



**Verified Carbon
Standard**

VERIFICATION REPORT OF 49.5 MW WIND POWER PROJECT BY FFCCEL IN PAKISTAN



Document Prepared By Earthood Services Private Limited

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Summary:

FFC Energy Limited has contracted M/s Earthood Services Private Limited (ESPL) to conduct an independent verification of their VCS project “49.5 MW Wind Power Project FFCEL in Pakistan” with VCS ID 1346 against VCS Standard version 4.2. The Project activity is located at Jhampir, District Thatta, Sindh, Pakistan.

The verification is an independent third-party assessment of the project design, actual ER sheet, supporting documents and encompasses a thorough assessment of the implementation of a project activity against the applicable VCS requirements. The project activity involves generating electricity through wind turbines and evacuating the generated power into the National Power and Despatch Company Limited (Grid), thus displacing the electricity that would have otherwise been generated through a fossil fuel-based power plant, and hence reducing its GHG emissions.

The scope of the verification includes conforming the implementation of the monitoring plan with the registered VCS PD, version 1.2, dated 28/10/2014, and the application of the monitoring methodology – ACM0002 “Grid-connected electricity generation from renewable sources” version 15.0.

The verification is being conducted for the monitoring period 01/12/2020 to 31/10/2021 (including both days).

The verification consisted of three phases:

1. Desk review of the project,
2. Resolution of outstanding issues, *and*
3. The issuance of the final verification report and opinion.

The overall verification, from Contract Review to verification Report & opinion, was conducted following ESPL internal quality procedures.

A risk-based approach has been followed to perform this verification activity and there are no uncertainties associated with this verification.

During this verification, a total of 04 CARs, 03 CLs, and 01 FARs were raised and are discussed in detail in Appendix III. The review of the monitoring Report and additional documents related to baseline and monitoring methodology, the subsequent background information, follow-up remote interviews with project owners have provided ESPL with sufficient evidence to verify the fulfillment of the stated criteria of VCS. ESPL confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements.

Therefore, the emission reduction from the VCS project activity “49.5 MW Wind Power Project by FFCEL in Pakistan” during the current verification period could be represented as follows:

Period	Baseline emissions or removals (tCO ₂)	Project emissions or removals (tCO ₂)	Leakage emissions (tCO ₂)	Net GHG emissions reduction or removals (tCO ₂)
01/12/2020 to 31/12/2020 (both dates inclusive)	4,495	0	0	4,495
01/01/2021 to 31/10/2021 (both dates inclusive)	60,812	0	0	60,812
Total	65,308	0	0	65,308

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1 INTRODUCTION

1.1 Objective

The objective of this verification is a thorough and independent, third-party verification of the emission reductions for the project. The verification includes verifying all the documentary evidence that are relevant and material to authenticate the sources and sinks of the GHGs within the project boundary, the processes involved, the metrics for qualification of these monitored parameters, along with their level of reliability, and validity of supporting documents shared at each stage of verification.

Verification is an independent review and retroactive determination by ESPL, of the monitored emission reductions in the GHG emissions that has occurred during the current monitoring period i.e., 01/12/2020 to 31/10/2021 (both dates inclusive, implicit in all future references). Certification is the written assurance by ESPL that this project activity has achieved a total of 65,308 tCO₂e as verified emission reductions.

1.2 Scope and Criteria

Scope of the verification was an independent and objective review and the ex-post determination of the monitored emission reduction in the GHG emissions from the implementation of this project activity. The verification of the project is done against the registered project description/1/, the ER calculations/4/, the applied methodologies/8/ and supporting documents provided by the project proponent to the verification.

During the verification, following criteria was adopted:

- a) Review of the project implementation against the registered project description
- b) Verification of the documents and follow up interviews with the project developers
- c) Review of the ER calculation against the approved methodologies

1.3 Level of Assurance

- ☒ Reasonable Level of Assurance
- ☐ Limited Level of Assurance

Reasonable level of assurance includes the understanding that there is 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 evidence to reduce audit risk to an acceptable low level.

A draft verification report is prepared by the assessment team. The information provided in the report is further reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by ESPL were duly complied with and such opinion/conclusion is reached in an objective manner that complies with the applicable VCS and CDM requirements as appropriate. The technical review team is collectively required to possess the technical expertise in all the technical areas/sectoral scopes the project is related to. The technical review team members are independent of verification team.

The evidence used to achieve a reasonable level of assurance is specified in section 2.3 and 2.4 of this report.

1.4 Summary Description of the Project

The VCS project activity titled “49.5 MW Wind power project by FFCEL in Pakistan” (VCS ID - 1346) comprises of installation of grid connected wind power project in the Jhimpir, District Thatta, Sindh Province, Pakistan.

The project activity involves the installation of 33 wind turbines of 1.5 MW each reaching a total installed capacity of 49.5 MW, which has been verified from generating licence/19/ shared by the PP and also has been discussed during Remote site visit/30/ on 24/01/2022. The project harnesses the wind energy to generate and supply electricity to the national grid of Pakistan. The wind turbine works on the lift and drag principle to produce a positive turning force on the shaft, which results in the rotation moment of the shaft. The mechanical power produced by the rotary moment is converted to electricity by using a generator and a gearbox. The WTGs can only convert wind energy into electrical energy and hence, do not use any other type of fuel for the same.

The electricity generated by the project activity is being supplied to the national grid of Pakistan and hence displacing electricity that would have otherwise been generated through a carbon intensive fossil fuel-based power plant or by addition of new units (fossil fuel based) in the future.

The wind power project developers have signed the Energy Purchase agreement with the National Transmission and Dispatch Company Limited (NTDCL)/29/. The assessment team has verified monthly JMRs/12/ and confirmed that the wind power plant is connected to NTDCL through 132kV transmission lines in Jhimpir and Nooriabad in Nooriabad district, Sindh Province. Also, during RSV, PP has given a brief explanation through SLD of the plant about the metering point and arrangement of wind turbines, readings were verified through SCADA system, backup energy meters were checked against the description in MR and registered PD and meter serial numbers were verified and found to be OK.

The start date of project activity is 16/05/2013, which is also the date of commissioning of the wind power plant, verified through the commissioning certificate/18/. The project is registered for a fixed crediting period of 10 years. The duration of crediting period is 16/05/2013 to 15/05/2023.

Location of the wind turbines in the project activity was verified through Google map/26//Appendix V/ and found consistent with the data provided in the registered VCS PD/1/ and VCS MR/3/.

The project activity is operational since its commissioning and during the current monitoring period. The project activity has generated a total of 102,961.12 MWh of clean electricity which was verified through JMRs/12/, resulting in 65,308 tCO_{2e} emission reduction during the current monitoring period (i.e., from 01/12/2020 to 31/10/2021) which is found to be consistent with the ER sheet/4/.

2 VERIFICATION PROCESS

2.1 Method and Criteria

M/s ESPL assessed and determined whether the proposed implementation and operation of the project activity and the steps taken to report the emission reductions comply with the VCS guidelines and the criteria. The verification consists of the following three phases:

- A desk review of the VCS PD/1/ and VCS MR/3/.
- Remote site visit/30/ (using Microsoft teams) follow up interviews with PP and clients.
- The resolution of outstanding issues and Issuance of the final report and opinion.

