



VERIFICATION REPORT FOR “BUNDLED WIND ENERGY GENERATION PROJECTS IN GUJARAT, INDIA”



Document Prepared by Earthood Services Private Limited

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Summary:

Earthood Services private Limited (hereafter referred to as ESPL) has been contracted by Wind World (India) Ltd. to conduct the verification of the project- “Bundled wind energy generation projects in Gujarat, India”, VCS ID 412 with regards to the relevant requirements of VCS programme guidelines and standard (VCS standard Version 4.2, & VCS program guide version 4.1). Relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting has been applied for verification.

The monitoring period covered under this verification is from 01/01/2021 to 31/12/2021 (including both the dates).

The verification includes confirming the implementation of the monitoring plan of the registered VCS PD (VCS ID 412) and final MR for the monitoring period and the application of the monitoring methodology as per ACM0002 version 17: ‘Grid- connected electricity generation from renewable sources.

The project activity involves electricity generation by the wind power supplying the generated electricity to state DISCOM i.e., Indian grid. The project being a renewable energy generation activity, leads to reduction in fossil fuel dominated electricity generation. The project activity results in reductions of greenhouse gas (GHG) emissions that are real, measurable, and verifiable and also plays beneficial role in the mitigation of climate change.

A risk-based approach has been followed to perform this verification. In the course of verification, 03 corrective action request (CARs), 00 Forward action request (FARs), and 02 Clarification request (CLs) were raised and successfully closed.

The review of the project description, monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, telephonic interviews and stakeholders have provided ESPL with sufficient evidence to validate the fulfilment of the stated criteria.

ESPL confirms that the project is implemented in accordance with the registered VCS PD. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the project's GHG emissions, and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the emission reductions from the project activity "Bundled wind energy generation projects in Gujarat, India" during the period 01/01/2021 to 31/12/2021 (including both the days) amounts to 79,427 tonnes of CO₂e and with displacing 81,252.045 MWh of electricity from the grid.

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1 INTRODUCTION

1.1 Objective

Earthood Service Private limited (ESPL) has been contracted by Wind World (India) Ltd., to undertake the verification of the renewable energy project titled ‘Bundled wind energy generation projects in Gujarat, India” (VCS ID – 412). The verifier has reviewed the GHG data collection to date for the monitoring period from 01/01/2021 to 31/12/2021 (including both the dates) covered in this verification.

The objective of this verification is a thorough and independent assessment of registered project activities against the applicable VCS requirements by the VVB. 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)/02/ against the VCS criteria, including but not limited to, VCS standard version 4.2 /05/, applied methodology/07/ and other relevant rules and requirements established for VCS project activities.

The verification is not meant to provide any consultation towards the Project Proponents. However, the stated request for clarification and/or correction action request may have provided inputs for improvement of the project design.

1.3 Level of Assurance

☒ Reasonable level of assurance

☐ Limited level of assurance

The level of assurance of the verification report falls under reasonable assurance engagement as selected by the client. Reasonable assurance is a high level of assurance regarding material misstatement, but not an absolute one.

Reasonable assurance includes the understanding that there is a remote likelihood that material misstatements will not be prevented or detected on a timely basis. To achieve reasonable assurance, the auditor needs to obtain sufficient appropriate audit evidence to reduce audit risk to an acceptably low level. This means that there is some uncertainty arising from the use of sampling, since it is possible that a material misstatement will be missed.

The evidence used to achieve a reasonable level of assurance is specified in section 2.3 and 2.4 of this report. Materiality for the project is 5%, however the assessment team has verified 100% data (no sampling plan is applied), hence it is sufficient to meet the materiality requirements of the project.

1.4 Summary Description of the Project

The project activity consists of 72 machines of WWIL made of 800 KW each and 3 machines of WWIL made of 600 KW each, totalling the capacity to 59.4 MW (75 WTGs) in the state of Gujarat. The electricity generated is wheeled through supply to the Indian electricity grid comprising mainly fossil fuel-based power plants. The project is spread across villages in Satapar, Okhamadhi, Navadra, Bamnasa and kurunga of Jamnagar District in state of Gujarat.

The first machine under the bundled project activity was commissioned on June 2004 and the last machine under the bundled project activity was commissioned on September 2006. Commissioning dates for each WTG is provided under the MR and same has been verified using the registered PD/01/, previous validation and verification reports/04/ and during the remote audit /08/.

Location of the project WTGs were verified through Google Map (<https://www.google.co.in/maps>) and found consistent with the data provided in the registered PD /01/.

The are total of 75 wind energy converters (WECs) installed for the project activity set up to produce clean power from the wind electric converters. The project leads to reduction in greenhouse gas (GHG) emissions because it displaces electricity from fossil fuel-based electricity generation plants.

This is the sixth verification for the project under the second crediting period. The current monitoring period is from 01/01/2021 to 31/12/2021 (both days included) and emission reductions achieved during this period are 79,427 tCO₂e.

The verification team also verified all the equipment's and meters installed at the site. The description of the project activity was also verified by the ESPL team during the previous verification/04/. Based on the assessment of the documents, the assessment team is able to confirm that the project activity is fully functional and implemented as described in the registered VCS PD/01/ and MR/02/.

