




# Verification and certification report form for CDM project activities

(Version 01.0)

## VERIFICATION AND CERTIFICATION REPORT

<b>Title of the project activity</b>	Vaayu India Wind Power Project in Tamilnadu
<b>Reference number of the project activity</b>	4930
<b>Version number of the verification and certification report</b>	03
<b>Completion date of the verification and certification report</b>	26/10/2016
<b>Monitoring period number and duration of this monitoring period</b>	Monitoring period number-05 16/06/2015 to 11/02/2016 (both days are included)
<b>Version number of monitoring report to which this report applies</b>	04
<b>Crediting period of the project activity corresponding to this monitoring period</b>	Fixed, 19/07/2011, 10 years
<b>Project participant(s)</b>	Vaayu (India) Power Corporation Private Limited
<b>Host Party</b>	India
<b>Sectoral scope(s), selected methodology(ies), and where applicable, selected standardized baseline(s)</b>	Sectoral Scope 1 - Energy industries (renewable/ non-renewable sources) ACM0002, Version 12.1.0
<b>Estimated GHG emission reductions or net anthropogenic GHG removals for this monitoring period in the registered PDD</b>	68,412 tCO <sub>2</sub> e
<b>Certified GHG emission reductions or net anthropogenic GHG removals for this monitoring period</b>	40,029 tCO <sub>2</sub> e
<b>Name of DOE</b>	Earthood Services Private Limited
<b>Name, position and signature of the approver of the verification and certification report</b>	 Dr. Kaviraj Singh Managing Director

**SECTION A. Executive summary**

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**Brief summary of the project activity:**

The project activity involves electricity generation by wind electric convertors and supplying the generated electricity to the Southern Grid. The project being a renewable energy generation activity, it leads to removal of fossil fuel dominated electricity generation. The project activity results in reductions of greenhouse gas (GHG) emissions that are real, measurable, and verifiable and also plays beneficial role in the mitigation of climate change.

The project activity consists of 63 WTGs (0.8 MW capacity each), making the total installed capacity to be 50.4 MW in the Tirunelveli district in Tamil Nadu, India. The WTGs are of Enercon (E-53) make. The WTGs have been commissioned between 29/09/2010 and 11/07/2011. The same was verified against the commissioning certificates/13/.

All 63 WTGs are fully functional and the assessment team verified this during the site visit. The assessment team confirms that the total emission reductions achieved under this monitoring period 16/06/2015 – 11/02/2016 (including both days) are 40,029 tCO<sub>2</sub>e.

The basic details of the project activity are mentioned below:

Project title	Vaayu India Wind Power Project in Tamilnadu
UNFCCC registration number	4930
Date of registration	19/07/2011
Sectoral scope	1 - Energy industries (renewable/ non-renewable sources).
Methodology/ies applied	Approved consolidated baseline methodology ACM0002, Version 12.1.0
Project participant	Vaayu (India) Power Corporation Private Limited
Location of Project Activity	Tirunelveli district, Indian State of Tamil Nadu

**Scope of verification:**

Vaayu (India) Power Corporation Private Limited has contracted Earthood Services Private Limited (Earthood) to conduct the verification and certification of emission reductions reported for the CDM project activity 4930 "Vaayu India Wind Power Project in Tamilnadu " in India for the period 16/06/2015 to 11/02/2016 (including both days).

The verification is the periodic independent review and *ex post* determination by Earthood of the monitored reductions in GHG emissions that have occurred because of the registered CDM project activity during the defined monitoring period.

The scope of the verification is to establish/verify that:

- The project activity has been implemented and operated as per the registered PDD/revised approved PDD or any approved revised approved PDD, and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- The monitoring report and other supporting documents provided are complete in accordance with the latest applicable version of the completeness checklist for requests for issuance of CERs, verifiable, and in accordance with applicable CDM requirements;
- The actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan, any registered monitoring plan, the approved methodology including applicable tool(s) and/or, where applicable, the approved standardized baseline;
- The data recorded and stored as per the monitoring methodology including applicable tool(s) and, where applicable, the standardized baseline.

**Verification Process:**

The verification process involved following;

- Contract with Vaayu (India) Power Corporation Private Limited for the scope of verification;
- Publication of monitoring report
- Desk review
- Physical on-site inspection
- Issuance of verification findings
- Reporting, calculation checks, QA/QC and resolution of findings
- Issuance of draft verification report
- Independent technical review of the project documentation
- Issuance of the final verification report
- Submission of the request for issuance, as appropriate

Major verification milestones are stated below;

Monitoring report publication:	19/07/2016
Desk review:	25/08/2016 – 28/08/2016
On-site assessment:	02/09/2016
Reporting, calculation checks and QA/QC:	10/09/2016 – 15/09/2016
Draft Verification Report	17/09/2016
Final Verification Report (after internal quality check)	26/10/2016

#### Conclusion:

Earthood has performed the fifth verification of the CDM project “Vaayu India Wind Power Project in Tamilnadu” having UNFCCC Ref. Number 4930. The verification includes confirming the implementation of the monitoring plan of the PDD and the application of the monitoring methodology as per ACM0002 Version 12.1.0. Earthood confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. The emission reductions from the CDM project activity 4930 “Vaayu India Wind Power Project in Tamilnadu” in India during the period 16/06/2015 -11/02/2016 (including both days) amount to 40,029 tCO<sub>2</sub>e.

### SECTION B. Verification team, technical reviewer and approver

#### B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader, Methodological Expert and Local Expert (India)	IR	Soni	Ravi Kant	Central Office	Y	Y	Y	Y
2.	Verifier	IR	Soni	Ravi Kant	Central Office	Y	Y	Y	Y
3.	Technical Expert (TA1.2)	IR	Soni	Ravi Kant	Central Office	Y	Y	Y	Y
4.	Financial/ Other Expert	NA	-	-	Not required	NA	NA	NA	NA
5.	Trainee	NA	-	-	-	-	-	-	-

#### B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Mahawar	Abhishek	Central Office
2.	Technical Expert (TA1.2)	IR	Mahawar	Abhishek	Central Office
3.	Approver	IR	Singh	Kaviraj	Central Office

**SECTION C. Application of materiality****C.1. Consideration of materiality in planning the verification**

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human error in recording monitored data in JMR sheets and further in monthly statement for energy generation	Low	The reading of JMR is being recorded in the presence of representatives of DISCOM and O&M contractor. So chances of noting down incorrect reading diminishes. Monthly statement are endorsed by TNEB.	All the monthly statements to be checked.
2.	Error in transferring the recorded data to ER sheet	High	The procedure for transferring the recorded joint meter readings to the spreadsheet is manual in nature thus increasing the chances of error.	All the monthly reported values in ER sheet to be verified with JMRs and invoices.

**C.2. Consideration of materiality in conducting the verification**

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In accordance with CDM VVS Version 9 para 361 the prescribed thresholds for materiality for CDM PAs (materiality is not applicable for CDM PoAs as per 359 (a) of CDM VVS Version 9) are as under;

Emission Reductions (tCO <sub>2</sub> e)/year	500,000 or more	300,001 to 499,999	300,000 or less	Small Scale CDM PAs	Micro Scale CDM PAs
Materiality Threshold (para 361)	0.5%	1.0%	2.0%	5.0%	10.0%

The applicable materiality threshold is 2% as project activity.