No sampling plan has been adopted by the verification team as all the data related to the Wind Power Plants were presented in the VCS MR/3/ and ER sheet/4/ was reviewed.

2.2 Document Review

The verification is performed primarily as a document review of the documents submitted at the various stages of assessments. The documents are reviewed against registered VCS PD/1/, Validation report/5/, previous verification report/34/ and associated documents as stated in detail in appendix 1 of this report. The assessment is performed as per the ESPL internal procedures in-line with the VCS latest standards/7/. The information provided in the Monitoring report is cross-checked with the VCS PD/1/, Validation Report, supporting documents provided by the PP, information from publicly available sources other than those used and also conducted independent background investigations on registration in any other GHG programs, various CSR activities/33/ carried out by the PP.

2.3 Interviews

PP representatives were interviewed over the telephonic call to discuss various aspects of the project activity such as implementation of the project activity, monitoring plan, operation and maintenance at the project site, details on calibrations, local stakeholder consultation, CSR activities etc.

No.	Interviewee			Date	Verification team Member	Topics
	Last Name	First Name	Affiliation			
1.	Bawari	Deepak	Emergent ventures (Consultant)	24/01/2022	Sanjay Kumar	Monitoring system, ER calculations, Calibration Certificates
2.	Khalid	Haris Bin	Master Wind Energy Private limited (Deputy General Manager - Plant)	24/01/2022	Sanjay Kumar	Project description, technologies implemented, Monitoring system, QA/QC procedures, calibration procedures and details, Local stakeholder consultation, CSR activities
3.	Ayub	Danish	FFC Energy Limited	24/01/2022	Sanjay Kumar	Project implementation, Monitoring plan, data recording and management, major shutdowns in plant

2.4 Site Inspections

The current verification was based on the virtual means/30/ in place of a physical site visit. This was deemed sufficient to confirm the plant operations and other aspects of the project operations. This approach adopted ie., remote site visit (RSV) was in accordance to para 4.1.2 of the VCS standard v4.2/7/ "The validation/verification body shall select samples of data and information to be validated or verified to provide a reasonable level of assurance and to meet the materiality requirements of the specific project." The representatives of the PA were interviewed through video call (via Microsoft teams), details of which is included in section 2.3 of this report.

To achieve a reasonable level of assurance, the assessment team has followed the alternative means to substantiate the verification criteria as discussed in the table below:

Requirements	Means of Verification/ source documents	Assessment opinion
Project implementation and operation	The project consists of installation of 33 wind turbines of 1.5 MW each, to capture the wind power generated from the rotary action of the turbines and converting into electricity, which is supplied to the NTDCL through a 132kV transmission line. Supporting documents: 1. Commissioning certificate /18/ 2. VCS Registered PD/1/ 3. Technical specification of equipment/27/ 4. Photographs and videos of project site /30/ 5. Joint meter reading report/12/ 6. Calibration certificates/14 - 17/ 7. Energy Purchase Agreement/29/ 8. Generating Licence/19/	The start date of the project activity has been verified through the commissioning certificate/18/ provided by the PP. This is also found to be in compliance with the registered PD/1/. The implementation of the project activity has been verified through EPA/29/, generating licence/19/ and photographs and video for the project site/31//32/. PP were interviewed during remote site visit/30/, also. The continuous operation of the project activity has been verified through the JMRs/12/ issued by the NTDCL, the source was found to be reliable and authentic as NTDCL is a government owned entity of Pakistan. Independent research has been carried out for the project activity to achieve a higher level of assurance about the implementation of project activity.

		It is evident from the documents that the project is implemented as per registered PD/1/ and could state with “reasonable confidence” that the meters operating at site are exclusive to the project activity
Monitoring systems and procedures	The approved reports from the validation and the project description could be one of the pieces of evidence for the compliance of the monitoring system. The JMRs/12/ can also act as supportive documents. The technical specification of the meter installed can be verified from the technical description/20/ and the calibration certificates/14 - 17/.	The frequency of monitoring of parameters listed under approved monitoring plan is verified through JMRs/12/. The photographs of the monitoring equipment/32/ sent by the PP has been verified and found to be appropriate. The PP were interviewed about the monitoring system and procedures during the RSV/30/. The documents were cross-checked by the VVB and the implementation of the monitoring system and procedure has been verified. VVB based on this assessment both physical and documentary, finds that the monitoring system followed at site within acceptable limits as far as measurement of Energy Generation
Calibration frequency	Calibration certificates of each energy meter/14 - 17/ NEPRA Grid code/24/ VCS registered PD/1/	Calibration frequency and energy meter specifications has been verified through calibration certificates/14 - 17/, VCS PD/1/ and NEPRA grid code requirements/24/ and was found consistent. Responsibility of calibration and maintenance of the energy meters is solely under control of NTDC, which is body coming under Govt of Pakistan
Data and calculations	Monthly JMRs issued by the NTDC/12/	Monthly values of the monitoring parameters used in the ER calculation are verified through

	ER sheet/4/ VCS Registered PD/1/	Monthly JMRs/12/ and are found consistent. Methods, formulae, and emission factor for calculating baseline emissions used in the ER sheet/3/ have been followed in accordance with the VCS PD/1/ and applied methodology/8/.
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It is noteworthy that no sampling has been carried for the verification as 100% data is verified for the current monitoring period. The primary reference documents (calibration of the Energy Meters /14/-/17/, technical specifications of Energy Meters /20/) referred by the assessment team are either issued /endorsed by national grid (Government of Pakistan), hence is deemed authentic.

Based on the above assessment it can be concluded that the assessment team has verified sufficient data, to reduce audit risk to an acceptably low level as a requisite to achieve reasonable level of assurance for the current monitoring period.

2.5 Resolution of Findings

The objective of this step is to identify, discuss and conclude on the issues that are found during the assessment (Monitoring, implementation, and operations) of the project activity which could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of the emission reductions. The findings may be of the following types: CAR – Corrective action Request, CL – Clarification Request, FAR – Forward Action Request.

A total of 04 CARs, 03 CLs and 01 FARs were raised during the current verification. All the findings that were raised and communicated to project participants during the verification are included in appendix III. This section also includes the responses provided by the project participants, along with an assessment by the verification team if it was closed out or otherwise.

2.5.1 Forward Action Requests

This is third verification of the project activity. One FAR is raised during the current monitoring period.

FAR#01: As per VVB assessment (M/s ESPL), VERs has been issued for the MP – 16/05/2013 to 30/11/2014. As per section 3.4.4 of the VCS standard v4.2, monitoring periods shall be contiguous with no time gaps between monitoring periods. The VVB in the next verification shall ensure that the verification of the previous vintage of the preceding monitoring periods (ie., 01/12/2014 to 30/11/2020) are appropriately considered in accordance with the VCS standard requirements and there are no time gaps left in between. Further, verifying VVB to check of there is any issue identified from the verification that could have impact on current or future verifications. The next verifying VVB can close this FAR once all the final verification reports for the period (01/12/2014 – 30/11/2020) have been issued.

