GRID CONNECTED WIND POWER PROJECT BY M/S. D. J. MALPANI IN RAJASTHAN

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Summary:

4K Earth Science Private Limited (4KES) has performed the verification of the project "Grid Connected Wind Power Project by M/s. D. J. Malpani in Rajasthan" VCS ID 1021, against VCS Standard Version 4. The project involves installation and operation of 7.5 MW (5 units of Suzlon make 1.5 MW WTG) wind power project in the state of Rajasthan, India. The project is developed by 'M/s. D.J. Malpani'. The electricity generated by the project activity displaces the grid electricity and there by avoid associated CO_2 emission.

During the current monitoring period, project activity undergoes continued operation since their commissioning and no major breakdown had taken place

The proposed project is a voluntary action being undertaken by the project owner of the project activity. EKI Energy Services Limited (hereafter referred as "EKIESL") is acting as the other party for this project activity.

The project is also registered under CDM and the UNFCCC reference number of the project activity is 5794.

The scope of verification includes confirming the implementation of the monitoring plan of the registered CDM PDD (version 2.3, dated 09/02/2012), approved VCS PD (version 3, dated 02/04/2013) and the application of the monitoring methodology "AMS.I-D version 16: "Grid connected renewable electricity generation".

The monitoring period covered in the verification is 01-October-2016 to 31-August-2020 (including both days)

The verification is consisted of three phases: i) desk review of the project; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted following 4KES internal quality procedures.

During the verification process 06 CARs, 02 CLs and 00 FARs were raised. All the findings have been closed satisfactorily and the same has been discussed in Appendix II.

4KES confirms that the monitoring system is in place and the emission reductions are calculated without

material misstatements. The emission reductions from the project activity “Grid Connected Wind Power Project by M/s. D. J. Malpani in Rajasthan” in India during the period 01-October-2016 to 31-August-2020 (including both days) amount to 34,931 tonnes of CO_2e.

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1 INTRODUCTION

1.1 Objective

EKI Energy Services Limited has contracted 4K Earth Science Pvt. Ltd (4KES) to perform VCS Verification of the 'Grid Connected Wind Power Project by M/s. D. J. Malpani in Rajasthan' in India (hereafter called project). This project has already been registered as a VCS project (VCS ID 1021). The objective of this verification is a thorough and independent assessment of registered project activities against the applicable VCS requirement by the DOE. The verification process shall determine whether the proposed project activity complies with the requirements of latest VCS guidelines, applicability conditions of the selected methodology, relevant host country regulations and guidance issued by the VCS Board.

1.2 Scope and Criteria

The scope of verification is to assess the claims and assumptions made in the VCS monitoring report (MR) against the VCS criteria, including but not limited to, VCS standard, applied methodology and other relevant rules and requirements established for VCS project activities.

The Verification is not meant to provide any consulting towards the project participants. However, stated requests for clarification and/or correction actions request may have provided inputs for improvement of the project design

1.3 Level of Assurance

The verification team verified the complete monitoring data for all the parameters of the monitoring plan and confirms that the reported emission reductions are free from any type of material errors. Therefore, 4KES confirms that the verification is conducted with reasonable level of assurance

1.4 Summary Description of the Project

The main purpose of this project activity is to generate clean form of electricity through renewable wind energy sources. The project activity aims to harness wind energy through installation of wind turbine generators with total installed capacity of 7.5 MW (5 WTGs of Class S-82 manufactured by M/s. Suzlon Energy Limited). The project is located in Fatehgarh & Jaisalmer Taluks of Jaisalmer district, Rajasthan,India. The details of the projects are given below:

Sr. No.	Location number	Khasra No.	Village	Taluka	Commissioning date
1.	AK-278	83/P, 76/P	Sangana	Fatehgarh	30-March-2011
2.	AK-283	147/P	Asayach	Jaisalmer	21-March-2011
3.	AK-262	370/P	Chord	Fatehgarh	30-March-2011
4	AK-321	310/P	Chord	Fatehgarh	30-March-2011
5	AK-331	94/P	Asayach	Jaisalmer	21-March-2011

As per MR, the electricity generated from the project is supplied to grid which is confirmed form approved CDM PDD & VCS PD/4/ and interview with PP.

As mentioned above, the WTGs were commissioned between 21-March-2011 to 30-March-2011. Commissioning date of each WTG is given in the table above. The commissioning dates of the WTGs are verified against the commissioning certificates/7/.

Location of the project was verified through Google Map (https://maps.google.com/maps) and found consistent with the data provided in the registered PDD/4/

The Project activity is a new facility (Greenfield) and the electricity delivered by the project activity is exported to the North East West North-East (NEWNE) grid (now part of Indian grid). The project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid.

As per registered PDD, the project activity results in replacing anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 13,636 tCO_2e per year, thereon displacing 14,374 MWh/year amount of electricity from the gird.