Particulars / Monitoring Report	MR Version (Public)	MR Version (Revised/Final)
Emission Reductions Achieved (tCO <sub>2</sub> e) in this monitoring period	40,025 tCO <sub>2</sub> e	40,029 tCO <sub>2</sub> e
Applicable Threshold (%) as per para 361 of CDM VVS Version 9	2%	2%

The verification team has identified the impact of errors observed and those were corrected by PP during verification for all monitoring parameter at individual level. The extrapolated impact on ERs is also provided for parameters individually and in aggregated manner in the end.

Monitored Parameter (Symbol / Description)	Reporting Frequency	Number of Discrete Data (Total)	Sample selected for verification	Type of error identified	Impact on ERs	
					ERs impacted (Sample)	ERs impacted (Population based on extrapolation)
EG <sub>PJ,y</sub> Net Electricity Exported to the grid by the project	Monthly	8 (100%)	8 (100%)	No errors were identified during the verification of data from there source.	No impact.	No impact

<b>EG<sub>export,y</sub></b> Electricity exported by project activity to grid recorded at 33kV metering points (Cluster meter)	Monthly	8 (10 0%)	8 (100%)	No errors were identified during the verification of data from there source.	No impact.	No impact
<b>EG<sub>import,y</sub></b> Electricity imported by project activity to grid recorded at 33kV metering points (Cluster meter)	Monthly	8 (100%)	8 (100%)	No errors were identified during the verification of data from there source.	No impact.	No impact
<b>TE</b> Line loss between the metering point at 33 kV metering points of project activity and the metering point at 110 kV at the ENERCON pooling substation.	Monthly	8 (100%)	8 (100%)	1 manual error related to transfer of data from the JMR sheets to ER calculation sheet.	Impact Not Significant (less than 0.1%)	No Impact as the complete reported data was verified.

Based on the above table it can be confirmed that the materiality threshold is not breached applicable for the registered PA as per CDM VVS.

## SECTION D. Means of verification

### D.1. Desk review

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Earthood conducted a desk review as under;

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan, the monitoring methodology including applicable tool(s) and, where applicable, the applied standardized baseline, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;

In addition to the monitoring documentation, Earthood has reviewed;

- The registered PDD Version 04 dated 15/03/2011 ,revised approved PDD version 06,dated 28/12/2015 and the monitoring plan;
- The Validation Opinion on PRC Version 01 dated 07/03/2016;

- The applied monitoring methodology (ACM0002 Version 12.1.0);
- The monitoring report (all versions) to verify that it is as per the standardized format;
- Any other information and references relevant to the project activity's emission reductions (e.g. IPCC reports, data on electricity generation in the national grid or laboratory analysis and national regulations).

The complete list of documents reviewed is included under Appendix 3.

## D.2. On-site inspection

Duration of on-site inspection: 02/09/2016				
No.	Activity performed on-site	Site location	Date	Team member
1.	<p>An assessment of the implementation and operation of the registered project activity as per the registered PDD or any approved revised approved PDD;</p> <p>A review of information flows for generating, aggregating and reporting the monitoring parameters;</p> <p>Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD;</p> <p>A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;</p> <p>A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD, the applied methodology including applicable tool(s), and, where applicable, the applied standardized baseline;</p> <p>A review of calculations and assumptions made in determining the GHG data and emission reductions;</p> <p>An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters</p>	Tirunelveli	02/09/2016	Ravi Kant Soni

**D.3. Interviews**

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Bohra	Deepjyoti	Vaayu (India) Power Corporation Private Limited	02/09/2016	Electricity Generation Records ( monthly energy statements, Invoices and break up sheets), Reliability & accuracy of readings considered for emission reduction calculations, Calibration procedure	Ravi Kant Soni
2.	Sathishkumar	R.	Vaayu (India) Power Corporation Private Limited	02/09/2016	Monitoring and measuring system, Collection of measurements, Observations of established practices and Data Verification of monitoring parameters	Ravi Kant Soni
3.	Tendulkar	S.	WWIL	02/09/2016	Calibration procedure of meters	Ravi Kant Soni
4.	T	Pradeep.	WWIL	02/09/2016	QA/QC procedures, data management, internal audits to maintain data quality & reliability, maintenance Practices Consideration of monitoring period, monitoring methodology, project documentation and emission reduction calculations	Ravi Kant Soni
5.	Karugunda	Sangamesh	WWIL	02/09/2016	Calibration procedure of meters	Ravi Kant Soni

**D.4. Sampling approach**

Not applicable.

**D.5. Clarification requests, corrective action requests and forward action requests raised**

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	CAR #1 and CAR #3	-
Compliance of the project implementation with the registered PDD	-	-	-
Post-registration changes	-	-	-
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	-	CAR #2 and CAR #4	-
Others (please specify)	-	-	-
<b>Total</b>	-	4	-

**SECTION E. Verification findings****E.1. Compliance of the monitoring report with the monitoring report form**

<b>Means of verification</b>	The monitoring report form used is CDM-MR-FORM version 05.1, which was the
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	appropriate form, and the latest version available at the time of verification. All the sections of the form were filled as per the guidelines and gave all the relevant details.
<b>Findings</b>	CAR #3 was raised and resolved.
<b>Conclusion</b>	The monitoring report is found to be complying with the monitoring report form.

## E.2. Remaining forward action requests from validation and/or previous verification

This is fifth verification of the project activity. There are no FAR(s) from validation/1.4/ or previous verification /1.3 /that need to be closed during this verification.

## E.3. Compliance of the project implementation with the registered project design document

<b>Means of verification</b>	<p>This project activity is the generation of electricity from WTGs supplying the generated electricity to the southern grid of India. The project is located at Vagaikulam, Kuruchikulam, Ettankulam, Kalakudi, Muthammalpuram, Ukkirankottai villages in Tirunelveli district of Tamilnadu State in India and has an installed capacity of 50.4 MW (63 WTGs x 0.8 MW/WTG). The PP has signed PPA/14/ with state utility for the sale of electricity to the grid. The project was registered as a CDM project on 19/07/2011 /16/. The PP has considered a fixed crediting period for the project activity from 19/07/2011 to 18/07/2021. This is the fifth verification of the project activity covering the period from 16/06/2015 to 11/02/2016.</p> <p>The project has been implemented; equipment installed and is being operated as described in the revised approved PDD /01/. The monitoring plan implemented during the current monitoring period is in compliance with the monitoring plan of the revised approved PDD and the applied methodology. This was verified during the site visit.</p> <p>The project activity WTGs have been commissioned between 29/09/2010 and 11/07/2011 as mentioned in the Monitoring Report/5/. The details of the WTGs installed have been verified against the commissioning certificates/13/ and found to be consistent. In addition to the physical inspection of the site, the following documents have been reviewed by the assessment team during the site visit to verify the project implementation:</p> <ol style="list-style-type: none"> <li>Commissioning certificates</li> <li>Power Purchase Agreements</li> <li>Invoices raised by the PP to TNEB</li> <li>Testing certificates of all energy meters</li> </ol> <p>The information relating to the project implementation, provided in the Monitoring Report /05/ is consistent with that stated in the revised approved PDD/1/. The data and variables provided in the monitoring report are the same as stated in the revised approved PDD.</p>
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	<ul style="list-style-type: none"> <li>In view of the information's verified during the site visit, the verification team is able to confirm that all physical features (technology, project equipment, and monitoring and metering equipment) of the registered CDM project activity are in place and that the project participants have operated the project activity as per the revised approved PDD.</li> <li>No information with regard to data and variables was identified that may surpass the estimated quantity of ERs in the revised approved PDD.</li> <li>The emission reductions achieved during the current monitoring period are 40,029 tCO<sub>2</sub>e within the estimated quantity (68,412tCO<sub>2</sub>e) in the revised approved PDD for the comparable period.</li> </ul>

## E.4. Post-registration changes

### E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

There are no temporary deviations from registered monitoring plan or applied methodology. It was verified and confirmed from the revised approved PDD/1/; the applied methodology/3/ and the on-site verification.



