Verification and certification report form for CDM project activities

(Version 03.0)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title and UNFCCC reference number of the project activity	Renewable Energy Wind Power Project in Rajasthan UNFCCC ref.No-5090
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the verification and certification report	03
Completion date of the verification and certification report	07/01/2020
Monitoring period number and duration of this monitoring period	Monitoring period number-06 01/09/2017 – 31/12/2018; including first and last days of monitoring period
Version number of the monitoring report to which this report applies	1.1
Crediting period of the project activity corresponding to this monitoring period	Type: Fixed ,Lenth-10 years Duration: 28/02/2012 to 27/02/2022 (including first and last days)
Project participants	Vish Wind Infrastrukture LLP ACT Financial Solutions B.V. First Climate Markets A.G.
Host Party	India
Applied methodologies and standardized baselines	Selected Methodology: ACM0002 Version 12.3.0 – "Consolidated baseline methodology for grid connected electricity generation from renewable sources" Selected standardized baseline: N/A
Mandatory sectoral scopes	Sectoral scope : 1- Energy industries (renewable - / non-renewable sources
Conditional sectoral scopes, if applicable	Not applicable
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	65,362 tCO2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	42,481 tCO2e
Name and UNFCCC reference number of the DOE	Earthood Services Private Limited UNFCCC ref.No- E-0066
Name, position and signature of the approver of the verification and certification report	Sign Dr. Kaviraj Singh

	Managing Director

SECTION A. Executive summary

>> The project activity involves electricity generation by wind electric convertors and supplying the generated electricity to the NEWNE 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 plays beneficial role in the mitigation of climate change.

The project activity consists of 37 WTGs (0.8 MW capacity each), making the total installed capacity to be 29.6 MW in the district of Jaisalmer & Jodhpur, in the Indian State of Rajasthan, India. The WTGs are of Wind World (E-53) make. The WTGs have been commissioned between 23/09/2010 and 26/01/2011. The same was verified against the commissioning certificates/17/.

Name of project participant is changed as "Vish Wind Infrastrukture LLP" from 06/09/2017 onwards. The same is verified through the name change consent issued by Ministry of Environment, Forest and Climate Change, Government of India/25/ and also reflected at UNFCCC project webpage/13/.

All 37 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 01/09/2017 – 31/12/2018 (including both days) is 42,481 tCO_2e.

The basic details of the project activity are mentioned below:

Project title	Renewable Energy Wind Power Project in Rajasthan
UNFCCC registration number	5090
Date of registration	28/02/2012
Sectoral scope	1 - Energy industries (renewable/ non-renewable sources).
Methodology/ies applied	Approved consolidated baseline methodology ACM0002, Version 12.3.0
Project participant	Vish Wind Infrastrukture LLP
Location of Project Activity	Jaisalmer and Jodhpur district, Indian State of Rajasthan

Scope of verification

The scope of the verification was limited to the monitoring period covered under the current monitoring period 01/09/2017 to 31/12/2018 of the registered CDM PA "Renewable Energy Wind Power Project in Rajasthan" to determine whether;

- The project activity has been implemented and operated as per the registered PDD or any approved revised 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 revised approved 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 Vish Wind Infrastrukture LLP 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

Conclusion

ESPL has performed the verification of the CDM PA "Renewable Energy Wind Power Project in Rajasthan" having UNFCCC Ref. Number 5090 for the monitoring period 01/09/2017 to 31/12/2018. The verified emission reductions amount to 42,481 tCO_2e in the aforesaid monitoring period.

The verification concluded that the registered CDM PA complies with all relevant CDM procedures/standards/guidance and therefore request for issuance is being submitted in accordance with the CDM procedures.

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 and Local Expert	OR	Soni	Ravi Kant	Climensys Private Limited	Y	Y	Y	Y
2.	Verifier and Meth Expert	OR	Soni	Ravi Kant	Climensys Private Limited	Y	Y	Y	Y
3	Technical Expert	OR	Soni	Ravi Kant	Climensys Private Limited	Y	Y	Y	Y
4	Financial/ Other Expert	EI/IR	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Trainee	EI/IR	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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	Gupta	Anshika	Central Office
2.	Expert to TR	IR	Gupta	Anshika	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.	Omissions and misstatements in data transfer from hand written data in the JMR to ER calculation sheet.	Low	Ineffective quality control of data transfer due to unclear QA/QC procedure.	Quality procedure followed at site to be checked. It is to be demonstrated by the PP that how to transfer data and how this can be crosschecked. Relevant site personnel has been interviewed to confirm whether procedure is actually conducted.
2.	Missing data due to failure of measurement equipment	Low	The monitoring plan defines emergency procedures in case malfunctioning or failure of meter. Further, check meters are also installed onsite.	It is to be checked if related main meters are installed as per monitoring plan. Relevant site personnel has been Interviewed to confirm whether the emergency procedure is known to them. To be checked if the equipment is malfunctioning and the accuracy and reliability of data for the concerned period cannot be ensured, the relevant emission reductions have been claimed or not.

C.2. Consideration of materiality in conducting the verification

>>>> In accordance with CDM VVS for PAs, Version 02.0 para 326 the prescribed thresholds for materiality for CDM PAs are as under;

Emission Reductions (tCO2e)/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 326)	**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 (tCO2e) in this monitoring period	65,231 tCO2e	42,481 tCO2e
Applicable Threshold (%) as per para 326(c) of CDM VVS for PAs Version 02.0	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)**
$EG_{facility,y}$ Net electricity	Monthly	16(100%)	16 (100%)	No errors were identified during the verification of data from	No impact.	No impact

generation supplied to the grid by the Project activity, from 01/09/2017 to 31/12/2018				there source.		
$EG_{export,y}$ Electricity export to the grid by the Project activity.	Monthly	16 (100%)	16 (100%)	No errors were identified during the verification of data from there source.	No impact.	No impact
$EG_{import,y}$ Electricity import from the grid by the Project activity	Monthly	16 (100%)	16 (100%)	No errors were identified during the verification of data from there source.	No impact.	No impact
$\sum EG_{Controller,j}$ electricity generation at the WTG controller	Monthly	16 (100%)	16 (100%)	No errors were identified during the verification of data from there source.	Not applicable	Not applicable

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/document review

>>>> A desk review was conducted by the verification team that included

a) A review of the data and information presented to verify its completeness;

b) A review of the registered 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;

c) 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;

A complete list of documents/evidences reviewed is included as Appendix 3.