During the monitoring period from 01-October-2016 to 31-August-2020 (including both days), the project replaced 34,931 tonnes of CO_2e by displacing the 36821.94 MWh electricity.

2 VERIFICATION PROCESS

The registered VCS project is undergoing second verification under VCS (1st Crediting period) apart from 2 verification completed in CDM, the approach adopted to ensure the quality of emission reductions is described in the following sections.

2.1 Method and Criteria

4KES assessed and determined whether the proposed implementation and operation of the project activity, and the steps taken to report emission reductions comply with the criteria and relevant guidance provided by the VCS Board. The validation/verification process consist of the following three phases;

- A desk review of the CDM PDD, VCS PD and VCS MR
- Follow up interviews with project stakeholders
- The resolution of outstanding issues and issuance of final report and opinion.

The prepared verification report and other supporting documents then undergo an internal quality control before being submitted to the VCS executive board for issuance of credits as per VCS standard version 4.

2.2 Document Review

The verification is performed primarily as a document review of the approved VCS PD, previous MR and Verification report and associated documents as stated in detail in appendix 1 of this document. The assessment is performed by a verification team using a protocol. The cross checks between information provided in the Monitoring report, VCS PD and information from sources other than those used, if available, the team's sectoral or local expertise and, if necessary, independent background investigations

2.3 Interviews

Due nationwide lockdown due to COVID-19 spread, Verification team could not conduct the site visit. Since the date of closure of lockdown is uncertain due to the increase spread of COVID-19 and hence VVB did not conduct site visit for this project activity. However, the verification team performed the telephonic interview with the site person and reviewed documents to achieve a reasonable level of assurance in the verification. This is in line with Section 4.1.2 of the VCS Standard, v4.0 which does not explicitly mandate site visits as part of the validation and verification process, only that VVBs must achieve a reasonable level of assurance on all validations and verifications.

No sampling procedures were adopted in document verification and all the document were cross checked to ensure conservative estimation of emission reduction. Kindly find below names of the persons interviewed (telephonic interview).

Sr. No	Name of the person	Role/Designation
1	Mr. Kailash Bankar	PP Representative
2	Mr. Abhay Kumar	WWIL
3	Mr. Barun Sharma	DGM- Operation, EKI Energy Services Limited

2.4 Site Inspections

As mentioned above, due nationwide lockdown due to COVID-19 spread, Verification team could not conduct the site visit. Since the date of closure of lockdown is uncertain due to the increase spread of COVID-19 and hence VVB did not conduct site visit for this project activity. However, the verification team performed the video conference and telephonic interview with the PP, Consultant and the site person and reviewed documents to achieve a reasonable level of assurance in the verification. This is in line with Section 4.1.2 of the VCS Standard, v4.0 which does not explicitly mandate site visits as part of the validation and verification process, only that VVBs must achieve a reasonable level of assurance on all validations and verifications

2.5 Resolution of Findings

The objective of this step is to identify, discuss and conclude on the issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions. This is done based on the desk review and onsite assessment. The verification team prepares and/or updates a verification protocol (internal document) that records the conformities and non-conformities, which may be of following types;

CAR (Corrective Action Request) is raised if one of the following occurs:

- Non-compliance with the monitoring plan, the methodology or the standardized baseline are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;

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

Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. All CARs and CLs raised by the 4KES during verification shall be resolved prior to submitting a request for issuance.

FAR (Forward Action Request) is raised during verification if the monitoring and reporting require attention and/or adjustment for the next verification period.

During the Verification process, total 06 CAR and 02 CL were raised and resolved satisfactorily. No FAR has been raised in the verification. The list of CARs/CLs/FARs raised and the response provided, the mean of validation, reasons for their closure and references to correction in the relevant documents are provided in Appendix II of this report.

2.5.1 Forward Action Requests

The project activity is undergoing second verification of 1st crediting period under VCS apart from 2 verification completed in CDM; there were no FARs raised during the validation or previous verification of CDM or VCS.

2.6 Eligibility for Validation Activities

The Validation and verification body holds accreditation to carry out both validation and verification activities. The accreditation scope can be checked from the below link:

http://cdm.unfccc.int/DOE/list/DOE.html?entityCode=E-0069

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

Apart from the VCS, the project activity is registered under the CDM (UNFCC ID 5794) and the CER issuance is completed till 30/09/2016. The current monitoring period (01-October-2016 to 31-August-2020) do not overlap with the previous CDM monitoring period. PP has also provided a declaration/16/ that the PP will not claim emission reduction from CDM or any other GHG program for the reported monitoring period.

The project is not registered under any other emissions trading program or any other mechanism that includes GHG allowance trading PP also confirms that net GHG emission reductions or removals generated during this monitoring period shall not be used for compliance under any such programs or mechanisms. This was confirmed through a declaration/16/ submitted by the PP and hence accepted by the assessment team.