**E.4.2. Corrections**

Correction in the registered PDD was approved during previous verification (fourth monitoring period) by UNFCCC on 08/06/2016 in the PDD version 06, dated 28/12/2015.  
(Ref: Validation opinion on changes in PDD, version 01, dated 07/03/2016)/1.2/)

**E.4.3. Changes to the start date of the crediting period**

There is no change to the start date of the crediting period. It was verified and confirmed from the UNFCCC project webpage/16/.

**E.4.4. Inclusion of a monitoring plan to a registered project activity**

Not applicable

**E.4.5. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline**

Permanent changes to the registered monitoring plan was submitted during the previous verification (fourth verification) and the revised PDD version 06 dated 28/12/2015 was approved on 08/06/2016 by the UNFCCC as reflected on the project webpage/16/.

(Ref: Validation opinion on changes in PDD, version 01, dated 07/03/2016)/1.2/)

**E.4.6. Changes to the project design of a registered project activity**

Not applicable

**E.4.7. Types of changes specific to afforestation and reforestation project activities**

Not applicable

**E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline**

<b>Means of verification</b>	<p>The monitoring plan as contained in the revised approved PDD/01/ was reviewed against the monitoring requirements of the applied methodology ACM0002 version 12.1.0. Based on this review it was found the monitoring plan contained in the revised approved PDD includes all the required parameters to be monitored in the context of project design and description and allows proper determination of emission reductions in accordance with the PDD /01/ and applied methodology ACM0002 version 12.1.0 /03/.</p> <p>It was observed during the site visit that, the WTGs belongs to the project activity are connected to the dedicated meters through different clusters at 33 kV metering points at project site. The cluster meters are further connected to the WWIL pooling substation at Pillayarkulam (110 kV bulk metering point).</p> <p>The bulk metering point at WWIL substation having one main meter and check meter. It is to be noted that the project activity WTGs and non-project WTGs are connected to the bulk metering point, hence the net electricity supplied to the grid by project activity( at 110 kV metering point) is calculated adjusting the transmission losses to the generation recorded at 33 kV metering point.</p> <p>The procedure to calculate the net electricity supplied to the grid by the WTGs of the project activity has been correctly described in section C of the MR and in section B.7.2 of the revised approved PDD. This was also verified by interviewing the staff at the sub-station and the officials of the state utility.</p> <p>The transmission loss calculation is carried out by the state utility and the PP has no role in this calculation. It was confirmed from the representatives of the O&amp;M provider during the site visit, that the procedure to derive the electricity exported to the grid by each project owner is completely under jurisdiction of the state utility.</p> <p>This was also confirmed through the "Monthly statement of electricity generation" issued by TANGEDCO that mentions the electricity imported, electricity exported ,transmission losses and net electricity supplied by the project activity at the sub-station.</p> <p>The monthly statements are issued by TANGEDCO, is prepared and endorsed by</p>
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	an external government agency i.e. the State Electricity Board and the PP has no influence in the entire procedure. Hence the data issued by the state electricity board through the monthly statements is considered to be authentic.
<b>Findings</b>	CAR #2 was raised and resolved
<b>Conclusion</b>	The monitoring plan outlined in the revised approved PDD is in accordance with the applied methodology /03/ and correctly applied by the registered CDM project activity.

## E.6. Compliance of monitoring activities with the registered monitoring plan

### E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

#### E.6.1.1. Operating Margin Emission Factor of Southern Electricity Grid ( $EF_{grid,OM,y}$ , $tCO_2e/MWh$ )

<b>Means of verification</b>	The value of this parameter is considered as 0.98756. This was checked with the revised approved PDD /01/ and CO2 Baseline Database for Indian Power Sector", version 05 published by the Central Electricity Authority, Ministry of Power, Government of India /15/.
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	The value in the monitoring report /05/ and corresponding emission reduction calculations spreadsheet /07/ are consistent with the revised approved PDD (page 28). The applied value is correct and justified.

#### E.6.1.2. Build Margin Emission Factor of Southern Electricity Grid ( $EF_{grid,BM,y}$ , $tCO_2e/MWh$ )

<b>Means of verification</b>	The value of this parameter is considered as 0.81792. This was checked with the revised approved PDD /01/ and CO2 Baseline Database for Indian Power Sector", version 05 published by the Central Electricity Authority, Ministry of Power, Government of India /15/.
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	The value in the monitoring report /05/ and corresponding emission reduction calculations spreadsheet /07/ are consistent with the revised approved PDD (page 28). The applied value is correct and justified.

#### E.6.1.3. Combined Margin Emission Factor of Southern Electricity Grid ( $EF_y$ or $EF_{grid,CM,y}$ , $tCO_2e/MWh$ )

<b>Means of verification</b>	The value of this parameter is considered as 0.94515. This was checked with the revised PDD /01/ and CO2 Baseline Database for Indian Power Sector", version 05 published by the Central Electricity Authority, Ministry of Power, Government of India /15/.
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	The value in the monitoring report /05/ and corresponding emission reduction calculations spreadsheet /07/ are consistent with the revised approved PDD (page 28). The applied value is correct and justified.

### E.6.2. Data and parameters monitored

#### E.6.2.1. Net Electricity Exported to the grid by the project, $EG_{PJ,y}$ (MWh)

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is calculated and recorded on monthly basis, however, the input values used to calculate the value of $EG_{PJ,y}$ are continuously monitored, hourly measured and monthly recorded.  This parameter is calculated and based on the measured values of export and import on the energy

		meter and transmission losses. This is the difference of electricity export to the grid by the project activity and electricity imported by project, less transmission losses.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the revised approved PDD/01/ and monitoring methodology /3/.
	Monitoring equipment	No monitoring equipment is used as this parameter is calculated using the measured values.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Not applicable
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable
	Calibration frequency /interval:	Not applicable
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
	Is(are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been	Not applicable