D.2. On-site inspection

Duration of on-site inspection: 18/06/2019 to 19/06/2019				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1	An assessment of the implementation and operation of the registered CDM project activity as per the registered PDD or any approved revised PDD;	Jodhpur/Jaisalmer	18/06/2019 and 19/06/2019	Ravi Kant Soni
2	A review of information flows for generating, aggregating and reporting the monitoring parameters;	Jodhpur/Jaisalmer	18/06/2019 and 19/06/2019	Ravi Kant Soni
3	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the registered monitoring plan;	Jodhpur/Jaisalmer	18/06/2019 and 19/06/2019	Ravi Kant Soni
4	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;	Jodhpur/Jaisalmer	18/06/2019 and 19/06/2019	Ravi Kant Soni
5	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;	Jodhpur/Jaisalmer	18/06/2019 and 19/06/2019	Ravi Kant Soni
6	A review of calculations and assumptions made in determining the GHG data and emission reductions;	Jodhpur/Jaisalmer	18/06/2019 and 19/06/2019	Ravi Kant Soni
7	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;	Jodhpur/Jaisalmer	18/06/2019 and 19/06/2019	Ravi Kant Soni

D.3. Interviews

No.	**Interviewee**			**Date**	**Subject**	**Team member**
	Last name	**First name**	**Affiliation**			

1.	Kumar	Navneet	VWLLP	18/06/2019 and 19/06/2019	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.	Mangal	Jaiprakash	WWIL	18/06/2019	Monitoring and measuring system, Collection of measurements, Observations of established practices and Data Verification of monitoring parameters	Ravi Kant Soni
3.	Kumar	Hemant	WWIL	18/06/2019	Calibration procedure of meters	Ravi Kant Soni
4.	Ram	Sharvan	WWIL	19/06/2019	Monitoring and measuring system, Collection of measurements, Observations of established practices and Data Verification of monitoring parameters	Ravi Kant Soni
5.	Singh	Umesh	WWIL	19/06/2019	Calibration procedure of meters	Ravi Kant Soni

D.4. Sampling approach

>> No sampling approach has been applied by the verification team as all the monthly reported figures in the MR/06/ and the ER sheet/08/ were checked from the actual records.

D.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	CL#1	-	-
Compliance of the project implementation and operation with the registered PDD	-	-	-
Post-registration changes	-	-	-

Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	CAR #4	-
Assessment of data and calculation of emission reductions or net removals	-	CAR #3	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	CL #2 (missing documents)		
Total	2	2	-

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	The monitoring report form used is CDM-MR-FORM version 07.0, which was the 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.
Findings	CL #1 was raised and resolved.
Conclusion	The monitoring report is found to be complying with the monitoring report form.

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

>> This is 6th verification of the project activity. There are no FAR(s) from validation/11/ or previous verification /11.1 /that need to be closed during this verification.

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

Means of verification	This project activity is the generation of electricity from WTGs supplying the generated electricity to the NEWNE grid of India. The project is located at Jaisalmer (17 WTGs) and Jodhpur (20 WTGs) districts of Rajasthan state in India and has an installed capacity of 29.6 MW (37 WTGs x 0.8 MW/WTG). This was confirmed from document review of commissioning certificates /17/. The commercial operation of the project activity had been started on 23/09/2010–26/01/2011, which was verified vide commissioning certificates/17/ and corroborated by monthly breakup sheets/14/ prepared by O&M contractor and approved by state utility, indicating the start date of commercial operation. The technical specifications of WTGs were verified through the nameplate details (imprinted/placed at the bottom of WTG tower) available at the WTGs physically checked during the site visit and were found to be consistent with the details provided in the revised approved PDD (approved on 23/09/2014)/09/. The project is located between latitude 26°, 25’,25.2” to 26°,41’,58.8” N and longitude 70°, 56’,13.0” to 72°,50’,44.5” E. Location of the project was verified through Google Map (https://www.gps-coordinates.net/) and found consistent with the same mentioned in the revised approved PDD and MR. During the site visit, the verification team randomly selected 11 numbers of WTGs to physically confirm the geographical locations/coordinates by using hand held device. The sample size (11) was determined in accordance with the ‘Sampling and survey for CDM project activities and programmes of activities’ V08/23/ as per the assumptions marked below;

Producer Risk	10%
Consumer Risk	10%
AQL	0.5%
UQL	20%
Sample Size	11
Acceptance Number	0 (No discrepancy allowed)

The verified geo-coordinates of WTGs are mentioned below;

Sr.No	Location No-	Latitude (N)	Longitude (E)	Remark
1	39	26° 35' 46"	70° 51' 53"	Accuracy 9 meters
2	30	26° 44' 04"	70° 50' 19"	Accuracy 10 meters
3	35	26° 31' 35"	70° 56' 51"	Accuracy 6 meters
4	121	26° 45' 04"	71° 08' 04"	Accuracy 11 meters
5	53	26° 37' 15"	70° 48' 14"	Accuracy 9 meters
6	601	26° 33' 26"	71° 05' 26"	Accuracy 10 meters
7	603	26° 44' 16"	71° 09' 31"	Accuracy 11 meters
8	156	26° 24' 47"	72° 49' 51"	Accuracy 8 meters
9	161	26° 29' 21"	72° 34' 08"	Accuracy 10 meters
10	168	26° 36' 40"	72° 48' 51"	Accuracy 9 meters
11	510	26° 20' 59 "	72° 55' 47"	Accuracy 12 meters

The geo coordinates of the remaining WTGs forming part of the project activity, which were not visited physically were verified using Google Map (https://www.gps-coordinates.net/) and were found to be consistent with the same reported under section A. 2 of the monitoring report and in Annex-1 of revised approved PDD/09/.

The WTGs belong to project activity are installed at Jaisalmer and Jodhpur site and connected to various clusters and each cluster have exclusive dedicated metering arrangement at 33kV at project site.

Similarly, the WTGs of other project developers (non-project activity) are also connected to separate clusters having exclusive dedicated metering arrangement at 33kV at project site. All the cluster meters (for the project activity and non-project activity are further connected at 220 kV Wind World sub-station (Bhu sub-station, Jaisalmer) and at 132 kV Wind World sub-station (Salodi sub-station, Jodhpur) through 33 kV bus, from where the electricity supplied to DISCOM sub-station (Akal,Jaisalmer) and (PS-8 Narwa,Jodhpur) respectively. At both the substations the electricity generated by all the WTGs (project and non-project) is being fed to the NEWNE grid through two separate lines. Each line having one set of meters (main and check meter) and monthly reading is taken by the RRVPNL representatives in the presence of WWIL officials in the form of JMR.

It was observed during the site visit that, the WTGs (project activity and non-project) are connected to the sub-station meters (common metering points) at Jaisalmer and Jodhpur site.

Hence, in order to calculate the net electricity exported to the grid by the WTGs of the project activity alone, an apportioning procedure is followed which has been correctly described in section C of the MR/06/ and in section B.7.3 of the revised approved PDD/09/.

The rated capacity of transformers were also indicated at the metering points located in the DISCOM substations/21/ and the same was found to be consistent with description given in the revised approved PDD. Furthermore, capacity of transformers verified through the specifications mentioned at the name plate of transformer/21/ and found consistent with revised approved PDD /09/ and MR.