2.6 Eligibility for Validation Activities

Since no validation was performed during the current verification, this section is Not applicable.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The Project is registered under VCS only (VCS ID - 1346) with 10 years crediting period from 16/05/2013 to 15/05/2023/1/. There is no other GHG program for which the project activity is registered or was rejected during registration. The ER's generated due to the project activity is not being claimed under any other GHG emission trading program. A declaration/35/ has been provided by the PP against the same, which may be considered acceptable. Independent research has been carried out, in which the VVB has searched through registries of different GHG programs like CDM, GS, GCC etc. which confirms that the project is not registered in CDM, GS or any other GHG registry. One finding namely, CL#02 was raised and resolved details can be found in appendix III.

3.2 Methodology Deviations

No methodology deviation from the stated methodology is observed during the current monitoring period as per registered PD.

3.3 Project Description Deviations

There is no Project Description deviation identified during the verification of current monitoring period. Details of implementation of project activity has been mentioned in section 2.4 of the report.

3.4 Grouped Project

This is not a grouped project activity. Hence, this section is Not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project implementation was checked in the following manner:

- There are no material discrepancies between project implementation and project description. This has been verified from the various information like validation report/5/, Previous verification report/34/, information available in MR/3/, calibration certificates of main meter and check meter/14 - 17/, against the registered VCS PD/1/ as well as the RSV /30/
- The implementation status of the monitoring plan was checked for its completeness, which included the verification of the process and schedule for obtaining, recording, compiling, and analysing the monitored data and parameters. This has been verified from Joint meter readings/12/, along with data in the ER sheet/4/, review of the information provided in the MR/3/, Photographs and videos of project site/31/, review of calibration certificates and calibration frequency for the equipment and it was cross-checked with the project description/1/ for the parameter were adopted by the verification team.
- The material discrepancies if any between the actual monitoring system, the monitoring plan set out in VCS PD/1/ and the applied methodology/8/ were done through the review of the information available in the MR/3/ and it was cross-checked with the VCS PD/1/ and the applied methodology/8/ as well as during the RSV /30/.
- The VCS project, 1346 has not been registered or rejected from any other GHG program activity. This has been verified from the review of the declaration certificate/35/ sent by the PP, which clearly states that the VCS registered project has not been registered in any other program nor was rejected in the past.
- The declaration certificate/35/ shared by PP, has clearly stated that the project activity has not been registered for any other program. Hence, confirms that it has not received any other form of environmental credits or is doing so during current verification.
- The declaration certificate/35/ shared by PP, clearly states that the project activity has not been registered for any other program, which also mentions that GHG emission reduction or removals generated by the project are not the part of emission trading program or any other mechanism that includes GHG allowance trading.
- The PP has started the project activity for improving the atmosphere of the surrounding areas by reducing the GHG emissions occurring from his plant, that would otherwise be emitted in the project baseline. The PP regularly takes part in the number of welfare programs that is based in and on around the project activity such as running medical camps, providing hygiene facilities in school and several such CSR activities from time to time, the same has been verified from the interview conducted during remote site visit/30/ and details of the various types of CSR activities shared by the PP/33/.

Based on the above, it can be concluded that the verification team has thoroughly checked the project activity's implementation status, and there were no discrepancies found in this regard. Two finding namely, CL#01 and CAR#08 was raised and resolved, also FAR#01 was raised during the current monitoring period details of which can be found be appendix III.

4.2 Safeguards

4.2.1 No Net Harm

Since this project is a grid-connected renewable energy power plant which involves generation of electricity through wind power, it does not have any negative environmental and socio-economic impacts.

4.2.2 Local Stakeholder Consultation

Local stakeholder consultation was conducted during the project registration as a part of the EIA assessment, which was validated at the time of project registration/1//5/ in VCS. Furthermore, it can be seen that the PP participates in various CSR activities in or around the project activity area, which has been verified from the interview during remote site visit/30/ and details of the various types of CSR activities/33/ shared by the PP. For ongoing stakeholder communication, the PP is maintaining a feedback/ complaint register at the project site office. During the current monitoring period, no grievances were received from the local stakeholders between the period 01 December 2020 to 31 October 2021. Thus, the assessment team has reason to believe that the ongoing stakeholder communication under the local stakeholder consultation has been properly implemented. One finding namely, CL#03 was raised and resolved details can be found in appendix III.

4.3 AFOLU-Specific Safeguards

This section is Not applicable as this project activity is a non-AFOLU type project activity.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The project monitoring has been carried out in accordance with the registered VCS PD/1/ and the monitoring report/3/. The monitoring plan laid on the registered PD was being followed at the site. The assessment team has verified the information flow (data generation, aggregation, to recording, calculation and reporting for these parameters including the values) in the MR/3/ as per section 3.15 of the VCS Standard/7/. The Joint meter reading is taken by the representative of NTDCL in the presence of the PP in the form of JMRs/12/. Monthly JMRs/12/ issued by NTDCL provide the values of parameters that is directly used for emission reduction calculations. During RSV/30/, some of the months are randomly picked and verified through the SCADA system present at site, data was found to be appropriate as per the JMRs/12/ received by the PP for the respective months.

The calculation of the emission reduction 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 parameters $EG_{\text{export},y}$ and $EG_{\text{import},y}$ is directly sourced from monthly JMRs/12/ issued by the NTDCL. The PP has provided complete set of data for all the monitored parameters in the ER sheet/4/. This data has been verified as described in section 4.5 of this report. The formulae & method used to calculate the baseline emissions, project emissions and leakage emissions are appropriate and in line with the approved methodology ACM0002/8/.

The ex-ante parameters have been calculated at validation stage and remains fixed throughout the crediting period, in accordance with the tool to calculate emission factor for an electricity system/10/ and are in-line with reported value in registered VCS PD/1/.

As per ER sheet/4/ submitted by the PP, the net emission reduction achieved during the current verification period i.e., 01/12/2020 to 31/10/2021, was found to be 65,308 tCO_{2e}, which is 21.9% lower than the ERs estimated for the current monitoring period.

Annual emission reductions estimated as per the registered PD/1/ is 91,085 tCO_{2e}. When we adjust the time period mentioned in PD/1/ against the time period in MR /3/ and estimate the emission reductions by interpolation, the emission reduction for this monitoring period should be in the range of 83,599 tCO_{2e}. However actual generation is only 65,308 tCO_{2e}/3/ which is 21.9% lower, due to lower wind generation as per the plant officials and operators stated during the RSV /30/. This was cross checked with publicly available wind atlas map of Sind Province, Pakistan which showed that the wind speeds were lower than previous years during 2021/36/

The calculation method and formulae used for calculating baseline emission, project emission and leakage emission are in compliance with the applied methodology ACM0002 v15.0/8/. One finding namely, CAR#07 was raised and resolved details of which can be found in appendix III.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

The ERs generated for the project activity is based on the electricity generation from the wind power. The PP has shared all the relevant evidence against the data related to the monitored parameter. List of all documents reviewed for the current verification has been listed down in appendix I of this report. The values of the parameter, electricity imported and exported has been checked by the assessment team through monthly JMRs/12/ to verify the values reported in the ER sheet/4/ and found to be consistent. Since monthly JMRs are prepared and issued by the NTDCL, they are found to be a reliable and authentic source.

The monitoring of the project activity is found to be in accordance with the monitoring plan set out in the VCS PD/1/ and monitoring methodology ACM0002/8/. The mechanism is reliable and effective. The verification of ex-ante and monitored parameter has been discussed in this section.

1. Assessment of Data and parameter

The assessment of ex-ante parameter has been carried out as method described in below table.