2 VERIFICATION PROCESS

The registered VCS project is undergoing sixth verification under its second crediting period, the approach adopted to ensure the quantity of emission reductions is described in the following sections.

2.1 Method and Criteria

The verification approach consists of two phases.

In the first phase, ESPL completed a strategic review and risk assessment of the project's activity 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 emission from these sources.
- Collecting and handling of data.
- Controls on the collection and handling of data.
- Means of verifying reported data.
- Compilation of the verification Report.

At the end of this phase, ESPL produced a Verification Checklist which, based on the risk assessment of the parameters and data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

In the second phase using the verification checklist, ESPL verified the implementation of the monitoring plan and the data presented in the VCS MR/02/ for the period in question. This involves the telephonic interview of the project proponent representative's and a desk review of the monitoring Report. The verification report describes the finding of this assessment.

2.2 Document Review

The verification is performed primarily as a document review of the registered VCS PD/01/ & MR/02/, previous MR and verification report /04/ 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/02/, VCS PD/01/ and information from source other than those used, if available, the team's sectoral or local expertise and, if necessary, independent background investigations.

2.3 Interviews

Due to the current situation with the global COVID-19 pandemic scenario physical site inspection is not done for the verification. Although domestic travel has resumed in India, it is still not recommended until necessary and considering health and safety a top priority, physical site visit for verification audit is not conducted. Furthermore, as per the Section 4.1.2 of the VCS Standard, v4.2, it is not mandatory to conduct the on-site visit by VVB for verification.

However, the representatives of the PP were interviewed remotely via video conference meeting on 25/03/2022 i.e., personnel responsible for monitoring of the project activity, data collection and management, and QA/QC procedure.

The details of the people interviewed are mentioned in the table below:

Name	Organisation	Topics Covered
Mr. Mukund Jadeja	Site-In charge, Wind World India Pvt. Ltd.	Reliability & accuracy of reading considered for emission reduction calculations, calibration procedure monitoring and measuring system. QA/QC procedures, data management, internal audits to maintain data quality & reliability, maintenance Practices. Collection of measurements observation of established practices for verification of monitoring parameters Ongoing local stake holders' consultation process
Mr. Navneet Kumar Ms. Poorvi Joshi Shenoy	Project Consultants	Project Implementation, start date as per the VCS requirements. Electricity generation records (monthly energy statements, Invoices) Emission reduction calculation

2.4 Site Inspections

As discussed in the above sections, physical site inspection is not done for the current verification. However, to achieve a reasonable level of assurance, the assessment team has followed the alternative means of remote interview via a video conference meeting on 25/03/2022 with the PP representatives to substantiate the verification criteria as described in the below table:

Assessment Criteria	Means of verification/ source documents	Assessment opinion
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Description of project activity	VCS verification reports for previous monitoring period and validation report/04/ Virtual interviews with site personal and PPs representatives on 25/03/2022^{/08/}	The information's with reference to project capacity, technology, plant equipment's and commissioning dates as provided in section 1.1 of MR are found consistent with the documents.
Compliance of the project implementation with the registered project design documents	Monthly share certificates issued by GETCO/09/ Geographical co-ordinates of project activity verified through google map. VCS verification report for previous monitoring period/04/ Virtual interviews with site personnel and PPs representative on 25/03/2022^{/08/} and site photographs for WTGS and metering system/13/	Monthly share certificates and JMR issued by GEDA/GETCO indicating the following information: Identification of meter serial number used for measurement, Capacity of project and name of Project Proponent. Location of project is verified through GPS Map and found consistent with registered VCS PD/01/ All the information's regarding the project implementation as discuss above are further verified through VCS PD/01/ and found consistent.
Compliance of the registered monitoring plan with applied methodologies and standard baselines	Virtual interviews with site personal and PPs representatives on 25/03/2022^{/08/} Monthly share certificates issued by GETCO/09/	The organizational structure, responsibilities and competencies of the personnel confirmed through telephonic interview. Frequency of monitoring of parameters listed under approved monitoring plan is

		verified through share certificates. The methods used for measuring, recording, storing, aggregating, and reporting the data on monitored parameters are verified through PPA and virtual conversations with site personnel.
Compliance with the calibration frequency requirements for measuring instruments	Calibration certificates of meters installed at site/15/ Photograph of energy meters indicating sr. No, accuracy class, make /13/ Central Electricity Authority (Installation and Operation of Meters) Regulations/12/	Meter serial numbers, last calibration and desired calibration frequency have been checked.
Assessment of data and calculation of emission reductions or net removals	Monthly Share certificates issued by GETCO/09/. CEA CO2 Baseline Database for the Indian Power Sector /11/	Monthly values of monitoring parameter used in ER calculation are verified through share certificates. Methods, formulae and emission factor for calculating baseline emissions have been followed are in accordance with the applied methodology/07/ and as described in the registered PD

It is noteworthy that no sampling plan for verification is applied as 100% data is verified for the current monitoring period. Most of the reference document referred by the assessment team (above table) are either issued /endorsed by the state utility (GETCO), an external government agency, hence is deemed authentic.

