refer VVS 269 (b))		
	i) project emission parameters	For wind projects, there is no project emission. It is as per applied methodology.	OK

	Checklist Questions	Comments by verifier	Conclusion
	ii) baseline emission parameters	Baseline emission is based on the net electricity exported to the grid. Monthly net electricity generation from the WTGs is calculated from the JMR and invoices. As per registered PDD, Emission factor was calculated ex ante and it remains the same for the entire crediting period. The values thus calculated are used for calculating the baseline emission. So, the verification team concludes that baseline emission is calculated as per CDM/VCS requirements. From the report It is observed that there is a difference in actual ER and estimated ER. But reason for difference in net electricity generation which depends on wind speed, wind availability, machine availability and grid availability is not reflected in the monitoring report.	GR-1
	iii) leakage parameters	This parameter was adequately justified in the monitoring report.	OK
	iv) Management and operational system: the responsibilities and authorities for monitoring and reporting are in accordance with the responsibilities and authorities stated in the monitoring plan?	It is demonstrated that project management system procedures, including responsibility and authority of monitoring and reporting activities are comply with registered monitoring plan. The emergency preparedness mentioned in the monitoring report is complete.	OK

	Checklist Questions	Comments by verifier	Conclusion
12	Has the equipment used for monitoring is in accordance with section 4 below and is controlled and calibrated in accordance with the monitoring plan, the applied methodology, the applied standardized baseline, the Board guidance, local/national standards, or as per the manufacturer's specification? (Refer VVS 269 (c))	It is found that there is calibration delay for some of the WTGs.	OK
13	Are monitoring results consistently recorded as per approved frequency? (Refer VVS 269 (d))	Yes. But the frequency of calibration of Energy meters is mentioned explicitly in the monitoring report	OK
14	Have quality assurance and quality control procedures been applied in accordance with the monitoring plan or revised monitoring plan? (Refer VVS 269 (e))	The readings in these meters is taken by State Electricity Board (SEB) officials and used for billing purposes. But it is clearly indicated that in the monitoring report the activities related to the project, e.g. Measurement, calculation, reporting complies with the procedures defined in the registered PD and applied methodology	OK
	Compliance with the calibration frequency requirements for measuring instruments.		

	Checklist Questions	Comments by verifier	Conclusion
	Determine whether the calibration of those measuring equipments that have an impact on the claimed emission reductions is conducted by the project participants at a frequency specified in the applied monitoring methodology, the applied standardized baseline and/or the monitoring plan.		
15	Identify if there is any monitoring equipment not calibrated in accordance with the monitoring plan, the applied monitoring methodology, the Board guidance, local/national standards, or as per the manufacturer's specification? (Refer VVS 272)	It is found that there is calibration delay for some of the WTGs.	OK
16	If there is delayed and the calibration has been implemented after the monitoring period in consideration (i.e. the results of delayed calibration are available), has the following conservative approach adopted in the calculation of emission reductions: (a) Applying the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration and the actual date of calibration, if the results of the delayed calibration do not show any errors in the measuring equipment, or if the error is smaller than the maximum permissible error; or	It is found that there is calibration delay for some of the WTGs.	OK

	Checklist Questions	Comments by verifier	Conclusion
17	(b) Applying the error identified in the delayed calibration test, if the error is beyond the maximum permissible error of the measuring equipment. (Refer VVS 283)	It is found that there is calibration delay for some of the WTGs.	OK
18	Confirm that the error has been applied: (a) In a conservative manner, such that the adjusted measured values of the delayed calibration shall result in fewer claimed emission reductions;	It is found that there is calibration delay for some of the WTGs.	OK
	(b) For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration. (Refer VVS 283)	It is found that there is calibration delay for some of the WTGs.	OK
19	In cases where the results of the delayed calibration are not available, or the calibration has not been conducted at the time of verification, the verification team, prior to finalizing verification, shall request the project participants to conduct the required calibration and shall determine whether the project participants have calculated the emission reductions conservatively using the approach mentioned in paragraph 4.2 above. (Refer VVS 275)	It is found that there is calibration delay for some of the WTGs.	OK