The PP has signed PPA/19/ with state utility for the sale of electricity to the grid and

	has been supplying electricity in compliance with the PPA as confirmed from the monthly invoices /15/. The project was registered as a CDM project on 28/02/2012 /13/. The PP has considered a fixed crediting period for the project activity from 28/02/2012 to 27/02/2022. This is the sixth verification of the project activity covering the period from 01/09/2017 to 31/12/2018. All 37 WTGs were fully functional and the assessment team verified this during the site visit/21/. 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: i. Commissioning certificates/17/ ii. Power Purchase Agreement/19/ iii. Invoices raised by the PP to State utility /15/ iv. Testing certificates of all energy meters/18/ The information relating to the project implementation, provided in the Monitoring Report/05/ is consistent with that stated in the revised approved PDD/09/. The data and variables provided in the monitoring report are the same as stated in the approved PDD. Total emission reductions achieved under this monitoring period 01/09/2017 to 31/12/2018 (including both days) is 42,481 tCO_2e.
Findings	No finding was raised
Conclusion	• 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. • No information with regard to data and variables was identified that may surpass the estimated quantity of ERs in the revised approved PDD. • The emission reductions achieved during the current monitoring period are (42,481 tCO_2e), that is within the estimated quantity (65,362 tCO_2e) in the revised approved PDD for the comparable period.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[1]

>> There are no temporary deviations from registered monitoring plan or applied methodology. It was verified and confirmed from the revised approved PDD/09/; the applied methodology/12/ and the on-site verification.

E.4.2. Corrections

>> A request for prior approval of post registration changes (corrections) was submitted during the second verification and the revised PDD version 11 dated 08/07/2014 was approved on 23/09/2014 by the UNFCCC (Ref: PRC-5090-002) as reflected on the project webpage /13/.

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/13/.

E.4.4. Inclusion of a monitoring plan

>> Not applicable

[1] Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

>> A request for prior approval of post registration changes to the monitoring plan was submitted during the second verification and the revised PDD version 11 dated 08/07/2014 was approved on 23/09/2014 by the UNFCCC (Ref: PRC-5090-002) as reflected on the project webpage/13/.

E.4.6. Changes to the project design

>>Not applicable

E.4.7. Changes specific to afforestation and reforestation project activities

>> Not applicable

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	The monitoring plan as contained in the revised approved PDD /09/ has been reviewed against the monitoring requirements of the applied methodology ACM0002 Version 12.3.0. Monitoring plan in the revised approved PDD (approved on 23/09/2014) includes the following parameters: 1. Net electricity generation supplied to the grid by the Project activity ($EG_{facility,y}$)- This parameter is calculated as the difference of the apportioned electricity exported and imported by the WTGs involved in the project activity connected to the four feeders at grid- interconnection point. $EG_{facility,y} = EG_{export,y} - EG_{import,y}$ 2. Electricity export to the grid by the project activity ($EG_{export,y}$) 3. Electricity imported by the project activity from the grid ($EG_{import,y}$) 4. Summation of net electricity generation (Gross Export-Gross Import) by all the WEGs of project activity (j number of WEGs), as measured at the controller (LCS meter) at project site. Each WEG has exclusive LCS meter that records net electricity generation (Gross Export-Gross Import) from the WEG. j is number of WEGs of project activity connected to main meter (JMR/billing meter) at DISCOM substation and backup meter at WWIL substation ($\sum \mathbf{EG_{Controller,j}}$) Both the parameters (2&3) are calculated using the apportioning procedure as described in section B.7.3 of the revised approved PDD and directly sourced from monthly break-up sheets issued by state utility. **Apportioning procedure:** During the site visit it is observed that WTGs belong to project activity are connected to common metering points (at Jaisalmer and Jodhpur site both) where each metering point is a common pool where the PP and other project developers feed electricity. Hence electricity exported and imported by the project activity ($EG_{export,y}$ and $EG_{import,y}$) is calculated using apportioning procedure as described under section B.7.3 of the revised approved PDD. The O&M contractor (also referred as EPC contractor) is responsible to apportion the electricity generation data. The following parameters involved in the apportioning process: (a) Electricity export by project and non-project recorded at respective billing meters located at DISCOM sub-station. ($EG_{JMR, export}$) (b) Electricity import by project and non-project recorded at respective billing meters located at DISCOM sub-station ($EG_{JMR, import}$) (c) Summation of net electricity generation by all the WEGs (j number of WEGs) of project activity, as measured at the controller (LCS meter) at project site ($\Sigma EG_{Controller, j}$). (d) Summation of net electricity generation by all WEG (i number of WEGs) of

project activity or non-project activity, as measured at the controller (LCS meter) at project site ($\Sigma EG_{Controller,i}$)

As per the apportioning procedure, electricity exported by the project activity to the grid (EG_{export}) is calculated using following formula

$$EG_{export,y} = \frac{\mathbf{EG}_{JMR,Export} * \Sigma \mathbf{EG}_{Controller,\ j}}{\Sigma EG_{Controller,i}}$$

Similarly electricity imported by the project activity from the grid ($EG_{import,y}$) is calculated as follows:

$$EG_{export,y} = \frac{\mathbf{EG}_{JMR,Import} * \Sigma \mathbf{EG}_{Controller,\ j}}{\Sigma EG_{Controller,i}}$$

It is to be noted that generation data of other project developers [parameter (a),(b) & (d) above] are confidential in nature, hence, state utility does not disclose the same and therefore beyond the control of PP. Thus, $EG_{JMR,export}$,$EG_{JMR,\ import}$ and summation of generation data from other WTGs (Non-project WTGs connected to the common metering points) is not available to PP. Hence, these parameters are not included in the approved monitoring plan.

Post apportioning, O&M contractor issues month wise "Break-up sheets" which is endorsed by DISCOM. The breakup sheet contains electricity export, import and net export by the project WTGs connected to the individual feeder. These values (mentioned in "Break-up sheet") are the main source to calculate the baseline emission by this project activity and same is in line with section B.7.3 of the revised approved PDD /09/.

The apportioning procedure has been implemented used in this project activity is a common practice followed for wind projects in the State of Rajasthan, India. This is also need to be considered that revision in the registered monitoring plan was already sought to incorporate the actual apportioning practice adopted at site and same was approved by UNFCCC on 23/09/2014 (ref: PRC-5090-002). In the PRC validation, opinion/11/ it was concluded that the apportioning procedure is included in the PDD (Section B.7.3) to improve transparency regarding the actual monitoring practice followed at site.

It is to be that the parameter $\Sigma EG_{Controller,i}$ directly not used for estimation of emission reduction. Whereas, $EG_{export,y}$ and $EG_{import,y}$ is calculated using apportioning procedure implemented by O&M contractor and values of parameters are directly sourced from breakup sheets issued by O&M contractor and certified by state utility .

It is worthy to note that complete set of parameters used in "apportioning procedure" neither available to PP nor the part of registered approved monitoring plan, hence calculation results obtained through apportioning (Break-up sheet) cannot be reproduced by PP in the ER calculation sheet. Further, in line with registered monitoring plan (after Post Registration Changes) it is not required for PP.

The assessment team has verified that values of parameter $EG_{facility,y}$, $EG_{export,y}$ and $EG_{import,y}$ are directly sourced from breakup sheets/14/ which are in line with the requirements of approved monitoring plan (after Post Registration Changes)/11/.

During the onsite visit, representatives of O&M contractor were interviewed and confirmed that they implement the apportioning procedure described in the revised approved PDD and the PP is not involved in the process directly or indirectly.