The assessment team has verified all the primary supporting related to operations, quality, and generation of data during the monitoring period like share certificates issued by government authority, invoices raised by PP, calibration certificates, video interview with onsite person etc. the

photographs were only used as means of secondary cross check of the information verified from primary sources. Also, this is the sixth monitoring period. So, the information regarding project capacity commission and monitoring system are already verified in previous monitoring report which are also cross checked with previous monitoring report which are also cross checked with previous report. Thus, a reasonable level of assurance is achieved.

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 interaction with site personnel over phone. 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 Proponents, 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 Proponents.
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions.

Clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

All CARs and CLs raised by the ESPL 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 current verification, 03 Corrective Action request (CARs), 00 Forward Action request (FARs), and 02 Clarification request (CLs) were raised and successfully closed. All the findings that are raised and communicated to Project Proponent during the verification are included under Appendix 3. The section also includes the response, if provided, by the project proponents and an assessment by the verification team if it was closed out or otherwise.

2.5.1 Forward Action Requests

The project activity is undergoing sixth verification in VCS. No FAR are raised during the current monitoring period. There are also no open FARs from previous validation or verification reports, applicable for current monitoring period.

2.6 Eligibility for Validation Activities

This section is not applicable for present verification.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is registered under VCS only (VCS ID- 412).

The PP has submitted the declaration/10/ which states that the net GHG emission reductions generated by the project activity will not be used for compliance with any other emissions trading program or to meet binding limits on GHG emissions for the same monitoring period.

CL#02 was raised regarding this issue and was successfully resolved.

3.2 Methodology Deviations

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

3.3 Project Description Deviations

The following project deviation identified during the current monitoring period:

The project activity WTGs are connected to the grid through two substations i.e. Bhogat and Navadra having 2 and 3 meters (respectively) installed for continuous monitoring of the electricity generation. The desired calibration frequency as defined in the registered PD is for 3 years. The energy meters were calibrated in April, 2017 and were due for calibration in April 2020.

However, the calibration of energy meters was not carried out as per the frequency outlined under registered monitoring plan due to the current prevailing pandemic scenario from last 2 years and it seems that current pandemic scenario may continue to remain same for undefined time-period.

Further, calibration of meters is completely under preview of state utility and PP has no control over the same as confirmed through interviews of site personnel/8/ and verified from the registered PD/1/ and previous verification reports/4/.

Thus, the PP has proposed as permanent deviation in the MR, where the desired calibration frequency is changed to national standard of 5 years from the 3 years as mentioned in the registered monitoring plan of the registered PD.

Chief Electricity Authority (CEA) is a designated central agency in India under the Ministry of Power. CEA has issued a notification dated 17 March 2006/12/, which provides guidelines for calibration of energy meters and confirms the energy meters test/calibration frequency as once in five years.

Thus, the PP has proposed a permanent deviation and has change the calibration frequency of meters to 5 years in accordance with CEA guidelines.

Since CEA is regulatory authority under central government and applies uniformly across all the states, the guidelines issued by them are found to be appropriate and as per the national standard to the assessment team. CEA guidelines are also widely used and referred as national standard for calibration frequency by many registered projects and thus appropriately used by the PP.

The meters are sealed and maintained by the state agency and also being used for commercial purposes for being by the PP to the state agency. The state agency immediately replaces meters or takes corrective actions in case of faulty meters between the calibration period. Thus, the quality of the data is ensured.

The deviation during previous monitoring periods:

Monitoring period (01/01/2020- 31/12/2020);

A delay in meter calibration was identified during the previous verification as well. As the meter calibration is not in the control of the PP, a error factor (-1.0) was applied by the PP on net export values. The assessment accepted the deviation applied.

Monitoring period (01/01/2019 – 31/12/2019):

A delay in calibration was also identified during second verification. A deviation was taken by the PP for the same. A maximum error was applied on the net export values for a conservative approach.

There was another deviation taken in 2010, the company named Indo Fashion Pvt Ltd. was merged into company Surbhi Textile Mills Pvt Ltd, Surat and it valid for the current monitoring period.

These are the permanent deviation taken by the PP and is verified and accepted by the assessment team. This deviation is also proposed to be applicable for the remaining crediting period of the project activity.

The assessment team is able to confirm that the deviation identified during the current monitoring period is appropriately described and justified in section 3.2.2 of the monitoring report and the project remains in compliance with the VCS rules. Also, the deviation does not have an impact on the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.

3.4 Grouped Project

This is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity involves installation of 72 WTGs of WWIL makes 800 KW each and 3 WTGs of WWIL make of 600 KW, totalling the capacity of 59.4 MW (75 WTGs) in the state of Gujarat. The commissioning, capacity, project implementation and grid connectivity, make and technical specifications of the WTGs verified during the previous monitoring periods and validation of the renewal crediting period/04/, Since this is already sixth verification under second crediting period of the project activity.

The proposed wind power project will reduce the GHG emission generation by the current generation energy mix in India's power grid, which is dominated by fossil fuel-based grid connected power plants. The power generated through the proposed project activity being supplied to Indian grid as verified from registered PD/01/ and previous verification report/04/.