	Checklist Questions	Comments by verifier	Conclusion
20	In cases where the verification team determines that it is not possible for the project participants to conduct the calibration at a frequency specified by either the applied methodology, the applied standardized baseline, guidance provided by the Board, and/or the registered monitoring plan due to reasons beyond the control of project participants (For example, due to the contractual terms between the project participant and purchasing/selling entities), the verification team, shall follow the requirements for post registration changes in section of E of the VVS. (Refer VVS 276)	It is found that there is calibration delay for some of the WTGs.	OK
21	In cases where neither the applied monitoring methodology, where applicable, the applied standardized baseline nor the monitoring plan specify any requirements for calibration frequency for measuring equipments, the verification team shall determine whether the equipments are calibrated either in accordance with the specifications of the local/national standards, or as per the manufacturer's specification. If neither local/national standards nor the manufacturer's specification are available, international standards may be used. Refer to appendix 1 of the VVS for an illustrative example to apply the above requirements. (Refer VVS 277)	Not applicable as the registered PD mandates 5 year calibration frequency.	OK

	Checklist Questions	Comments by verifier	Conclusion
	Assessment of data and calculation of emission reductions		
	Assess the data and calculations of GHG emission reductions achieved by/resulting from the project activity by the application of the selected methodology and, where applicable, the applied standardized baseline.		
22	If only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, the verification team shall raise a CAR for the project participants to comply with the requirements of Appendix 1 of the Project Standard or submit a request for deviation prior to submitting the request for issuance, if appropriate; (Refer VVS 280 a)	Not applicable	OK
23	Has information provided in the monitoring report been crosschecked with other sources such as plant log books, inventories, purchase records, laboratory analysis? (Refer VVS 280 b)	It is crosschecked with the invoices.	OK

	Checklist Questions	Comments by verifier	Conclusion
24	Have calculations of baseline emissions, proposed VCS project activity emissions and leakage, as appropriate, been carried out in accordance with the formulae and methods described in the monitoring plan, the applied methodology and where applicable, the applied standardized baseline? (Refer VVS 280 c)	Yes, the information in the report has been crosschecked with the JMR reading along with invoices raised by the PP to the State Electricity board and the values used in the monitoring report are found to be correct.	OK
25	Any assumptions used in emission calculations? If yes, they been justified? (Refer VVS 280 d)	Yes. The emission factor is determined ex ante and fixed for the crediting period and is correctly applied by the PP. But VER sheet is not provided. It is observed that some of the TN WTGs is registered under REC. Electricity- REC component is not allowed for claiming VCU credit. Please provide calibration certificates covering the monitoring period. The emission reductions for every year (data vintages) are not mentioned in the MR. For TN WTGs: PP has applied an error of 0.2% (maximum permissible error of the meter) for the whole period due to non-availability of some of the calibration certificates. Thus PP is requested to adjust the VER for next verification if actual error is more that permissible limit of accuracy class.	CAR-3 CAR-4 CAR-5 CR-2 FAR-1

	Checklist Questions	Comments by verifier	Conclusion
26	Have appropriate emission factors, IPCC default values and other reference values been correctly applied? (Refer VVS 280 e)	No. No other assumptions are followed.	OK
27	For a registered VCS project activity using an approved standardized baseline that standardizes baseline emissions, have the standardized value(s) of the parameter(s) are applied using the correct version of the applied standardized baseline in accordance with the Project standard. (Refer VVS 280 f)	Not applicable.	OK
	Post registration changes Temporary deviations from the registered monitoring plan, monitoring methodology and/or standardized baseline		
28	Where the deviation is identified during verification, the DOE shall indicate in the verification report how the monitoring report reflects the application of the approved guidance from the Board regarding the deviation from the provisions of the registered monitoring plan, the applied methodology and /or the applied standardized baseline. (Refer VVS 290)	Not applicable	OK
29	Where the deviation is identified prior to verification, the DOE shall state its opinion on whether the deviation reflects the application of the approved guidance from the Board regarding the deviation from the provisions of the registered monitoring plan, the applied methodology and /or the applied standardized baseline and as per the applicable provisions of the Project Standard. (Refer VVS 291)	Not applicable.	OK

	Checklist Questions	Comments by verifier	Conclusion
	Corrections		
30	If the DOE identifies that the project participants have made corrections to project information or parameters determined at validation, the DOE shall determine whether: (a) The corrected information is an accurate reflection of actual project information; and/or (Refer VVS 293 a)	Not applicable.	OK
31	The corrected parameters are in accordance with the applied methodology the monitoring plan and /or the applied standardized baseline. (Refer VVS 293 b)	Not applicable.	OK
	Changes to the start date of the crediting period		
32	The DOE shall indicate if the requirements in the Project standard have been met and shall submit a request for post registration changes in accordance with the Project cycle procedure. (Refer VVS 296)	The start date of the crediting period is correctly mentioned.	OK
	Permanent changes from the registered monitoring plan or monitoring methodology		
33	The DOE shall determine whether the changes to the monitoring plan contained in the registered PDD proposed by the project participants are in compliance with the applied methodology and, where applicable, the applied standardized baseline and do not reduce the level of accuracy of the monitoring compared with the requirements contained in the registered monitoring plan. (Refer VVS 298)	Not applicable.	OK