3.2 Methodology Deviations

There is no methodology deviation applied during the current monitoring period.

3.3 Project Description Deviations

There is no deviation to the project description applied

3.4 Grouped Project

Not applicable. The project activity is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity is installation of 7.5 MW wind power project, promoted by M/s. D.J. Malpani. This project consist 5 units of Suzlon make 1.5 MW WTG. The purpose of the project activity is to generate clean electricity with utilization of wind energy. The WTG locations and commissioning details are given below:

Sr. No.	Location number	Khasra No.	Village	COD	Latitude	Longitude
1.	AK-278	83/P, 76/P	Sangana	30-March-2011	N 26°47'48.7"	E 71°08'12.6"
2.	AK-283	147/P	Asayach	21-March-2011	N 26°48'54.9"	E 71°07'04.6"
3.	AK-262	370/P	Chord	30-March-2011	N 26°45'32.0"	E 71°09'49.3"
4	AK-321	310/P	Chord	30-March-2011	N 26°47'36.7"	E 71°10'15.8"
5	AK-331	94/P	Asayach	21-March-2011	N 26°49'45.3"	E 71°07'59.6"

Starting date of the operation of the project activity is 21-March-2011 which is the date of commissioning/commercial operation of the 1st WTG.

The WTG installed in the project is Suzlon make 1.5 MW WTG. The technical specification of the WTGs are as below:

Suzlon-1.5 MW (Class S-82)

1.	**Main Data**	
	Turbine type	Horizontal axis turbine
	Rated Power	1500 kW
	Rotor Diameter	82 m
	Hub height (including foundation)	Approximately 78.5 m
	Rotational Speed	15.6 to 18.4 rpm
2.	**Rotor**	
	Number of rotor blades	3
	Rotor Orientation	Upwind

	Material	Epoxy bonded fibre glass
3.	**Gear Box**	
	Type of Gear Box housing	One planetary stage / Two helical stages
	Ratio	1: 95.09
	Power	1650 kW
	Type of cooling	Forced oil cooling lubrication system
4.	**Generator System**	
	Generator type	Single speed induction generator with slip rings, variable rotor resistance via Suzlon Flexi slip system
	Rated power	1500 kW
	Speed at rated power	1511 rpm
	Rated voltage	690 V AC (phase to phase)
	Frequency	50 Hz
	Insulation Class	Class H
5.	**Tower**	
	Tower type	Tubular tower (corrosion proof painting on inner and outer surface) with welded steel plates
	Tower Height	76 m
6.	**Operational Parameters**	
	Cut-in wind speed	4 m/s
	Rated wind speed	14 m/s
	Cut-off wind speed	20 m/s
	Survival wind speed	52.5 m/s

The installation and specification of Wind turbine Generators has been checked with WTG Technical Specification/6/ and commissioning certificates/7/. The commissioning has also been duly validated in the VCS validation report of the project activity/04/. There was no major breakdown or shutdowns during the monitoring period which might affect the applicability of methodology or might cause material errors in emission reductions. PP has provided the details of the plant downtime in the MR which is verified from plant breakdown log records/15/ and found to be correct.

The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period. The project design as mentioned in the registered CDM PDD, VCS PD & monitoring report submitted is implemented and thus the same is acceptable to the assessment team. All required monitoring equipment's and procedures as mentioned in the registered CDM PDD, VCS PD & monitoring report are available and implemented in an appropriate manner

The organisational role and responsibility as mentioned in the registered CDM PDD, VCS PD & monitoring report is followed onsite. All the monitoring equipment was calibrated as per the specified interval in the registered CDM PDD, VCS PD & monitoring report. No delay in calibration was observed. All the emergency preparedness as mentioned in the registered CDM PDD, VCS PD & monitoring report is followed onsite and no discrepancies were found regarding the same.

It was also observed during the verification process that project is not rejected by any other GHG program around the world. Declaration in that effect is also provided by PP.

The assessment team found that the project is in line with the registered VCS PD, monitoring report, and no deviation on project design or monitoring plan is observed.

Assessment team concludes the following:

- There is no material discrepancies between project implementation and the project description provided in the registered PD/04/.
- The monitoring plan is implemented completely and monitoring system (i.e., process and schedule for obtaining, recording, compiling and analysing the monitored data and parameters) is appropriate.
- There is no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology/08/.
- The project is also registered under CDM, but PP provided undertaking that the PP will not claim CERs for the reported monitoring period under CDM.
- The GHG emission reductions or removals generated by the project have not included in an emissions trading program or any other mechanism that includes GHG allowance trading/16/.
- The project has not received or sought any other form of environmental credit, or has become eligible to do so since validation or previous verification.
- The project activity is comply with indicators for sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India as discussed under section 1.11 of MR.

In view of the information's as verified above the assessment team is able to conclude that the project has been implemented as described in the project description.