The technical specification of the project activity equipment's has been checked through the photographs of all the equipment's installed at site and are found to be consistent with the details mentioned under MR. The current status of the project activity is verified through generation data for project investors and WTGS and hence it is confirmed that the project is fully functioning.

The assessment team has reviewed the monthly share certificates/9/, previous verification records/02/ and confirmed that, the WTGs (project activity and non-project) are connected to the common metering system at sub-stations of Navadra and Bhogat sites.

Hence, in order to calculate the net electricity exported to the grid by the WTGs of the project activity, the state electricity utility uses an apportioning procedure that has been correctly described in section 4.3 of the MR/02/ and in the PD/01/. This was also verified by interviewing the staff at the site during the remote audit.

As verified through clause 3 in section C of share certificates issued by state utility/09/ that the apportioning procedure is carried out by the state utility and the PP has no role in this calculation. It was confirmed through the interviews of representatives of the O&M provider during the remote audit, that the procedure to derive the electricity exported to the grid by each project owner is completely under jurisdiction of the state utility.

The required monitoring system have been installed and are operational. The meters comply with appropriate quality standards applicable for the technology. The accuracy class of the meters installed for the project activity was verified against the registered VCS PD/01 and VCS MR/02/.

The monitoring plan of the registered VCS PD/01/ & MR/02/ includes the monitoring parameter "Net electricity supplied to the grid by the project activity (EG_y).

Monitoring Procedure:

The WTGs belongs to project activity are connected to Navadra and Bhogat substations through various clusters and each cluster has exclusive dedicated metering arrangement at 33kV at project site. Similarly, the WTGs of other project developers (non-project activity) are also connected to separate clusters having exclusive dedicated metering arrangement at 33kV at project site. All the cluster meters (for the project activity and non-project activity) are further connected at 66 kV Wind World sub-station through 11kV bus (Navadra substation) and 132 kV WWIL substation (Bhogat).

At both the substations the electricity generated by all the WTGs (project and non-project) is being fed to the Indian grid through separate feeders. Each feeder having separated metering arrangement and monthly reading is taken by the representatives GEDA/GETCO in the presence of WWIL officials in the form of JMR. The metering equipment is an electronic tri-vector meter of accuracy class 0.5% and 0.2% required for the project. The meter is installed and owned by state agency (GETCO/GEDA). The net electricity supplied to the grid is recorded monthly by talking Joint Meter Reading (JMR) at individual metering point in the presence of official from GEDA. This has been verified from the registered PD/01/, MR/02/and previous verification reports/04/ and cross checked during the remote audit/08/ and through share certificates/09/.

Values of the parameter “Net electricity supplied to the grid by project” i.e., EGy is directly sourced from the monthly “Share certificates” issued by GEDA/GETCO/09/ that indicates the share of electricity for project activity received at the respective pooling sub-stations and it is in line with applied methodology. Thus, this parameter is considered in emission reduction calculations.

The Share certificates/09/ are prepared and endorsed by GETCO, an external government agency and the PP has no influence in the entire procedure. Hence, the data issued by the state electricity board through the Share certificate is deemed authentic.

The Values mentioned in the share certificates are the main source to calculate the baseline emission by this project activity and same in the line with information provided in the registered monitored plan/02/.

The assessment team has verified the latest photographs of project site (including monitoring equipment's)/13/, share certificates/09/ and it is observed that, the WTGs belonging to the project activity are connected to the grid through an appropriate power evacuation system. Appropriate metering system and calculation procedures are transparently described in the monitoring plan to enable accurate determination of emission reductions achieved by the project activity.

The VCS MR/02/ has been reviewed to check that the procedure for data uncertainty, emergency preparedness, roles and responsibility, operational and management structure are mentioned in the MR. The monitoring plan completely describes all measures to be implemented for monitoring all parameters required. The monitoring plan described the positioning of the equipment. Calibration frequency for the energy meters has been changed to once in 5 years which inline with CEA Notification/16/ No. 502/70/CEA/DP&D dated 17/03/2006 which is considered as national standard mentions that “All interface meters shall be tested at least once in five years.” Hence, calibration frequency once in 5 years considered for the project activity is found to be appropriate.

The information relating to the project implementation, provided in the Monitoring Report /02/ is consistent with that stated in the registered PD/01/. The data and variables provided in the monitoring report are the same as stated in the registered PD/01/. Total emission reduction achieved under this monitoring period 01/01/2021 to 31/12/2021 (including both days) is **79,427** tCO₂e by displacing **81252.045** MWh of electricity from fossil fuel dominant electricity generation grid.

Assessment team concludes the following:

- There are no material discrepancies between project implementation and the project description provided in the registered PD/01/.
- 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 are no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology/07/.
- 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/10/.
- 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/04/10/.
- The project is registered under VCS only.
- The project activity is complying 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. The latest requirement of VCS standard 4.2 for mandatory demonstration of 3 SDG goals is not yet applicable to the project activity.

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

CAR#01 was raised regarding completeness and compliance of MR with the latest version of the VCS MR template. The CAR was successfully closed.

4.2 Safeguards

4.2.1 No Net Harm

The project activity does not involve any negative environmental or socio-economic impacts.