	Checklist Questions	Comments by verifier	Conclusion
34	In cases where the proposed changes refer to a later version of the applied methodology and /or the applied standardized baseline in the registered PDD, the DOE shall determine whether the application of any later version of the applied methodology any applicable tool(s) and/or the applied standardized baseline does not impact the conservativeness of the monitoring and verification process, including the related emission reduction calculations. (Refer VVS 299)	Not applicable.	OK
35	If the DOE identifies that the project participants are unable to implement the monitoring plan contained in the registered PDD and it will not be possible to monitor the registered VCS project activity in accordance with a monitoring plan that would comply with the applied methodology any applicable tools, and, where applicable, the standardized baseline or the relevant provisions of appendix 1 of the Project standard, the DOE shall request guidance from the Board concerning the acceptability of the permanent changes in accordance with the section on post registration changes in the Project cycle procedure. (Refer VVS 300)	Not applicable.	OK
36	The DOE shall determine whether the permanent changes are likely to lead to a reduction in the accuracy of the calculation of emission reductions. In cases where the DOE considers that the permanent changes will lead to a reduction in the accuracy of the calculation of emission reductions, the DOE shall request the project participants to apply conservative assumptions or discount factors to the calculations to the extent required to ensure that emission reductions will not be over-estimated as a result of the permanent change. (Refer VVS 301)	Not applicable.	OK
	Changes to the project design of a registered project activity		

	Checklist Questions	Comments by verifier	Conclusion
37	If the DOE identifies that the project design in the implementation or operation of the project activity does not conform with the description contained in the registered PDD or the relevant provisions of appendix 1 of the Project standard, the DOE shall request guidance from the Board concerning the acceptability of the proposed or actual changes in accordance with the section on post registration changes in the Project cycle procedure. (Refer VVS 305)	Not applicable.	OK
38	In case of actual changes, the DOE shall, by means of an on-site visit and review of the submitted revised PDD by the project participants, which describes the nature and extent of the actual changes, determine whether this description accurately reflects the implementation, operation and monitoring of the modified project activity. (Refer VVS 306)	Not applicable.	OK
39	The DOE shall conduct an on-site inspection to assess the impacts of the actual changes on the compliance of the monitoring plan, the level of accuracy of the monitoring activity, the applied monitoring methodology and including applicable tool(s) and/or, where applicable, the applied standardized baseline. (Refer VVS 307)	Not applicable.	OK

	Checklist Questions	Comments by verifier	Conclusion
40	The DOE shall, by means of reviewing the revised PDD against applicable additionality and methodological requirements, determine whether the proposed or actual changes would adversely affect the conclusions of the validation report of the registered PDD with regard to: (a) Additionality of the project activity; (b) Scale of the project activity; (c) Applicability and application of the approved baseline methodology and, where applicable, the approved standardized baseline under which the project activity has been registered; or (d) The compliance of the monitoring plan with the applied monitoring methodology and, where applicable, the applied standardized baseline (Refer VVS 308)	Not applicable.	OK
41	If the proposed or actual changes affect the additionality of the project activity then the DOE shall confirm that: (a) In the case of investment analysis, project participants have only modified the key parameters in the original spreadsheet calculations affected by the proposed or actual changes to the project activity; (b) In the case where only barriers have been claimed to demonstrate additionality, project participants have demonstrated that the barriers are still valid under the new circumstances. (Refer VVS 309)	Not applicable.	OK
42	For registered VCS project activity using an approved standardized baseline that standardizes additionality:- If the proposed or actual changes affect the additionality of the project activity then the DOE shall confirm that the project activity complies with the positive list of the applied standardized baseline in the registered PDD. (Refer VVS 309)	Not applicable.	OK