	carried out?	
	How were the values in the monitoring report verified?	<p>The monthly values of this parameter were verified from the monthly statements issued by state utility/10/ and found to be consistent.</p> <p>Furthermore monthly values of this parameter is reported in the ER calculation sheet are also verified with the monitoring report and found to be consistent.</p> <p>Value of this parameter for the current monitoring period was verified as 42,352.274 MWh.</p>
	If applicable, has the reported data been cross-checked with other available data?	The monthly reported values of $EG_{PJ,y}$ were further cross checked with the monthly invoices raised by the PP /11/ and found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes, all the stakeholders, namely, the Grid Authority, the PP and the WWIL (O&amp;M Contractor), implemented the adequate QA/QC procedures. The data transfer process for the said parameter is as follows:</p> <p>The Joint meter reading at cluster metering points (33 kV) and at WWIL pooling substation (110 kV) is taken by the representatives of TNEB (State utility) in the presence of WWIL officials in the form of JMRs.</p> <p>Based on the data recorded in the JMRs, electricity supplied to the grid by the project activity(<math>EG_{PJ,y}</math>) is calculated by state utility, using the following formula:</p> $EG_{PJ,y} = EG_{Export,y} - EG_{Import,y} - T_E$ <p>Where,</p> <p><math>EG_{Export,y}</math>= Electricity exported by project activity to grid recorded at cluster meters(33kV metering points)</p> <p><math>EG_{Import,y}</math>= Electricity imported by project activity to grid recorded at cluster meters(33kV metering points)</p> <p><math>T_E</math>=Transmission losses refer to the energy loss incurred between the 2 metering points for the project WTGs connected at 33 kV metering points and the receiving pooling substation at Pillayarkulam village where voltage is stepped up to 110 kV and exported to the grid.</p> <p>The verification team has cross-checked the value of <math>EG_{Export,y}</math>, <math>EG_{Import,y}</math> and <math>T_E</math> from the monthly statements issued by the state utility/10/ for current monitoring period and found to be appropriate and reliable.</p>
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1	No such issues.

	to the CDM Project Standard?	
<b>Findings</b>	No finding was raised	
<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the monitoring plan (as per measurement methods and procedures to be applied) outlined in the revised approved PDD and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

**E.6.2.2. Electricity exported by project activity to grid recorded at 33kV metering points (Cluster meter), EG<sub>Export,y</sub> (MWh)**

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	This parameter is continuously measured by online energy meters installed at project site (33 kV metering points) and recorded on monthly basis.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is in line with the monitoring plan as outlined in the revised approved PDD/01/ and monitoring methodology /3/.
	Monitoring equipment	Electricity exported to the grid from all WTGs is monitored at each metering point through main meter with 0.2% accuracy class. The main meter is also called "joint meter" which has been kept under custody of Tamil Nadu Electricity Board (TNEB).  Details of monitoring equipments are provided in section E.7 of this report.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes the accuracy of the meters is in accordance with the monitoring plan as outlined in the revised approved PDD (page 43).
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes. The accuracy of monitoring equipment's is valid for the entire range.
	Calibration frequency /interval:	Calibration frequency of the meters is once in 5 years.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan	Yes. The calibration frequency is in line with the monitoring plan as outlined in the revised approved PDD (P.43)

	does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes the calibration is conducted by TNEB which NABL Accredited Government institution/12/.
	Is(are) calibration(s) valid for the whole reporting period?	Yes calibration of the meters are valid for the complete reporting period.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes. The calibration is carried out appropriately.
	How were the values in the monitoring report verified?	<p>The monthly values of this parameter were verified from the monthly statements issued by state utility/10/ and found to be consistent.</p> <p>Furthermore monthly values of this parameter is reported in the ER calculation sheet are also verified with the monitoring report and found to be consistent.</p> <p>Value of this parameter for the current monitoring period was verified as 43,883.632 MWh.</p>
	If applicable, has the reported data been cross-checked with other available data?	The monthly reported values of $EG_{Export,y}$ were further cross checked with the monthly invoices raised by the PP /11/ and found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes, all the stakeholders, namely, the Grid Authority, the PP and the WWIL (O&amp;M Contractor), implemented the adequate QA/QC procedures. The data transfer process for the said parameter is as follows:</p> <p>Monthly values at cluster metering points are recorded by the representatives of TNEB in the presence of WWIL officials in the form of JMRs. This parameter is used for calculating the net electricity supplied to grid by project activity. The state utility is responsible entity to carry out the calibration, periodical testing, sealing, and maintenance of meters in the presence of PPs representative.</p>
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1	No such issues.

	to the CDM Project Standard?	
<b>Findings</b>	CAR #2 was raised and resolved	
<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the monitoring plan (as per measurement methods and procedures to be applied) outlined in the revised approved PDD and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

**E.6.2.3. Electricity imported by project activity to grid recorded at 33kV metering points (Cluster meter),  $EG_{Import,y}$  (MWh)**

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	This parameter is continuously measured by online energy meters installed at project site (33 kV metering points) and recorded on monthly basis.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The measuring and reporting frequency is in line with the monitoring plan as outlined in the revised approved PDD /01/ and monitoring methodology.
	Monitoring equipment	Electricity imported from the grid from all WTGs is monitored at each metering point through main meter with 0.2% accuracy class. The main meter is also called "joint meter" which has been kept under custody of Tamil Nadu Electricity Board (TNEB).
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes the accuracy of the meters is in accordance with the monitoring plan as outlined in the revised approved PDD (page 43).
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes. The accuracy of monitoring equipment's is valid for the entire range.
	Calibration frequency /interval:	Calibration frequency of the meters is once in 5 years.
	Is the calibration interval in line with the monitoring plan and/or methodology?	Yes. The calibration frequency is in line with the monitoring plan as outlined in the revised approved PDD (P.43).

	If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes the calibration is conducted by TNEB which NABL Accredited Government institution/12/.
	Is(are) calibration(s) valid for the whole reporting period?	Yes calibration of the meters are valid for the complete reporting period.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes. The calibration is carried out appropriately.
	How were the values in the monitoring report verified?	<p>The monthly values of this parameter were verified from the monthly statements issued by state utility/10/ and found to be consistent.</p> <p>Furthermore monthly values of this parameter is reported in the ER calculation sheet are also verified with the monitoring report and found to be consistent.</p> <p>Value of this parameter for the current monitoring period was verified as 267.708 MWh.</p>
	If applicable, has the reported data been cross-checked with other available data?	The monthly reported values of $EG_{Import,y}$ were further cross checked with the monthly invoices raised by the PP /11/ and found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Yes, all the stakeholders, namely, the Grid Authority, the PP and the WWIL (O&amp;M Contractor), implemented the adequate QA/QC procedures. The data transfer process for the said parameter is as follows:</p> <p>Monthly values at cluster metering points are recorded by the representatives of TNEB in the presence of WWIL officials in the form of JMRs.</p> <p>This parameter is used for calculating the net electricity supplied to grid by project activity. The state utility is responsible entity to carry out the calibration, periodical testing, sealing, and maintenance of meters in the presence of PPs representative.</p>
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as	No such issues.



	stipulated by Appendix 1 to the CDM Project Standard?	
<b>Findings</b>	No finding was raised	
<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

**E.6.2.4. Line loss between the metering point at 33 kV metering points of project activity and the metering point at 110 kV at the ENERCON pooling substation, T<sub>E</sub> (MWh)**

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is calculated and recorded on monthly basis.  The calculation of transmission losses is carried out by state utility considering the export readings of the bulk meter at the 110 kV receiving WWIL pooling substation as well as the export readings of each cluster metering point at project site (33 kV metering points).
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the revised approved PDD/01/ and monitoring methodology.
	Monitoring equipment	No monitoring equipment is used as this parameter is calculated using the measured values.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Not applicable
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Not applicable

