Verification and certification report form for CDM project activities

(Version 02.1)

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	Kaladonger wind power project in Rajasthan (UNFCCC reference number: 9342[1])
Version number of the verification and certification report	01
Completion date of the verification and certification report	10/08/2018
Monitoring period number and duration of this monitoring period	Monitoring period No.: 01 Monitoring period Duration: 31/12/2012 to 06/01/2014 (Inclusive of both days)
Version number of the monitoring report to which this report applies	02
Crediting period of the project activity corresponding to this monitoring period	31 Dec 12 - 30 Dec 22 (Fixed)
Project participants	M/s Bindu Vayu Urja Private Limited (BVUPL)
Host Party	India
Applied methodologies and standardized baselines	Methodology: ACM0002 Consolidated baseline methodology for grid-connected electricity from renewable energy version 12.3.0 Standardized baseline: Not Applicable
Mandatory sectoral scopes linked to the applied methodologies	01
Conditional sectoral scope(s) linked to the applied methodologies	NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	129,248 tCO_2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	Amount achieved before 1 January 2013: 91 tCO_2e Amount achieved after 1 January 2013: 126,710 tCO_2e Total CERs achieved for the monitoring period: 126,801 tCO_{2e}
Name and UNFCCC reference number of the DOE	LGAI Technological Center, S.A. (Applus+ Certification). UNFCCC reference number: E-0032

[1] https://cdm.unfccc.int/Projects/DB/RWTUV1356681143.52/view

Name, position and signature of the approver of the verification and certification report	Juan Sendín Caballero, Applus+ Certification BU Managing Director 

SECTION A. Executive summary

The project activity envisages implementation of a 75.6 MW wind power project consisting of 36 Wind Electric Generators (WTGs) of individual capacity 2.1 MW, at Kaladonger village in Rajasthan, India by M/s Bindu Vayu Urja Private Limited (BVUPL). The electricity generated by the project is exported to the NEWNE electricity grid. The project activity is therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The project proponent plans to avail CDM benefits for the project.

The project activity is in line with the sustainable development priorities of the country. The electricity generated from the wind farm will be exported to the NEWNE grid and sold to the state electricity utility, thereby marginally contributing to reducing the energy demand supply gap in the state of Rajasthan[2].

The total emission reductions for the current monitoring period are 126,801 tCO_{2e}.

The project activity is located in Kaladonger Site of Jaisalmer District Rajasthan State, India

The commissioning dates and latitude and longitude of the WTGs are as follow:

S.No.	Loc.No.	LATITUDE (N)			LONGITUDE (E)			Date of Commissioning
		Deg	Min	Sec	Deg	Min	Sec	
1	KD-001	27	5	35.4	70	59	59	20.07.2012
2	KD-002	27	5	54.9	70	59	53.5	20.07.2012
3	KD-003	27	6	16.8	70	59	54.4	20.07.2012
4	KD-004	27	6	27.3	70	59	42.5	20.07.2012
5	KD-005	27	6	38.7	70	59	30.8	20.07.2012
6	KD-006	27	6	49.8	70	59	18.6	20.07.2012
7	KD-007	27	7	1.7	70	59	4.3	20.07.2012
8	KD-012	27	7	26.1	70	59	48	30.03.2012
9	KD-013	27	7	14.1	70	59	59.1	30.03.2012
10	KD-014	27	7	1.8	71	0	9.9	30.03.2012
11	KD-024	27	7	9.5	71	2	4.5	23.03.2012
12	KD-027	27	7	36.3	71	1	28.8	31.03.2012
13	KD-028	27	7	41.5	71	1	13	31.03.2012
14	KD-029	27	7	51.5	71	0	54.8	28.03.2012
15	KD-030	27	7	54.5	71	0	33.3	27.03.2012
16	KD-035	27	8	40.9	71	0	46.3	14.03.2012
17	KD-036	27	8	34.2	71	1	3.8	18.02.2012
18	KD-037	27	8	27.5	71	1	23.9	14.03.2012
19	KD-038	27	8	17.6	71	1	39.8	25.03.2012
20	KD-039	27	8	10.4	71	1	56.5	14.03.2012
21	KD-040	27	7	59.8	71	2	4.9	23.03.2012
22	KD-042	27	7	44.8	71	2	35.6	10.09.2012
23	KD-054	27	8	22.4	71	2	59.3	27.03.2012
24	KD-055	27	8	30.7	71	2	49.9	25.03.2012
25	KD-056	27	8	38.2	71	2	38.8	25.03.2012
26	KD-057	27	8	45.1	71	2	26.5	14.03.2012
27	KD-058	27	8	52.9	71	2	6.3	31.03.2012
28	KD-059	27	9	2.5	71	1	51.7	14.03.2012