4.2 Safeguards

4.2.1 No Net Harm

The project is a wind power project which is a cleaner source of power generation. The wind power project does not emit any GHG or any other toxic gases. Hence, wind turbine generator has no significant impact on the environment. As per the EIA notification dated 14thSeptember 2006, the wind power projects are exempted from environmental clearance. Hence, Environmental impact assessment is not required for this project activity.

The report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013 also confirms that wind power project activity operations do not result in direct air pollution, noise pollution. Hence verification team confirms that there are no any significant impacts due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

4.2.2 Local Stakeholder Consultation

As per the section 2.2 of the MR, the projects have continuous feedback mechanism and kept a grievance register to receive any feedback/grievances from stakeholder. Verification team conducted telephonic interview with PP representative and found that the continuous feedback mechanism is implemented effectively.

As verified from the copy of grievances registers from site/19/ no grievances/feedback received on the operation of the project activity. However, some grievances received related to CSR activities undertaken by the PP. The details of the grievances received are provided in the MR. Verification team discussed with the site in-charge and confirmed that all the grievances are addressed by PP.

4.3 AFOLU-Specific Safeguards

Not Applicable.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the MR. 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 monitoring plan of the CDM PDD, VCS PD and MR.

In detail the following has been verified:

Transparency: It has been checked whether the calculation of baseline emissions is fully traceable and, where used, the Excel calculation provides all calculation formulae.

Parameter consistency: It has been checked whether all internal and external parameters and data used for the calculation are applied consistently in the monitoring report and the calculation spreadsheet.

Correctness: It has been checked whether the applied formulae and methods for calculating baseline emissions are in accordance with the monitoring plan and the approved methodology.

Completeness: It has been checked whether all calculations are complete and without omissions

Baseline emission: The baseline Emissions for a given year is calculated by multiplying the energy baseline (EB) with the regional grid emission factor. The grid in this case would be the 'NEWNE National Grid'

Formula Used:-

$$BE_y = EG_{PJ,facility\ y} * EF_{CO2,grid,y}$$

Where:

BE_y: Baseline emissions in year y (tCO_2e/yr)

$EG_{PJ,facility,\ y}$: Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y (MWh/yr)

$EF_{CO2,grid,y}$: Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2e/MWh)

The verification team has checked the entire monthly JMR/Credit reports and invoices applicable for the monitoring period as per the project activity applied for verifications and found all the parameters are monitored and recorded as per the monitoring plan in the approved PD. The verification team has crosschecked the emission reduction sheet and monitoring report data with the JMR sheet and invoice bills and found all the values are matching.

Project Emission: As per the applied methodology, para 19 of AMS I.D version 16, "For most renewable energy project activities PE=0". However, for the following categories of project activities, project emissions have to be considered following the procedure described in the most recent version of ACM0002.

- Emissions related to the operation of geothermal power plants (e.g. non-condensable gases, electricity/fossil fuel consumption)

- Emissions from water reservoirs of hydro power plants

Since the project is a wind power project, PE_y= 0.

Leakage: As per methodology and registered PDD the leakage is zero. LE_y= 0.

Emission Reduction:

Emission reduction is calculated as below:

ERy = BEy – PEy - LEy

PP has submitted emission reduction the calculation in the excel sheet/2/. The emission reduction calculation in the excel sheet is checked whether the calculation is in accordance with the formula given in the approved PD/4/ and the selected methodologies/8/.

The verification team confirms the following:

- The calculations of emission reduction have been carried out in accordance with the equations and methods described in the registered monitoring plan and applied methodology.
- The emission factor applied is an ex-ante value valid for the fixed crediting period.
- Any assumptions used in emission or removal calculations have been justified.
- Appropriate emission factor and other reference values have been correctly applied. It can be confirmed that the emission reduction calculation is overall correct.
- The ER calculation sheet provided is clear, transparent and the calculations provided in the sheet are reproducible.
- Hence, the emission reduction reported in the monitoring report for the monitoring period is verified to be correct

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

The only monitoring parameter in the project activity is “Quantity of net electricity supplied to the grid in year y” (**$EG_{BL, y}$).** This parameter is monitored through controller reading of each WTG and the reading of bulk energy meters installed at substation.

The apportioning of the electricity is the responsibility of the State Utility. The sample apportioning procedure adopted for any given WTG for any given month is given below:

Generation Ratio at site metering point:

The generation ratio is the ratio of controller reading of project activity WTG/s to the controller reading for all WTGs connected to the applicable metering point.

$$G_{R,\ metering\ point} = EG_{Controller,\ WTG} / EG_{Controller,\ metering\ point} \quad (a)$$

Where:

$G_{R,\ metering\ point}$: Generation Ratio at metering point

$EG_{Controller,\ WTG}$: Electricity generated by installed WTG of PP connected to the applicable metering point

$EG_{Controller,\ metering\ point}$: Total generation by all the connected WTGs to the applicable metering point

Calculation of net electricity export by project activity WTG/s to the grid:

The main meter at the applicable metering point measures number of parameters including export and import for all the connected WTGs.