	Calibration frequency /interval:	Not applicable
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Not applicable
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Not applicable
	Is(are) calibration(s) valid for the whole reporting period?	Not applicable
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Not applicable
	How were the values in the monitoring report verified?	<p>The monthly values were verified from the monthly statements/10/ showing the energy generated by the project activity issued by state utility and found to be consistent.</p> <p>Furthermore monthly values of this parameter is reported in the ER calculation sheet are also verified with the monthly billing records and found to be consistent.</p> <p>Value of this parameter for the current monitoring period was verified as 1,263.650 MWh.</p>
	If applicable, has the reported data been cross-checked with other available data?	The monthly reported values of $T_E$ were further cross checked with the monthly invoices raised by the PP to state utility /11/ and found to be consistent.
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	<p>Transmission losses is calculated considering the reading recorded at cluster metering points (33 kV) and at 110 kV WWIL pooling substation as following:</p> $T_E = Z \times (EG_{Export,y} - EG_{Import,y})$ <p>Where,</p> <p>Z= Percentage of transmission losses incurred between the 2 metering points i.e. for the 33 kV metering points (for project activity WTGs and non-project WTGs) and the receiving WWIL substation. Transmission losses (<math>T_E</math>) used to calculate the net electricity supplied to the grid by the project activity and values of <math>T_E</math> are recorded in the monthly statement on energy generation issued by the state utility (TNEB/ TANGEDCO).</p>	

	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.
<b>Findings</b>	No finding was raised	
<b>Conclusion</b>	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

### E.6.3. Implementation of sampling plan

<b>Means of verification</b>	Not applicable
<b>Findings</b>	Not applicable
<b>Conclusion</b>	Not applicable

### E.7. Compliance with the calibration frequency requirements for measuring instruments

<b>Means of verification</b>	As per the monitoring plan in the revised approved PDD/01/ the meters are to be tested and calibrated once in 5 years. The calibration frequency has been followed for the current monitoring period. Hence the assessment team has confirmed that the testing of the meters cover the entire monitoring period.					
	As per the section 4, paragraph 8 of PPA “check meter reading shall be considered when main meters found to be defective or stopped. Provided that if difference between the readings of main and check meter vis-à-vis main meter reading exceeds twice the percentage error applicable to relevant class, both meters shall be tested and one found defective shall be immediately replaced and reading of other will be considered”. The verification team has verified the monthly JMRs and confirmed that no such situations encountered and only main meters reading are considered during the current monitoring period, hence it can assured that meters were working satisfactorily.					
	The project activity metering has been physically inspected during the site visit. The details of monitoring equipment’s involved in the project activity and their calibration dates are mentioned in Section C of the MR/05/ and are summarised in the tables below. All the cluster meters and substation meters are of accuracy class of 0.2s and calibration frequency of once in 5 years.					
	<b>Cluster Meters (33 kV metering points):</b>					
	<b>Sr.No-</b>	<b>HTSC no-</b>	<b>Meter Sr.No</b>	<b>Latest calibration date</b>	<b>Due date of calibration</b>	<b>Calibration Delay(Y/N)</b>
	1	3376	HT2121081	26/08/2013	26/08/2018	N
	2	3461	HT2110167	02/11/2012	02/11/2017	N
	3	3462	HT2110162	02/11/2012	02/11/2017	N
	4	3463	HT2110156	02/11/2012	02/11/2017	N
	5	3464	HT2110161	02/11/2012	02/11/2017	N
6	3465	HT2110151	02/11/2012	02/11/2017	N	
7	3466	HT2110149	02/11/2012	02/11/2017	N	
8	3467	HT2110153	02/11/2012	02/11/2017	N	
9	3470	HT2121079	30/07/2013	30/07/2018	N	
10	3500	HT2110146	02/11/2012	02/11/2017	N	

11	3501	HT2110143	02/11/2012	02/11/2017	N
12	3502	HT2110152	02/11/2012	02/11/2017	N
13	3503	HT2110166	02/11/2012	02/11/2017	N
14	3504	HT2110148	02/11/2012	02/11/2017	N
15	3505	HT2110154	02/11/2012	02/11/2017	N
16	3506	HT2110168	02/11/2012	02/11/2017	N
17	3507	HT2110144	02/11/2012	02/11/2017	N
18	3508	HT2110163	03/11/2012	03/11/2017	N
19	3509	HT02121080	30/07/2013	30/07/2018	N
20	3510	HT2110165	03/11/2012	03/11/2017	N
21	3511	HT2110158	03/11/2012	03/11/2017	N
22	3512	HT2110157	03/11/2012	03/11/2017	N
23	3513	HT2110147	02/11/2012	02/11/2017	N
24	3514	HT2110150	02/11/2012	02/11/2017	N
25	3515	HT2110159	02/11/2012	02/11/2017	N
26	3516	HT2110164	02/11/2012	02/11/2017	N
27	3517	HT2110142	02/11/2012	02/11/2017	N
28	3518	HT2110160	02/11/2012	02/11/2017	N
29	3519	HT2110145	02/11/2012	02/11/2017	N
30	3528	HT2110155	02/11/2012	02/11/2017	N
31	3768	HT2110195	02/11/2012	02/11/2017	N
32	3769	HT2110220	03/11/2012	03/11/2017	N
33	3770	HT2110196	03/11/2012	03/11/2017	N
34	3771	HT2110215	02/11/2012	02/11/2017	N
35	3772	HT2110219	03/11/2012	03/11/2017	N
36	3773	HT2110216	03/11/2012	03/11/2017	N
37	3774	HT2110169	03/11/2012	03/11/2017	N
38	3775	HT2110191	03/11/2012	03/11/2017	N
39	3776	HT2110218	03/11/2012	03/11/2017	N
40	3777	HT2110226	03/11/2012	03/11/2017	N
41	3778	HT2110198	03/11/2012	03/11/2017	N
42	3779	HT2110223	03/11/2012	03/11/2017	N
43	3780	HT2110218	03/11/2012	03/11/2017	N
44	3781	HT2110229	03/11/2012	03/11/2017	N
45	3782	HT2110206	03/11/2012	03/11/2017	N
46	3783	HT2110211	03/11/2012	03/11/2017	N
47	3784	HT2110192	03/11/2012	03/11/2017	N
48	3785	HT2110203	03/11/2012	03/11/2017	N
49	3789	HT2110225	03/11/2012	03/11/2017	N
50	3790	HT2110228	03/11/2012	03/11/2017	N
51	3791	HT2110224	03/11/2012	03/11/2017	N

**Sub-station meters:**

Meter type	Meter Sr.No-	Date of recent calibration	Due date of calibration	Calibration Delay (Y/N)
Main Meter	HT1100044	07/12/2012	07/12/2017	N
Check Meter	HT1100045	09/12/2012	09/12/2017	N

The above meter details have been verified through the following means:

- Physical inspection of the meters during the site visit
- Interviewing the staff at the sub-station
- The CMS of the O&M service provider located at the site
- Calibration certificates

The installation and working condition of the meters were checked during the on-site inspection and it was found to be satisfactory. It is evident from the above table that calibration for all monitoring equipment involved in the project activity are valid for current monitoring period and there is no delay in calibration for cluster and