In view of the above discussion, the assessment team confirms that the apportioning procedure revealed under section B.7.3 of PDD (approved on 23/09/2014) and in section C of the MR is the actual procedure implemented by the O&M contractor, provides completeness of the monitoring plan, and reflect the

	actual monitoring practices and procedure implemented at project site. As per the applied methodology ACM0002 version 12.3.0 "Quantity of net electricity generation supplied by the project plant/unit to the grid in year y" shall be measured through electricity meters. In accordance with the approved monitoring plan "The net electricity supplied by the project activity" ($EG_{facility,y}$) is a calculated parameter; however, input values used in calculation are measured from energy meters installed at respective DISCOM substations and the LCS meters installed at individual WTGs connected to these feeders. Hence, it can be concluded that approved registered monitoring plan complies with the approved monitoring methodology applied to the project activity.
Findings	No finding was raised
Conclusion	The monitoring plan outlined in the revised approved PDD is in accordance with the applied methodology /12/ 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 NEWNE Electricity Grid ($EF_{OM,y}$, tCO_2e/MWh)

Means of verification	The value of this parameter is considered as 1.0050. This was checked with the revised approved PDD /09/ and CO2 Baseline Database for Indian Power Sector", version 05 published by the Central Electricity Authority, Ministry of Power, Government of India /20/.
Findings	No finding was raised
Conclusion	The value in the monitoring report /06/ and corresponding emission reduction calculations spreadsheet /08/ are consistent with the revised approved PDD (page 25). The applied value is correct and justified.

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

Means of verification	The value of this parameter is considered as 0.6752. This was checked with the revised approved PDD /09/ and CO2 Baseline Database for Indian Power Sector", version 05 published by the Central Electricity Authority, Ministry of Power, Government of India /20/.
Findings	No finding was raised
Conclusion	The value in the monitoring report /06/ and corresponding emission reduction calculations spreadsheet /08/ are consistent with the revised approved PDD/09/ (page 26). The applied value is correct and justified.

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

Means of verification	The value of this parameter is considered as 0.9225. This was checked with the revised approved PDD /09/ and CO2 Baseline Database for Indian Power Sector", version 05 published by the Central Electricity Authority, Ministry of Power, Government of India /20/.
Findings	No finding was raised.
Conclusion	The value in the monitoring report /06/ and corresponding emission reduction calculations spreadsheet /08/ are consistent with the revised approved PDD/09/ (page 26). The applied value is correct and justified.

E.6.2. Data and parameters monitored

Net electricity generation supplied to the grid by the Project activity, $EG_{facility,y}$ (MWh)

Means of verification	

Criteria/Requirements	Assessment/Observation
Measuring /Reading /Recording frequency	The parameter is calculated as difference of $EG_{Export,y}$ and $EG_{Import,y}$ and recorded monthly basis in line with the approved monitoring plan. $EG_{facility,y} = EG_{Export,y} - EG_{Import,y}$ Where,

		EG_{Export}= Electricity exported by the project activity to the grid EG_{Import}= Electricity imported by the project activity to the grid
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. In line with the approved monitoring plan, this parameter is recorded on monthly basis in the breakup sheets issued by state utility.
	Monitoring equipment	No monitoring equipment is used as this parameter is calculated.
	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.
	How were the values in the monitoring report verified?	The data transfer process for the said parameter is as follows: The Joint meter reading at all the metering points at DISCOM substation is taken by the representatives of DISCOM (RRVPNL) in the presence of WWIL officials in the form of JMRs. Based on the data recorded in the JMRs and

		generation recorded at WTGs panel meters, electricity exported/imported to/from the grid by the project activity is calculated by O&M contractor, using the apportioning procedure and breakup sheets for each project developer is prepared which is endorsed by state utility(DISCOM). Cumulative value of $EG_{facility, y}$ for entire monitoring period is reported in the monitoring report, however monthly values are reported in the ER calculation sheet. The monthly values were verified from the breakup sheets issued by state utility and found to be consistent. Value of this parameter for the current monitoring period is 46,058.23 MWh.
	If applicable, has the reported data been cross-checked with other available data?	Monthly reported values of $EG_{facility,y}$ for the current monitoring period were further cross-checked with the monthly invoices raised by the PP /15/ to state utility 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?	Yes, all the stakeholders, namely, the Grid Authority (DISCOM), and the WWIL (O&M Contractor), implemented the adequate QA/QC procedures.
	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.
Findings	No finding was raised	
Conclusion	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.	

Electricity export to the grid by the Project activity, $EG_{Export,y}$ (MWh)

Means of verification		
	Criteria/Requirements	**Assessment/Observation**
	Measuring /Reading /Recording frequency	The parameter is calculated and recorded on monthly basis using following measured parameters: (a) Monthly export readings recorded at grid-interconnection point (JMR Reading) and (b) Generation recorded at LCS meter at each WTG.

	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The monitoring of parameter has been implemented in accordance with the registered monitoring plan.
	Monitoring equipment	No monitoring equipment is used as this parameter is calculated using the measured values. There are common metering (for the project activity and non-project activity WTGs) arrangement done at 220 kV Wind World sub-station (Bhu sub-station, Jaisalmer) and at 132 kV Wind World sub-station (Salodi sub-station, Jodhpur) through 33 kV bus, from where the electricity supplied to DISCOM sub-station (Akal,Jaisalmer) and (PS-8 Narwa,Jodhpur) respectively. There is one set of billing meters (main and check meter) is installed at each DISCOM substation. In addition backup meters are also installed at WWIL substations. The accuracy of the monitoring equipment (energy meters) used to measure the input values used to calculate $EG_{Export,y}$ is 0.2s as verified from the physical inspection of the project activity, which is as per the approved CDM PDD/09/ which is as per the norm defined in the PPA/19/. Calibration details of the meters are provided under 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?	The accuracy of the monitoring equipment used to measure the input values used to calculate this parameter is 0.2s as verified from the physical inspection of the project activity, which is as per the registered CDM PDD/09/ which is as per the norm defined in the PPA/19/.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes. Calibration certificates/18/ are verified and confirmed that accuracy of monitoring instruments is valid for the entire range.
	Calibration frequency /interval:	Calibration frequency of the meters is annual/09/.
	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	Yes. The calibration frequency is in line with the monitoring plan as outlined in the registered PDD/09/.

	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 Darsh Calibration Pvt Limited which NABL Accredited entity/18/.
	How were the values in the monitoring report verified?	The data transfer process for the said parameter is as follows: The Joint meter reading at all the metering points at both DISCOM substations is taken by the representatives of DISCOM in the presence of WWIL officials in the form of JMRs. Based on the data recorded in the JMRs and generation recorded at WTGs panel meters, electricity exported/imported to/from the grid by the project activity is calculated by O&M contractor, using the apportioning procedure and breakup sheets for each project developer is prepared. Cumulative value of $EG_{Export,y}$ for entire monitoring period is reported in the monitoring report, however monthly values are reported in the ER calculation sheet. The monthly values were verified from the monthly breakup sheets/14/ issued by state utility and found to be consistent. Value of this parameter for the current monitoring period is 46,144.61 MWh.
	If applicable, has the reported data been cross-checked with other available data?	Monthly reported values of $EG_{Export,y}$ for the current monitoring period were further cross-checked with the monthly invoices raised by the PP /15/ to state utility 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?	Yes, all the stakeholders, namely, the Grid Authority (RRVPNL)), and the WWIL (O&M Contractor), implemented the adequate QA/QC procedures.
	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.
Findings	No finding was raised	
Conclusion	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.	