The import, kWh by the project WTG at the metering point is calculated in the following manner:

$$EG_{Export,\ metering\ point} = G_{R,\ metering\ point} \times EG_{Total\ Import,\ metering\ point} \quad (b)$$

Where:

$G_{R,\ metering\ point}$: Generation Ratio at metering point

$EG_{Total\ Import,\ metering\ point}$: Total Import, kWh by all the WTGs at the metering point

The export, kWh by the project WTG at the metering point is calculated in the following manner:

$$EG_{Import,\ metering\ point} = G_{R,\ metering\ point} \times EG_{Total\ Export,\ metering\ point} \quad (c)$$

Where:

$G_{R,\ metering\ point}$: Generation Ratio at metering point

$EG_{Total\ Export,\ metering\ point}$: Total Export, kWh by all the WTGs at the metering point

The net electricity supplied/exported by the by project activity WTG/s to the grid is calculated by subtracting equation (b) from (c). Thus:

$$= EG_{Export,\ metering\ point} - EG_{Import,\ metering\ point} \quad (d)$$

Transmission Loss Calculation:

The total transmission loss occurred during export of the electricity between the 33/220 kV level pooling station & 220 kV level common delivery point is calculated as the difference between total aggregated reading of export for all metering points at 33/220 kV level and the total reading of export for same metering points recorded at the 220 kV level. Similarly transmission loss occurred during import of the electricity is also calculated.

The PP/WTG wise transmission loss during export & import is calculated by multiplying the values of arrived transmission loss for export & import for wind farm with the *Generation Ratio at common delivery point.*

Generation Ratio at common delivery point:

It is the ratio of electricity generated by installed WTG to the total generation by all the connected WTGs/ or connected metering points under common delivery point.

$GR_{,\ Common\ Delivery\ Point} = EG_{Controller,\ WTG} / EG_{Controller,\ Common\ Delivery\ Point}$ (e)

Where:

$GR_{,\ Common\ Delivery\ Point}$: Generation Ratio at common delivery point

$EG_{Controller,\ WTG}$: Electricity generated by installed WTG

$EG_{Controller,\ Common\ Delivery\ Point}$: Total generation by all the connected WTGs/ or connected metering points under common delivery point.

Calculation of net electricity delivered to the Grid:

The values of transmission loss during export & import for the given WTG are subtracting from $EG_{Export,\ metering\ point}$ & $EG_{Import,\ metering\ point}$ respectively to get the values of export and import respectively for the given month.

The net electricity delivered to the Grid by the given WTG for the given month (net export kWh) is then obtained by subtracting import from export. Thus,

= Export – Import (f)

These apportioned values viz import, export and net export kWh can be referred from the Monthly Break up of net export units report.

The monthly export, import and net export are recorded in the Joint meter reading (JMR)/Credit report which is signed by DISCOM and PP. The appropriateness of reading is assessed as below:

Criteria/Requirements	Assessment/Observation

Measuring /Reading /Recording frequency	The electricity exported to the grid is determined through controller reading and bulk energy meter installed at government sub-station. The electricity exported is measured on continuous basis and reported monthly.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The reporting frequency is in line with the monitoring plan as outlined in the approved PD/04/ and monitoring methodology/8/.
Monitoring equipment	Energy meters (main & Check) installed at substation.
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?	All the energy meters are two-way tri-vector meters of accuracy class 0.2s. Accuracy of the monitoring equipment's is in accordance with the monitoring plan as outlined in the PD.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes the accuracy valid for the entire measuring range.
Calibration frequency /interval:	3 year
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?	The methodology does not provide calibration frequency requirement. PP has considered the calibration frequency as 3 years as per registered PDD which is found to be in line with national standard.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration of the measuring equipment's is carried out by an accredited entity.
Is(are) calibration(s) valid for the whole reporting period?	Yes. No, delay in calibration is observed.
Is the calibration carried out for a measuring	Yes, calibration carried out for a measuring

range comparable with the range for which measurements have been carried out?	range comparable with the range for which measurements have been carried.
How were the values in the monitoring report verified?	Reported values of this parameter have been verified with monthly joint metering or credit report/12/. Value of this parameter for the current monitoring period is verified as 36821.94 MWh. Furthermore monthly values of this parameter is reported in the ER calculation sheet/02/ are also verified with the MR/01/ and found to be consistent.
If applicable, has the reported data been cross-checked with other available data?	The monthly reported values of this parameter were further cross checked with the monthly invoices raised by the PP /13/ 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, the adequate QA/QC procedures were implemented by all the stakeholders, namely, the Grid Authority, the PP and the O&M Contractor. The Net electricity exported to the grid can be cross checked against the invoice raised by the PP towards the DISCOM and found to be correct
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.