Ex-ante parameter	Assessment
EF _{grid,OMy} , Operating margin CO ₂ emission factor for grid in the year y (tCO ₂ /MWh)	PP has applied the value of 0.7625 tCO ₂ /MWh, which is in line with the calculation method used in “Tool to calculate emission factor for an electricity system”/10/. It’s an ex-ante value fixed at the time of validation. The value mentioned in the MR/3/ is found to be consistent with the VCS PD/1/.
EF _{grid,BMy} , Build margin CO ₂ emission factor for grid in the year y (tCO ₂ /MWh)	PP has applied the value of 0.2496 tCO ₂ /MWh, which is line with the calculation method used in “Tool to calculate emission factor for an electricity system”/10/. It’s an ex-ante value fixed at the time of validation. The value mentioned in the MR/3/ is found to be consistent with the VCS PD/1/.
EF _{grid,CMy} , Combined margin CO ₂ emission factor for grid in the year y (tCO ₂ /MWh)	PP has applied the value of 0.6343 tCO ₂ /MWh, which is line with the calculation method used in “Tool to calculate emission factor for an electricity system”/10/. It’s an ex-ante value fixed at the time of validation. The value mentioned in the MR/3/ is found to be consistent with the VCS PD/1/.

The ex-ante parameters mentioned in the MR are cross-checked with the registered VCS PD/1/ and are found to be consistent.

The assessment of monitored parameter has been carried out as per the method described in below table.

Parameter	EG _{export,y} , MWh, Electricity exported to the grid by the project activity in year y	
Means of verification		
	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Continuous measuring, monthly recording
	Is Measuring and reporting frequency in accordance with the	Yes, the measuring and reporting frequency is in line with the monitoring

	monitoring plan and monitoring methodology? (Yes / No)	plan as set out in VCS PD/1/ and monitoring methodology/8/.
	Monitoring equipment	The energy meter is of accuracy class 0.2s/14 - 17/ and make ISKRA, model no: MT860/20/. The serial Nos. of the equipment being 41507169, 41510586, 41507148 and 41510585. All the energy meter used are of same make and same accuracy level. The same has been verified from the photographs of energy meter/32/ shared by the PP.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes, The accuracy of the monitoring equipment is 0.2s, which is in accordance with the monitoring plan/1/. This has been verified from the calibration certificates/14 - 17/ provided by the PP.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy is valid for entire measuring range. The calibration certificates clearly shows that the accuracy level is valid for entire monitoring period/14 - 18/.
	Calibration frequency /interval:	As per VCS PD/1/, the calibration frequency is once in two years which is in-lines with the details provided in MR/3/ and with the NEPRA grid code/24/. During the current monitoring period, calibration was performed as per the details provided in appendix IV of this report. A delay of 10 month has been noted in the calibration frequency of above meters. The scheduled calibration for energy meter was 24/01/2021, but PP conducted the calibration on 07/10/2021, which is evident from the calibration report/14 - 17/ shared by the PP. The corrected value error has been implemented by the PP correctly in the ER calculation as per the section 3.4.2 of VCS Validation and verification Manual/28/. It is to be noted that during the delayed calibration, the calibration did not show up any error. Thus, the

		application of 0.2% margin in a conservative manner to determine emission reduction is most conservative in the given circumstances as per the section 3.4.2 of VCS Validation and verification Manual/28/. The calibration certificate/14 - 17/ of each of the calibration dates has been checked and the meter is found to be within the stated error range.
	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?	No, the calibration interval isn't inline with the frequency set out by the PP in the monitoring plan/1/. A calibration delay of 10 month was identified. The corrected value based on the conservative error value has been implemented by the PP in the ER sheet/4/ according to the delay in calibration, conservative error value applied is 0.2%, which is the maximum permissible error and is found to be appropriate. PP has also provided the calibration reports from the start of the project activity to ensure if there is gap in calibration. One other instance where calibration was delayed for 10 months was found. Other than that, the PP has conducted scheduled calibration for the entirety of the crediting period.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration has been carried out by NTDCL itself which is the government organisation of Pakistan. This has been checked against the calibration certificates/14 - 17/ shared by the PP. Since the calibrating agency is a Govt of Pakistan agency, the report has been accepted as authentic and reliable

	How were the values in the monitoring report verified?	The cumulative values of $EG_{\text{export},y}$ for the entire monitoring period is reported in the MR/3/, and the monthly values are reported in the ER calculation sheet/4/ is 103,388.12 MWh. This value is checked from the monthly JMRs/12/ shared by the PP. The ER /3/ sheet was checked for application of formula, arithmetic consistency, faithful reproduction of data from the JMR, and accordingly accepted to be reliable data with high level of confidence
	If applicable, has the reported data been cross-checked with other available data?	Since JMR /12/ is issued by NTDCL which is a Govt of Pakistan agency, the values were accepted as authentic and hence was not cross checked with other sources
	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 the PP. The joint meter reading is taken by the representative of NTDCL in the presence of the PP in the form of JMRs. Monthly JMRs issued by NTDCL provide the value of $EG_{PJ,y}$ that is directly used for emission reduction calculations.
Findings	CL#04, CAR#01 and CAR#06 was raised and resolved.	
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.	

Parameter	$EG_{\text{import},y}$, MWh, Electricity imported from the grid by the project activity in year y	
Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Continuous measuring, monthly recording
	Is Measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency is in line with the monitoring plan as set out in VCS PD/1/ and monitoring methodology/8/.
	Monitoring equipment	The energy meter is of accuracy class 0.2s/14 - 17/ and make ISKRA, model no: MT860/20/. The serial Nos. of the equipment being 41507169,

		41510586, 41507148 and 41510585. All the energy meter used are of same make and same accuracy level. The specifications of the meters has been verified from the photographs of energy meter/32/ shared by the PP.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes, The accuracy of the monitoring equipment is 0.2s, which is in accordance with the monitoring plan/1/. This has been verified from the calibration certificates/14 - 17/ provided by the PP.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy is valid for entire measuring range. The calibration certificates clearly shows that the accuracy level is valid for entire monitoring period/14 - 17/.
	Calibration frequency /interval:	As per VCS PD/1/, the calibration frequency is once in two years which is in-lines with the details provided in MR/3/ and with the NEPRA grid code/24/. During the current monitoring period, calibration was performed as per the details provided in appendix IV of this report. A delay of 10 month has been noted in the calibration frequency of above meters. The scheduled calibration for energy meter was 24/01/2021, but PP conducted the calibration on 07/10/2021, which is evident from the calibration report/14 - 17/ shared by the PP. The corrected value error has been implemented by the PP correctly in the ER calculation as per the section 3.4.2 of VCS Validation and verification Manual/28/. The calibration certificate/14 - 17/ of each of the calibration dates has been checked and the meter is found to be within the stated error range.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the	No, the calibration interval isn't inline with the frequency set out by the PP in the monitoring plan/1/.

	frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	A calibration delay of 10 month was identified. The corrected value based on the conservative error value has been implemented by the PP in the ER sheet/4/ according to the delay in calibration, conservative error value applied is 0.2%, which is the maximum permissible error and is found to be appropriate. PP has also provided the calibration reports from the start of the project activity to ensure if there is gap in calibration. One other instance where calibration was delayed for 10 months was found. Other than that, the PP has conducted scheduled calibration for the entirety of the crediting period.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration has been carried out by NTDCL itself which is the government organisation of Pakistan. This has been checked against the calibration certificates/14 - 17/ shared by the PP.
	How were the values in the monitoring report verified?	The cumulative values of $EG_{import,y}$ for the entire monitoring period is reported in the MR/3/, and the monthly values are reported in the ER calculation sheet/4/ is 427 MWh. This value is checked from the monthly JMRs/12/ shared by the PP.
	If applicable, has the reported data been cross-checked with other available data?	NA
	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 the PP. The joint meter reading is taken by the representative of NTDCL in the presence of the PP in the form of JMRs. Monthly JMRs issued by NTDCL provide the value of $EG_{PJ,y}$ that is directly used for emission reduction calculations.