	<p>substation meters as per the calibration frequency mentioned in the revised approved PDD.</p> <p>These meters are duly approved, installed, tested, sealed and in the custody of the state utility. The PP has no control over the same.</p> <p>Accordance with the guidelines as state under section 3.2.3 of CEA Notification No. 502/70/CEA/DP&amp;D dated 17/03/2006/19/ which is considered as national standard "All interface meters shall be tested at least once in five years." Hence, the calibration frequency of once in 5 year, mentioned in the revised approved PDD for the meters is appropriate.</p> <p>It is verified that the PP receives payment, for the electricity supplied to the grid, from the state utility (which is a Government Organisation and a 3<sup>rd</sup> party with respect to this CDM project). This electricity supplied to the grid is obtained using directly measured values at the energy meters. Hence the state utility ensures that the energy meters are in proper working condition, since it has to make payments based on these meter readings.</p>
<b>Findings</b>	CAR #1 was raised and resolved
<b>Conclusion</b>	<p>Based on the above mentioned means of verification, the assessment team confirms that:</p> <ul style="list-style-type: none"> <li>• The meter details are correctly mentioned in the MR</li> <li>• The meter details are consistent throughout all verified documents</li> <li>• The entire metering system is in the custody of the state utility. The PP has no control on the same</li> <li>• The responsibilities and authorities for monitoring and reporting are in accordance with what is stated in the monitoring plan.</li> <li>• The accuracy of the equipment used for monitoring is in accordance with the relevant guidance provided by the CDM Executive Board</li> <li>• The monitoring equipment are controlled and calibrated in accordance with the monitoring plan in the revised approved PDD.</li> </ul> <p>As per paragraph 390 (c) to (e) of the VVS, version 9.0, the verification team confirms that</p> <ul style="list-style-type: none"> <li>• The equipment used for monitoring is in accordance with the relevant guidance provided by the CDM Executive Board and it is controlled and calibrated in accordance with the monitoring plan</li> <li>• Monitoring results are consistently recorded as per approved frequency</li> <li>• Quality assurance and quality control procedures have been applied in accordance with the monitoring plan</li> </ul>

## E.8. Assessment of data and calculation of emission reductions or net removals

### E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

<b>Means of verification</b>	<p>The verification team verified that</p> <ol style="list-style-type: none"> <li>A complete set of data for the monitoring period was available for the monitoring period and the verification of each monitoring parameter is elaborated under Section E.6.2 of this report. The complete monitoring data is also presented in the corresponding ER sheet /07/ of final Monitoring Report /05/.</li> <li>The information provided in the monitoring report was cross checked with other sources, wherever appropriate and available, and such information is also included under Section E.6.2 of this report.</li> <li>The calculations of baseline emissions as presented in the corresponding ER sheet of final Monitoring Report were checked and found to be consistent with the formulae and methods described in the registered monitoring plan and the applied methodology.</li> <li>All assumptions used in the emission calculations were found appropriate and therefore justified</li> <li>Appropriate emission factors and other reference values have been correctly applied. This has also been elaborated under Section E.6.1 of this report.</li> <li>No standardized baseline was prescribed in the revised approved PDD and therefore it has not been applied.</li> <li>There is no pro-rate approach (para 402(g) of CDM VVS Version 09) was applied in the current monitoring period as entire monitoring period falls into</li> </ol>
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	<p>period that is after the end of first commitment period of Kyoto Protocol.</p> <p>The baseline emissions are the product of net electricity supplied to the grid <math>EG_{PJ,y}</math> expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor. Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors.</p> $BE_y = EG_{PJ,y} * EF_{grid, CM, y}$ <p>Where:</p> <p><math>BE_y</math>: Baseline Emissions in year <math>y</math>; t CO<sub>2</sub></p> <p><math>EG_{PJ, y}</math>: Net electricity supplied to the grid by the project activity</p> $EG_{PJ, y} = EG_{Export-y} - EG_{Import-y} - T_E$ <p><math>EF_{grid, CM, y}</math> = Combined margin CO<sub>2</sub> emission factor (tCO<sub>2</sub>/MWh)</p> <p>As per the revised approved PDD, combined margin emission factor is 0.94515 tCO<sub>2</sub> /MWh. Hence the baseline emissions for the project activity for the current monitoring period are as follows.</p> $BE_y = 42,352.274 * 0.94515 = 40,029 \text{ tCO}_2e$ <p>Note:</p> <p>During the current monitoring period, it is noted that end date of each month overlaps with the start date of consecutive month, however despite of overlapping there is no double counting of data because meter reading is taken at a particular time of the day (e.g. 11:30 AM). Hence the period for e.g 16/06/2015 to 14/07/2015 would denote reading till that time of 14/07/2015, next period 14/07/2015 to 12/08/2015 denotes reading after that particular time of 12/08/2015. These dates are also reflected in the monthly statement issued by state utility based on which ER calculation is done.</p>
<b>Findings</b>	CAR #2 and CAR #4 was raised and resolved
<b>Conclusion</b>	<p>The verification team confirms that</p> <ol style="list-style-type: none"> <li>The complete data was available and is duly reported;</li> <li>As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section E.6.2 of this report);</li> <li>Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals were followed;</li> <li>Appropriate emission factors and other reference values were correctly applied.</li> <li>There is no pro-rate approach (para 403(e) of CDM VVS Version 09) was applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol.</li> </ol>

### E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

<b>Means of verification</b>	The revised approved PDD/1/ and applied monitoring methodology/3/ does not prescribe any project emissions to be considered. The onsite visit and project design also did not reveal any potential source to be considered in this regard.
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	No project emissions were required to be calculated.

### E.8.3. Calculation of leakage GHG emissions

<b>Means of verification</b>	The revised approved PDD and applied monitoring methodology does not prescribe any leakage emissions to be considered. The onsite visit and project design also did not reveal any potential source to be considered in this regard.
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	No project emissions were required to be calculated

### E.8.4. Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

<b>Means of verification</b>	As elaborated above, the entire emission reductions from the project activity were based on baseline emissions. The calculations presented in this regard in the final monitoring report and corresponding ER calculation sheet were found appropriate
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	and complying with the provisions prescribed in the registered monitoring plan of revised PDD and applied methodology. The verification team confirms that an audit trail that contains the evidence and records that validated the stated figures were checked and found acceptable.
<b>Findings</b>	CAR # 4 was raised and resolved.
<b>Conclusion</b>	The verification team confirms that <ul style="list-style-type: none"> <li>a) The complete data was available and is duly reported;</li> <li>b) As indicated above, the description with regard to cross-check of reported data is included under respective parameter (refer Section E.6.2 of this report);</li> <li>c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project emissions and leakage emissions were followed;</li> <li>d) Appropriate emission factors and other reference values were correctly applied.</li> <li>e) There is no pro-rate approach (para 403(e) of CDM VVS Version 09) was applied in the current monitoring period as entire monitoring period falls into period that is after the end of first commitment period of Kyoto Protocol.</li> </ul> <p>The total number of ERs achieved during the current monitoring period is 40,029 tCO<sub>2</sub>e.</p>

#### **E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD**

<b>Means of verification</b>	As verified and evident from the final Monitoring Report /05/ and corresponding ER sheet /07/, the actual emission reductions achieved by the project activity in the current monitoring period were found less than( 41.49% lower) the estimated quantity in the revised approved PDD/1/ for the comparable period. This is largely due to low plant load factor achieved during the current monitoring period. Considering, there is no increase in ERs than the estimated amount, it was found acceptable to the assessment team.
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	The actual emission reductions achieved by the project activity are lower than the estimated quantity of ERs in the revised approved PDD. Accordingly, the verification team accepted it.