In the Host country India, the project activity does not fall under the listed categories and hence not required an EIA to be done as per legal requirement. However, the EIA requirement has been addressed and verified at the time of registration first verification and checked. It is confirmed that project activity does not involve any negative environmental or socio-economic impacts, as the project activity involves generation of power using wind energy which is a clean source of energy. Hence no mitigation measures are required.

4.2.2 Local Stakeholder Consultation

The project activity undergoing sixth verification and local stakeholder consultation was appropriately conducted in a way to inform the design of the project and maximize participation from stakeholders during the project activity.

The project proponent has also established a mechanism for continuous stakeholders' interaction and considering the grievance from local stakeholders on ongoing basis. The details are provided under section 2.2 of the MR and verified during the remote audit and grievance register maintained at the site.

The assessment team has checked the photographs of the grievance register maintained at respective site office/14/ and confirmed that no formal complaints were received during the current monitoring period.

CL#03 was raised regarding on-going local stakeholder consultation measures. The CAR was successfully resolved.

4.3 AFOLU-Specific Safeguards

Not applicable for the project activity.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The calculation of the emission reductions is found to be correct. The details of the reported and the verified values for all the parameters are listed in section 4.5 of this report.

The formulae & method used to calculate the baseline emissions, project emissions and leakage are appropriate and in line with the approved methodology ACM0002, version 17 /07/.

The grid emission factor is calculated as the weighted average of OM & BM; and has been fixed ex-ante for the entire crediting period.

The emission reduction has been calculated based on the formula:

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = emission reduction in Year, y (tCO_2e/y)

BE_y = Baseline Emissions in year, y (tCO_2e/y)

PE_y = Project Emissions in year, y (tCO_2e/y)

LE_y = Project Leakage in year, y (tCO_2e/y)

Since, project emission $PE_y = 0$, $LE_y = 0$

Hence, $ER_y = BE_y$

Baseline Emissions for the amount of electricity supplied is calculated as following:

$$BE_y = EG_y * EF_y$$

EG_y = Electricity supplied to the grid = 81,252.045 MWh

EF_y = CO_2 emission factor of the grid = 0.9777 tCO_2/MWh

$$BE_y = 81,252.045 * 0.9777$$

$$BE_y = 79,427 tCO_2e$$

Since, $ER_y = BE_y$

$$ER_y = 79,427 tCO_2e$$

The assessment team is able to confirm that the GHG emission reduction and removals have been quantified correctly in accordance with the project description and applied methodology.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

All the data recoded are in compliance with registered VCS PD/01/ and monitoring report/02/. The assessment team has checked the monthly share certificates/09/ generated and supplied by the project activity for the current monitoring period to verify the values of monitoring parameters reported in the ER sheet/03/ and found to be consistent. Since the monthly certificates are based on the JMRs undertaken every month by the state agency and are issued by state utility they are found to be reliable and authentic.

The monitoring of the project activity is found to be in accordance with the monitoring methodology described in ACM0002, version 17 /07/. The monitoring method is effective and reliable. During the audit, personnel involved at various levels of the operation of the project activity have been interviewed to confirm that the plant personnel are conscious of the importance of the monitoring activities. All the information is found to be consistent with the monitoring plan/01/.

The meters comply with appropriate quality standards applicable for the used technology. The accuracy class of the meters installed for the project activity was verified through the registered VCS PD/01/, MR /02/.

Parameter: Quantity of net electricity generation supplied by the project plant/unit to the grid in year y, EGy, Net (MWh):

Means of verification		
	Criteria/ Requirements	Assessment/ observation
	Measuring /Reading /Recording frequency	The parameter is calculated and recorded on monthly basis, however, the input values used to calculate the value of EGy are continuously monitored, hourly measured and monthly recorded.
	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 registered PD/01/ and monitoring methodology/07/.
	Monitoring equipment	All the meters installed are tri-vector with accuracy class of 0.2% and/or 0.5% in line with registered PD.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of the monitoring equipment is 0.2% and/or 0.5%, which is as per the registered VCS PD/01/.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes. The accuracy of monitoring equipment's is valid for the entire range.
	Calibration frequency /interval:	The meter calibration has been changed to every 5 years which is in line with CEA Notification/12/ and meters have worked under the desired calibration period during the current monitoring period.

	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, pending until the findings are closed or as per the manufacturer's specifications?	The revised calibration interval considered is in line with the CEA guidelines and national standard practice.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	No calibration has been undertaken during current verification. The previous calibration has been undertaken by the accredited state utility during the previous monitoring period.
	Is(are) calibration(s) valid for the whole reporting period?	Yes, calibration is valid for the entire period considering the revised calibration frequency deviation.
	How were the values in the monitoring report verified?	Cumulative value for entire monitoring period is reported in the monitoring report/02/ and monthly values are reported in the ER sheet/03/. The values in the monitoring report were verified from the monthly share certificates issued by GEDA/GETCO/09/. Final value of electricity supplied to the grid by the project activity is verified as 81,252.045 MWh.
	If applicable, has the reported data been cross-checked with other available data?	The monthly reported values of EG _y were further cross checked with the monthly invoices raised by the PP to state utility and found to be consistent.