Findings	CL#04, CAR#01 and CAR#06 was raised and resolved.
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.

Parameter	EG _{PJ,y} , MWh, Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y	
Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	Continuous measuring, monthly recording
	Is Measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency is in line with the monitoring plan as set out in VCS PD/1/ and monitoring methodology/8/.
	Monitoring equipment	The energy meter is of accuracy class 0.2s/14 - 17/ and make ISKRA, model no: MT860/20/. The serial Nos. of the equipment being 41507169, 41510586, 41507148 and 41510585. All the energy meter used are of same make and same accuracy level. The same has been verified from the photographs of energy meter/32/ shared by the PP.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes, The accuracy of the monitoring equipment is 0.2s, which is in accordance with the monitoring plan/1/. This has been verified from the calibration certificates/14 - 17/ provided by the PP.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy is valid for entire measuring range. The calibration certificates clearly shows that the accuracy level is valid for entire monitoring period/14 - 17/.
	Calibration frequency /interval:	As per VCS PD/1/, the calibration frequency is once in two years which is in-lines with the details provided in MR/3/ and with the NEPRA grid code/24/.

		During the current monitoring period, calibration was performed as per the details provided in appendix IV of this report. A delay of 10 month has been noted in the calibration frequency of above meters. The scheduled calibration for energy meter was 24/01/2021, but PP conducted the calibration on 07/10/2021, which is evident from the calibration report/14 - 17/ shared by the PP. The corrected value error has been implemented by the PP correctly in the ER calculation as per the section 3.4.2 of VCS Validation and verification Manual/28/. The calibration certificate/14 - 17/ of each of the calibration dates has been checked and the meter is found to be within the stated error range.
	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?	No, the calibration interval isn't inline with the frequency set out by the PP in the monitoring plan/1/. A calibration delay of 10 month was identified. The corrected value based on the conservative error value has been implemented by the PP in the ER sheet/4/ according to the delay in calibration, conservative error value applied is 0.2%, which is the maximum permissible error and is found to be appropriate. PP has also provided the calibration reports from the start of the project activity to ensure if there is gap in calibration. One other instance where calibration was delayed for 10 months was found. Other than that, the PP has conducted scheduled calibration for the entirety of the crediting period.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration has been carried out by NTDCL itself which is the government organisation of Pakistan. This has been checked against the calibration certificates/14 - 17/ shared by the PP.

	How were the values in the monitoring report verified?	The cumulative values of $EG_{PJ,y}$ for the entire monitoring period is reported in the MR/3/, and the monthly values are reported in the ER calculation sheet/4/ is 102,961.12 MWh. This value is checked from the monthly JMRs/12/ shared by the PP.
	If applicable, has the reported data been cross-checked with other available data?	NA
	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 the PP. The joint meter reading is taken by the representative of NTDCL in the presence of the PP in the form of JMRs. Monthly JMRs issued by NTDCL provide the value of $EG_{PJ,y}$ that is directly used for emission reduction calculations.
Findings	CL#04, CAR#01 and CAR#06 was raised and resolved.	
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.	

2. Assessment of Data and calculation of GHG emissions or net removals

i. Calculation of Baseline Emissions

In accordance with the applied methodology ACM0002 v15.0/8/, the baseline emissions are CO₂ emissions from the electricity generation from the fossil fuel fired power plant that are displaced due to the project activity.

The baseline emissions are calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

Where,

BE_y = Baseline emissions in year y (tCO_{2e})

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"/10/ (tCO₂/MWh)

As per the paragraph 41, the calculation of $EG_{PJ,y}$ is different for Greenfield plants, capacity additions, retrofits, rehabilitations, and replacements. Since the proposed project activity is Greenfield plant, hence as per the paragraph 42 of ACM0002, Version 15.0/8/.

$$EG_{PJ,y} = EG_{facility,y}$$

Where,

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

$EG_{facility,y}$ = Quantity of net electricity generated that is supplied by the project plant/unit to the grid in year y (MWh/yr)

ii. Calculation of Project Emissions

As per the paragraph 29 of the applied methodology/8/, for most renewable power generation project activities, $PE_y = 0$. Since the project activity is a wind and solar energy-based power generation, the project emissions are not applicable to the project activity.

Hence, $PE_y = 0$

iii. Calculation of Leakage Emissions

As per para 54 of the applied methodology/8/, no leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of projects in power sector are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g., extraction, processing, and transport). These emissions sources are neglected.

Therefore, $LE_y = 0$.

iv. Calculation of net emissions reduction or removal

The emission reduction as per the applied methodology/8/ 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:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

$$BE_y = (102,961.12 \times 0.6343) \text{ tCO}_{2e}$$

$$BE_y = 65,308 \text{ tCO}_{2e} \text{ (Round-down)}$$

As per the paragraph 58 of the applied methodology/8/, emission reductions are calculated as:

$$ER_y = BE_y - PE_y$$

$$ER_y = (65,308 - 0) \text{ tCO}_{2e}$$

$$ER_y = 65,308 \text{ tCO}_{2e}$$

The total emission reduction during the current crediting period – 01/12/2020 to 31/10/2021 is 65,308 tCO_{2e}.

The assessment team confirms that the appropriate methods and formulae for calculating GHG emission have been followed. The assumptions, emissions factors and default values that were applied in the calculations are justified. The actual emission reduction achieved during the current monitoring period is lesser than the estimated emission reduction as described in the registered VCS PD/1/.

All the data were made available and have monitored as per the required monitoring frequency/1/.

No sampling has been done by the VVB as 100% of the monitored data were verified for the current monitoring period

4.6 Non-Permanence Risk Analysis

There is no non-performance risk rating determined by the project proponent.

5 VERIFICATION CONCLUSION

Earthood Services Private Limited (ESPL), was contracted by FFC Energy Limited, to perform the independent verification of the emission reductions for the VCS project activity (VCS ID - 1346) “49.5 MW Wind Power Project by FFCEL in Pakistan” for the monitoring period 01/12/2020 to 31/10/2021 as reported in the Monitoring Report version 1.1, dated 15/01/2022/3/.

ESPL commenced the verification based on the baseline and approved methodology ACM0002: “Grid-connected electricity generation from renewable sources”, version 15.0/8/, the monitoring plan contained in the VCS PD/1/, VCS guidelines/6//7/, Monitoring Report/3/ as per the process described under section 2 of this report.