Parameter fixed ex-ante:

$EF_{grid,CO2,y}$; tCO_{2e}/MWh: it is the CO_2 Emission Factor of the grid in year y fixed at the time of project registration and mentioned value of 0.9487 tCO_{2e}/MWh is consistent with the registered CDM PDD/04/.

$EF_{grid,OM,y}$; tCO_{2e}/MWh: it is the Operating margin CO_2 emission factor for the project electricity system fixed at the time of project registration and mentioned value of 0.9942 tCO_{2e}/MWh is consistent with the registered CDM PDD/04/.

$EF_{grid,BM,y}$; tCO_{2e}/MWh: it is the build margin emission factor of NEWNE grid fixed at the time of project registration and mentioned value of 0.8123 tCO_{2e}/MWh is consistent with the registered CDM PDD /04/.

Calibration of meters:

During the verification assessment of the project activity, accuracy of all the metering have been checked and found appropriate. As per the deviation explained in section 3.3 above, the calibration frequency of energy meter is 3 years. Details of meter calibration are provided in below table:

metering point	Meter No	Accuracy Class	Date of Calibration	Validity
SEL-81	Main Meter (old): MSB10311	0.2 s	26-April-2016	25-April-2019
	Main Meter (new): RJB90208*	0.2 s	18-April-2017*	17-April-2020
		0.2 s	20-April-2018	19-April-2021
	Backup Meter (old): MSB10312	0.2 s	26-April-2016	25-April-2019
	Backup Meter (new) RJB90209*	0.2 s	18-April-2017*	17-April-2020
		0.2 s	20-April-2018	19-April-2023
SEL 204	Main Meter: RJB85056	0.2 s	28-April-2016	27-April-2019
		0.2 s	20-April-2018	19-April-2021
		0.2 s	12-June-2019	11-June-2022
	Check Meter RJB85057	0.2 s	28-April-2016	27-April-2019
		0.2 s	20-April-2018	19-April-2021
		0.2 s	12-June-2019	11-June-2022

* Energy meter changed on 18-April-2017. The inspection report of the new meter installation is checked.

The energy meter calibration certificates/14/ are checked and found that the calibration details provided in the MR is correct. From the verification of above table, verification team also confirms that the energy meter calibrations are valid for the complete monitoring period.

The assessment team has verified the monthly joint meter reading report issued by respective state utility and confirmed that only the data recorded through main meters is used to calculate net electricity supplied to the grid by the projects belongs to particular developer and consequently for ER calculations. As verified through the calibration certificates, that meters were working satisfactorily during the current monitoring period.

In view of the above discussion the assessment team able to confirm that evidence used to determine the GHG reductions and removals are sufficient and appropriate with respect to quality and quantity.

GHG Calculations

The emission reduction as per the applied methodology equals the baseline emissions (project emissions and leakage emissions for such project activities is considered zero). The formula provided for the calculation of baseline emissions is:

$$BE_y = EG_{BL,y} * EF_{grid,CO2,y}$$

BE_y = 36821.94 x 0.9487 = 34,931 tCO_2e

Since project emission and leakage are zero, baseline emission is equal to emission reduction.

$ER_y = BE_y$

The emission reduction is estimated for each month in ER calculation sheet, and the summary of vintage wise emission reduction is given below:

Year	Baseline emissions or removals* (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)
2016	853	0	0	853
2017	9632	0	0	9632
2018	8468	0	0	8468
2019	8885	0	0	8885
2020	7093	0	0	7093
Total	34931	**0**	**0**	34931

* rounded down value

The verification team confirms that appropriate methods and formulae for calculating baseline emissions have been followed. The assumptions, emission factors and default values that were applied in the calculations are justified. All the data were made available and have monitored as per required monitoring frequency. The means of verification for the values of parameters, used for baseline emission calculation, is described above.

However, verification team has observed that the actual ER achieved during the current monitoring period is 35% lower than the estimated ER as per registered PD for the comparable period. This comparison is submitted in the ER sheet along with a justification confirming that this event of higher power generation was an unforeseen situation and also not under the direct control of PP. Since the emission reduction is less than the estimated emission reduction, no further justification is required.

4.6 Non-Permanence Risk Analysis

Not applicable.

5 VERIFICATION CONCLUSION

4K Earth Science Pvt. Ltd (4KES), contracted by EKI Energy Services Limited, has performed the independent verification of the emission reductions for the VCS project activity (VCS ID-1021) "Grid Connected Wind Power Project by M/s. D. J. Malpani in Rajasthan" in India for the monitoring period 01-October-2016 to 31-August-2020 as reported in the Monitoring Report Version 02 dated 16-December-2020. The EKI Energy Services Limited and the respective project proponent are 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

4KES commenced the verification on the basis of the baseline and monitoring methodology AMS I.D version 16, the monitoring plan contained in the registered CDM PDD (version 2.3, dated 09-February-2012), VCS PD (Version 3, dated 02-April-2013 and VCS guidelines version 4, Monitoring Report (Version 02 dated 16-December-2020) as per the process described under Section 2 of this report.