	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data ensure correct transfer of data and reporting of emission reductions management. QA/QC processes are in place.
	In case Project Proponents 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?	Not Applicable
Findings	CAR#05 was raised as some of the reported data were not matching with the source values i.e., GEDA/GETCO certificate. Also name of the Excel Crop Care was changed to Sumitomo Chemicals India Ltd during the monitoring period. The CAR was closed as details were revised and complete data are verified with the source.	
Conclusion	The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan. The verification team is able to confirm that the project is implemented as per the registered PD/01/ and there is no discrepancy observed between the actual monitoring system and the monitoring plan set out in the registered PD/01/ and the applied methodology/07/. The emission reduction calculation for the project activity is estimated based on the electricity supplied by the WTGs. Since 100% data was verified, the team can ascertain that the values taken for emission reduction calculation are free from material errors.	

Parameters fixed ex ante:

EF_{grid, CM,y}: The parameter is described as combined margin CO₂ emission factor of Indian grid which is measured in units tCO₂/MWh. The value provided in MR i.e., 0.9777 has been verified from PD.

EF_{grid, BM,y}: The parameter is described as build margin CO₂ emission factor of Indian grid which is measured in units tCO₂/MWh. The value provided in MR i.e., 0.9285 has been verified from PD.

EF_{grid, OM,y}: The parameter is described as operating margin CO₂ emission factor of Indian Grid and is measured in unit tCO₂/MWh. The value provided in MR i.e., 0.9941 has been verified from PD.

Calibration of meters:

The energy meters installed at respective sub-stations are of accuracy class 0.5% and 0.2%. The installation and working conditions of the meters were checked through calibration certificates/15/ and found to be satisfactory. Details of meters are provided in table below:

Name of WWIL substation	Meter serial no	Accuracy Class	Calibration Dates	Calibration Due date before
Bhogat	GJB 00486	0.5%	06/04/2017	06/04/2022
	GJU07452	0.2%	06/04/2017	06/04/2022
Navadra	GJB 00267	0.5%	07/04/2017	07/04/2022
	GJB 00268	0.5%	07/04/2017	07/04/2022
	GJU 00269	0.5%	07/04/2017	07/04/2022

A deviation has been taken and the meter calibration frequency has been changed to 5 years in accordance with CEA notification/12/.

The details of monitoring equipment are involved in the project activity and their calibration details/07/ are mentioned under section 4.3 of the VCS MR. The CEA Notification No. 502/70/CEA/DP&D dated 17/03/2006/12/ which is considered as national standard mentions that “All interface meters shall be tested at least once in five years.” Hence, the stipulated calibration frequency of once in 5 years as considered in the deviation is found appropriate.

It is evident from the above table that the calibrations of all the existing meters are valid during the current monitoring period.

Also, the CEA Notification No. 502/70/CEA/DP&D dated 17/03/2006 and its amendments Notified on 26/06/2010 No. 502/6/2009/DP&D/D-I /12/ which is considered as national standard, mentions that for voltage of 650 V up to 33 kV, 0.5s accuracy class or above is recommended. Hence, the accuracy classes of 0.2% & 0.5% for the energy meters installed at the project activity site are found to be appropriate.

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.

CAR#04 was raised as updated calibration details were not provided in the initial version or MR. CAR was subsequently closed as complete details were provided by PP including the considered permanent deviation.

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 emission reduction has been calculated based on the formula:

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = emission reduction in Year, y (tCO₂e/y)

BE_y = Baseline Emissions in year, y (tCO₂e/y)

PE_y = Project Emissions in year, y (tCO₂e/y)

LE_y = Project Leakage in year, y (tCO₂e/y)

Since, project emission $PE_y = 0$, and leakage emissions $LE_y = 0$

Hence, $ER_y = BE_y$

Baseline Emissions for the amount of electricity supplied is calculated as following:

$$BE_y = EG_y * EF_y$$

EG_y = Electricity supplied to the grid = 81,252.045 MWh

EF_y = CO₂ emission factor of the grid = 0.9777 tCO₂/MWh

$$BE_y = 81,252.045 * 0.9777$$

$$BE_y = 79,427 \text{ tCO}_2\text{e}$$

Since, $ER_y = BE_y$

$$ER_y = 79,427 \text{ tCO}_2\text{e}$$

The verification team confirms that appropriate methods and formulae for calculating baseline emissions have been followed.

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.

4.6 Non-Permanence Risk Analysis

Not applicable for the project activity.

5 VERIFICATION CONCLUSION

Earthood Services Private Limited (ESPL) contracted by Wind World (India) Ltd, to perform the independent verification of the emission reductions for the VCS project activity “Bundled Wind Energy Generation Projects in Gujarat, India”. (VCS ID- 412) for the monitoring period 01/01/2021 to 31/12/2021. The Wind World (India) Ltd is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity. ESPL commenced the verification on the basis of the baseline and monitoring methodology ACM0002, version 17/07/.

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

In our opinion the GHG emissions reductions reported for the project activity for the period 01/01/2021 to 31/12/2021 (including both the dates) are fairly stated in the monitoring report version 1.3 dated 15/10/2022. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0002, version 17 /07/ and the VCS standard version 4.2.