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

In our opinion, the GHG emission reductions for the project activity for the monitoring period 01/12/2020 to 31/10/2021 (both dated included) are fairly stated in the monitoring report/3/. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0002/8/ and the VCS standard/7/.

Verification period: From 01-December-2020 to 31-October-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)
2020 (01/12/2020 to 31/12/2020)	4,495	0	0	4,495
2021 (01/01/2021 to 31/10/2021)	60,812	0	0	60,812
Total	65,308	0	0	65,308

Approved by



Dr. Kaviraj Singh
Managing Director
Earthood Services Privated Limited

Date: 21/02/2022
Place: Gurgaon, Haryana

6 APPENDIX I: DOCUMENTS REVIEWED OR REFERRED

No.	Author	Title	Reference documents to	Provider
1.	PP	VCS Project Description	Version 1.2, dated 28/10/2014	Others
2.	PP	Monitoring Report	Version 1.0, dated 12/01/2022	PP
3.	PP	Final Monitoring Report	Version 1.1, dated 15/01/2022	PP
4.	PP	ER spreadsheet	Pertaining to latest MR	PP
5.	Bureau Veritas Certification	Validation report	Version 1.1, dated 01/11/2014	Others
6.	Verra	VCS Program Guide	Version 4.1	Others
7.	Verra	VCS Standard	Version 4.2	Others
8.	CDM	ACM0002 “Grid-connected electricity generation from renewable sources”	Version 15.0	Others
9.	CDM	Tool for the demonstration and assessment of additionality	Version 7.0.0	Others
10.	CDM	Tool to calculate emission factor for an electricity system	Version 4.0	Others
11.	CDM	Standard: CDM VVS for PA	Version 3.0	Others
12.	NTDCL	Joint meter Reading Reports	January 2015 – October 2021	
13.	Verra	VCS Monitoring Report Template v4.0	-	Others

14.	NTDCL	Calibration and testing Certificates – Main Meter Jhampir Serial No. – 41507169	13/09/2014 28/04/2016 25/01/2019 07/10/2021	PP
15.	NTDCL	Calibration and testing Certificates – Main Meter Nooriabad Serial No. - 41507148	13/09/2014 28/04/2016 25/01/2019 07/10/2021	PP
16.	NTDCL	Calibration and testing Certificates – Backup Meter Jhampir Serial No. - 41510586	13/09/2014 28/04/2016 25/01/2019 07/10/2021	PP
17.	NTDCL	Calibration and testing Certificates – Backup Meter Nooriabad Serial No. - 41510585	13/09/2014 28/04/2016 25/01/2019 07/10/2021	PP
18.	NTDCL	Commissioning Certificate	16/05/2013	PP
19.	NTDCL	Generating Licence	27/08/2010	PP
20.	ISKRA	Technical Specifications of Energy meter http://www.smsmetering.co.uk/wp-content/uploads/2015/03/MT860_TechnicalDescription_V6.1_eng_SMS.pdf	-	Others
21.	Verra	Program Activity Webpage:	-	Others
22.	Others	Geo-coordinates - http://www.dmap.co.uk/utmworld.htm	-	Others
23.	IPCC	IPCC default values – fifth commitment period	2014	Others
24.	NEPRA	NEPRA grid code	June, 2005	Others

25.	FFCEL	PP website:	-	Others
26.	Google Map	Independently verified	ESPL	Others
27.	GE	Technical Specifications of WTGs	-	Others
28.	Verra	Validation and Verification Manual	Version 3.2, dated 19 October, 2016	Others
29.	NTDCL	Energy Purchase Agreement (EPA)	29/03/2011	PP
30.	-	Remote Site Visit	24/01/2022	Others
31.	-	Photographs and video of Project site	-	PP
32.	-	Photographs of backup meters	-	PP
33.	-	CSR Project List	-	PP
34.	Bureau Veritas Certification	Verification report MP01 - 16/05/2013 to 30/11/2014	Version 1.2, dated 15/04/2015	PP
35.	PP	Declaration Certificate for no double counting	01/12/2020 - 31/10/2021	PP

7 APPENDIX II: COMPETENCE STATEMENT

Competence Statement			
Name	Sanjay Kumar K		
Country	India		
Education	M.E., Environmental Engineering B.E. Civil Engineering		
Experience	20 years		
Field	Climate Change, Environmental Management, Sustainability		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	NO		
Local expert	Yes		
Financial Expert	NO		
Technical Reviewer	NO		
TA Expert (X.X)	NO		
Reviewed by	Deepika Mahala, Quality Manager	Date	27/01/2022
Approved by	Ashok Kumar Gautam, Technical Manager	Date	28/01/2022

Competence Statement			
Name	Shreya Garg		
Education	M.E., Environmental Engineering B.E. Civil Engineering		
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., ACM0002, ACM0012		
Local expert	Yes (India)		
Financial Expert	NO		
Technical Reviewer	Yes		
TA Expert	Yes (TA 1.2, TA 3.1)		
Reviewed by	Abhishek Mahawar,	Date	01/03/2018
Approved by	Ashok Kumar Gautam	Date	01/03/2018

Competence Statement			
Name	Divij Varshney		
Education	M.Tech. Renewable energy systems B.Tech. Electrical Engineering		
Experience			
Field	e.g., Climate Change & Environment / Industry		
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, Quality Manager	Date	08/09/2021
Approved by	Ashok Kumar Gautam, Technical Manager	Date	17/09/2021

Competence Statement			
Name	Harsh Raval		
Education	Bachelor of Engineering in Chemical Engineering Masters of Science in Environmental and Energy Engineering		
Experience	15 years		
Field	Climate Change, Environmental and Waste Management		
Approved Roles			
Team Leader	Yes		
Validator	Yes		
Verifier	Yes		
Methodology Expert	-		
Local expert	Yes (India)		
Financial Expert	NO		
Technical Reviewer	Yes		
TA Expert	TA 1.2		
Reviewed by	Deepika Mahala, Quality Manager	Date	08/12/2021
Approved by	Ashok Kumar Gautam, Technical Manager	Date	08/12/2021

8 APPENDIX III: FINDING OVERVIEW

Table 1. CL from this verification

CL ID	01.	Section no.	4.1	Date : 24/01/2022
Description of CL				
The present monitoring period is between 01/12/2020 to 31/10/2021, while the start date of crediting period is 16/05/2013 as per registered PD. As per section 3.4.4 of the VCS standard v4.2, monitoring periods shall be contiguous with no time gaps between monitoring periods. The PP is requested to clarify how the present monitoring period as per the requirements quoted above.				
Project participant response				Date : 25/01/2022
The project underwent first verification for the period 16/05/2013-30/11/2014. Second verification for the period 01/12/2014-01/12/2020 is currently under process with another DOE.				
Documentation provided by project participant				
DOE assessment				Date: 08/02/2022
As per VVB assessment, VERs has been issued for the MP – 16/05/2013 to 30/11/2014. As per section 3.4.4 of the VCS standard v4.2, monitoring periods shall be contiguous with no time gaps between monitoring periods. However, the VVB team converts this CL01 into FAR to ensure that the verification of the previous vintage of the present monitoring period has not raised any FAR.				
Converted into FAR 01				

CL ID	02.	Section no.	3.1	Date : 24/01/2022
Description of CL				
i. As per Section 3.6.1 of VCS Standard v4.2, the PP is required to provide these documents as proof of ownership a. Power Purchase agreement b. Operating License ii. As per Section 3.21 of VCS Standard v4.2, PP is requested to provide documentary evidence for avoidance of double counting				
Project participant response				Date : 25/01/2022
i. Following are being provided a. PPA b. Operating license ii. Undertaking is issued by PP.				
Documentation provided by project participant				
• PPA • Operating license • Undertaking issued by PP.				
DOE assessment				Date: 08/02/2022

i.	The submitted documents has been reviewed and has been found appropriate as a proof of ownership for the PA. CLOSED
ii.	The undertaking document provided by the PP has been reviewed and has been found deemed appropriate for the current monitoring period. It can be concluded that the PP is not seeking any other sort of environmental credits from any other program. Hence, there is not issue of double counting of ERs. CLOSED
CL#02 is closed.	