Electricity import from the grid by the Project activity, $EG_{Import,y}$ (MWh)

Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The parameter is calculated and recorded on monthly basis using following measured parameters: (a) Monthly import readings recorded at grid-interconnection point (JMR Reading) and (b) Generation recorded at LCS meter at each WTG.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	The monitoring of parameter has been implemented in accordance with the registered monitoring plan.
	Monitoring equipment	No monitoring equipment is used as this parameter is calculated using the measured values. There are common metering (for the project activity and non-project activity WTGs) arrangement done at 220 kV Wind World sub-station (Bhu sub-station, Jaisalmer) and at 132 kV Wind World sub-station (Salodi sub-station, Jodhpur) through 33 kV bus, from where the electricity supplied to DISCOM sub-station (Akal,Jaisalmer) and (PS-8 Narwa,Jodhpur) respectively. There is one set of billing meters (main and check meter) is installed at each DISCOM substation. In addition backup meters are also installed at WWIL substations. The accuracy of the monitoring equipment (energy meters) used to measure the input values used to calculate $EG_{Import,y}$ is 0.2s as verified from the physical inspection of the project activity, which is as per the approved CDM PDD/09/ which is as per the norm defined in the PPA/19/. Calibration details of the meters are provided under 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?	The accuracy of the monitoring equipment used to measure the input values used to calculate this parameter is 0.2s as verified from the physical inspection of the project activity, which is as per the registered CDM PDD/09/ which is as per the norm defined in the PPA/19/.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring	Yes. Calibration certificates/18/ are verified and confirmed that accuracy of monitoring instruments is valid for the entire range.

	ranges?	
	Calibration frequency /interval:	Calibration frequency of the meters is annual/01/.
	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?	Yes. The calibration frequency is in line with the monitoring plan as outlined in the registered PDD/09/.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes the calibration is conducted by Darsh Calibration Pvt Limited which is a NABL Accredited entity/18/.
	How were the values in the monitoring report verified?	The data transfer process for the said parameter is as follows: The Joint meter reading at all the metering points at both DISCOM substations is taken by the representatives of DISCOM in the presence of WWIL officials in the form of JMRs. Based on the data recorded in the JMRs and generation recorded at WTGs panel meters, electricity exported/imported to/from the grid by the project activity is calculated by O&M contractor, using the apportioning procedure and breakup sheets for each project developer is prepared. Cumulative value of $EG_{Import,y}$ for entire monitoring period is reported in the monitoring report, however monthly values are reported in the ER calculation sheet. The monthly values were verified from the monthly breakup sheets/14/ issued by state utility and found to be consistent. Value of this parameter for the current monitoring period is 86.37 MWh.
	If applicable, has the reported data been cross-checked with other available data?	Monthly reported values of $EG_{Import,y}$ for the current monitoring period were further cross-checked with the monthly invoices raised by the PP /15/ to state utility 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?	Yes, all the stakeholders, namely, the Grid Authority (RRVPNL)), and the WWIL (O&M Contractor), implemented the adequate QA/QC procedures.

	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.
Findings	No finding was raised	
Conclusion	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.	

Summation of net electricity generation (Gross Export-Gross Import) by all the WEGs of project activity (j number of WEGs), as measured at the controller (LCS meter) at project site. Each WEG has exclusive LCS meter that records net electricity generation (Gross Export-Gross Import) from the WEG. j is number of WEGs of project activity connected to main meter (JMR/billing meter) at DISCOM substation and backup meter at WWIL substation, $\sum EG_{Controller,j}$ (MWh)

Means of verification		
	Criteria/Requirements	**Assessment/Observation**
	Measuring /Reading /Recording frequency	The parameter is continuously measure, recorded hourly and reported monthly in line with the registered monitoring plan.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. In line with the approved monitoring plan, this parameter is recorded on monthly basis in the monthly generation reports (MGR) issued by O&M contractor/16/.
	Monitoring equipment	This parameter is measured through LCS meter (controller panel meter) integrated with WTG and monitored via online monitoring system (SCADA).
	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?	The LCS meter at each WTG is a microprocessor based multi-function relay (MFR) which is highly accurate and it monitors the electricity generated by each WTG. The relay runs software to sample inputs and numerically processes the information. It is therefore highly unlikely for this relay to wrongly read/record data.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring	Yes the accuracy of LCS meter is valid for the entire measuring range or do different accuracy levels apply to different measuring ranges.

	ranges?	
	Calibration frequency /interval:	It is not possible to calibrate controller because it is integral part of WTG cannot be removed during operation. Letter of undertaking from WTG supplier/24/ regarding the calibration of controller is provided by PP and same has been confirmed through interview of site personnel during site visit.
	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
	How were the values in the monitoring report verified?	The data is generated and recorded in the SCADA system automatically. The O&M contractor, based on recorded data in the SCADA system, prepares the daily generation reports. These daily generation reports are used to prepare monthly generation reports. The monitoring procedures were sufficiently robust to enable accurate transmission of data. Cumulative value of Σ $EG_{Controller,j}$ for entire monitoring period is reported in the monitoring report, however monthly values are reported in the ER calculation sheet. The monthly values were verified from the monthly generation reports/16/ issued by state utility and found to be consistent. Value of this parameter for the current monitoring period is 45,858.442 MWh.
	If applicable, has the reported data been cross-checked with other available data?	Not applicable, as the generation recorded at the LCS meter is cross verified by the energy calculated by inverting system installed in the WTGs.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Grid Authority (RRVPNL), and the WWIL (O&M Contractor), implemented the adequate QA/QC procedures.

	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.
Findings	No finding was raised	
Conclusion	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

Means of verification	Not applicable
Findings	Not applicable
Conclusion	Not applicable

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

Means of verification

As per the monitoring plan in the revised approved PDD/09/ the meters are to be tested and calibrated once in a year. The calibration frequency has not been followed for the meters installed at Jaisalmer and Jodhpur site in the current monitoring period.
The latest calibration reports of meters installed at Jaisalmer and Jodhpur site have been checked and confirmed that the meters were working satisfactorily, and the errors observed within permissible limits.
The project activity metering has been physically inspected during the site visit. The details of monitoring equipment involved in the project activity and their calibration dates are mentioned in Section C of the MR/06/ and are summarised in the tables below. All the meters installed at WWIL substation and state electricity board substations are of accuracy class of 0.2s and a calibration frequency of once in a year.

Jaisalmer Site:

Meter Location	Meter Sr.No	Date of calibration	Is there any delay in calibration?
Akal Sub - station (220 kV,Electrcity Board substation)	Main meter 15624843	09/03/2017 and 14/05/2018	Y
	Check meter: 15624844	09/03/2017 and 14/05/2018	Y
Bhu Sub-station (WWIL substation)	Backup meter: 15197055	25/05/2017 and 14/05/2018	N

Jodhpur Site:

Meter Location	Meter Sr.No	Date of calibration	Is there any delay in calibration?
PS-8 Sub - station	Main meter : RJB 00354	16/06/2017 and 14/08/2019	Y
	Check meter:	16/06/2017 and	Y

	(132 kV,Electrcity Board substation)	RJB 00356	14/08/2019	
	Salodi Sub-station (WWIL substation)	Backup Main meter: RJB 00358	16/06/2017 and 14/08/2019	Y
		Backup Check meter: RJB 00357	16/06/2017 and 14/08/2019	Y

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

i. Physical inspection of the meters during the site visit
ii. Interviewing the staff at the sub-station
iii. The SCADA of the O&M service provider located at the site
iv. 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 the meters has not been conducted as per the calibration frequency mentioned in the revised approved PDD/09/.

Assessment of delay in calibration of billing meters:

Jaisalmer Site:

It is verified from calibration certificates, calibration of meter (earliest) was done on 09/03/2017 (next calibration was due on 09/03/2018) and subsequent calibration was done on 14/05/2018. Hence calibration of meters considered to be delayed for the period 09/03/2018 to 13/05/2018, since the billing cycle starts from 1st day of every month to the last day of the month, hence the PP has applied the error factor to related parameters for entire month of March 2018, April 2018 and May 2018.

The approach followed by the PP is found to be conservative and in line para 366(a) of CDM VVS for PAs version 02.0, hence accepted.

The verification team has checked the latest calibration certificates of energy meters and confirmed that meter was working satisfactorily and error within the permissible limits.

Jodhpur Site:

Latest calibration of billing meters was done on 16/06/2017(next calibration was due on 16/06/2018) and subsequent calibration was conducted on 14/08/2019.

It is noted that calibration is not conducted as per the schedule, hence there is a delay in calibration for the period from 16/06/2018 to 31/12/2018 is considered. Following conservative approach the PP has applied the error factor to the concerned parameters for entire month from June 2018 to December 2018.

It is verified through the revised approved PDD and PPA signed by the PP with state utility that the state utility (RRVPNL) is the buyer of generated electricity and sole entity responsible for calibration of meters.

During the site visit, the assessment team has physically verified the meters installed at site and found to be working satisfactorily and checked the monthly JMRs that mention the identification of meters whose data used to prepare monthly break up sheets.

Accordance with the guidelines outlined under paragraph 366(a) of CDM VVS for PAs version 02.0, an error factor 0.2% had to be applied for both export & import i.e. the measured values in the delayed calibration period. However, the monthly breakup sheets issued by the state utility only provides the calculated value of electricity exported and imported by the project activity. Hence the error factor – 0.2% is applied for export values and +0.2% for import values. The approach followed by the PP was found to be conservative and appropriate, hence accepted.

The meters are duly approved, installed, tested, sealed and in the custody of the state utility. The PP has no control over the same.

CEA Notification No. 502/70/CEA/DP&D dated 17/03/2006/22/ which is considered as national standard mentions that “All interface meters shall be tested at least once in five years.” Hence, the calibration frequency of once in a year, mentioned in the revised approved PDD for the meters is appropriate.

Findings	CAR #4 was raised and resolved

Conclusion	The assessment team has confirmed that the calibration is conducted at the frequency following the relevant industry standard as specified by the methodology /03/ and the monitoring plan contained in the revised approved PDD /09/. Therefore, the requirements of paragraph 370 of CDM-VVS for PAs, version 02.0 have been met. The assessment team also 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 GHG emission reductions or net anthropogenic GHG removals; (b) For all measured values taken during the period between the scheduled date of calibration and the actual date of calibration.

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

Means of verification	The verification team verified that a) 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 /08/ of final Monitoring Report /06/. b) The information provided in the monitoring report was crosschecked with other sources, wherever appropriate and available, and such information is also included under Section E.6.2 of this report. c) 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. d) All assumptions used in the emission calculations were found appropriate and therefore justified e) Appropriate emission factors and other reference values have been correctly applied. This has also been elaborated under Section E.6.1 of this report. f) No standardized baseline was prescribed in the revised approved PDD and therefore it has not been applied. The baseline emissions are the product of net electricity exported to the grid 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. $BE_y = EG_{PJ,y} * EF_{grid,CM,y}$ Where: BE_y = Baseline emissions in year y (tCO2) $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh) $EF_{grid,CM,y}$ = Combined margin CO2 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 (tCO2/MWh) Since the project activity is the installation of a new grid connected renewable power plant the $EG_{PJ,y}$ is calculated as : $EG_{PJ,y} = EG_{facility,y}$ Where, $EG_{facility,y}$= Quantity of net electricity generation supplied by the project plant/unit to

	the grid in year *y* (MWh/yr). $EG_{facility,y} = EG_{Export,y} - EG_{Import,y}$ Hence baseline emissions are calculated as: $BEy = EG_{facility,y} * EF_{grid,CM,y}$ As per the revised approved PDD, combined margin emission factor is 0.9225 tCO_2 /MWh. Hence the baseline emissions for the project activity for the current monitoring period are as follows. $BEy = 460,058.23 * 0.9225 = 42,481\ tCO_2e$
Findings	CAR #3 was raised and resolved.
Conclusion	In line with the paragraph 374 of VVS for PAs version 02.0, the verification team confirms that: a) The complete data was available and is duly reported; 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); c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals were followed; d) Appropriate emission factors and other reference values were correctly applied.

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

Means of verification	The revised approved PDD/09/ and applied monitoring methodology/12/ 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.
Findings	No finding was raised
Conclusion	No project emissions were required to be calculated.

E.8.3. Calculation of leakage GHG emissions

Means of verification	The revised approved PDD/09/ and applied monitoring methodology/12/ 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.
Findings	No finding was raised
Conclusion	No leakage emissions were required to be calculated.

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

Means of verification	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 and complying with the provisions prescribed in the monitoring plan of revised approved PDD/09/ 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.
Findings	No finding was raised
Conclusion	The verification team confirms that a) The complete data was available and is duly reported; 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); c) Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals, project emissions and leakage emissions were followed; d) Appropriate emission factors and other reference values were correctly applied. e) There is no pro-rate approach 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. The total number of ERs achieved during the current monitoring period is 42,481tCO_2e.

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

Means of verification	As verified and evident from the final Monitoring Report /06/ and corresponding ER sheet /08/, the actual emission reductions achieved by the project activity in the current monitoring period were found lesser than (35% lower) the estimated quantity in the revised approved PDD/09/ for the comparable period.

Estimated ERs for comparable period as per revised approved PDD (tCO2e)	Actual ERs achieved in the current monitoring period (tCO2e)
65,362	42,481

Findings	CAR #3 was raised and resolved
Conclusion	The actual emission reductions achieved by the project activity are lower than the estimated quantity of ERs in the registered PDD/09/. Accordingly, it was accepted by the verification team.

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

Means of verification	The actual emission reductions were less than the estimation in the revised approved PDD/09/ for an equivalent length of the monitoring period therefore no further explanation is required.
Findings	No finding was raised
Conclusion	The actual ERs are less than the estimated quantity of ERs as given in the revised approved PDD/09/, 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

Means of verification	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 5090 "Renewable Energy Wind Power Project in Rajasthan" in India during the period 01/09/2017 to 31/12/2018 (including both days) is 42,481 tCO_2e.

	First commitment period (up to 31 Dec 2012) (tCO2e)	01 Jan 2013 onwards (tCO2e)
Emission Reductions	NA	42,481

Findings	No finding was raised
Conclusion	Actual GHG emission reductions achieved during period starting from 1st January 2013 onwards was verified as 42,481 tCO_2e.

E.9. Assessment of reported sustainable development co-benefits

Means of verification	Not applicable
Findings	Not applicable
Conclusion	Not applicable

E.10. Global stakeholder consultation

Means of verification	Not applicable
Findings	Not applicable
Conclusion	Not applicable

SECTION F. Internal quality control

>> The 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 on behalf of Earthood Services Private Limited.

SECTION G. Verification opinion

>> Earthood Services Private Limited (ESPL), contracted by Vish Wind Infrastrukture LLP, has performed the independent verification of the emission reductions for the CDM project activity 5090 "Renewable Energy Wind Power Project in Rajasthan" in India for the monitoring period 01/09/2017 to 31/12/2018 (including both days) as reported in the Monitoring Report (public) Version 1 dated 15/01/2019. The Vish Wind Infrastrukture LLP is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

ESPL commenced the verification based on the baseline and monitoring methodology ACM 0002 Version 12.3.0, the monitoring plan contained in the revised approved PDD Version 11 dated 08/07/2014 and Monitoring Report (public) Version 1 dated 15/01/2019.

ESPL 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. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL 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 (ESPL), contracted by Vish Wind Infrastrukture LLP, has performed the independent verification of the emission reductions for the CDM project activity 5090 "Renewable Energy Wind Power Project in Rajasthan" in India for the monitoring period 01/09/2017-31/12/2018 (including both days) as reported in the Monitoring Report (Final) Version 1.1 dated 10/07/2019. The Vish Wind Infrastrukture LLP 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.

ESPL commenced the verification on the basis of the baseline and monitoring methodology ACM0002 Version 12.3.0, the monitoring plan contained in the PDD Version 11 dated 08/07/2014, Monitoring Report (public) Version 1 dated 15/01/2019 as per the methodology described under Section D of this report.

ESPL 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. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL 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 01/09/2017-31/12/2018 are fairly stated in the Monitoring Report (final) Version 1.1 dated 10/07/2019. The GHG emission reductions were calculated correctly based on the approved baseline and monitoring methodology ACM0002 Version 12.3.0 and the monitoring plan contained in the PDD Version 11 dated 08/07/2014.

Earthood Services Private Limited is able to certify that the emission reductions from the CDM project activity 5090 "Renewable Energy Wind Power Project in Rajasthan" in India during the period 01/09/2017 – 31/12/2018 (including both days) amount to 42,481 tCO_2e.

Verified and certified emission reductions as per commitment period:

Commitment period	**Amount**
Upto 31/12/2012 (1st commitment period)	Not Applicable/Nil
From 01/01/2013 onwards	42,481 tCO_2e

Appendix 1. Abbreviations

Abbreviations	Full texts
General	
ACM	Approved Consolidated Methodology
AM	Approved Methodology
AMS	Approved Methodology for SSC Projects
BE	Baseline Emission
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CH4	Methane
CL	Clarification Request
CM	Combined Margin
CME	Coordinating/Managing Entity
CO2	Carbon di oxide
CP	Crediting Period
CPA DD	Component Project Activity Design Document
DNA	Designated National Authority
DR	Desk Review
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact Assessment
ESPL	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Green House Gas
GSC/GSP	Global Stakeholder Consultation Process
GW	Giga Watt
GWh	Giga Watt hour
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
Kw	kilo Watt
kWh	kilo Watt hour
LoA	Letter of Approval/Authorization
LSC	Local Stakeholder Consultation Process
MoC	Modalities of Communication
MoV	Means of Validation
MP	Monitoring Plan
MW	Mega Watt
MWh	Mega Watt hour
N2O	Nitrous Oxide
OM	Operating Margin
PCP	Project Cycle Procedure
PDD	Project Design Document
PE	Project Emission
PLF	Plant Load Factor
PoA DD	Programme of Activities Design Document
PP	Project Participant
PS	Project Standard
RFR	Request for Registration
Tco2e	Tonnes of Carbon di oxide equivalent
TPH	Tonnes Per Hour
UNFCCC	United Nations Framework Convention on Climate Change
V	Version
VVS	Validation and Verification Standard
Project Specific	

ABT	Availability Based Tariff
DISCOM	Distribution Company
EIL	Enercon (India) Limited
EPC	Engineering and Procurement Contractor
GOI	Government of India
JMR	Joint Meter Reading
JVVNL	Jaipur Vidyut Vitran Nigam Limited
LCS	Local Controller System
MGR	Monthly Generation Reports
NEWNE	North East West North-East
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
QA/QC	Quality Assurance/Quality Control
RERC	Rajasthan Electricity Regulatory Commission
RMP	Revision in Monitoring Plan
RPTCL	Rajasthan Power Transport Company Limited
RRVPNL	Rajasthan Rajya Vidyut Prasaran Nigam Limited
VWIL	Vish Wind Infrastrukture LLP
WTG	Wind Turbine Generator
WWIL	Wind World India Limited

Appendix 2. Competence of team members and technical reviewers

Competence Statement			
Name	Ravi Kant Soni		
Country	India		
Education	B. Tech. (Mechanical Engineering) M. Tech. (Energy Management)		
Experience	8 Years +		
Field	Energy and Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-I.C., ACM0002		
Local expert	YES (India)		
Financial Expert	No		
Technical Reviewer	No		
TA Expert	YES (TA 1.2)		
Reviewed by	Shreya Garg	**Date**	04/06/2019
Approved by	Anshika Gupta	**Date**	04/06/2019

Competence Statement			
Name	Anshika Gupta		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	4 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.A., AMS-II.G., ACM0002, AMS-III.A.V.		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	Yes (TA 1.2, TA 3.1)		
Reviewed by	Shreya Garg	**Date**	12/03/2019
Approved by	Kaviraj Singh	**Date**	12/03/2019

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	UNFCCC	Standard: CDM PS for PAs	Ver. 02.0	Others
2	UNFCCC	Standard: CDM PCP for PAs	Ver. 02.0	Others
3	UNFCCC	Standard: CDM VVS for PAs	Ver. 02.0	Others
4	UNFCCC	Form: CDM-MR-FORM	Ver. 07.0	Others
5	PP	Monitoring Report (published)	Ver.1,dated 15/01/2019	PP
6	PP	Monitoring Report (revised/final)	Ver.1.1,dated 10/07/2019	PP
7	PP	ER Spread sheet (draft)	Ver.1,dated 15/01/2019	PP
8	PP	ER Spread sheet (revised/final)	Ver.1.1,dated 10/07/2019	PP
9	PP	Revised approved PDD	Ver.11,dated 08/07/2014	Others
10	DOE (DNV KEMA Energy & Sustainability)	Validation Report on PRC	Report No. PRJC-442304-2013-CCS-IND dated 12/03/2013	Others
11	DOE(SGS United Kingdom Limited)	Validation Report on PRC	Report No. CDM.VER1424 MP2 Revision 3.0,dated 09/07/2014	Others
11.1	DOE(ESPL)	Verification Report (fifth monitoring period)	Version 02,dated 28/12/2017	Others
12	UNFCCC	ACM0002	Version 12.3.0 dated 02/03/2012	
13	UNFCCC	Project Webpage	http://cdm.unfccc.int/Projects/DB/BVQI1312546277.77/view	Others

14	RRVPNL	Monthly breakup sheets issued by state utility	For the period 01/09/2017 to 31/12/2018	PP
15	PP	Monthly Invoices raised by the PP to state utility	For the period 01/09/2017 to 31/12/2018	PP
16	WWIL	Monthly Generation Reports issued by EPC contractor	For the period 01/09/2017 to 31/12/2018	PP
17	RRVPNL	Commissioning certificates for project WTGs issued by state utility	-	PP
18	Darsh Calibration Pvt Ltd.	Calibration certificates for all the meters	-	PP
19	RRVPNL	Power purchase agreements signed between VWIL and state electricity board.	-	PP
20	CEA	CO_2 Baseline Database for Indian Power Sector	Ver.05	Others
21	ESPL	Site visit observation and photographs	Dated 18/06/2019 and 19/06/2019	PP
22	CEA	CEA Notification No. 502/70/CEA/DP&D	Dated 17/03/2006	Others
23	UNFCCC	Sampling and survey for CDM project activities and programmes of activities'	Version 08	Others
24	WWIL	Undertaking from WTG supplier regarding calibration of LCS meter	-	PP
25	Ministry of Environment,Forest and climate change,GOI	Project Participant name change (from Vish Wind Infrastructure LLP to Wish Wind Infrastrukture LLP) consent issued by Government of India, (Ref.No-4/8/2010-CC)	Dated 06/09/2017	PP

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

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

FAR ID	xx	**Section no.**	E.2	**Date:** DD/MM/YYYY
Description of FAR				
Project participant response				**Date:** DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				**Date:** DD/MM/YYYY

Table 2. CL from this verification

CL ID	01	**Section no.**	E.1	**Date :** 20/06/2019
Description of CL				
Please clarify why latest version of CDM-MR-FORM is not referred.				
Project participant response				**Date :** 10/07/2019
PP has revised MR as per latest CDM-MR-FORM.				
Documentation provided by project participant				

MR version 1.1, darted 10/07/2019
DOE assessment **Date:** 31/10/2019
The PP has referred latest version of the CDM-MR-FORM, for updated monitoring report, found to be satisfactory, hence accepted. CL #1 is closed.

CL ID	02	**Section no.**	D.1	**Date :** 20/06/2019
Description of CL				
Please submit the following documents: 1. Commissioning certificate, PPA 2. Monthly JMRs and invoices raised to state utility for the current monitoring period 3. Calibration certificates valid for current monitoring period				
Project participant response				**Date :** 10/07/2019
PP has submitted the following documents: 1. Commissioning certificate, PPA *2.* Monthly JMRs and invoices raised to state utility for the current monitoring period *3.* Calibration certificates valid for current monitoring period				
Documentation provided by project participant				
1. Commissioning certificate, PPA *2.* Monthly JMRs and invoices *3.* Calibration certificates				
DOE assessment				**Date:** 31/10/2019
The PP has submitted the requested documents, found appropriate, hence accepted. CL #2 is closed.				

Table 3. CAR from this verification

CAR ID	03	**Section no.**	E.6.2	**Date :** 20/06/2019
Description of CAR				
Value of estimated and actual emission reductions achieved during the current monitoring period as mentioned in the MR is not consistent with ER calculation sheet. Monitoring period dates mentioned in the ER sheet (tab CER calculation) is not consistent with MR. Please submit Monthly operating logs (Monthly generation reports) recorded in electronic format by EPC contractor for the current monitoring period.				
Project participant response				**Date :** 10/07/2019
PP has revised value of estimated and actual emission reductions achieved during the current monitoring period as mentioned in the MR . PP has revised monitoring period dates mentioned in the ER sheet (tab CER calculation) is accordance with MR. PP has revised value of monitored parameters mentioned in section D.2 of the MR as per ER calculation sheet. PP has submitted to DOE monthly operating logs (Monthly generation reports) recorded in electronic format by EPC contractor for the current monitoring period.				
Documentation provided by project participant				
MR version 1.1, dated 10/07/2019				
DOE assessment				**Date:** 31/10/2019
• The PP has corrected the value of estimated and actual emission reductions achieved during the current monitoring period in the revised MR and found consistent with ER calculation sheet. • Monitoring period dates in the ER sheet (tab CER calculation) is corrected and found consistent with MR. • Monthly operating logs (Monthly generation reports) recorded in electronic format by EPC contractor for the current monitoring period are submitted and monthly generation values reported in the ER sheet are found consistent with monthly generation reports, hence accepted. CAR #3 is closed.				

CAR ID	04	**Section no.**	E.7	**Date :** 20/06/2019
Description of CAR				

Please clarify why latest version of VVS is not referred in section C of the MR, while describing calibration delay. Calibration date of meters installed in Jaisalmer site and Jodhpur site as mentioned in section C of the MR is not consistent with the ER calculation sheet.
Project participant response **Date :** 10/07/2019
PP has provided reference of latest version of VVS and its paragraph, while describing calibration delay. For Jaisalmer site, current monitoring Period for the meters installed at Jaisalmer site, calibration was due on 09/03/2018 but the same was done on 14/05/2018.Hence, the calibration of the meters got delayed for the period from 09/03/2018 to 14/05/2018. However, the billing cycle is from 01st of every month to last day of the month, hence the correction factor (maximum permissible error of "0.2 %") is applied for whole month of Mar-18 to May-18. Similarly, For Jaisalmer site, For Jodhpur site, the calibration was due on 16/06/2018 but the same was been not conducted as of yet. PP has requested state electricity board for conducting the meter calibration but it is not under the control of PP to bind the government entity. Hence, the calibration of the meters got delayed for the period from 16/06/2018 to 31/12/2018. Hence, the correction factor (maximum permissible error of "0.2%") is applied for month of Jun-18 to Dec-18.
Documentation provided by project participant
MR version 1.1 *ER sheet version 1.1*
DOE assessment **Date:** 31/10/2019
Latest version of VVS guidelines is referred in the MR to describe the delay in calibration of meters identified in the current monitoring period. There is calibration delay for the meters installed at Jaisalmer site identified from 09/03/2018 to 14/05/2018 and for the meters at Jodhpur site calibration delay from 16/06/2018 to 31/12/2018. The PP has addressed the delay in calibration of meters following the guidelines provided under paragraph 366(a) of VVS for PAs version 02.0, the approach followed is found to be satisfactory and conservative, hence accepted. CAR #4 is closed.

Table 4. FAR from this verification

FAR ID	xx	**Section No.**		**Date:** DD/MM/YYYY
Description of FAR				
Project participant response				**Date:** DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				**Date:** DD/MM/YYYY

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Document information

Version	*Date*	*Description*
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM validation and verification standard for project activities" (CDM-EB93-A05-STAN); • Make structural and editorial improvements.
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the "CDM validation and verification standard for project activities" (version 01.0).
01.0	23 March 2015	Initial publication.

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: project activities, verifying and certifying