	Checklist Questions	Comments by verifier	Conclusion
43	The DOE shall confirm that the applied methodology including applied tools and/or the applied standardized baseline do not impact the conservativeness of the monitoring and verification process and the related emission reduction calculations in cases where: (a) The proposed or actual changes impact the implementation of the project activity; (b) The original methodology and/or the original standardized baseline would no longer be applicable; and (c) The project participant applies: (i) A later version of the methodology and/or the standardized baseline; or (ii) Another methodology and/or another standardized baseline that is(are) applicable to the project activity. (Refer VVS 310)	Not applicable.	OK
44	The DOE shall assess whether the revised PDD complies with: (a) The applied methodology, tools and/or standardized baseline; (b) Any later version of the methodology and/or the standardized baseline; or (c) The requirements of another methodology and/or another standardized baseline that is(are) applicable to the project activity. (Refer VVS 311)	Not applicable.	OK

TABLE: RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1	Summary of project owner response	Verification team conclusion
CAR 1 Evidence for there will not be any double counting like CDM, GS etc is not provided.	S. No 2	The evidence for there will not be any double counting is provided now. REC part is removed from claiming VCS credit.	The verification team has reviewed the undertaking letter stating that there is no double counting for this project which has accepted. Conclusion: CAR 1 is closed.
CAR 2 It is found that the JMR readings for TN WTGS are dated 5 th or 15 th of each month. How the electricity exported is calculated for the month of December is not clear. PP is requested to take corrective action.	S. No 7	The calculation of electricity exported for the balance period up to 31 st Dec is done by following apportioning procedure. <u>For 5th:</u> End date as per JMR = 05.12.2014 End date as per monitoring period = 31.12.2014 End date of the next month = 05.01.2015 The daily readings are also noted in the log sheets. So, the net electricity exported to the grid is calculated from 6 th December 2014 to 31 st December 2014 is calculated as follows. Apportioned Generation for balance period for Dec 13 = Daily electricity summation for 6 th December 2014 to 31 st December 2014. It is also crosschecked with the Jan 2015 invoice. Similar way it is calculated for JMRs having end date on 15 th .	The verification team has reviewed the approach used for this project and checked the log sheets and accepted the same as correct. Conclusion: CAR 2 is closed.
CAR 3	S. No 25	The emission reduction sheet is provided now for	The verification team has checked the emission factor in the VER

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1	Summary of project owner response	Verification team conclusion
The emission factor is determined ex ante and fixed for the crediting period and is correctly applied by the PP. But VER sheet is not provided.		validation.	sheet and accepted the same. Conclusion: CAR 3 is closed
CAR 4 It is observed that some of the TN WTGs is registered under REC for all the months covered in the monitoring period. Electricity-REC component is not allowed for claiming VCU credit.	S. No 25	Since we have electricity bifurcation for REC WTG and Non REC WTG. We are excluding REC component of 45 MW. So there is no double accounting. Revised VER sheet is sent for verification.	The verification team has checked the VER sheet and accepted the same. Conclusion: CAR 4 is closed
CAR 5 Please provide calibration certificates covering the monitoring period.	S. No 25	Calibration certificates for TN WTGs are provided. But for some WTGs, calibration certificates are not available. PP has applied an error of 0.2% for all the WTGs for conservativeness. For Karnataka and AP, error of 0.2% is applied for the delay period. Revised VER sheet is sent for verification.	The verification team has checked the VER sheet and accepted the same. Conclusion: CAR 5 is closed
CR 1 It is observed that there is a difference in actual ER and estimated ER. But reason for difference in net electricity generation which depends on wind speed, wind availability, machine availability and grid availability is not reflected in the monitoring report.	S. No 11	The reasons which are mainly attributable for the difference in electricity generation are as follows; 1. Wind availability 2. Wind speed 3. Machine availability 4. Grid availability	The verification accepted the attribution factor for the deviation in the actual generation which is reasonable. Conclusion: CR 1 is closed

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 1	Summary of project owner response	Verification team conclusion
CR 2 The emission reductions for every year (data vintages) are not mentioned in the MR.	S. No 25	The emission reductions for every year (data vintages) are now mentioned in the MR	The verification team has reviewed the monitoring report and now the ER for each data vintage is now mentioned. Conclusion: CR 2 is closed
FAR 1 For TN WTGs: PP has applied an error of 0.2% (maximum permissible error of the meter) for the whole period due to non-availability of the calibration certificates for some of the WTGs. Thus PP is requested to adjust the VER for the next verification if actual error is more the applied error.	S. No 25	PP will provide calibration certificate for all WTGs of Tamilnadu site during next verification and if calibration result is beyond the permissible limit of accuracy class, the VCUs will be adjusted in next verification accordingly. In case of calibration result within permissible limit, no any action will be required in next verification.	The verification team has accepted the response of PP. Conclusion: FAR 1 can be resolved during the next verification cycle.