#### **E.8.6. Remarks on difference from estimated value in registered PDD**

<b>Means of verification</b>	The actual emission reductions were less than the estimation in the revised approved PDD for an equivalent length of the monitoring period therefore no further explanation is required.
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	The actual ERs are less than the estimated quantity of ERs as given in the revised approved PDD, which is appropriate and accepted.

#### **E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards**

<b>Means of verification</b>	Based on the assessment done in section E.8.1 to E.8.6, the verification team is able to certify that the emission reductions from the CDM project activity 4930 "Vaayu India Wind Power Project in Tamilnadu" in India during the period 16/06/2015 to 11/02/2016 (including both days) is 40,029 tCO <sub>2</sub> e.
<b>Findings</b>	No finding was raised
<b>Conclusion</b>	Actual GHG emission reductions achieved during period starting from 1 <sup>st</sup> January 2013 onwards was verified to be 40,029 tCO <sub>2</sub> e.

### **SECTION F. Internal quality control**

A draft verification report that is prepared by verification team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable CDM rules/requirements. The technical review team is collectively required to possess the

technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the verification team.

During the technical review process additional findings may be identified or the closed out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted to UNFCCC. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team. The decision taken by the Technical Reviewer is final and is authorized by the Managing Director on behalf of Earthood Services Private Limited.

## **SECTION G. Verification opinion**

Earthood Services Private Limited (Earthood), contracted by Vaayu (India) Power Corporation Private Limited, has performed the independent verification of the emission reductions for the CDM project activity 4930 “Vaayu India Wind Power Project in Tamilnadu” in India for the monitoring period 16/06/2015 - 11/02/2016 (including both days) as reported in the Monitoring Report (public) Version 1 dated 02/07/2016. The Vaayu (India) Power Corporation Private Limited is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

Earthood commenced the verification on the basis of the baseline and monitoring methodology ACM 0002 Version 12.1.0, the monitoring plan contained in the revised approved PDD Version 06 dated 28/12/2015, Monitoring Report (public) Version 1 dated 02/07/2016.

ESPL confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. This verification report has been prepared using the latest available template specified by UNFCCC and complies with the instructions to follow as per para 406 and 407 of CDM VVS Version 9.

Earthood's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the verification by obtaining evidence and other information and explanations that Earthood considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

The verification team confirms that:

- The project activity was found completely implemented as per the description given in the revised approved PDD.
- The actual operation conforms to the description in the revised approved PDD.

## **SECTION H. Certification statement**

Earthood Services Private Limited (Earthood), contracted by Vaayu (India) Power Corporation Private Limited, has performed the independent verification of the emission reductions for the CDM project activity 4930 “Vaayu India Wind Power Project in Tamilnadu” in India for the monitoring period 16/06/2015 - 11/02/2016 (including both days) as reported in the Monitoring Report (Final) Version 04 dated 19/10/2016. The Vaayu (India) Power Corporation Private Limited is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity. It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity

Earthood commenced the verification on the basis of the baseline and monitoring methodology ACM0002 Version 12.1.0, the monitoring plan contained in the PDD Version 06 dated 28/12/2015, Monitoring Report (public) Version 1 dated 02/07/2016 as per the methodology described under Section D of this report.

Earthood's verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. Earthood planned and performed the verification by obtaining evidence and other information and explanations that Earthood considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions reported for the project activity for the period 16/06/2015 - 11/02/2016 are fairly stated in the Monitoring Report (final) Version 04 dated 19/10/2016. The GHG emission reductions were calculated correctly based on the approved baseline and monitoring methodology ACM0002 Version 12.1.0 and the monitoring plan contained in the PDD Version 06 dated 28/12/2015.



Earthood Services Private Limited is able to certify that the emission reductions from the CDM project activity 4930 "Vaayu India Wind Power Project in Tamilnadu" in India during the period 16/06/2015 – 11/02/2016 (including both days) amount to 40,029 tCO<sub>2</sub>e.

**Verified and certified emission reductions as per commitment period:**

<b>Commitment period</b>	<b>Amount</b>
Upto 31/12/2012	0 tCO <sub>2</sub> e
From 01/01/2013 onwards (16/06/2015 -11/02/2016)	40,029 tCO <sub>2</sub> e

## Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	Clean Development Mechanism Validation and Verification Standard
EB	Executive Board
EF	Emission Factor
EPC	Engineering ,Procurement and Construction
ER	Emission Reductions
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CL	Clarification Request
DOE	Designated Operational Entity
DNA	Designated National Authority
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GOI	Government of India
HTSC	High Temperature Superconductor
IPCC	Intergovernmental Panel on Climate Change
JMR	Joint Meter Reading
MP	Monitoring Plan
MR	Monitoring Report
MWh	Megawatt hour
PDD	Project Design Document
PPA	Power Purchase Agreement
PP	Project Participant
PRC	Post Registration Changes
PS	Project Standard
RMP	Revised Monitoring Plan
SLDC	State Load Dispatch Centre
TANGEDCO	Tamil Nadu Generation and Distribution Corporation
TNEB	Tamil Nadu Electricity Board
TNERC	Tamil Nadu Electricity Regulatory Commission
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
UID	Unique Identification number
UNFCCC	United Nations Framework Convention on Climate Change
VIPCL	Vaayu (India) Power Corporation Private Limited
WTG	Wind Turbine Generator
WEC	Wind Energy Convertor
WWIL	Wind World (India) Limited

## Appendix 2. Competence of team members and technical reviewers

Competence Statement			
<b>Name</b>	Ravi Kant Soni		
<b>Country</b>	India		
<b>Education</b>	B. Tech. (Mechanical Engineering) M. Tech. (Energy Management)		
<b>Experience</b>	7 Years		
<b>Field</b>	Energy and Climate Change		
Approved Roles			
<b>Team Leader</b>	YES		
<b>Validator</b>	YES		
<b>Verifier</b>	YES		
<b>Methodology Expert</b>	AMS-I.D., AMS-I.C., ACM0002		
<b>Local Expert</b>	YES (India)		
<b>Financial Expert</b>	NO		
<b>Technical Reviewer</b>	YES		
<b>TA Expert (1.2)</b>	YES		
<b>Reviewed by</b>	Abhishek Mahawar	<b>Date</b>	09/09/2016
<b>Approved by</b>	Kaviraj Singh	<b>Date</b>	09/09/2016

Competence Statement			
<b>Name</b>	Abhishek Mahawar		
<b>Country</b>	India		
<b>Education</b>	B. Tech. (Chemical Engineering) MBA (Finance)		
<b>Experience</b>	7 Years +		
<b>Field</b>	Climate Change & Environment		
Approved Roles			
<b>Team Leader</b>	YES		
<b>Validator</b>	YES		
<b>Verifier</b>	YES		
<b>Methodology Expert</b>	AMS-I.D and ACM0002		
<b>Local expert</b>	YES (India)		
<b>Financial Expert</b>	YES		
<b>Technical Reviewer</b>	YES		
<b>TA Expert (1.2)</b>	YES		
<b>Reviewed by</b>	Ashok Gautam	<b>Date</b>	07/09/2016
<b>Approved by</b>	Kaviraj Singh	<b>Date</b>	07/09/2016

### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	PP	Revised approved PDD	Version 6.0 ,Dated 28/12/2015	Other
1.1	PP	Registered PDD	Version 4.0 ,Dated 15/03/2011	Other
1.2	ESPL	Validation Opinion – PRC	Version 1 dated 07/03/2016	Other
1.3	ESPL	Verification report previous monitoring period	Version 1 dated 07/03/2015	
2	DNV	Validation Report	Report No. 2010–0459 Revision 02 dated 16/06/2011	Other
3	UNFCCC	Approved Consolidated Methodology ACM0002	Version 12.1.0	Other
4	PP	Monitoring Report (publication)	Version 01,dated 02/07/2016	PP
4.1	PP	Monitoring Report	Version 02, dated 07/09/2016	PP
4.2	PP	Monitoring Report	Version 03, dated 14/10/2016	PP
5	PP	Monitoring Report (final)	Version 04, dated 19/10/2016	PP
6	PP	ER Spreadsheet	Version 01, dated 02/07/2016	PP
6.1	PP	ER Spreadsheet	Version 2, dated 14/10/2016	
7	PP	ER spreadsheet (final)	Version 3, dated 19/10/2016	PP
8	UNFCCC	CDM VVS	Version 09	Other
9	UNFCCC	CDM PS	Version 09	Other
10	TANGEDCO	Monthly Statements issued by state utility	For the period from 16/06/2015 to 11/02/2015	PP
11	PP	Monthly invoices raised by the PP to state utility	For the period from 16/06/2015 to 11/02/2015	PP
12	TNEB	Calibration certificates of main meters and check meters	-	PP
13	TNEB	Commissioning certificates (for all 63 WTGs)	-	PP
14	TNEB	Power Purchase Agreement between TANGEDCO and Vaayu (India) Power Corporation Private Limited	<ul style="list-style-type: none"> <li>• Dated 15/09/2011 for 24 MW</li> <li>• Dated 30/03/2012 for 26.4 MW</li> </ul>	PP
15	CEA	CO <sub>2</sub> Baseline Database for Indian Power Sector	Version 05	Others
16	UNFCCC	UNFCCC webpage for the project activity	<a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1308823376.98/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1308823376.98/view</a>	Others
18	Ministry of corporate Affairs, GOI	Name change consent issued by Government of India	dated 01/01/2013	PP
19	CEA	CEA Notification No. 502/70/CEA/DP&D	dated 17/03/2006	Others

## Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	Section no.	Date :DD/MM/YYYY
<b>Description of FAR</b>		
N/A		
<b>Project participant response</b>		<b>Date :DD/MM/YYYY</b>
<b>Documentation provided by project participant</b>		
DOE assessment		
		<b>Date: DD/MM/YYYY</b>

Table 2. CL from this verification

CL ID	Section no.	Date :
<b>Description of CL</b>		
N/A		
<b>Project participant response</b>		<b>Date :DD/MM/YYYY</b>
<b>Documentation provided by project participant</b>		
DOE assessment		
		<b>Date: DD/MM/YYYY</b>

Table 3. CAR from this verification

CAR ID	01	Section no.	B.2.5	Date :03/09/2016
<b>Description of CAR</b>				
Permanent changes to the registered monitoring plan were identified and approved by UNFCCC during previous monitoring period but the same are not reported in the MR. Please clarify.				
<b>Project participant response</b>				<b>Date : 07/09/2016</b>
The section B.2.5 of the MR has been revised to include the information pertaining to the permanent changes to the registered monitoring plan adopted for the project. Please refer to the revised version of the MR (i.e. version 02).				
<b>Documentation provided by project participant</b>				
MR Version 02, dated 07/09/2016				
<b>DOE assessment</b>				<b>Date: 15/09/2016</b>
The PP has provided the information about post registration changes in relevant sections of the MR in accordance with MR completion guidelines, hence accepted.				

CAR ID	02	Section no.	E.1	Date :03/09/2016
<b>Description of CAR</b>				
Please submit the ER calculation sheet for the current monitoring period.				
<b>Project participant response</b>				<b>Date : 07/09/2016</b>
The Emission Reduction calculation sheet has been submitted to DOE.				
<b>Documentation provided by project participant</b>				
ER Sheet, version 01, dated 06/07/2016				
<b>DOE assessment</b>				<b>Date: 15/09/2016</b>
ER calculation sheet submitted by the PP is verified and data reported in the sheet found to be consistent with monthly statements and invoices, hence accepted.				
CAR #2 is closed.				

CAR ID	03	Section no.	E.1	Date : 13/10/2016
<b>Description of CAR</b>				

Start date of current monitoring period mentioned in A.1 of MR is inconsistent with cover page and UNFCCC project web page. ER sheet-Tab summary: End date of current monitoring period is inconsistent with monitoring report.	
<b>Project participant response</b>	<b>Date : 14/10/2016</b>
<b>Monitoring Report:</b> The start date of the monitoring period mentioned under the section A.1 of the MR is now corrected. The current monitoring period is from 16/06/2015 to 11/02/2016 (both days included) which is now consistent in all the documents.	
<b>ER sheet:</b> The end date of the monitoring period mentioned in the cell no. B22 under the "Summary" tab of the ER sheet has been now corrected.	
<b>Documentation provided by project participant</b>	
Revised MR. (MR version 03, dated 14/10/2016) Revised ER sheet (ER sheet version 02, dated 14/10/2016)	
<b>DOE assessment</b>	<b>Date: 14/10/2016</b>
Start date of current monitoring period mentioned in A.1 of MR is corrected and made consistent with cover page and UNFCCC project web page. End date of current monitoring period is corrected in the ER calculation sheet. CAR #3 is closed.	

<b>CAR ID</b>	04	<b>Section No.</b>	E.6.2	<b>Date : 19/10/2016</b>
<b>Description of FAR</b>				
Value of parameter $T_E$ for the WTG HTSC No-3467 (Month June 2015, Sept 2015) and HTSC 3501 (Sept 2015) reported in the ER calculation sheet does not match with the invoice and bill for the concern month. Please clarify the inconsistency observed. Duration of the month July 2015 mentioned in the ER sheet is inconsistent				
<b>Project participant response</b>				<b>Date : 19/10/2016</b>
There were some type errors in digits in the identified values of $T_E$ pertaining to the WTG HTSC No. 3467 (for the month of Jun and Sep 2015) and HTSC No. 3501 (for the month of Sep 2015). Therefore, corrections have been made to these values. The revised ER sheet is now consistent with the values of the invoices of respective months. Also the duration of the month July 2015 has been made consistent in the ER sheet. The changes in ER values have also been addressed in the MR.				
<b>Documentation provided by project participant</b>				
Revised ER sheet, version 03, dated 19/10/2016 Revised MR, version 04, dated 19/10/2016				
<b>DOE assessment</b>				<b>Date: 20/10/2016</b>
Typo error in the value of $T_E$ for the specific WTGs is rectified in the revised ER calculation sheet; corrected values are further verified with the bills and invoices for the concerned months and found to be consistent. Duration of July month is corrected in the ER sheet, hence accepted. CAR #4 is closed.				

Table 4. FAR from this verification

<b>FAR ID</b>	NA	<b>Section No.</b>	NA	<b>Date :DD/MM/YYYY</b>
<b>Description of FAR</b>				
No FAR raised during the verification.				
<b>Project participant response</b>				<b>Date :DD/MM/YYYY</b>
NA				
<b>Documentation provided by project participant</b>				
NA				
<b>DOE assessment</b>				<b>Date: DD/MM/YYYY</b>
NA				

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		