Verification period: From 01/01/2021 to 31/12/2021

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

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2021 (01/01/2021 to 31/12/2021)	79,427	0	0	79,427
Total	79,427	0	0	79,427

The actual emission reductions for this monitoring period are 79,427 tCO₂e. Whereas the estimated emission reductions for this monitoring period are 91,266 tCO₂e. Thus, there is a variation of 12.97% (negative) in the total ERs.

Approved by



Kaviraj Singh

Managing Director

Earthood Services Private Limited

Date: 21/10/2022

Place: Gurgaon, Haryana

APPENDIX 1: DOCUMENT REFERENCES

S. no	Documents	Version	Date
1.	Registered PD for the project activity used during the renewal of crediting period Available at Verra registry for project activity page: https://registry.terra.org/app/projectDetail/VCS/412	3	12/04/2017
2.	Final Monitoring Report, verified along with this report	1.3	15/10/2022
3.	ER sheet – Corresponding to the Final MR	-	11/04/2022
4.	Previous Verification Reports for the project activity Available at Verra registry for project activity page: https://registry.terra.org/app/projectDetail/VCS/412		05/07/2021
	Validation report issued for the renewal of crediting period and Available at Verra registry for project activity page: https://registry.terra.org/app/projectDetail/VCS/412	02	12/04/2017
5.	VCS Standard	4.2	
6.	VCS program guide	4.1	
7.	Applied CDM methodology: ACM0002: 'Grid- connected electricity generation from renewable sources'	17	-
8.	Remote site visit and interviews conducted by assessment team	-	25/03/2022
9.	Monthly share certificates by GEDA/GETCO for the monitoring period	-	-
10.	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period	-	-
11.	CEA CO ₂ Baseline Database for the Indian Power Sector, version 11 https://cea.nic.in/cdm-co2-baseline-database/?lang=en	Version 11	-

12.	Central electricity Authority (CEA) guidelines for energy/ electricity meter testing https://cea.nic.in/wp-content/uploads/2020/02/meter_reg.pdf	-	2020
13	Latest photographs of SCADA system, WTGs, transformers and energy meters installed at site	-	-
14	Copy of Grievance register maintained at project site	-	-
15	Calibration Certificates for all meters	-	-

APPENDIX 2: ABBREVIATIONS

Abbreviations	Full texts
ABT	Availability Based Tariff
BEF	Baseline Emission Factor
BM	Build Margin
CAR	Corrective Action Request
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CL	Clarification Request
CMS	Central Monitoring System
CMP	Conference of Parties Serving as Meeting of Parties
CO2	Carbon dioxide
DISCOM	Distribution Company
EB	Executive Board
EPC	Engineering, Procurement and Construction
FAR	Forward Action Request
GHG	Green House Gas
ISO	International Standards Organization
JMR	Joint Meter Reading
kW	Kilowatt
kWh	Kilowatt hour
GEDA	Gujarat Energy Development Agency
MFR	Multi-Function Relay

MR	Monitoring Report
GETCO	Gujarat Energy Transmission Corporation Limited
MW	Megawatt
MWh	Megawatt-hour
NEWNE	Northern Eastern Western Northern-Eastern
O&M	Operation and Maintenance
PD	Project Description
PLF	Plant Load Factor
PP	Project Proponent
PPA	Power Purchase Agreement
QA/QC	Quality Assurance and Quality Control
SLDC	State Load Dispatch Centre
TOD	Time of the Day
UNFCCC	United Nations Framework Convention on Climate Change
WEC	Wind Energy Convertor
WEG	Wind Energy Generator
WTG	Wind Turbine Generator
VCS	Voluntary Carbon Standard
VCSA	Voluntary Carbon Standard Association
VCS PD	VCS Project Description
VCUs	Voluntary Carbon Units
GEDA	Gujarat Energy Development Agency
GETCO	Gujarat Energy Transmission Corporation Limited

APPENDIX 3: FINDINGS OVERVIEW

CAR ID	01	Section no.	Completeness	Date : 05/03/2022
Description of CAR				
PP needs to follow latest version of MR template from the VCS and complete all the sections accordingly. Currently which is 4.1.				
Project Proponent response				Date : 15/03/2022
PP has revised VCS MR as per latest version of MR template version 4.1.				
Documentation provided by project proponent				
MR version 1.1				
VVB assessment				Date: 30/03/2022
The PP has submitted revised MR with latest available template. All the section information are filled appropriately. However, the relevant project implementation dates are not provided under section 1.1				
Project Proponent Response			Date: 28/04/2022	
Revised MR version 1.2 is submitted with updated details				
Documentation provided by project proponent				
MR version 1.2				
VVB Assessment:			Date: 30/04/2022	
The PP has provided the revised MR with project implementation details. The same is checked and found appropriate.				
Closed.				

CL ID	02	Section no.	3.3	Date : 05/03/2022
Description of CL				
Please submit declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions.				
Project proponent response				Date : 15/03/2022
PP has submitted declaration to DOE confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions.				
Documentation provided by project proponent				
Declaration				
VVB assessment				Date : 30/03/2022
The PP has submitted the declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions, found to be satisfactory, hence accepted. Closed.				

CL ID	03	Section no.	2.2	Date : 05/03/2022
Description of CL				
Please clarify why the information regarding the ongoing communication with local stakeholders is not provided in relevant section of the MR, in line with the guidelines provided under the clause 3.17.4 of the VCS standard v 04.2				
Project proponent response				Date : 15/03/2022

PP has provided information regarding the ongoing communication with local stakeholders under section 2.2 of revised MR.	
Documentation provided by project proponent	
MR version 1.1	
VVB assessment	Date: 30/03/2022
The PP has described the procedure for ongoing communication with local stakeholders under section 2.2 of the MR, in line with the guidelines provided in line with the guidelines provided under the clause 3.17.4 of the VCS standard v 04.2. Closed.	

CAR ID	04	Section no.	4.5	Date : 05/03/2022
Description of CAR				
The updated details regarding meter calibration are not provided in the MR. The PP is requested to correct the same and provide the calibration certificates.				
Project proponent response				Date : 28/04/2022
There is delay in calibration of energy meters. the scheduled date of calibration was 06/04/2020 but these energy meters are not calibrated yet due to ongoing COVID-19 Pandemic. The calibration is not under control of the PP. PP has reminded the responsible state agency GETCO many times regarding the calibration, but it is not carried out yet. due to ongoing COVID-19 pandemic the meter calibration is not carried out as per the plan by the state agency. So permanent deviation is taken and according with the CEA guidelines, meter calibration frequency is fixed for 5 years. Necessary details added in the updated MR for deviation.				
Documentation provided by project proponent				
MR version 1.2 CEA Notification, previous calibration certificates				
VVB assessment				Date: 30/03/2022
The desired calibration frequency as defined in the registered PD is for 3 years. However, the calibration of energy meters was not carried out as per the frequency to the current prevailing pandemic scenario from last 2 years. The calibration of meters is under preview of state utility GETCO and PP has no control over it. CEA has issued a notification dated 17 March 2006/12/, which provides guidelines for calibration of energy meters and confirms the energy meters test/calibration frequency as once in five years. PP has proposed a permanent deviation and has changed the calibration frequency of meters to 5 years in accordance with CEA guidelines. Revised MR for deviation has been checked and found acceptable. calibration certificates are checked and it is confirmed that considering frequency of 5 years, previous calibration is still valid for the current monitoring period. OK Closed.				

CAR ID	05	Section no.	4.5	Date : 05/03/2022
Description of CAR				
Net generation data needs to be rechecked as for some of the investors, excel sheet values does not match with the reports issued by the GETCO.				
Project proponent response				Date : 15/03/2022
PP has revised generation data in ER sheet as per reports issued by the GETCO.				
Documentation provided by project proponent				
ER sheet version 1.1				
VVB assessment				Date: 30/03/2022
Revised ER sheet is checked, most of the data is corrected and matching now. However, the data for Excel Crop Care are not available for some months in the share certificates submitted. Open				
Project proponent Response :				Date : 28/04/2022

Location ECCLNA-01 (0.8 MW – 1 WTG) was for allocated to project investor Excel Crop Care Ltd. However, from the month of September 2021, the Excel Crop Care Ltd has been taken over by another investor Sumitomo Chemicals India Ltd. So, from September 2021 onwards generation of the location ECCLNA-01 is issued on the name of Sumitomo Chemicals India Ltd. In the share certificate.	
Documentation provided by project proponent	
Revised MR 1.2 and ER sheet	
VVB assessment	Date: 30/04/2022
The PP has clarified the change in the investor name. this does not impact the project proponent. The values reported for location ECCLNA-01 are matching now. The PP has also added a clarification regarding investor name change in the MR and ER sheet. Closed.	

APPENDIX 4: COMPETENCY STATEMENTS

Competence Statement			
Name	Harsh Raval		
Education	Bachelor of Engineering in Chemical Engineering Master of Science in Environmental and Energy Engineering		
Experience	15 Years		
Field	Climate Change, Environment and Waste Management		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	YES (AMS-I.D, ACM0002)		
Local expert	YES (INDIA)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert (1.2)	YES		
Reviewed by	Deepika Mahala (Quality Manager)	Date	08/12/2021
Approved by	Ashok Gautam (Technical Manager)	Date	08/12/2021

Competence Statement	
Name	Muskan Chawla
Education	M.Sc. Environment Science
Experience	NA
Field	Environment Science
Approved Roles	
Team Leader	NO
Validator	NO
Verifier	NO
Methodology Expert	NO
Local expert	NO
Financial Expert	NO
Technical Reviewer	NO
TA Expert (X.X)	NO
Trainee	YES

Reviewed by	Deepika Mahala	Date	09/03/2022
Approved by	Ashok Gautam	Date	09/03/2022

Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	6 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS.I.A., AMS.I.C., AMS.I.D., AMS.I.F., AMS.II.D., AMS.II.G., AMS.II.J., AMS.III.AV., AMS.III.BL, ACM0002, ACM0012		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2, TA 3.1)		
Reviewed by	Shifali Guleria	Date	26/04/2022
Approved by	Deepika Mahala	Date	26/04/2022