CL ID	03.	Section no.	4.2.2	Date : 24/01/2022
Description of CL				
As per the description under section 1.11, 2.1, 2.2 in MR, the PP is requested to submit the supporting documents of field records (eg; grievance redressal), and systems in place to achieve the goals set under the sustainable development contribution to the project.				
Project participant response				Date : 25/01/2022
PP undertakes a number of CSR activities in the project area which directly benefits the people. PP is committed to support local population in working towards their welfare.				
Documentation provided by project participant				
CSR activities undertaken by PP.				
DOE assessment				Date: 08/02/2022
The submitted document has been reviewed and it can be said that PP has undertaken multiple CSR activities in field of infrastructure, Education, Health. The documents provided satisfies the requirement to fill the data for the given sections.				
CL#03 is closed				

CL ID	04.	Section no.	4.2 Data and Parameters monitored	Date : 24/01/2022
Description of CL				
i. Under the parameter in this section, $EG_{export,y}$, the PP states that archiving systems exists to keep the records for 10 (crediting period)+2 years. PP is requested to submit documentary evidences to support this claim as per the registered PD				
ii. Similar claims are made for $EG_{import,y}$, $EG_{PJ,y}$ monitoring parameters. The PP is requested to submit documents to support archiving systems present at the project location in line with the registered PD.				
iii. PP is also requested to submit evidences at project activity where measures or systems are in place to ensure that QA/QC measures are undertaken as per the monitoring plan and in line with section 3.15.2 of the VCS standard v4.2.				
Project participant response				Date : 25/01/2022
The key information such as JMRS, invoices and calibration of meters is kept by the project owner. Such information is provided to DOE already.				
Calibration of meters is a key QA/QC requirement of project to ensure accuracy of emission reductions claim. This is carried out by state agency. Calibration records are provided to DOE covering the reporting period.				
Documentation provided by project participant				
DOE assessment				Date: 08/02/2022

i.	The submitted documents has been reviewed and it can be concluded that the PP has achieved all the previous year data from the start of the crediting period till now. Hence, the claim by the PP under the parameter $EG_{export,y}$ is found to be relevant. CLOSED
ii.	The submitted documents has been reviewed and it can be concluded that the PP has achieved all the previous year data from the start of the crediting period till now. Hence, the claim by the PP under the parameter $EG_{import,y}$, $EG_{PJ,y}$ is found to be relevant. CLOSED
iii.	As per VVB assessment, the calibration certificate can be used to fulfill the QA/QC requirements, as the calibration certificates was issued by the state electricity board, this has been verified from the certificates submitted. This has been cross-checked with registered PD and found to be in-line. Hence, sufficient QA/QC procedures has been implemented by the PP as per the registered PD. CLOSED
CL#04 is closed.	

Table 2. CAR from this verification

CAR ID	05.	Section no.	4.2 Data and Parameters monitored	Date : 24/01/2022
Description of CAR				
PP is requested to provide evidences to support the claim that the energy generation data is reliable and systems exist which prevent data loss/corruption or measures to mitigate such risks in line with section 3.15.1, 3.15.2 of the VCS standard v4.2 exists.				
Project participant response				Date : 25/01/2022
Calibration of meters is a key QA/QC requirement of project to ensure accuracy of emission reductions claim. This is carried out by state agency as per their plan. Calibration records are provided to DOE covering the reporting period. Main generation data is based on JMRs which are generated by the state agency and kept as records for future verifications.				
Documentation provided by project participant				
DOE assessment				Date: 08/02/2022
As per VVB assessment, the calibration certificate can be used to fulfill the QA/QC requirements, as the calibration certificates was issued by the state electricity board, this has been verified from the certificates submitted. This has been cross-checked with registered PD and found to be in-line. Hence, sufficient QA/QC procedures has been implemented by the PP to mitigate risks of data loss/corruption.				
CAR#05 is closed.				

CAR ID	06.	Section no.	4.3 Monitoring Plan	Date : 24/01/2022
Description of CAR				
Since this monitoring period starts from 01/12/2020 to 31/10/2021, while the crediting period as per the registered PD starts from 16-05-2013, the PP is requested to provide the calibration schedule to check the frequency of calibration during the interim years. This is to ensure that the frequency schedule follows the requirements under section 3.15.5 of VCS standard v4.2				
Project participant response				Date : 25/01/2022
Calibration details since start of project are added to MR.				
Documentation provided by project participant				
MR V1.1				
DOE assessment				Date: 08/02/2022

The calibration certificates were checked for the 4 energy meters for the period Sep 2014, April 2016, Jan 2019 and Oct 2021. The dates although were missed, the calibration of meters showed that there was no error in the readings. Thus it satisfies the requirement of calibration as per 3.15.5 of VCS v4.2

CAR#06 is closed.

CAR ID	07.	Section no.	5.4 Net GHG Emissions Reduction and Removals	Date : 24/01/2022
Description of CAR				
As per the emission reduction submitted along with MR, it was found that the measured emission reductions during this monitoring period is lower than the estimated emission reduction as per the registered PD by as much as 86.4%. However, on closer examination, it was found that the PP had used the ER for the month of June 2021 alone for comparison purposes. PP is requested to explain the reason behind this calculation step In the same vein, when VVB performed the analysis for ER by comparing the ER achieved in MR with the comparable period as per the registered PD, ER achieved is 22% lower. PP is requested to explain this difference.				
Project participant response				Date : 25/01/2022
This is an edit error and now stands corrected.				
Documentation provided by project participant				
MR V1.1 ER sheet V1.1				
DOE assessment				Date: 08/02/2022
The revised ER submitted has been reviewed. The PP has now reflected the entire current monitoring period for comparison with ex-ante estimate ERs. The calculation and formula are correctly applied. Hence, it can be concluded that the ERs achieved during this monitoring period is less than estimate by 21.9%. As per VVB assessment, the ex-ante estimate was calculated based on the PLF of 33.11%. The PP has determined that the difference could be due to lower wind availability, poor access to power evacuation which is found to be appropriate in terms of wind power plant. Hence, acceptable.				
CAR#07 is closed.				

CAR ID	08.	Section no.	1.1 Summary Description of the Implementation Status of the Project	Date : 24/01/2022
Description of CAR				
The PP is requested to elaborate on the project design with respect to project design as per the details below and in line with section 3.4.1 and 3.4.2 of VCS standard V4.2 There are 33 WTGS spread over a 4.5 km wide area with WTG-01 as the center. i.Are there any other Wind farms in the precincts of the project activity? ii.How do you ensure that the measurement is exclusive to VCS 1346 alone and the meters do not measure energy generation from other wind farms?				
Project participant response				Date : 25/01/2022
There are two sets of energy meters installed at site dedicated to the WTGs of project activity. Details are appended to MR.				

Documentation provided by project participant	
MR V1.1	
DOE assessment	Date: 08/02/2022
Based on the remote site visit conducted on 24/01/2022 and interview with the plant engineers, it was found that the meters were exclusive to the present project activity. At the same time based on the schedule 02 of the project report which states about the description of the complex it was found that WTGs are exclusive to the present project activity and that there are no other power sources whose energy generation is measured using these meters. CAR#08 is closed.	

Table 3. FAR from this verification

FAR ID	01	Section no.	1.7 Project Location	Date : 08/02/2022
Description of FAR				
As per VVB assessment, VERs has been issued for the MP – 16/05/2013 to 30/11/2014. As per section 3.4.4 of the VCS standard v4.2, monitoring periods shall be contiguous with no time gaps between monitoring periods. The VVB in the next verification shall ensure that the verification of the previous vintage of the present monitoring periods are appropriately considered in accordance with the VCS standard requirements and there are no time gaps left in between. Further, verifying VVB to check of there is any issue identified from the verification that could have impact on current or further verifications. The next verifying VVB can close this FAR once all the final verification reports for the period (01/12/2014 – 30/11/2020) have been issued.				
Project participant response				Date : DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

9 APPENDIX IV: CALIBRATION OVERVIEW

Equipment	Serial No.	Date of calibration	Expected of the Calibration Date	Calibration Validity	Delay in Calibration	Error Detected at Calibration	Whether VER calculation involved conservative application?
Main Energy Meter Feeder: Jhimpir	41507169	07/10/2021 Previous Calibrations: 25/01/2019 28/04/2016 13/09/2014	24/01/2019	2 years	Y (Delay time: 10 months)	None	Yes. Despite no error in calibration, VER was calculated conservatively/3/
Backup Energy Meter Feeder: Jhimpir	41510586	07/10/2021 Previous Calibrations: 25/01/2019 28/04/2016 13/09/2014	24/01/2019	2 years	Y (Delay time: 10 months)	None	Yes. Despite no error in calibration, VER was calculated conservatively/3/
Main Energy Meter Feeder: Nooriabad	41507148	07/10/2021 Previous Calibrations: 25/01/2019 28/04/2016 13/09/2014	24/01/2019	2 years	Y (Delay time: 10 months)	None	Yes. Despite no error in calibration, VER was calculated conservatively/3/
Backup Energy Meter Feeder: Nooriabad	41510585	07/10/2021 Previous Calibrations: 25/01/2019	24/01/2019	2 years	Y (Delay time: 10 months)	None	Yes. Despite no error in calibration, VER was calculated conservatively/3/

		28/04/2016					
		13/09/2014					

10 APPENDIX V: GEO-COORDINATES OF WTGS

The Project activity is located in Jhimpir, District Thatta, Sindh, Pakistan. Geo-coordinates of each WTGs in UTM system are as follows:

Turbine No	Easting 'E' (M)	Northing 'N' (M)
T-01	397089	2773257
T-02	397226	2773647
T-03	396806	2773917
T-04	396621	2774104
T-05	397843	2774073
T-06	397505	2774307
T-07	397367	2773072
T-08	397621	2772897
T-09	396548	2773623
T-10	396936	2774702
T-11	397131	2774562
T-12	398397	2773482
T-13	398881	2773222
T-14	398183	2773155
T-15	398398	2772974
T-16	398657	2772798
T-17	399243	2773093
T-18	400099	2772348
T-19	398288	2772430
T-20	398900	2772607
T-21	398603	2772209

T-22	398891	2772011
T-23	399157	2771828
T-24	399473	2771610
T-25	399758	2771414
T-26	400348	2771824
T-27	399286	2772390
T-28	399583	2772208
T-29	399782	2771962
T-30	399846	2772687
T-31	399534	2772901
T-32	400120	2771238
T-33	397624	2773479

11 APPENDIX VI: LIST OF ABBREVIATIONS

Sl No	Abbreviation	Expansion
1	%	Percentage
2	&	And
3	(M)	Meridian
4	/	Or
5	'E'	Easting
6	'N'	Northing
7	ACM0002	Approved Consolidated Methodology
8	AFLOU	Agriculture, Forestry and Other Land Use
9	B,Tech	Bachelor of Technology
10	B.E	Bachelor of Engineering
11	BE _y	Baseline Emissions at year y
12	CAR	Corrective Action Request
13	CDM	Clean Development Mechanism
14	CER	Certified Emission Reductions
15	CL	Clarification Request
16	CO ₂	Carbon dioxide
17	CSR	Corporate Social Responsibility
18	DOE	Designated Operational entity
19	Dr	Doctor
20	e.g.,	Example
21	EF _{grid,BMy}	Emission Factor of Grid Build Margin at year y
22	EF _{grid,CM,y}	Emission Factor of Grid Combined Margin at year y

24	EF _{grid,OMy}	Emission Factor of Grid Operating Margin at year y
25	EG _{export,y}	Electricity Generation Export at year y
26	EG _{facility,y}	Electricity Generation of Facility at year y
27	EG _{import,y}	Electricity Generation Import at year y
28	EG _{PJ,y}	Quantity of net electricity supplied to the grid at year y
29	EPA	Energy Purchase Agreement
30	ER	Emission Reduction
31	ESPL	Earthood Services Private Limited
32	FAR	Forward Action Request
33	FFCEL	Fauji Fertilizer Company Energy Limited
34	GCC	Global Carbon Council
35	GE	General Electric
36	GHG	Green House Gas
37	Govt	Government
38	GS	Gold Standards
39	ID	Identification
40	IPCC	Intergovernmental Panel on Climate Change
41	JMR	Joint Measurement Readings
42	Km	Kilo meter
43	kV	Kilo Volt
44	LE _y	Leakage Emissions at year y
45	M.E	Master of Engineering
46	M.Tech	Master of Technology

47	MP	Monitoring Period
48	MR	Monitoring Report
49	MW	Mega Watt
50	MWh	MegaWatt-Hour
51	N	No
52	NA	Not Available
53	NEPRA	National Electric Power Regulatory Authority
54	NTDCL	National Transmission and Dispatch Company Limited
55	PA	Project Activity
56	PD	Project Document
57	PE _y	Project Emissions at year y
58	PLF	Plant Load Factor
59	PP	Project Proponent
60	QA/QC	Quality Assurance/Quality Control
61	RSV	Remote Site Visit
62	s	Seconds
63	SCADA	Supervisory Control and Data Acquisition
64	SLD	Single Line Diagram
65	T-	Turbine
66	TA	Technical Areas
67	tCO ₂ e	Tonnes Carbon Di Oxide
68	V4.2	Version 4.2
69	VCS	Voluntary Carbon Services
70	VER	Verification

71	VERRA	A portmanteau of words “Verification” and “Terra”
72	VERs	Verified Emission Reductions
73	VVB	Validation and Verification Body
74	VVS	Validation and Verification Standard
75	WTG	Wind Turbine Generator
76	_y	year when used as subscript
77	Y	Yes