4KES 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. 4KES planned and performed the verification by obtaining evidence and other information and explanations that 4KES 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-October-2016 to 31-August-2020 are fairly stated in the Monitoring Report Version 02 dated 16-December-2020. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology AMS I.D, version 16, and the VCS standard.

Verification period: From 01-October-2016 to 31-August-2020

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

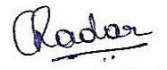
Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2016	853	0	0	853
2017	9632	0	0	9632
2018	8468	0	0	8468
2019	8885	0	0	8885
2020	7093	0	0	7093
Total	**34,931**	**0**	**0**	**34,931**

Approved by

Chandrakala R.

Director

Date:19-December-2020



4K Earth Science Private Limited

Place: Bangalore, India

APPENDIX I: LIST OF DOCUMENTS

Ref. No	Title of Document	Version	Date
1	Monitoring Report	1.0	29/09/2020
		2.0	16/12/2020
2	Emission Reductions Calculation Spread sheet	1.0	29/09/2020
		2.0	16/12/2020
3	VCS Project page: https://registry.verra.org/app/projectDetail/VCS/1021	-	-
4	Registered CDM PDD	2.3	09/02/2012
	Approved VCS Project Description	3	02/04/2013
	CDM Validation Report	3.1	10/02/2012
5	Previous CDM Monitoring Report (2nd Monitoring)	1	16/02/2017
	Previous CDM Verification Report (2nd Verification)	2	30/05/2018
6	Technical specifications of the WTG		
7	Commissioning certificates of the Wind Turbine Generator implemented in the project site.	-	-
8	CDM Methodology: AMS.I-D, "Grid connected renewable electricity generation"	16.0	-
9	VCS Standard	Version 4	19/09/2019
	VCS Program Guide	Version 4	19/09/2019
10	Clean Development Mechanism Validation and Verification Standard	02.0	29/11/2018
9	Grievances Registers	-	-
12	Joint Meter Reading for the monitoring period	-	-
13	Invoices for the electricity sold for the monitoring period	-	-
14	Energy meter Calibration Certificates		
15	Break down details of the complete monitoring period	-	-
16	Declaration regarding no participation in other GHG program for the concerned monitoring period	-	-
17	Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013	-	-
18	MOEF Notification http://envfor.nic.in/legis/eia/so1533.pdf		14/09/2006

APPENDIX II: VERIFICATION FINDINGS

FAR from validation and/or previous verification

~~FAR ID~~		~~Section no.~~		~~Date:~~
~~Description of CAR~~				
~~NA~~				
~~Project participant response~~				~~Date:~~
~~Documentation provided by project participant~~				
~~DOE assessment~~				~~Date:~~

Clarification Requests

CL ID	01	**Section no.**		**Date:** 21/10/2020
Description of CL				
In section 1.6 of MR, it is mentioned that the project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times. However as per the approved VCS PD, the crediting period will be maximum renewed once. Clarification is requested.				
Project participant response				**Date:** 17/12/2020
Section 1.6 of MR has been updated as per register PDD.				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 18/12/2020
The crediting period is now modified as per the approved VCS PD. CL is closed				

CL ID	02	**Section no.**		**Date:** 21/10/2020
Description of CL				
In section 1.6 of the MR, it is confirmed that that the project is registered under CDM (UNFCCC Ref No: 5794). PP shall clarify how the double counting is avoided during the monitoring period.				
Project participant response				**Date:** 17/12/2020
Undertaking has been provided to avoid the double counting and the same has been mentioned in section 1.9 of MR.				
Documentation provided by project participant				
Undertaking provided				
DOE assessment				**Date:** 18/12/2020
Through the undertaking letter PP has confirmed that the PP will not claim CERs under CDM for the reported monitoring period. CL is closed.				

Corrective Action Requests

CAR ID	01	Section no.		Date: 21/10/2020
Description of CAR				
PP shall submit the following undertaking: • Confirmation that Project neither has not intends to generate any form of GHG related environmental credit for GHG emission reductions or removals claimed under the VCS program • Confirmation that the project is not availing other forms of environmental credit for the same monitoring period under consideration				
Project participant response				**Date:** 17/12/2020
Undertaking has been provided to avoid the double counting				
Documentation provided by project participant				
Undertaking provided				
DOE assessment				**Date:** 18/12/2020
PP has provided the undertaking letter confirming the above points. CAR is closed.				