[2] http://www.cea.nic.in/reports/yearly/annual rep/2009-10/ar 09 10.pdf

29	KD-060	27	9	11	71	1	31.3	14.03.2012
30	KD-061	27	9	17	71	1	17.4	14.03.2012
31	KD-067	27	9	21.4	71	2	54.1	28.03.2012
32	KD-068	27	9	14.6	71	3	9.3	27.03.2012
33	KD-076	27	8	23.5	71	4	55.5	28.03.2012
34	KD-077	27	8	39.3	71	4	47.2	27.03.2012
35	KD-078	27	8	48.3	71	4	31.9	23.03.2012
36	KD-079	27	9	2.9	71	4	29.8	27.03.2012

The above details i.e. Commissioning dates are checked by the assessment team during the verification site against the commissioning certificate visit and latitude and longitude are also checked via google earth and GPS meters during the site visit. The detail also forms the part of Monitoring report and thus acceptable to the assessment team. Power generation using wind is achieved by deploying 36 wind turbine generators (WTGs). Wind power generation is an environmentally safe and sound technology. The WTGs supplied by Suzlon Energy Limited to the project participant. The components were manufactured in India and assembled at the project site. There is no transfer of technology from outside the host country for this project activity.

The technical details are checked by the assessment team during the field visit and also cross checked with manufacturers technical manual and found correct. The detail is as follows:

OPERATING DATA	
Rated power	2100 kw
Rotor speed	12.1 to 17.6 rpm
Power regulation	Active pitch regulated
Cut-in wind speed	3.5 metre/second
Rated wind speed	11 metre/second
Cut-off wind speed	25 metre/second
Restart wind speed	23 metre/second
Wind class	IEC IIA
Estimated service life	20 years
Ambient temperature range-operation	-10°to+ 40°C
A factor	9.59 m/s
ROTOR DATA	
Diameter	95 metre
Rotor cone angle	5°
Rotor speed at rated power	15.83 rpm
Tip speed at rated power	78.7 m/s
Swept area	7085 metre^2
BLADES	
Type	SUZLON SB46
Length	46.3 m
Material	Glass fibre reinforced plastic / Epoxy
Type of aerodynamic brake	
GENERATOR	
Type	Asynchronous 3 phase induction generator with slip rings operated with rotor circuit inverter system.
Rated power	2.1 MW
Number of poles/Synchronous speed	4/1500 rpm
Frequency	50 Hz
Rated generator speed	1568 rpm
TOWER	
Type	Tubular steel tower

Tower Height	80m

The electricity exported by the proposed project activity would displace an equivalent amount of electricity generated by the power plants already operational and proposed to be added in the Grid which relies predominantly on fossil fuels. Thus, it contributes towards reduction in the demand-supply gap during periods of electricity shortage and increase in the share of renewable energy in the grid mix.

No events or situations happened during the reported monitoring period that can alter the applicability of the applied methodology.

1. Verification Scope: The verification scope encompasses an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the DOE. The verification is based on the submitted monitoring report, the validated and registered PDD as well as its validation report, the applied monitoring methodology, relevant decisions, clarifications and guidance from the CMP and the EB and any other information and references relevant to the project activity's resulting emission reductions. These documents are reviewed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance. Based on the requirements in the VVS version 01 for the project activity, Applus+ Certification has applied a rule-based approach for the verification of the project. The principles of accuracy, completeness, relevance, reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion. The verification considers both quantitative and qualitative information on emission reductions. The verification is not meant to provide any consultancy towards the client. However, stated requests for clarifications, corrective and/or forward actions may provide input for improvement of the monitoring activities.

2. Methodology:

LGAI Technological Center, S.A. (Applus+ Certification) – Hereinafter referred as Applus+ Certification - approach to the verification is a two-stage process.

In the 1st stage, Applus+ Certification completed a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:

- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the monitoring report.

Applus+ Certification used a periodical Verification Checklist which, based on the risk-based assessment of the parameters and data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

3. Assessment team

According to the sectoral scope / technical area and experience in the sectoral or national business environment, LGAI Technological Center, S.A. (Applus+ Certification) has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of LGAI Technological Center, S.A. (Applus+ Certification).

The composition of audit team shall be approved by the LGAI Technological Center, S.A. (Applus+ Certification) ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT)
- Technical Expert (TE).

- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect
Mr. Sukanta Das	LA/TE	YES	YES	NA
Mr. Simon Shen	TR	YES	YES	NA

The curriculum vitae of the DOE's Verification team members are provided in Appendix 2 of this report.

3. Review of Documentation:

The Monitoring Report version 01 submitted by the PP was made publicly available on the UNFCCC website before the verification activities started. The published MR was assessed based on all the relevant documents. The aim of the assessment in the desk review was to:

- Verify the completeness of the data and the information presented in the MR;
- Check the compliance of the MR with respect to the monitoring plan depicted in the registered PDD and verify that the applied methodology was carried out. Particular attention to the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures was paid;
- Evaluate the 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 reviewed is available in Appendix 3 of this report.

4. On-site Assessment and follow-up Interviews:

As a part of the verification, the on-site inspection has been performed by the assessment team.
The objective of the on-site assessment is to:
-confirm the implementation and operation of the project;
-review the data flow for generating, aggregating and reporting the monitoring parameters;
-confirm the correct implementation of procedures for operations and data collection;
-Cross-check the information provided in the MR documentation with other sources;
-check the monitoring equipment against the requirements of the PDD and the approved methodology, including calibrations, maintenance, etc.
-review the calculations and assumptions used to obtain the GHG data and ER;
-Identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.
The details are mentioned in section D.2 of this report.

5. Quality of Evidences

Sufficient evidence covering the full verification period in the required frequency is available to verify the figures stated in the Final MR Version 02. The source of the evidences will be discussed in Appendix 3 of this report. Specific cross-checks have been done in cases that further sources were available. The monitoring report's figures were checked by the assessment team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

6. Reporting of Findings

As an outcome of the verification process, the assessment team can raise different types of findings.

Where a non-conformance arises the assessment team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

a) Modifications to the implementation, operation and monitoring of the registered project activity have not been sufficiently documented by the project participants;

b) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

c) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

The assessment team shall raise a Clarification Request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

All CARs/CLs / FARs raised during verification is resolved prior to submitting a request for issuance.

Forward Action Requests (FARs) may be raised during verification for actions where the monitoring and reporting require attention and/or adjustment for the next verification period. All the CARs/CLs/FARs are being discussed in Appendix 4 of this report

7. Internal Quality Control

As a final step of verification, the final documentation including the verification report has to undergo an internal quality control by the Technical Reviewer. Each report has to be finally approved either by the DOE's Technical Manager or the Deputy. In case one of these two persons is part of the assessment team, the approval can only be given by the person who is not a part of the assessment team. If the documents have been satisfactorily approved, the request of issuance is submitted to CDM EB along with the requisite documents.

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/document review	On-site inspection	Interviews	Verification findings
1.	Lead Auditor /Technical Expert	OR	DAS	SUKANTA	True Quality Certifications private Limited-Outsourced entity	Yes	Yes	Yes	Yes

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	EI	Shen	Simon	Applus+ Certification
2.	Approver	IR	Sendin Caballero	Juan	Applus+ Certification

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 errors: Readings from Meters (if not automatic)	LOW	Human error is likely to occur if the monitoring personnel are not	All the personal are well trained to monitor and collect data and thus risk

			trained well or inexperienced in data recording procedures and monitoring processes.	associated with Human error is minimized. Assessment team checked the training records to confirm that all the personal are well trained to handle the activities related to monitoring. Assessment team checked the training records for the complete monitoring period and confirm that the personal are well trained to monitor and collect data for the project activity.
2	Human error: Quantification of emission reduction	LOW	Use of ER spreadsheets without adequate data control, changes/updates, version tracking, traceability and security.	All the JMRs and the invoices for the complete monitoring period are checked and thus the assessment team confirms that the ER value is conservative and correct.

C.2. Consideration of materiality in conducting the verification

In line with Guidelines for Application of materiality in verifications, the verification team has conducted a complete verification of all the information presented in the monitoring report and data monitored as presented in the emission reduction calculation spread sheet. It invoices follows the paper trail back to the raw data such as meter reading records and invoices. There are no material errors, overestimation of ER, omission or misstatement.

SECTION D. Means of verification

D.1. Desk/document review

The verification was performed primarily based on the review of the monitoring report and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment used including calibration requirements, and the QA/QC procedures, and an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of emission reduction.

The initial MR Version 01 submitted by the project participant and additional background documents related to the emission reductions are reviewed as an initial step of the verification process. The subsequent step involved the identification of corrective action requests, clarification requests and Forward action request (CAR, CL and FAR) which are presented in Appendix 4 of this report. As a result of these findings, the MR is revised to MR Version 02. A complete list of all documents and records reviewed is as attached in Appendix 03 of this report.

D.2. On-site inspection

Duration of on-site inspection: 28/07/2018				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	The verification team conducted visits to the project site on 28/07/2018 to confirm the information and to resolve issues identified in the document review. An on-site assessment was conducted as a part of verification activity and involved: 1) an assessment of the implementation and operation of the CDM project activity as per the registered PDD 2) a review of information flows for generating, aggregating and reporting of the monitoring parameters 3) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan 4) a cross-check between information provided in the MR and data from other sources 5) a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PDD and the applied methodology 6) a review of calculations and assumptions made in determining the GHG data and ERs, and 7) an identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters	The wind power project is located Kaladonger Site of Jaisalmer District Rajasthan State, India	28/07/2018	Mr. Sukanta Das

D.3. Interviews

No.	**Interviewee**			**Date**	**Subject**	**Team member**
	Last name	**First name**	**Affiliation**			
1.	Pramanik	Amit	PP representative	28/07/2018	As mentioned above in section D.2 of this report	Mr. Sukanta Das

D.4. Sampling approach

No sampling is used as the verification team has visited Wind site along with the substations. The verification team has reviewed all the documents like commissioning certificates, JMR, invoices etc.

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	00	00	00
Compliance of the project implementation and operation with the registered PDD	00	03	00
Post-registration changes	00	00	00
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	00	00	00
Compliance of monitoring activities with the registered monitoring plan	00	00	00
Compliance with the calibration frequency requirements for measuring instruments	00	01	00
Assessment of data and calculation of emission reductions or net removals	00	01	00
Assessment of reported sustainable development co-benefits	00	00	00
Global stakeholder consultation	00	00	00
Others (please specify) –	00	00	00
Total	00	05	00

SECTION E. Verification findings

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

Means of verification	The verification team has determined whether the monitoring report was completed using the valid version of the applicable monitoring report form. The verification team has checked whether all the sections of the monitoring report follows the guidelines provided in the template.
Findings	No finding was raised for the present verification.
Conclusion	PP has used the version 06.0 of the MR form which is the current and active version. The monitoring report has been prepared as per the instructions provided in the template. DOE has made the version 01 of the monitoring report covering the monitoring period from 31/12/2012 to 06/01/2014 (Inclusive of both days) publicly available through its dedicated interface on the UNFCCC CDM website before undertaking the site visit for the verification on 28/07/2018. The verification team has concluded that the monitoring report was completed using the valid version of the applicable monitoring report form and is followed the guidelines contained in the template.

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

This is 1st periodic verification. No FAR raised during the validation of the project activity.

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

Means of verification	The verification team determined the conformity of the actual implemented project activity and its operation with the registered project design document. DOE has, by means of a desk review and an on-site visit, assessed whether all physical features of the proposed CDM project activity proposed in the registered PDD are in place, and that the project participants have operated the CDM project activity as per the registered PDD
Findings	CAR 01, CAR 02 and CAR 03 were raised during the verification process and closed successfully. Please refer Appendix 4 for the complete closure of the CAR
Conclusion	The verification team has reviewed the commissioning certificates to conclude that the capacity of the project is same as mentioned in the registered PDD. The capacity does not change after the registration of the project activity as confirmed by the assessment team during verification site visit.

The detail of Commission for the project is provided below:

S.No.	Loc.No.	Date of Commissioning
1	KD-001	20.07.2012
2	KD-002	20.07.2012
3	KD-003	20.07.2012
4	KD-004	20.07.2012
5	KD-005	20.07.2012
6	KD-006	20.07.2012
7	KD-007	20.07.2012
8	KD-012	30.03.2012
9	KD-013	30.03.2012
10	KD-014	30.03.2012
11	KD-024	23.03.2012
12	KD-027	31.03.2012
13	KD-028	31.03.2012
14	KD-029	28.03.2012
15	KD-030	27.03.2012
16	KD-035	14.03.2012
17	KD-036	18.02.2012
18	KD-037	14.03.2012
19	KD-038	25.03.2012
20	KD-039	14.03.2012
21	KD-040	23.03.2012
22	KD-042	10.09.2012
23	KD-054	27.03.2012
24	KD-055	25.03.2012
25	KD-056	25.03.2012
26	KD-057	14.03.2012
27	KD-058	31.03.2012
28	KD-059	14.03.2012
29	KD-060	14.03.2012
30	KD-061	14.03.2012
31	KD-067	28.03.2012
32	KD-068	27.03.2012
33	KD-076	28.03.2012
34	KD-077	27.03.2012
35	KD-078	23.03.2012
36	KD-079	27.03.2012

The plant undergone scheduled maintenance as per the manufacturer's specifications and no unforeseen incident observed by the assessment team during the monitoring period. The details are checked by the assessment team from the plant log records and found correct.

Based on the documentary evidence of commissioning certificates and physical verification DOE concludes that the project was implemented as per the registered PDD.

	No events or situations happened during the reported monitoring period that can alter the applicability of the applied methodology as confirmed by the assessment team during the verification site visit. The revised MR version 02 now provides the detail of the Feeders to which WTGs are connected and the same is as per the site practice and thus acceptable to the assessment team. Assessment team also checked the metering position of the energy meters and found the same to be as per the information provided in the registered PDD. No deviation observed by the assessment team during the current monitoring period. The metering diagram is now provided clearly in the revised MR version 02 which is acceptable to the assessment team.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines

Not applicable for present Monitoring period

E.4.2. Corrections

Not applicable for present Monitoring period

E.4.3. Change to the start date of the crediting period of the project activity

Not applicable for present Monitoring period

E.4.4. Inclusion of a monitoring plan

Not applicable for present Monitoring period

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

Not applicable for present Monitoring period

E.4.6. Changes to the project design

Not applicable for present Monitoring period

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

Not applicable for present Monitoring period

E.5. Compliance of the registered monitoring plan with the methodology including applicable tools and standardized baselines

Means of verification	The verification team determined whether the registered monitoring plan is in accordance with the applied methodology ACM0002 version 12.3.0 including applicable tools.
Findings	No finding was raised regarding Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline
Conclusion	The verification team is able to confirm that the monitoring plan contained in the registered PDD is in accordance with the approved methodology applied by the project activity, i.e. ACM0002 version 12.3.0 and its applicable tools. The same is followed onsite and thus assessment team confirms that project activity comply with the requirement of Approved methodology and registered PDD.

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

Means of verification	The assessment team checked the registered PDD to confirm the ex-ante fixed parameter mentioned in the current monitoring report. Assessment team also interviewed the personal onsite to check further regarding the ex-ante values used for emission reduction calculation.
Findings	No findings were raised regarding the same.
Conclusion	$EF_{grid,CM,y}$, $EF_{grid,BM,y}$, $EF_{grid,\ OMsimple}$ were mentioned as ex-ante fixed parameter. Assessment team checked the values, source of data, choice of data, purpose of the data mentioned in the MR from the registered PDD and confirms that the similar approach was considered for the current monitoring period also. The values for $EF_{grid,CM,y}$ = 0.9527 tCO2/MWh- Assessment team Confirmed that the value is as per the registered PDD $EF_{grid,BM,y}$ = 0.8587 tCO2/MWh- Assessment team Confirmed that the value is as per the registered PDD $EF_{grid,OMsimple,,y}$ = 0.9841 tCO2/MWh- Assessment team Confirmed that the value is as per the registered PDD 1. $EF_{grid,OMsimple,y}$: Operating Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system 2.2.1. EF grid, OM, y is computed using the Simple Operating margin CO2 emission factor. Simple Operating margin CO_2 emission factor is calculated from the weighted average CO2 emissions per unit net electricity generation of all power plants serving the system, not including low-cost / must-run. This is in agreement with the guidance provided in the Tool to calculate the emission factor for an electricity system. The value is considered from CEA version 07 and registered PDD. Assessment team checked the registered PDD and found that value considered for emission reduction calculation in this present monitoring period is sourced from the registered PDD. Thus assessment team conclude that the emission reduction calculation for the present monitoring period is conservative and correct. 2. $EF_{grid,BM,y}$: Build Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor" 2.2.1. Build margin emission factor is the generation-weighted average emission factor of all power plants m during the most recent year y for which generation data is available. The value is considered from CEA version 07 and registered PDD. Assessment team checked the registered PDD and found that value considered for emission reduction calculation in this present monitoring period is sourced from the registered PDD. Thus assessment team conclude that the emission reduction calculation for the present monitoring period is conservative and correct. 3. $EF_{grid,CM,y}$: Combined Margin emissions factor for grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system 2.2.1. Combined Margin is computed using the official data sources and is in-line with the guidance provided in the tool. The value is considered from CEA version 07 and registered PDD. Assessment team checked the registered PDD and found that value considered for emission reduction calculation in this present monitoring period is sourced from the registered PDD. Thus assessment team conclude that the emission reduction calculation for the present monitoring period is conservative and correct. The value for $EF_{grid,OMsimple.y}$, $EF_{grid,BM,y}$ and $EF_{grid,CM,y}$ were considered from the CO_2 baseline database (Version 07) published by Central Electricity Authority (CEA). The default value as mentioned in the registered PDD and MR are same. The value

	of combined margin in India is being given by CEA and thus assessment team conclude that the value is correct and appropriate. The default value in turn is used for baseline calculation as per the formula given in the registered PDD for the current monitoring period.

E.6.2. Data and parameters monitored

Means of verification	The assessment team checked the registered PDD to confirm the ex-post parameter mentioned in the current monitoring report. Assessment team also interviewed the personal onsite to check further regarding the ex-post parameter monitoring and confirms that the same is in line with the registered PDD. ACM0002 version 12.3.0 which was the applied methodology during the registration of the project is also checked to ensure that monitoring parameter as mentioned in the registered PDD and current MR are in compliance with the methodology.
Findings	No CAR raised during the verification process
Conclusion	As per the registered monitoring plan and requirement of the registered methodology following parameters needs to be monitored: $\mathbf{EG}_{\mathbf{facility,y}}$: Quantity of net electricity generation supplied by the project/unit to the grid in year y The parameter is a sourced from primary source i.e. Monthly billing records issued by JVVNL. The Net electricity value is calculated from export and import values. The formula to calculate Net electricity value is (export-import). The practice is as per the registered PDD and approved methodology. The export and import value is provided by JVVNL for individual PP and same is checked for the current monitoring period for emission reduction calculation. PP has no role/control over this calculation and the same is found appropriate as per the onsite practice. The invoice is than raised by individual PP connected to meter via common feeder to state electricity board i.e. JVVN. Assessment team also found that for some month i.e. Dec 2012 and Jan 2014 of the monitoring period JMR billing cycle period and monitoring period are different (highlighted yellow in the ER sheet) , hence the export of each WTG is apportioned based on controller data However import of complete month is taken conservatively for Dec 2012 and Jan 2014. The Calculation is checked by the assessment team and found correct and conservative. The invoices are used for cross check mechanism and is as per the requirement of registered PDD and approved methodology. The meter reading is taken during a fixed billing cycle of every month and representative of electricity board and Operation and maintenance personal onsite present during the process. Assessment team checked all the values of the electricity exported and electricity imported from the JMR sheets. The electricity meters are under the custody of the electricity board and calibrated by electricity board as per their standard procedures. The meters are calibrated in line with Indian grid code regulations for such installations.

E.6.3. Implementation of sampling plan

Means of verification	The verification assessed whether the compliance of the sampling efforts and surveys with the registered sampling plan in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities" if PP had applied a sampling approach to determine data and parameters monitored.
Findings	There is no CAR/CL raised in this section.
Conclusion	PP did not apply sampling plan to determine data and parameters monitored during this monitoring period. The verification team has checked all the documents such as Monthly meter energy statement, invoice etc. and hence sampling plan was not required. The verification team hereby confirms that it checked all the documents

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

Means of verification	The verification team determined whether the calibration of the measuring equipment that has an impact on the claimed emission reductions is conducted by the PP at a frequency specified in the registered monitoring plan
Findings	CAR 05 was raised during the verification process and closed successfully. Please refer Appendix 4 for the detail closure of the CAR.

Conclusion

Assessment team checked the calibration details of the installed meters and found that meters are calibrated as per the frequency mentioned in the registered PDD for the monitoring period. The estimation of emission reduction is thus conservative and correct.

The calibration dates of the meters is within the range of monitoring period which is acceptable to the assessment team.

The details of the calibration is as follows:

S. No	Meter Number	Meter Make	Accuracy Class	Calibration Date	2nd Calibration	Due Date
1	UPP31771 (Main Substation Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
2	UPP31772 (Back up Substation Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
3	UPP31774 (Main Cluster Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
4	UPP31776 (Back up Cluster Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
5	UPP31769 (Main Cluster Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
6	UPP31770 (Back up Cluster Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
7	UPP31766(Main Cluster Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
8	UPP31783 (Back up Cluster Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
9	RJB78190 (Main Cluster Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014
10	RJB78191 (Back up Cluster Meter)	Secure Meters Limited	0.2 s	13/12/2012	11/12/2013	11/12/2014

Assessment team confirms that all the energy meters (both main and check meter) installed at the substation are of accuracy class of 0.2s and are calibrated as per the national standards followed by the electricity board, but they are calibrated at least once in a year. No delay in Calibration observed for the current monitoring period. The calibration of the energy meters installed at HT side of the transformer were carried out by Meter and testing division of the electricity board which is 3rd party organization and the same is acceptable to the assessment team. The Meter and testing division of the electricity board is accredited by NABL (National Accreditation Board for Laboratory, Govt of India) to carry out the testing of the meters which is as per the national regulation and thus traceability of the Calibration is also confirmed by the assessment team.

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 assessed whether the data and calculations of GHG emission

	reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan
Findings	CAR 04 was raised during the verification process. The description of the CAR and its closure is described below in Appendix 4 of this report
Conclusion	Baseline emission (BE_y): Baseline Emissions is calculated by multiplying the Baseline Emission factor to the net quantity of electricity supplied to the grid electricity system by the project according to the registered PDD and methodology is as below: BE_y=EGPJ,y x EFgrid,CM,y BE_y= 133097.170 x 0.9527 BEy= 126,801 tCO2e

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

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	No findings were raised
Conclusion	Project emission is zero as per the requirement of the methodology and registered PDD

E.8.3. Calculation of leakage GHG emissions

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	No findings were raised.
Conclusion	The leakage emissions is not applicable according to the applied methodology and registered PDD.

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

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the registered CDM project activity. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan.
Findings	There is no CAR/CL raised in this section.
Conclusion	Emission reductions in this monitoring period are: Total Baseline Emissions: 126,801 tCO_2e Total Project Emission: 0 Total Emission Reduction: Emission reduction calculation is done based on following formula, Emission reduction (ER_y) = Baseline Emission (BE_y) – Project Emission (PE_y) =126,801 tCO_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	The verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	There is no CAR/CL raised in this section.
Conclusion	The actual CER is 1.89% less than the estimated value. This is due to low PLF in the region.

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

Means of verification	The verification team has determined the CER achieved during this monitoring period with the estimated value and reason for increase if any.
Findings	There is no CAR/CL raised in this section.
Conclusion	The actual CER is 1.89% less than the estimated value. This is due to low PLF in the region.

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	The verification team has determined the CER achieved during first commitment period and second commitment period
Findings	There is no CAR/CL raised in this section.
Conclusion	1. GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012: 91 tCO_2e 2. GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards: 126,710 tCO_2e 3. Total CERs achieved for the monitoring period: 126,801 tCO_2e

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

Means of verification	Not applicable for the present monitoring period
Findings	Not applicable for the present monitoring period
Conclusion	Not applicable for the present monitoring period

E.10. Global stakeholder consultation

Means of verification	No comments received for the monitoring period
Findings	No comments received for the monitoring period
Conclusion	No comments received for the monitoring period

SECTION F. Internal quality control

As a final step of verification, the final documentation including the verification report has to undergo an internal quality control by the Technical Reviewer. Each report has to be finally approved either by the DOE's Technical Manager or the Deputy. In case one of these two persons is part of the assessment team, the approval can only be given by the person who is not a part of the assessment team. If the documents have been satisfactorily approved, the request of issuance is submitted to CDM EB along with the requisite documents.

SECTION G. Verification opinion

Applus+ Certification has been engaged by M/s Bindu Vayu Urja Private Limited (BVUPL) to perform the 1st periodical verification of the "Kaladonger wind power project in Rajasthan" (UN reference number: 9342)

The management of M/s Bindu Vayu Urja Private Limited (BVUPL) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project's Monitoring Plan in the registered approved PDD version 04 dated 24/12/2012 and the applied methodology ACM0002 version 12.3.0.

Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project design document approved by the EB;
- the monitoring plan is as per the applied methodology;
- the monitoring in Monitoring Report is as per the PDD and the monitoring plan approved by the EB;
- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.

In our opinion, the GHG emission reductions for "Kaladonger wind power project in Rajasthan" for the monitoring period 31/12/2012 to 06/01/2014 (Inclusive of both days) as reported in Monitoring Report, prepared on the basis of the project's Monitoring Plan are fairly stated.

Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period:	From 31/12/2012 to 06/01/2014 (Inclusive of both days)

Verified emissions in the above reporting period:

Leakage emissions	0 tCO_2 equivalents
Project emissions	0 tCO_2 equivalents
Baseline emissions	126,801 tCO2 equivalents
Emission reductions	126,801 tCO2 equivalents

SECTION H. Certification statement

Same as above

Appendix 1. Abbreviations

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification request
CM	Combined Margin
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
ER	Emission Reductions sheet
JVVNL	Jaisalmer VIDYUT VITRAN NIGAM LIMITED
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming potential
PP	Project Participant
PPA	Power purchase agreement

Appendix 2. Competence of team members and technical reviewers

1. Mr. Sukanta DAS, has done M. SC in (Electronics and Photonics) and M. Tech in (Energy technology) from Tezpur Central University/ Indian Institute of technology Bombay in India. He is a certified lead auditor for ISO 14001 EMS LA and ISO 9001 QMS LA from International registry for Certified Auditors (IRCA) and Certified Lean Management practitioner from Quality Council of India (QCI). He has more than eight years of working experience at TUV NoRD/ Re-consult/CRA/APPLUS certifications under various categories of projects stating from Renewable to waste to supercritical projects. He was JI/ CDM Lead Assessor in TUV NoRD and was involved in more than 100 CDM validation and verifications activities in Gold Standard, VCS, CDM projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1, 13 technical areas 1.2/1.1/13.1. Currently he is associated with True Quality Certifications Private Limited and is empanelled with APPLUS+ Certification to carry out GHG audit.

2. Meng (Simon) Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ Certification for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ LGAI, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for 3.5 years

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	NA	Commissioning certificates of the Wind power plant	Commissioning Certificates of the WTGs	Project participant
2	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
3	NA	VVS standard-version 01	UNFCCC web site	UNFCCC
4	NA	JMR sheets and Invoices for the complete monitoring period	JMR sheets and Invoices for the complete monitoring period	Project participant
5	NA	MR version 01 MR version 02	MR version 01 dated 22/02/2018 MR version 02 dated 03/08/2018	Project participant

6	NA	ER sheet version 01 ER sheet version 02	ER sheet version 01 dated 22/02/2018 ER sheet version 02 dated 03/08/2018	Project participant
7	NA	Actual geo-coordinates by GE	Actual coordinates for the project activity via GPS meters	Project participant
8	NA	Break Down details of both the Units	Log book records onsite	Project participant
9	NA	Guidelines for Application of materiality in verifications version 2.0	UNFCCC web site	UNFCCC
10	NA	Calibration details for the complete monitoring period	Calibration certificates for the installed meters	Project participant
11	NA	Registered documents of the project activity	https://cdm.unfccc.int/filestorage/x/z/86XZO39GR5JUKACWI72TMDSEY0NLB4.pdf/9342%20PDD.pdf?t=ekl8cGQ4ZTF6fDDxBahuqWGJUrnRzasYp40T Registered PDD dated 24/12/2012 version 04	NA
12	NA	Approved methodology	ACM0002 - Version 12.3.0, Consolidated baseline methodology for grid-connected electricity generation from renewable sources Tools applied: Tool to calculate the emission factor for an electricity system" (Version 2.2.1)	UNFCCC

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**~~	~~xx~~	~~**Section no.**~~		~~**Date:** DD/MM/YYYY~~
~~**Description of CL**~~				
~~**Project participant response**~~				~~**Date:** DD/MM/YYYY~~
~~**Documentation provided by project participant**~~				
~~**DOE assessment**~~				~~**Date:** DD/MM/YYYY~~

Table 3. CAR from this verification

CAR ID	01	**Section no.**	E.3.	**Date:** 03/08/2018
Description of CAR				
During the document review it was observed that the details of feeder wise WTGs location is missing in the MR. Corrective action is sought in the respective section of the MR				
Project participant response				**Date:** 03/08/2018
Feeder wise WTGs location has been updated as Appendix 1. Calibration Details in the MR V2.				
Documentation provided by project participant				
MR V2, Calibration Certificate and Commissioning Certificates				
DOE assessment				**Date:** 10/08/2018
The feeder details are now mentioned in the revised MR version 02 which is as per the onsite practice. CAR is thus closed.				

CAR ID	02	**Section no.**	E.3.	**Date:** 03/08/2018
Description of CAR				
The breakdown details of the WTGs are missing in the MR. Moreover, the supporting document regarding the breakdown details are also not provided to the assessment team. Corrective action is sought in the respective section of the MR and supporting documents for further analysis.				
Project participant response				**Date:** 03/08/2018
Breakdown details has been added as Appendix2 Breakdown details of MR V2.				
Documentation provided by project participant				
Breakdown sheet and MR V2				
DOE assessment				**Date:** 10/08/2018
The breakdown log details is checked and found correct by the assessment team. Plant undergone scheduled maintenance as per the Manufacturers specification and no unforeseen incident envisaged during the monitoring period. CAR is thus closed.				

CAR ID	03	**Section no.**	E.3.	**Date:** 03/08/2018
Description of CAR				
The metering position as described in the MR is not as per the onsite practice. Corrective action is sought for the same.				
Project participant response				**Date:** 03/08/2018
The metering position has been updated in the MR along with correct line diagram.				
Documentation provided by project participant				
MR V2				
DOE assessment				**Date:** 10/08/2018
The metering position is now corrected in the revised MR version 02. CAR is thus closed.				

CAR ID	04	**Section no.**	E.8.1	**Date:** 03/08/2018
Description of CAR				
During the document review it was observed that the JMR readings and the invoice for the monitoring period is missing. Moreover, the cross check mechanism is not included in the ER sheet as per the requirement of Methodology. The emission reduction calculation is thus reserved till the submission of proper documents.				
Project participant response				**Date:** 03/08/2018
Invoice value of respective months has been updated in the ER.				
Documentation provided by project participant				
ER V2				
DOE assessment				**Date:** 10/08/2018
The JMR sheets and the invoice for the complete monitoring period is now submitted. ER sheet is also updated with Invoice cross check values. CAR is thus closed.				

CAR ID	05	**Section no.**	E.7	**Date:** 03/08/2018
Description of CAR				
The calibration certificates and calibration details are missing in the MR. Corrective action is sought for the same.				
Project participant response				**Date:** 03/08/2018
The calibration has been added as Appendix 1. Calibration Details in MR V2 also the calibration certificates is being provided.				
Documentation provided by project participant				
Calibration Reports and MR V2				
DOE assessment				**Date:** 10/08/2018
The calibration details are checked and found correct by the assessment team. The calibration details are now mentioned in Appendix 1 of the MR version 02. CAR is thus 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~~

Document information

Version	*Date*	*Description*
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