CAR ID	02	Section no.		Date: 21/10/2020
Description of CAR				
In section 3.1 of MR, PP shall provide the complete commissioning details of the project.				
Project participant response				**Date:** 17/12/2020
Commissioning details has been provided in section 3.1 of the revised MR				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 18/12/2020
PP has provided commissioning details of the project in Section 3.1 which is verified to be correct. CAR is closed				

CAR ID	03	Section no.		Date: 21/10/2020
Description of CAR				
In section 4.1 of MR, all the ex-ante parameters are not given as per registered CDM PDD are not provided. The following ex-ante parameters are missing in section: • Operating margin CO2 emission factor for the project electricity system • Build margin CO2 emission factor for the project electricity system.				
Project participant response				**Date:** 17/12/2020
ex-ante parameters has been added on revised MR				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 18/12/2020
All ex-ante parameters are now included in section 4.1 of the MR. CAR is closed				

CAR ID	04	Section no.		Date: 21/10/2020
Description of CAR				
As per registered PDD, the calibration frequency of the energy meters is once in three years. However no calibration details are provided in MR to confirm the validity of calibration during the monitoring period. Also the calibration reports are not submitted for verification.				
Project participant response				**Date:** 17/12/2020
Calibration details has been provided in MR.				
Documentation provided by project participant				
Calibration report				
DOE assessment				**Date:** 18/12/2020
PP has now provided the calibration details in the MR and the calibration reports are submitted for verification. CAR is closed.				

CAR ID	05	Section no.		Date: 21/10/2020
Description of CAR				
In section 4.3 of MR, the various formula given for calculation of net electricity is not clearly written. PP is requested to correct the same.				
Project participant response				**Date:** 17/12/2020
Formula is added in section 4.3 of the revised MR				
Documentation provided by project participant				
Revised MR				
DOE assessment				**Date:** 18/12/2020
The formula given for calculation of net electricity is now clearly written in the section 4.3 of MR. CAR is closed.				

CAR ID	06	Section no.		Date: 21/10/2020
Description of CAR				
The following credits reports are missing in the documents submitted by PP: • April 2020 to August 2020				
Project participant response				**Date:** 17/12/2020
Documents has been provided for Assessment				
Documentation provided by project participant				
credits reports				
DOE assessment				**Date:** 18/12/2020
The missing credit reports are now submitted by PP. CAR is closed.				

Forward Action Requests

~~FAR ID~~		~~Section no.~~		~~Date:~~
~~Description of CAR~~				
~~NA~~				

~~Project participant response~~	~~Date:~~
~~Documentation provided by project participant~~	
~~DOE assessment~~	~~Date:~~

APPENDIX III: TEAM COMPETENCE

Certificate of Competence							
Name	☒ Mr. ☐ Ms.	**Narendra Kumar .R**					
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*					
Appointed to work as:							
		CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed		Yes	Yes	Yes	Yes	Yes	No
Appointed Date		29-07-2019					
Authorized to work as Technical Expert for:							
Authorized Technical Area		**Sectoral Scope**		**TA Code**	**Technical Area within the scope**		
		Energy industries (renewable - / non-renewable sources)		1.1	Thermal energy generation		
		Energy industries (renewable - / non-renewable sources)		1.2	Renewables		
		Energy demand		3.1	Energy demand		
		Waste handling and disposal		13.1	Solid waste and wastewater		
Authorized to work as Local Expert for:							
Country/Countries		India					
Compliance check by: Anand S. R.							

Certificate of Competence		
Name	☒ Mr. ☐ Ms.	**Ma Paa Puratchikkanal**
Qualification Procedure		*Fulfils the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.*

Appointed to work as:						
	CDM Validator/Verifier	**Team Leader**	**Team Member**	**Technical Expert**	**Technical Reviewer**	**Financial Expert**
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	29-07-2019					
Authorized to work as Technical Expert for:						
Authorized Technical Area	**Sectoral Scope**		**TA Code**	**Technical Area within the scope**		
	Energy industries (renewable - / non-renewable sources)		1.1	Thermal energy generation		
	Energy industries (renewable - / non-renewable sources)		1.2	Renewables		
	Energy demand		3.1	Energy demand		
	Construction		6.1	Construction		
	Waste handling and disposal		13.1	Solid waste and wastewater		
	Agriculture		15.1	Agriculture		
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: Anand S. R.						

APPENDIX IV: ABBREVIATIONS

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
DPR	Detailed Project Report
EB	Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse Gases
IPCC	Intergovernmental Panel for Climate Change
JMR	Joint Meter Readings
LCS	Local Controller System
MP	Monitoring Period
MR	Monitoring Report
MW	Mega Watt
MWh	MegaWatt hour
OM	Operating Margin
O&M	Operation & Maintenance
PD	Project Description
PP	Project proponent
PPA	Power Purchase Agreement
QA/QC	Quality Assurance/Quality Control
tCO_2	Tonnes of Carbon Dioxide
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit