Verification and certification report form for CDM project activities

(Version 04.0)

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

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	Sapphire 49.5 MW Wind Farm Project UNFCCC ID: 8163
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the verification and certification report	2.0
Completion date of the verification and certification report	17/12/2021
Monitoring period number and duration of this monitoring period	MP: 1st 22/11/2015-31/12/2017 (Included both days)
Version number of the monitoring report to which this report applies	2
Crediting period of the project activity corresponding to this monitoring period	Fixed crediting period (10 years) 22/11/2015 to 21/11/2025 (Included both days)
Project participants	Sapphire Wind Power Co. Ltd. (Project Owner) UPM Umwelt-Projekt-Management GmbH (CER Buyer)
Host Party	Islamic Republic of Pakistan
Applied methodologies and standardized baselines	ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (version 12.3.0) No Standardized Baseline is applied
Mandatory sectoral scopes	Sectoral scope 1: Energy industries (renewable sources)
Conditional sectoral scopes, if applicable	-
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	165,175 tCO_2e

Certified amount of GHG emission reductions or GHG removals for this monitoring period	Amount before 1 January 2013	Amount from 1 January 2013 until 31 December 2020	Amount from 1 January 2021
	N/A	193,376 tCO_2e	N/A

Name and UNFCCC reference number of the DOE	DOE Name: Shenzhen CTI International Certification Co., Ltd (CTI) UNFCCC reference number of the DOE: E-0061

Name, position and signature of the approver of the verification and certification report	Zhou Lu General Manager

SECTION A. Executive summary

UPM Umwelt-Projekt-Management GmbH has commissioned the Shenzhen CTI International Certification Co., Ltd. to carry out the 1st periodic verification of the project **"Sapphire 49.5 MW Wind Farm Project"** in Sindh Province, Pakistan with regard to the relevant requirements for CDM project activities.

This report summarises the findings of the verification of the project, performed on the basis of paragraph 62 of the CDM modalities and procedures, as well as criteria given to provide for consistent project operations, monitoring and reporting and the subsequent decisions by the CDM Executive Board. Verification is required for all registered CDM project activities as well as programme of activities intending to confirm their achieved emission reductions and proceed with request for issuance of CERs. This report contains the findings from the verification and a certification statement for the certified emission reductions.

Verification is the periodic independent review and *ex post* determination of both quantitative and qualitative information by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activities during a defined monitoring period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification is to verify and certify emission reductions reported for the **"Sapphire 49.5 MW Wind Farm Project"** in Sindh Province, Pakistan (UNFCCC Ref. No. 8163) for the period 22/11/2015 - 31/12/2017 (both days included).

The purpose of verification is to review the monitoring results and verify that monitoring methodology was implemented according to monitoring plan and monitoring data, used to confirm the reductions in anthropogenic emissions by sources is sufficient, definitive and presented in a concise and transparent manner.

In particular, monitoring plan, monitoring report and the project's compliance with relevant UNFCCC and host Party criteria are verified in order to confirm that the project has been implemented in accordance with previously registered design and conservative assumptions, as documented and also if the monitoring plan is in compliance with the approved monitoring methodology.

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.
- Where sampling is involved, sampling guidelines are applied to ensure the adequate sampling and survey method is followed in reaching professional judgements.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified. The verification comprises a review of the monitoring report over the monitoring period 22/11/2015 - 31/12/2017 based on the latest approved PDD in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participants. Remote verification and PP representatives' interviews are also performed as part of the verification process.

The verification has been performed as described in the CDM validation and verification standard for project activities (version 03.0)/24/ and constitutes the following steps:

- Publication of the MR on the UNFCCC website (27/08/2021)
- Desk review of the MR (version 01 dated 26/08/2021)/1/ and the relevant documents
- Remote verification assessment (27/09/2021)
- Issuance of draft verification report & verification protocol
- Desk review of the revised MR and related documents
- Resolution of the raised CARs and CLs
- Issuance of the final verification report

The remote verification on 27/09/2021 was carried out 21 days after the global publication of the MR on 27/08/2021, which is in conformity with the requirement of CDM project cycle procedure for project activities (Version 03.0)/25/.

The project activity is utilizing wind power for electricity generation, which is delivered to Water and Power Development Authority (WAPDA) Grid. The project activity involves installation of 33 sets wind turbines with unit capacity of 1.6MW and the total installation capacity is 52.8MW. The electricity generated by the project is exported to WAPDA grid after transmitted to the transformers.

The project activity uses renewable wind energy to generate electricity displacing fossil fuel dominated electricity generation in WAPDA grid and thus resulting in greenhouse gases emission reductions.

The estimated emission reductions are claimed from wind power plants is 78,196 tCO_2e per year during the 10-years crediting period and the Certified emissions reduction for the current 1st monitoring period from 22/11/2015 - 31/12/2017 is 193,376 tCO_2e.

This monitoring period belongs to fixed 10-years crediting period started on 22/11/2015 and ended on 21/11/2025.

In CTI's opinion, the GHG emission reductions reported for the project in the 1st monitoring report are fairly stated. CTI confirmed that the GHG emission reductions were calculated correctly on the basis of the approved monitoring methodologies ACM0002. ver. 12.3.0/19/ and the monitoring plan contained in the PDD (Version 1.5 dated 28/12/2016)/3/.

CTI confirms that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI is able to certify that emission reductions from the project **"Sapphire 49.5 MW Wind Farm Project"** during the indicated monitoring period.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader & Verifier	IR	Du	Wenjun	CTI	√	-	√	√

B.2. Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Lin	Wu	CTI
2.	Approver	IR	Zhou	Lu	CTI

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human error in the quantification of emissions	Low	Human error is likely to occur if personnel are unfamiliar with, or not well trained regarding, emissions processes or data recording	Depending on the monitoring period being verified, conduct increased verifying during the months when there is a greater likelihood of errors and issues with data quality control due to project participants' leave schedules
2.	Undue reliance on a poorly designed information system, which may have few effective quality controls	Low	Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security	Depending on how data is generated, processed, and reported, place greater emphasis on verifying data captured and processed manually and/or in spreadsheets versus those that are generated from an automated system
3.	Omissions and misstatements in data transfer from hand written notes into digital Excel ER spreadsheet	Medium	Ineffective quality control of data transfer due to unclear QA/QC procedure	Check QM procedure/manual. PP may demonstrate how to transfer data and how this is crosschecked. Conduct interview with related personnel whether procedure is actually conducted but not adequately described.

On the basis of the risk analysis the verification has been planned. A detailed audit/verification plan has been prepared and submitted to the project participant(s) in due time before the remote verification.

C.2. Consideration of materiality in conducting the verification

The errors identified in the project are below the threshold limit of materiality and hence not material. The GHG emission reductions are calculated without material misstatements.

SECTION D. Means of verification

D.1. Desk/document review

Desk review of all documents provided by PP and publicly available documents relevant for the verification including monitoring plan, monitoring report, monitoring methodology, project design document, applicable tools in particular attention to the frequency of measurements, QA/QC procedures and other relevant documents was conducted by CTI.

The Monitoring Report Version 01 dated 26/08/2021/1/ submitted by the client was web hosted on the UNFCCC-CDM website on 27/08/2021 and available in the public domain.

The main documents are listed below:

(i) the last revision of the PDD including the monitoring plan/3/,
(ii) the last revision of the validation report/4/,
(iii) the documentation of previous verifications/5/,
(iv) the emission reduction calculation spreadsheet/2/.

Other supporting documents, such as publicly available information on the UNFCCC website and background information were also reviewed.

D.2. On-site inspection

Duration of on-site inspection[1]: 27/09/2021				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening meeting	N/A	27/09/2021	Wenjun Du
2	Interview with PP Representative and Operation Staff via conference call meeting APP and check project site via videos and photos	N/A	27/09/2021	Wenjun Du
3	Documents check as per doc's list in Appendix 3.	N/A	27/09/2021	Wenjun Du
4	Finding Summary	N/A	27/09/2021	Wenjun Du
5	Close Meeting ➢ Introduce following procedures after remote verification	N/A	27/09/2021	Wenjun Du

According to the EB110th meeting report/22/ issued by EB, If the site visit cannot be postponed but are not conducted due to the COVID-19 pandemic, the DOE may use other standard auditing techniques for validation or verification and extend the period in which DOEs may apply alternative measures of validation/verification to mandatory on-site inspections until 31/12/2021. Furthermore, EB at its 112th meeting/22/ agreed to further extend the period in which DOEs may apply alternative measures of validation/verification to mandatory on-site inspections until 30/06/2022.

In accordance with the requirement by EB, the reasons that the site visit cannot be postponed are justified as follow:

- As the requested by PP, the site visit cannot be postponed due to the business reason. Via checking the Purchase Order issued on 07/08/2021/31/ by CER buyer to the project owner, it is confirmed that CER buyer request the CER from year 2015 to 2020 of this project to be delivered before 28/02/2022, to avoid the risk on the CERs delivery delay before deadline, PP commissioned CTI to start the verification in September 2021 after the project was web hosted 21 days on the UNFCCC-CDM website.

- The project is located in Pakistan, and there is only one local DOE BV have local office in Pakistan, however BV has conducted the validation of this project, due to the project is a large-scale, hence BV can't carry out the verification. So PP can only choose the DOE outside Pakistan.

[1] CTI use remote verification method to replace on-site inspection which has been demonstrate in the table below.

- CTI is the DOE from China who has been commissioned by PP. As the result of the COVID-19 pandemic, the authority of Pakistan has taken preventive measures for foreigners i.e. suspension of visa exemption policy and visa on arrival, a health certificate and insurance requested for visa application, self-isolate regulation and reduction of flights, etc. Thus, CTI cannot ensure site visit to be on scheduled.

So CTI replace mandatory site visit verification with remote audits. The site visit was not conducted by the verification team, and the below alternatives have been conducted by the verification team as remote audit in line with the requirements from CDM validation and verification standard for project activities (version 03.0)/24/.

1. CTI used video conference call conducting the opening meeting.
2. CTI used video conference call checking the project site, main equipment and project implementation, monitoring equipment, etc. via videos and photos/18/.
3. CTI interviewed representatives of project owner and staffs, project owner introduced the operation of the project and monitoring system.
4. CTI discussed the document evidence with project owner based on desk review results.
5. The team discussed findings and conducted close meeting via phone call with PD and project owner.

In conclusion, although the site visit was not conducted by CTI, through interview call and checking the related videos and photos/18/, the requested information for the verification is got by CTI successfully and can be assessed by CTI to finish the verification.

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Shabbir	Aqsa	Sapphire Wind Power Co. Ltd. / Assistant Executive	27/09/2021	- General aspects of the project - Changes since validation / previous verifications - Project implementation status - Quality management system - Involved personnel and responsibilities - Training and practice of the monitoring personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects	Wenjun Du
2.	Naeem	Fahd	Sapphire Wind Power Co. Ltd. / Assistant Manager	27/09/2021	- Project implementation status - Quality management system - Involved personnel and responsibilities - Training and practice of the monitoring personnel - Implementation of the monitoring plan	Wenjun Du

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
					- Monitoring data management - Data uncertainty and residual risks - Maintenance	
3.	Siddiqui	Jawad	Sapphire Wind Power Co. Ltd. / General Manager	27/09/2021	- Project implementation status - Quality management system - Involved personnel and responsibilities - Training and practice of the monitoring personnel - Monitoring data management - Data collection and management - Maintenance	Wenjun Du
4.	Guo	Gaiai	UPM Umwelt-Projekt-Management GmbH / Consultant	27/09/2021	- Monitoring data management - Monitoring data collection - Data uncertainty and residual risks - Monitoring report preparing - GHG emission reduction calculation	Wenjun Du

D.4. Sampling approach

N/A

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	CL 01	-	-
Compliance of the project implementation and operation with the registered PDD	-	CAR 01	-
Post-registration changes	CL 02 CL 03	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	CL 04	CAR 02 CAR 03	-
Compliance of monitoring activities with the registered monitoring plan	CL 05 CL 06	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	CL 07	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	**7**	**3**	**0**

SECTION E. Verification findings

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

Means of verification

According to para 352&353 of VVS for project activities version 03.0/24/, the verification team cross-checked and compared the MR by employing the valid version of the applicable monitoring report form listed in UNFCCC website.

- The MR used the latest valid version of the applicable at UNFCCC website.

- The MR is completed and meets all relevant requirements of instructions for filling out the Monitoring Report Form (version 09.0)/27/ for CDM project activities.

Further every section has been checked against the requirements in Monitoring Report Form (version 09.0)/27/.

Via on-site investigation, CTI confirmed that the project is a newly built grid connected wind power project with a total installed capacity of 52.8 MW which is confirmed as in line with the latest approved PDD/3/.

The project activity consists of 33 sets of 1,600 kW wind turbine with total capacity of the project is 52.8 MW and the annual net electricity generation is estimated to be 137,500 MWh, according to the nominal power of installed wind turbine generators which has been confirmed by checking the nameplate during remote verification/18/ and Equipment technical specification/7/. The operation of the project displaces equivalent power generated from WAPDA grid which is mainly dominated by fossil fuel fired power plants. It helps to reduce greenhouse gas (GHG) emissions by an estimated 78,196 tCO_2e per year during the fixed crediting period.

The detailed geographic coordinates of the project included in this monitoring period is listed as below:

No.	Project Location		
Host Country	Pakistan		
Region:	Sindh Province		
Project location address:	Northeast of Jhimpir City		
Geographical Coordinates of Wind Farm Center	**No.**	**Longitude**	**Latitude**
	1	67º51’48.33” E	25º07’18.40” N
	2	67º51’48.03” E	25º07’10.59” N
	3	67º54’40.46” E	25º06’20.95” N
	4	67º56’01.05” E	25º05’35.46” N
	5	67º57’53.13” E	25º05’03.55” N
	6	67º58’08.95” E	25º05’28.90” N

The project location is confirmed as correct and actual by checking the location through Google Earth Map/29/.

The project is applicable to the applied CDM approved methodology of ACM0002 (Version 12.3.0): “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”/19/.

Also the methodological tools as below are applied by the project

“Tool for the demonstration and assessment of additionality” (version 6.0.0)/20/

“Tool to calculate the emission factor for an electricity system” (version 2.2.1)/21/

The project was registered as a CDM project on 14/11/2012 with the registration number of 8163. According to the validation report/4/, the project participant has adopted the fixed crediting period of 10 years with the start date of 22/11/2015, and ended on 21/11/2025.

As part of the remote verification the Verification Team was able to confirm that the

	project description in MR is in accordance with the project description contained in the PDD/3/.
Findings	CL 01 was raised and resolved. Refer to Appendix 4 for detail assessment.
Conclusion	As per requirement of VVS for project activities version 03.0/24/, based on the findings above, CTI confirmed that the final version of MR was in compliance with relevant valid version of monitoring report form/27/ and instructions therein for filling out MR.

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

This is the 1st periodic verification of the project. There is no FAR from validation via checking the previous validation report/4/.

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

Means of verification

By means of an in-depth review of the PDD and the checks carried out during the remote verification, an assessment has been carried out whether the project has been implemented and operated in line with the PDD and whether all physical features of the project are in place. The following has been checked: implemented technology, project equipment as well as monitoring equipment.

Further CTI has checked if relevant technical equipment of the project activity has been exchanged or modified during the monitoring period and consistent notations of key equipment (meters etc.) in PDD/3/, MR/1/ and ER calculation spreadsheet/2/ are applied.

The verifier has performed a remote verification and conducted interview with operation staffs, in addition checked all the provided evidence as listed in Appendix 3, CTI found that the project has been put into operation normally and CTI found that the implementation of the project activity is in accordance with the approved PDD/3/.

The project started construction on 28/08/2014 which is confirmed as correct by checking the Letter of Notice to proceed/10/ and was commissioned on 22/11/2015, which has been confirmed by checking daily operational log/15/ against the Certificate of Commissioning of Complex to the project/8/.

The details of verification against if any changes incorporated by PP during this monitoring period are provided in the respective sections and there is no significant change observed in the listed monitoring parameters since registration.

PP has provided detailed specifications in the MR section B.1. Verification team herewith confirms that the specifications of main equipment are the same as provided in the PDD/3/ and checking the nameplates photo of equipment/18/ and Equipment technical specification/7/.

Basic technical details of the project are summarized in below table.

Parameter	Unit	Value
Type	-	GE 1.6xle 50Hz WTG
Rated power	MW	1.6
Diameter of Rotor	m	82.5
Number of blades	-	3
Swept area	m^2	5,346
Rotor speed range	rpm	9 to 18
Rotational direction	-	Clockwise looking downwind
Maximum tip speed	m/s	77.2
Orientation	-	Upwind
Speed regulation	-	Pitch control
Manufacturer	-	GE
Lifetime	years	20

Interviews with operational personnel have been carried out, QMS records, maintenance records, instrument specifications were checked in this context.

	This is the 1st monitoring period and the verification team herewith confirms that the project implementation is consistent as mentioned in the PDD/3/. There are no major obstructions or gaps noted during this monitoring period. The actual distribution and operation were found in accordance with the descriptions provided in the PDD. There is no deviation / change evidenced during this monitoring period and there were no delays compared to information in approved project.
Findings	CAR 01 was raised and resolved. Refer to Appendix 4 for detail assessment.
Conclusion	According to para 354~356 of VVS version 03.0/24/, CTI confirmed that the implementation and operation of the project has been conducted in accordance with the description contained in the latest approved PDD and MR. There is no deviation or the proposed or actual changes in the implementation or operation of the project comply with the requirements of the Project standard version 03.0/23/. All physical features (technology, project equipment, and monitoring procedures) of the project specified in the PDD and MR are in place and that PP has operated the CDM project as per the latest approved PDD/3/.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[2]

There is no temporary deviation observed prior to or during this monitoring period.

E.4.2. Corrections

There is no correction observed prior to or during this monitoring period.

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

The start date of crediting period has been changed from 01/01/2014 (formerly) to 22/11/2015, the details have been verified by checking the PRC validation report/5/.
The Board has approved the change prior to the submission of the request for issuance on 10/04/2017 with PRC Reference No. PRC-8163-001 confirmed by checking the website of https://cdm.unfccc.int/PRCContainer/DB/prcp771647029/view

CL 02 was raised and resolved. Refer to Appendix 4 for detail assessment.

E.4.4. Inclusion of a monitoring plan

There is no inclusion of a monitoring plan observed prior to this monitoring period.

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

There is no permanent change from registered monitoring plan observed prior to or during this monitoring period.

E.4.6. Changes to the project design

There is a change to the project design have been approved by the Board prior to the submission of the request for issuance on 10/04/2017 with PRC Reference No. PRC-8163-001 confirmed by checking the website of https://cdm.unfccc.int/PRCContainer/DB/prcp771647029/view

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

The change to the project design is increased installed power capacity of project from 49.5MW (33*1.5MW) to 52.8MW (33*1.6MW), the details have been verified by checking the PRC validation report/5/.
CL 03 was raised and resolved. Refer to Appendix 4 for detail assessment.

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

Not applicable.

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

Means of verification	By means of comparison of the MR/1/ with the applied CDM methodology/19/ and all applicable CDM requirements, the verification team has checked whether the monitoring system is in compliance with the monitoring plan/3/ and related requirements of the applied methodology/19/, whether the source and the applied value of the monitored parameter is acceptable; whether the parameters monitored explain the operational and management structure, responsibilities and institutional arrangement for data collection/archiving, QA/QC procedures. The monitoring system applied by the project compliance with the registered monitoring plan is demonstrated as below: **Monitoring framework** The MR contains a diagram illustrating the Operations and Management Structure to be implemented by the project owner in order to implement the project activity which is confirmed consistent with the PDD. The General Manager conducts the overall responsibility for the monitoring process, monitoring Manager is responsible for supervise the implementation of the monitoring plan to assure the accuracy of the data for this monitoring period. And all the data and evidence were collected by the engineering staff and they make the daily operation and maintenance. The accounting staff is responsible for the process of power transactions with the power grid company and power sale receipts keeping and auditing staff is responsible for reviewing the data and receipt collected, ensuring the veracity and transparency of them. The organizational structure is considered sufficient to fulfil the monitoring requirements of the methodology and ensure that emission reductions verified for this monitoring period. **Monitoring equipment, data and procedures:** The monitoring procedures applied by the project compliance with the registered monitoring plan/3/ is demonstrated as below: For monitoring parameters, the quantity of net electricity generation supplied by the Project to the grid is calculated as follows: $EG_{facility,y} = EG_{export,y} - EG_{import,y}$ Where: $EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y $EG_{export,y}$ = The quantity of electricity supplied by the project plant/unit to the grid $EG_{import,y}$ = The quantity of electricity delivered to the project plant/unit from the grid The quantity of electricity supplied by the project plant/unit to the grid ($EG_{export,y}$) and the quantity of electricity delivered to the project plant/unit from the grid ($EG_{import,y}$) are monitored by two main bidirectional electricity meters with the accuracy of 0.2s (M11 and M21) which are installed as the main meters at the output side of the 132 kV substation. And the quantity of electricity is the sum of the reading of two meters. Besides, another two bidirectional electricity meters of the same accuracy of 0.2s (M12 as backup meter for M11; M22 as backup meter for M21) are also installed as

	the backup meters of the main meters of M11 and M21 located in the same location with main meters which will be used when the main meters are out of work. Main meters M11 and M21 are recorded by monitoring staffs/11/ according to the Energy Purchase Agreement/9/, and based on the monthly meter reading records, the accounting staff issued monthly receipts of power sales/purchase/12/ based on the confirmed data. The data from the receipts of power sales/purchase/12/ is crossed checked with the data from Main meters M11 and M21. The lower value for the exported electricity and the higher value for the imported electricity between receipts of power sales/purchase/12/ and Main meters M11 and M21 are used for emission reduction calculation. Besides, for all the relevant monitoring parameters used for grid emission factor calculation, via checking the latest Pakistan Energy Yearbooks/16/ issued by Ministry of Petroleum & Natural Resources, CTI confirmed that values for all the relevant monitoring parameters are correct and same to the data source and the grid emission factor is calculated based on "Tool to calculate the emission factor for an electricity system" Version 2.2.1 and using the correct data of relevant monitoring parameters. **Quality Assurance and Quality Control** The related QA/QC procedure has been conducted by PP for the monitoring process including data verification and cross check by monitoring team and project owner which has been verified by checking the monitoring electricity records/11/, receipts of power sales/purchase/12/ and calibration certificates/13/, latest Pakistan Energy Yearbooks/16/ issued by Ministry of Petroleum & Natural Resources. Via checking the calibration certificates/13/, CTI confirmed that the calibration of all the meters M11, M12, M21 and M22 have been carried out by the grid in line with the energy purchase agreement/9/ which is confirmed following the national standard/17/. CTI confirmed that the QA/QC procedure has been implemented by PP properly during this monitoring period and the data management is confirmed as effective. **Emergency Procedure** The readings of the backup meters M12 and M22 will be used for ER calculation if the main meters M11 and M21 works abnormally, and if both were malfunction, project owner and the grid company shall jointly estimate the correct reading in a conservative manner to ensure the ER calculation will not be overestimated. If the project owner and the grid company fail to mutually estimate of the correct reading, the readings will be taken as zero for conservative. Via checking all the monitoring electricity records/11/, receipts of power sales/purchase/12/ and calibration certificates/13/, CTI confirmed that no emergency happened during this monitoring period. **Data Management and Archive** Via checking the monitoring electricity records/11/, receipts of power sales/purchase/12/, calibration certificates/13/, latest Pakistan Energy Yearbooks/16/ issued by Ministry of Petroleum & Natural Resources, CTI confirmed that all the records and files are archived by project owner. All the monitored data will be kept during the whole crediting period and 2 years after the end of the crediting period or until the last issuance of CERs, whichever occurs later. In conclusion, the MP is completely in accordance with the approved methodology/19/ applied by the project and PDD/3/.
Findings	CL 04 and CAR 02, CAR 03 were raised and resolved. Refer to Appendix 4 for detail assessment.
Conclusion	The monitoring plan complies with the applied methodology and the monitoring system and all applied procedures are completely in compliance to the latest approved monitoring plan and the methodology ACM0002 (version 12.3.0) /19/.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	By means of comparison of the MR and the ER calculation with the latest approved PDD the verification team confirmed that there is no fixed ex-ante parameters determined for this project.
Findings	N/A
Conclusion	No parameters fixed ex ante have been indicated in the latest approved PDD.

E.6.2. Data and parameters monitored

Means of verification

In accordance with PS for project activities (version 03.0)/23/, VVS for project activities(version 03.0)/24/ and applied methodology included the applied tools, the verification team reviewed the MR/1/, latest approved PDD/3/, crosschecked against the other available data and documents, verified whether monitored parameters in accordance with all relevant applicable requirements in the PS/23/; whether the MR list all data and parameters to be monitored, as required by the applied methodology (ACM0002)/19/ and whether the data and parameters obtained in a reasonable way, whether the sample plan conducted accordingly, the source and the applied value of the monitored parameter is acceptable; whether the parameters monitored explain the operational and management structure, responsibilities and institutional arrangement for data collection/archiving, QA/QC procedures.

The information flow and the values in the monitoring report were verified as follows:

1. $EG_{facility,y}$

Data/Parameter	$EG_{facility,y}$
Unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Value applied for this monitoring period	306,481
Measured/calculated/ default	Measured and calculated by $EG_{facility,y} = EG_{export,y} - EG_{import,y}$
Measuring /Reading /Recording frequency	Measured continuously and recorded monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency are in line with the latest approved PDD/3/ and applied methodology/19/.
Monitoring equipment with accuracy	$EG_{export,y}$ and $EG_{import,y}$ are monitored by main meters M11 and M21 and backup meters M12 and M22 listed below,

No.	M11	M21
Meter type	ISKRA MT-860	ISKRA MT-860
Accuracy class	0.2s	0.2s
Serial number	41601054	41601050
Calibration dates	23/09/2015 20/09/2017	23/09/2015 20/09/2017
Validity	23/09/2015~	23/09/2015~

	22/09/2017 and 20/09/2017~ 19/09/2019	22/09/2017 and 20/09/2017~ 19/09/2019

No.	M12	M22
Meter type	ISKRA MT-860	ISKRA MT-860
Accuracy class	0.2s	0.2s
Serial number	41601051	41601049
Calibration dates	23/09/2015 20/09/2017	23/09/2015 20/09/2017
Validity	23/09/2015~ 22/09/2017 and 20/09/2017~ 19/09/2019	23/09/2015~ 22/09/2017 and 20/09/2017~ 19/09/2019

Is the installed monitoring equipment has been duly calibrated for this entire monitoring period?	Yes, CTI has checked all related calibration certificates/13/ and confirms that the calibration of each meter was conducted by grid company as per the EPA/9/ and national standard/17/and is valid for the entire 1st monitoring period.
How were the values in the monitoring report verified?	$EG_{facility,y}$ is calculated by below formula $EG_{facility,y} = EG_{export,y} - EG_{import,y}$ $EG_{export,y}$ and $EG_{import,y}$ are measured continuously by main meters M11 and M21, backup meters M12 and M22 installed at High Voltage Side (132kV) of the Power Transformer of the Complex with accuracy of 0.2s and recorded by monitoring staffs monthly on last day of each month during this monitoring period. The main meters monitor the amount of electricity exported to and imported from WAPDA grid by the project. The meter readings are recorded daily and aggregated monthly. The meter readings are recorded by the monitoring staffs/11/. Neither failure of main meters and backup meters were detected during the monitoring period. The reported value in the MR has been recalculated by the verification team based on the values from the monthly reports/11/. Based on monthly reports/11/, the verification team calculated the data aggregation completely independent from the calculation provided by the PP. 100% of the monthly reports have been verified. The values have been cross-checked with monthly receipts of power sales/purchase/12/ and verified as consistent. The calculated value of $EG_{facility,y}$ in the MR has been re-calculated by the verification team based on the values from the monthly meter reading records/11/ and receipts of power sales/purchase/12/ for all the listed parameters as assessed in below tables.
If applicable, has the reported data been cross-checked with other	Yes. The monthly meter reading records/11/ have been cross-checked with values in monthly receipts of power sales/purchase/12/ and verified as

available data?	consistent.
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, QA/QC procedure for monitoring staff training and competence/14/ were established and implemented. The data flow and protection process were verified via remote verification.

2. $EF_{grid,y}$

Data/Parameter	**$EF_{grid,y}$**
Unit	tCO_2e/MWh
Description	Grid Emission factor of WAPDA grid
Value applied for this monitoring period	Grid Emission Factor for year 2015: 0.6217; Grid Emission Factor for year 2016: 0.6445; Grid Emission Factor for year 2017: 0.6164;
Measured/calculated/ default	Calculated in line with the "Tool to calculate the emission factor for an electricity system" Version 2.2.1/21/
Measuring /Reading /Recording frequency	Calculated annually as per "Tool to calculate the emission factor for an electricity system" Version 2.2.1/21/ and the latest data available from the Pakistan Energy Yearbook 2014, 2015 and 2016/16/ issued by Ministry of Petroleum & Natural Resources
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency are in line with the latest approved PDD/3/ and applied methodology/19/.
Monitoring equipment with accuracy	N/A
Is the installed monitoring equipment has been duly calibrated for this entire monitoring period?	N/A
How were the values in the monitoring report verified?	$EF_{grid,y}$ is calculated annually as per "Tool to calculate the emission factor for an electricity system" Version 2.2.1/21/, and the latest data available from the Pakistan Energy Yearbook 2014, 2015 and 2016/16/ have been used for calculate the emission factor of the WPADA grid in year 2015, 2016 and 2017 which is verified in line with the request from "Tool to calculate the emission factor for an electricity system" Version 2.2.1/21/ and PDD. The reported value in the MR has been recalculated by the verification team based on the values from the Pakistan Energy Yearbook 2014, 2015 and 2016/16/ and verified as correct.
If applicable, has the reported data been cross-checked with other available data?	N/A

Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, QA/QC procedures were found to be appropriate and reliable via checking the annual data available from the Pakistan Energy Yearbook 2014, 2015 and 2016/16/.

3. $FC_{i,y}$

Data/Parameter	**$FC_{i,y}$**
Unit	Mass unit
Description	Amount of fossil fuel type *i* consumed in the project electricity system in year *y*
Value applied for this monitoring period	Refer to ER sheet/2/
Measured/calculated/ default	Default
Measuring /Reading /Recording frequency	Default data available from the Pakistan Energy Yearbook 2014, 2015 and 2016/16/ issued by Ministry of Petroleum & Natural Resources
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency are in line with the latest approved PDD/3/.
Monitoring equipment with accuracy	N/A
Is the installed monitoring equipment has been duly calibrated for this entire monitoring period?	N/A
How were the values in the monitoring report verified?	Default data available from the Pakistan Energy Yearbook 2014, 2015 and 2016/16/ issued by Ministry of Petroleum & Natural Resources
If applicable, has the reported data been cross-checked with other available data?	N/A
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	N/A

4. $NCV_{i,y}$

Data/Parameter	**$NCV_{i,y}$**
Unit	GJ/Mass unit
Description	Net calorific value (energy content) of fossil fuel type *i* in year *y*

Value applied for this monitoring period	Refer to ER sheet/2/
Measured/calculated/ default	Default
Measuring /Reading /Recording frequency	Available from IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC/28/
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency are in line with the latest approved PDD/3/.
Monitoring equipment with accuracy	N/A
Is the installed monitoring equipment has been duly calibrated for this entire monitoring period?	N/A
How were the values in the monitoring report verified?	Derived from IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC/28/
If applicable, has the reported data been cross-checked with other available data?	N/A
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	N/A

5. $EF_{CO2,y}$

Data/Parameter	**$EF_{CO2,y}$**
Unit	tCO_2/GJ
Description	CO_2 emission factor of fossil fuel type *i* used in power unit m in year *y*
Value applied for this monitoring period	Refer to ER sheet/2/
Measured/calculated/ default	Default
Measuring /Reading /Recording frequency	Available from IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC/28/
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring	Yes, the measuring and reporting frequency are in line with the latest approved PDD/3/.

methodology? (Yes / No)	
Monitoring equipment with accuracy	N/A
Is the installed monitoring equipment has been duly calibrated for this entire monitoring period?	N/A
How were the values in the monitoring report verified?	Derived from IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC/28/
If applicable, has the reported data been cross-checked with other available data?	N/A
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	N/A

6. EG_y

Data/Parameter	**EG_y**
Unit	MWh
Description	Net electricity generated by the power unit of electricity system in year y
Value applied for this monitoring period	Refer to ER sheet/2/
Measured/calculated/ default	Default
Measuring /Reading /Recording frequency	Default data available from the Pakistan Energy Yearbook 2014, 2015 and 2016/16/ issued by Ministry of Petroleum & Natural Resources
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency are in line with the latest approved PDD/3/.
Monitoring equipment with accuracy	N/A
Is the installed monitoring equipment has been duly calibrated for this entire monitoring period?	N/A
How were the values in the monitoring report verified?	Default data available from the Pakistan Energy Yearbook 2014, 2015 and 2016/16/ issued by Ministry of Petroleum & Natural Resources
If applicable, has the reported data been cross-checked with other	N/A

available data?	
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	N/A

7. $\eta_{m,y}$

Data/Parameter	$\eta_{m,y}$
Unit	-
Description	Average net energy conversion efficiency of power unit m in year y
Value applied for this monitoring period	Refer to ER sheet/2/
Measured/calculated/ default	Default
Measuring /Reading /Recording frequency	Default data available from the table in Annex 1 of the Tool to calculate the emission factor of an electricity system, version 2.2.1/21/
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency are in line with the latest approved PDD/3/.
Monitoring equipment with accuracy	N/A
Is the installed monitoring equipment has been duly calibrated for this entire monitoring period?	N/A
How were the values in the monitoring report verified?	Default data available from the table in Annex 1 of the Tool to calculate the emission factor of an electricity system, version 2.2.1/21/
If applicable, has the reported data been cross-checked with other available data?	N/A
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	N/A

Findings	CL 05 and CL 06 were raised and closed. Refer to Appendix 4 for detail assessment.
Conclusion	It can be confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with latest approved PDD and all applicable standards and relevant requirements.

E.6.3. Implementation of sampling plan

Means of verification	N/A
Findings	N/A
Conclusion	N/A

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

Means of verification	According to para 365 to 371, VVS (version 03.0)/24/, DOE shall determine whether the calibration of the measuring equipment that has an impact on the claimed GHG emission reductions or net anthropogenic GHG removals is conducted by PP at a frequency specified in the applied methodologies, the applied standardized baselines and/or the registered monitoring plan. Via checking the calibration reports/13/ of all the monitoring meters as assessed in the Section E.6.2 of this report, CTI verified that all the calibration activities during this monitoring period in compliance with the calibration requirements in national standard/17/and the calibration validity covered the entire 1st monitoring period.
Findings	N/A
Conclusion	Calibration activities during this monitoring period is in line with the calibration requirements in national standard/17/and latest approved PDD and the calibration validity covered the entire 1st monitoring period.

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	According to the latest approved PDD and applied methodology "ACM0002", "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 12.3.0/19/, the baseline GHG emissions have been calculated based on the following formula: $BE_y = EG_{facility,y} \times EF_{grid,y}$ $= EG_{facility,y} \times EF_{grid,CM,y}$ Where: BE_y = Baseline emissions in year y (tCO_2e) $EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh) $EF_{grid,CM,y}$ = Combined margin CO_2 emission factor of the WAPDA grid in year y (tCO_2/MWh) $EF_{grid,y}$ = Grid Emission factor of WAPDA grid in year y (tCO_2/MWh), equals to $EF_{grid,CM,y}$ $EG_{facility,y} = EG_{export,y} - EG_{import,y}$ Where: $EG_{facility,y}$ = Quantity of net electricity generation supplied by the Project to the grid in year *y* $EG_{export,y}$ = The electricity delivered to WAPDA by the project in year y $EG_{import,y}$ = The electricity input from the WAPDA by the project in year y For $EF_{grid,y}$ ($EF_{grid,CM,y}$), the calculation is checked in line with the Tool to calculate the emission factor of an electricity system, version 2.2.1/21/ and latest approved PDD/3/ as per below steps. The Tool to calculate the emission factor for an electricity system version 2.2.1 is used. Following the tool, this factor is calculated as a combined margin (CM), consisting of the simple average of the operating margin emission factor (OM) and the build margin (BM) emission factor: $EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$ With the input values: $EF_{grid,CM,y}$ Combined margin grid emission factor in year *y* (tCO_2/MWh)

$EF_{grid,OM,y}$	Operation margin grid emission factor in year *y* (tCO_2/MWh)
$EF_{grid,BM,y}$	Build margin grid emission factor in year *y* (tCO_2/MWh)
w_{OM}	Weighting of operation margin factor (%)
w_{BM}	Weighting of build margin factor (%)

For the calculation of these input values, below six steps are used according to Tool to calculate the emission factor of an electricity system, version 2.2.1/21/.

STEP 1. Identify the relevant electricity systems.
Via checking the Pakistan Energy Yearbook/16/, CTI confirmed that Pakistan comprised two electricity grids, the Karachi Electricity Supply Company (KESC) grid, which supplies Karachi city and adjoining areas of Sindh and Balochistan, and the national electricity grid, managed by the *Water and Power Development Authority (WAPDA).* As per the Tool to calculate the emission factor of an electricity system, version 2.2.1/21/, the WAPDA grid is determined as the relevant electricity systems due to the project is connected to the national electricity grid (WAPDA).

STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).
According to Option I of step 2 of Tool to calculate the emission factor of an electricity system, version 2.2.1/21/, off-grid power plants are not included in the calculation.

STEP 3. Select a method to determine the operating margin (OM).
Via checking the Pakistan Energy Yearbook/16/, CTI confirmed that share of low-cost/must-run resources has constituted less than 50% of total grid generation in average of the five most recent year, hence simple OM method (option a) is applicable.
For the calculation of $EF_{grid,OM,y}$, ex-post calculation is chosen in the PDD. Hence, the latest calculation of the operation margin emission factor has to be conducted in each monitoring report and the factor for the year proceeding the previous year (*y-1*) was used for the calculations which is confirmed in line with the Tool to calculate the emission factor of an electricity system, version 2.2.1/21/.

STEP 4. Calculate the operating margin emission factor according to the selected method.
Option B is chosen to calculate the OM emission factor using the total net electricity generation, emission and utilization data for each fuel type as above assessment. Via the Pakistan Energy Yearbooks/16/, the simple operation margins for the year 2015, year 2016 and year 2017 are calculated and verified as correct.

STEP 5. Calculate the build margin (BM) emission factor.
Option 2 is chosen and the build margin is updated every year of the fixed crediting period as per the PDD.
Via the Pakistan Energy Yearbooks/16/, the build margin emissions factor for the year 2015, year 2016 and year 2017 are calculated and verified as correct.

STEP 6. Calculate the combined margin (CM) emissions factor.

Due to the project is a wind power generation project activity, hence according to the Tool to calculate the emission factor of an electricity system, version 2.2.1/21/, w_{OM} = 0.75 and w_{BM} = 0.25, hence the final results of $EF_{grid,CM,y}$ are calculated as below,
0.6217 tCO_2/MWh for vintage 2015,
0.6445 tCO_2/MWh for vintage 2016,
0.6164 tCO_2/MWh for vintage 2017.

Then based on above assessment of each monitored parameters in section E.6.2 of this report, for this monitoring period the baseline emissions are calculated as 193,376 tCO_2e which is confirmed as correct.
The values monitored are transparently shown in the Monitoring Report Section D.2 and E.1. During onsite, the verification team checked and cross-checked these

	values in detail using various supporting records and documents. Refer to the section E.6.1 and E.6.2 of this report for parameters assessment. The Baseline emission calculation is provided in the Emission reduction calculation spreadsheet/2/ in a transparent manner and the calculation found correct. There is no material error noted in the accounting and application of various data against monitored parameters.
Findings	N/A
Conclusion	According to Para. 372 to 374 of VVS version 03.0/24/, the verification team checked and recalculated the baseline emission calculation sheet and confirms that: 1. A complete set of data for the specified monitoring period was available and is duly reported. 2. As indicated above, the description with regard to cross-check of reported data is included under respective parameter. 3. Appropriate methods and formulae for calculating baseline GHG emissions or baseline net GHG removals were followed. 4. Appropriate emission factor and other reference values have been correctly applied. The sheet is reproducible and calculation was correctly applied. The confirmed value of baseline emissions is 193,376 tCO_2e.

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

Means of verification	In accordance with ACM0002 ver. 12.3.0/19/, latest approved PDD/3/ and validation report/4/, for wind power project activity, PE_y = 0, hence the project emission is zero.
Findings	N/A
Conclusion	It can be confirmed that project emissions were considered to be zero.

E.8.3. Calculation of leakage GHG emissions

Means of verification	In accordance with ACM0002 ver. 12.3.0/19/, latest approved PDD/3/ and validation report/4/, no leakage is considered for the wind power project activity, leakage of the project activity is zero.
Findings	N/A
Conclusion	It can be confirmed that no leakage emissions were to be considered.

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

Means of verification	The verification team has checked if the MR includes a summary table of the emission reductions calculation specifying separately - Total baseline emissions, - Total project emissions, - Total leakage, - Total emission reductions. It has been assessed whether the values are correct or need to be revised as a consequence of issues identified above. Summary of emission reductions during the monitoring period: $ER_y = BE_y - PE_y - LE_y$ $= BE_y - 0 - 0$ $= BE_y$ Where: ER_y Emission reductions (t CO_2e) BE_y Baseline Emissions (t CO_2e) PE_y Project Emissions (t CO_2e) LE_y Project Leakages (t CO_2e) **Emission reduction calculation**

Period	Value	BE_y	PE_y	LE_y	ER_y

	(tCO_2e)	(tCO_2e)	(tCO_2e)	(tCO_2e)
22/11/2015 - 31/12/2015	8,418.38	0	0	8,418.38
01/01/2016 - 31/12/2016	100,669.84	0	0	100,669.84
01/01/2017 – 31/12/2017	84,287.94	0	0	84,287.94
Total for this monitoring period 22/11/2015 – 31/12/2017	**193,376**	**0**	**0**	**193,376**

All the figures as per the monitoring report were cross-checked by the verification team against all monitored data as assessed in the section E.6.1 and E.6.2 of this report.

Findings	N/A
Conclusion	According to Para. 372 to 374 of VVS version 03.0/24/, the verification team checked and recalculated the ER calculation sheet and confirms that: 1. A complete set of data for the specified monitoring period was available and is duly reported. 2. As indicated above, the description with regard to cross-check of reported data is included under respective parameter. 3. Appropriate methods and formulae for calculating GHG emission reductions or net GHG removals were followed. 4. Appropriate emission factor and other reference values have been correctly applied. The sheet is reproducible and calculation was correctly applied. The confirmed value of emission reductions is **193,376** tCO_2e.

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

Means of verification	Compared the monitoring report with the latest approved PDD, and found the actual value achieved during this monitoring period is 193,376 tCO_2e, which is 17.07% higher than values (165,175 tCO_2e) estimated according to the PDD calculated as below, 165,175 tCO_2e=78,196 tCO_2e/ 365days×1,037days
Findings	N/A
Conclusion	The MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the latest approved PDD. CTI confirmed that the ex-post determined value was found to be proportionally higher than the ex-ante estimated value.

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

Means of verification	On the basis of the above comparison of actual values of the monitoring period/1/ with the estimations in the latest approved PDD/3/, the verification team has checked whether an appropriate explanation is included in the MR if ex-post determined value was higher than the ex-ante estimated value. CTI confirmed that the actual emission reductions are 17.07% higher than the ex-ante estimated values in the latest approved PDD and the reasons have been assessed as below, a. Via comparing the actual value of net electricity supplied to the grid with the estimated value in latest approved PDD/3/, CTI confirmed that net electricity supplied to the grid during this current monitoring period is 306,481MWh, which is 5.52% higher than the value in the PDD (137,500MWh/yr*771d/365d = 290,445MWh), which is confirmed within a reasonable fluctuation range for the wind power project depending on the wind sources based on the expertise of verification team. Furthermore, due to the verification of 2nd monitoring period (01/01/2018 to 31/12/2020) was conducted together with 1st verification, via checking the total amount of net electricity supplied to the grid for the two monitoring periods (i.e. 22/11/2015-31/12/2020, 1,867days), CTI confirmed that the actual value of net electricity supplied to the grid is 640,873MWh (=306,481MWh+334,392MWh), which is 9% less than the value in the PDD (137,500MWh/yr*1,867d/365d= 703,321MWh), hence, CTI verified that the electricity value was fluctuated and

	there is no risk of significant higher value occurred for a long period. b. The grid emission factor is ex post determined and the calculation result for each vintage year during this monitoring period is 9.32%, 13.33% and 8.39% higher than the ex-ante figure (0.5687 tCO_2e/MWh). By using the actual grid emission factor for ex ante ER value calculation, CTI confirmed that the ER amounts achieved in 2015 and 2017 are lower than the PDD estimated and only 2016 higher, which is confirmed as reasonable for the wind project.
Findings	CL 07 was raised and closed. Refer to Appendix 4 for detail assessment.
Conclusion	No further justification or explanation is deemed required.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The verification team has checked chapter E.4 of the MR and the emission reduction calculation sheet/2/. The MR in section E.4 includes a summary table of the ER breakdown *a) ER up to 01/01/2013 and* *b) ER from 01/01/2013 until 31/12/2020* *c) ER from 01/01/2021 onwards* Via checking the MR and ER sheet, CTI confirmed that ERs have completely been generated within the period from 01/01/2013 until 31/12/2020, among the actual value achieved during this monitoring period of 193,376 tCO_2e
Findings	N/A
Conclusion	The data provided in the MR is correct as well as the related breakdown. The pro-rata approach was correctly applied to the calculations of GHG emission reductions or net anthropogenic GHG removals in accordance with the project standard, as the monitoring period starts after 01/01/2013 and before 31/12/2020.

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

Means of verification	There were no sustainable development co-benefits monitored by the project participants for the registered CDM project activity.
Findings	N/A
Conclusion	N/A

E.10. Global stakeholder consultation

Means of verification	The project MR was published for GSC on 27/08/2021 and comment period is ended on 17/09/2021. There were no comments received during stakeholder consultation conducted after the publication of the 1st monitoring report.
Findings	N/A
Conclusion	N/A

SECTION F. Internal quality control

The final verification report was undergone a technical review by a qualified independent reviewer before requesting issuance of the project activity. The technical review was performed by a technical reviewer qualified in accordance with CTI's qualification scheme for CDM validation and verification that meets the criteria of EB guidelines for qualification.

SECTION G. Verification opinion

The verification team assigned by the DOE (CTI) concludes that the 1st periodic verification of CDM project "Sapphire 49.5 MW Wind Farm Project" in Sindh Province, Pakistan, as described in the latest approved PDD and final version of monitoring report, meets all relevant requirements of the UNFCCC for CDM Project Activities including article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakesh Accords) project activities including carbon dioxide capture and storage in geological formation and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification is conducted in-line with the VVS requirements.

The project activity was correctly implemented according to selected monitoring methodology and monitoring plan. The collected monitoring data allowed to verify the amount of achieved GHG emission reductions. Thus, CTI is pleased to issue a positive verification opinion.

SECTION H. Certification statement

Shenzhen CTI International Certification Co., Ltd (CTI) has performed the 1st periodic verification of the emission reductions that have been reported for the CDM project "Sapphire 49.5 MW Wind Farm Project" in Sindh Province, Pakistan for the period 22/11/2015 to 31/12/2017.

The verification is based on the baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.3.0), the latest approved PDD and final version of monitoring report. The verification consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up remote verification and interviews with project participants; iii) resolution of outstanding issues and the issuance of the final verification and certification report.

The PP are responsible for the collection, calculation and determination of the GHG data in accordance with the monitoring plan and the reporting of GHG emission reductions on the basis set out within the project monitoring report.

It is CTI's responsibility to provide an independent verification statement on the reported GHG emission reductions for the project. Based on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these, CTI planned and performed our work to obtain the information and explanations that we considered necessary to provide reasonable assurance that reported GHG emission reductions are fairly stated.

CTI confirms that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI confirms that the emission reductions from the "Sapphire 49.5 MW Wind Farm Project" in Sindh Province, Pakistan during the monitoring period 22/11/2015 to 31/12/2017 as follows:

Monitoring Period Number: 1st

Monitoring period: 22/11/2015 to 31/12/2017 Emission reductions: 193,376 tCO_2e

Du wenjun

Mr. Du Wenjun
Team Leader
17/12/2021

Wu Lin

Mr. Lin Wu
Technical Reviewer
17/12/2021

Appendix 1. Abbreviations

Abbreviations	Full texts
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DverR	Draft Verification Report
EPA	Energy Purchase Agreement
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse gas(es)
MP	Monitoring Plan
MR	Monitoring Report
WAPDA	Water and Power Development Authority Grid
PA	Project Activity
PDD	Project Design Document
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
XLS	Emission Reduction Calculation Spread Sheet

Appendix 2. Competence of team members and technical reviewers

Mr. Wenjun DU

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	√	√	√	√	-	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:

Wu LIN Wu Lin

Technical Competent Manager

Shenzhen, 01/01/2021

Mr. Wu LIN

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	√	√	√	√	√	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation
	TA 1.2: Energy generation from renewable energy sources
SS 2: Energy distribution	TA 2.1: Electricity distribution
SS 3: Energy demand	TA 3.1: Energy demand
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 5: Chemical industry	TA 5.1: Chemical industry
	TA 5.2: Caprolactam, nitric and adipic acid
SS 10: Fugitive emissions from fuels (solid, oil and gas)	TA 10.1: Fugitive emissions from oil and gas
SS 11: Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	TA 11.1: Emissions of fluorinated gases
	TA 11.2: Refrigerant gas production
SS 12: Solvents use	TA 12.1: Chemical industry
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:

Lu ZHOU

General Manager

Shenzhen, 01/01/2021

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	UPM Umwelt-Projekt-Management GmbH	Monitoring Report	Monitoring Report of Sapphire 49.5 MW Wind Farm Project • version 1, dated 26/08/2021 • version 2, dated 27/10/2021	UPM Umwelt-Projekt-Management GmbH
2.	UPM Umwelt-Projekt-Management GmbH	Emission Reduction Calculation Sheets	Emission Reduction Calculation sheets (related to MR) • version 1, dated 26/08/2021 • version 2, dated 08/10/2021	UPM Umwelt-Projekt-Management GmbH
3.	UNFCCC	Project Design Document	Latest Approved Project Design Document for CDM project: "Sapphire 49.5 MW Wind Farm Project", version 1.5, dated 28/12/2016	UNFCCC website
4.	BV	Validation Report	Validation Report for CDM project "Sapphire 49.5 MW Wind Farm Project" Revision No. 04, dated 30/10/2012	UNFCCC
5.	TÜV NORD	Post Registration Report	Post Registration Report for CDM project "Sapphire 49.5 MW Wind Farm Project", version 01, dated 17/01/2017	UNFCCC
6.	The companies regulation	Business License	Business License of Sapphire Wind Power Co. Ltd.	Project Owner
7.	GE	Equipment technical specification	Equipment technical specification	Project Owner
8.	Project Owner, REEE (Pvt) Ltd and GOPA International Energy Consultant GMBH	Certificate of Commissioning	Certificate of Commissioning of Complex to the project issued on 21/11/2015	Project Owner
9.	Project Owner and National Transmission & Dispatch Company Ltd.[3]	Energy Purchase Agreement	Energy Purchase Agreement signed on 17/02/2014, valid in year 2014, 2015 and 2016 covering this monitoring period	Project Owner
10.	Project Owner	Letter of Notice to proceed	Letter of Notice to proceed dated on 28/08/2014	Project Owner
11.	Project Owner	Meter Reading Records	Monthly Meter Reading Records for main meters and backup meters covering this monitoring period	Project Owner
12.	National Transmission & Dispatch Company Ltd.	Receipts	1. Monthly Electricity sales receipts covering this monitoring period 2. Monthly Electricity purchases receipts covering this monitoring period	Project Owner
13.	National Transmission & Dispatch Company Ltd.	Calibration certificates	Calibration certificates for all the monitoring meters covering this monitoring period	Project Owner
14.	Sapphire Wind Power Co. Ltd.	Training and Competence Records	Project Responsibilities, Training and Competence Records in this monitoring period • Staff Training Records	Project Owner

[3] Refer to the footnote 9 in PDD for the function of National Transmission & Dispatch Company Ltd.

No.	Author	Title	References to the document	Provider
			• Competence of staffs	
15.	Sapphire Wind Power Co. Ltd.	LOG	Operation and management of project logs covering this monitoring period	Project Owner
16.	Ministry of Petroleum & Natural Resources	Pakistan Energy Yearbooks	Pakistan Energy Yearbooks 2012, 2013, 2014, 2015 and 2016	Project Owner
17.	National standard	National standard for meters and calibration	IEC 62052-11, IEC 62053-22 and IEC – 62053-23	Project Owner
18.	Project Owner	Videos and photos	Videos and photos of project site, main equipment, monitoring devices and control room and project implementation	Project Owner
19.	UNFCCC	Applied methodology	Approved CDM methodology ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.3.0)	UNFCCC Website
20.	UNFCCC	Methodological Tool	"Tool for the demonstration and assessment of additionality" (Version 6.0.0)	UNFCCC Website
21.	UNFCCC	Methodological Tool	"Tool to calculate the emission factor for an electricity system" (version 2.2.1)	UNFCCC Website
22.	EB	EB 110th and 112th meeting reports	EB 110th meeting report EB 112th meeting report	UNFCCC Website
23.	UNFCCC	Project Standard	CDM project standard for project activities (Version 03.0)	UNFCCC
24.	UNFCCC	Validation and Verification Standard	CDM validation and verification standard for project activities (Version 03.0)	UNFCCC
25.	UNFCCC	Project Cycle Procedure	CDM project cycle procedure for project activities (Version 03.0)	UNFCCC
26.	UNFCCC	Kyoto Protocol	Kyoto Protocol (1997)	UNFCCC
27.	UNFCCC	Monitoring Report Form	Monitoring Report Form (F-CDM-MR), Version 09.0	UNFCCC
28.	Intergovernmental Panel on Climate Change	IPCC Guidelines	2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC	www.ipcc-nggip.iges.or.jp
29.	Google	Google Earth Map	Google Earth Map earth.google.com/	Website
30.	UNFCCC	UNFCCC	http://cdm.unfccc.int	Website
31.	UPM Umwelt-Projekt-Management GmbH	Purchase Order of CER of the project	issued on 07/08/2021	Project Owner

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

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

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

Table 2. CL from this verification

CL ID	01	**Section no.**	A	**Date: 30/09/2021**
Description of CL				
In cover page and section A.5 of the MR, if the first and last day included into the monitoring period and crediting period is not clarified.				
Project participant response				**Date:** 08/10/2021
Yes, revised. The monitoring period is 22/11/2015-31/12/2017 (first and last day included), and the crediting period is 22/11/2015-21/11/2025 (first and last day included). See revised MR (version 2).				
Documentation provided by project participant				
/1/-V2				
DOE assessment				**Date:** 15/10/2021
The MR is revised accordingly, CTI confirmed that the related information has been added which is confirmed as correct and reasonable. CL 01 is closed.				

CL ID	02	**Section no.**	B.2.3	**Date: 30/09/2021**
Description of CL				
In section B.2.3, the description of change to the start date of the crediting period is not clarified in line with the requirement of MR FORM.				
Project participant response				**Date:** 08/10/2021
Yes, it has been added in the MR (version 2) as follows: Such change belongs to the category (b), i.e. *(b) Change that has been approved by the Board or notified to the secretariat and that affects the start of this monitoring period (i.e. the changed start date is the start of this monitoring period).* See MR (version 2).				
Documentation provided by project participant				
/1/-V2				
DOE assessment				**Date:** 15/10/2021
The MR is revised accordingly, CTI confirmed that the related information has been added and confirmed in line with the requirement of MR FORM. The start date of crediting period has been changed from 01/01/2014 (formerly) to 22/11/2015, the details have been verified by checking the PRC validation report/5/. The Board has approved the change prior to the submission of the request for issuance on 10/04/2017 with PRC Reference No. PRC-8163-001 confirmed by checking the website of https://cdm.unfccc.int/PRCContainer/DB/prcp771647029/view. CL 02 is closed.				

CL ID	03	**Section no.**	B.2.6	**Date: 30/09/2021**
Description of CL				
In section B.2.6, the description of change to the project design is not clarified in line with the requirement of MR FORM.				

Project participant response	Date: 08/10/2021
Yes, it has been added in the MR (version 2) as follows: Such change belongs to the category (b), i.e. (b) *Changes that have been approved by the Board as applicable from this monitoring period*.	
Documentation provided by project participant	
/1/-V2	
DOE assessment	**Date:** 15/10/2021
The MR is revised accordingly, CTI confirmed that the related information has been added and confirmed in line with the requirement of MR FORM. There is a change to the project design have been approved by the Board prior to the submission of the request for issuance on 10/04/2017 with PRC Reference No. PRC-8163-001 confirmed by checking the website of https://cdm.unfccc.int/PRCContainer/DB/prcp771647029/view The change to the project design is increased installed power capacity of project from 49.5MW (33*1.5MW) to 52.8MW (33*1.6MW), the details have been verified by checking the PRC validation report/5/. CL 03 is closed.	

CL ID	04	Section no.	C	Date: 30/09/2021
Description of CL				
1. In section C, PP stated that "Testing and calibration of all the meters M11, M12, M21 and M22 have been carried out by the grid as per the specification of the energy purchase agreement (EPA)", which is not in line with the request in PDD that "The method of calibration and frequency of tests will be agreed between SWPCL and the grid company based on the manufacturer's recommendations and national standards". Clarification is requested. 2. Who and how to issue the receipts of power sales/purchase is not clarified. 3. If any emergency happened during this monitoring period is not clarified.				
Project participant response				**Date:** 08/10/2021
1. Yes. The project was registered on 14/11/2012, at that time, the energy purchase agreement is not signed between SWPCL and the grid company yet. The calibration and frequency of tests is agreed between SWPCL and the grid company based on the manufacturer's recommendations and national standards, which is incorporated in the energy purchase agreement (EPA) that was signed on 20/02/2014. It means, the "agreed between SWPCL and the grid company based on the manufacturer's recommendations and national standards" refers to the EPA signed. Therefore, it is in line with the registered PDD. Hereby, regarding "Testing and calibration of all the meters M11, M12, M21 and M22 have been carried out by the grid as per the specification of the energy purchase agreement (EPA)", one footnote is added for clarification in the MR, i.e. This EPA is agreed between SWPCL and the grid company based on the manufacturer's recommendations and national standards. 2. Revised. The accounting staff issues the receipts of power sales/purchase to the grid company every month and then keeps the receipts of power sales/purchase. See MR (version 2). 3. Added. No emergency happened during this monitoring period.				
Documentation provided by project participant				
/1/-V2 /9/ /12/ /11/ /13/ /17/				
DOE assessment				**Date:** 15/10/2021
1. The MR is revised accordingly, CTI confirmed that the clarification has been provided. Via checking the signed EPA/9/, it is confirmed that the method of calibration and frequency of tests will be agreed between SWPCL and the grid company based on the manufacturer's recommendations and national standards and the information has been incorporated in the signed energy purchase agreement (EPA), hence, it is reasonable that testing and calibration of all the meters M11, M12, M21 and M22 have been carried out by the grid as per the specification of the energy purchase agreement (EPA). Based on checking the national standard/17/, CTI confirmed that the grid company conducted clarification is in line with the national standard. 2. The MR is revised accordingly, CTI confirmed that the clarification has been provided. Via checking the receipts of power sales/purchase/12/ to the grid company, it is confirmed that the information is correct and reasonable. 3. The MR is revised accordingly, CTI confirmed that the clarification has been provided. Via checking all the monitoring electricity records/11/, receipts of power sales/purchase/12/ and calibration certificates/13/, CTI confirmed that no emergency happened during this monitoring period.				

CL 04 is closed.

CL ID	05	Section no.	D.2	Date: 30/09/2021
Description of CL				
In section D.2, for parameter $EG_{facility,y}$, the calibration status is not provided following with the requirement in PDD.				
Project participant response				**Date:** 08/10/2021
Revised. Monitoring equipments are tested and maintained in accordance with the manufacturer's recommendations and national standards (IEC 62052-11, IEC 62053-22 and IEC – 62053-23). See MR (version 2).				
Documentation provided by project participant				
/1/-V2 /17/				
DOE assessment				**Date:** 15/10/2021
The MR is revised accordingly, CTI confirmed that the grid company conducted clarification is in line with the national standard which is in line with the requirement in PDD. CL 05 is closed.				

CL ID	06	Section no.	D.2	Date: 30/09/2021
Description of CL				
In section D.2, for parameter $EF_{grid,y}$, 1. Why the Pakistan Energy Yearbook 2014, 2015 and 2016 is applicable for calculation the EF of year 2015, 2016 and 2017 is not clarified. 2. The description of Pakistan Energy Yearbook in "Additional comment" is not same to above sections.				
Project participant response				**Date:** 08/10/2021
1. For grid emission factor calculation for year 2017, 2016 and 2015, the latest published Pakistan Energy Yearbook is Pakistan Energy Yearbook 2016, 2015 and 2014, respectively. Refer to section E.1 of the MR for details. 2. Typo revised. See MR (version 2).				
Documentation provided by project participant				
/1/-V2 /16/				
DOE assessment				**Date:** 15/10/2021
1. The MR is revised accordingly, CTI confirmed that the clarification has been added and via checking the Pakistan Energy Yearbook 2014, 2015 and 2016 /16/, it is confirmed that the latest published Pakistan Energy Yearbook is Pakistan Energy Yearbook 2016, 2015 and 2014 corresponding to grid emission factor calculation for year 2017, 2016 and 2015, this is also confirmed in line with the ex post calculation method of EF in the tool/21/. 2. The MR is revised accordingly, typo has been changed and description of Pakistan Energy Yearbook is consistent with other parts. CL 06 is closed.				

CL ID	07	Section no.	D.2	Date: 30/09/2021
Description of CL				
In section E.6, 1. The estimated ER value based on actual $EF_{grid,y}$ value of 2015, 2016 and 2017 is not calculated to compare with the actual ER value achieved in this monitoring period. 2. PP stated that due to richer wind resources, the net electricity supplied to the grid is higher than PDD, however, it is not clear that wind resources is richer than which value, clarification is requested.				
Project participant response				**Date:** 08/10/2021
1. Yes, revised. The estimated ERs based on the ex ante energy value in the PDD and actual $EF_{grid,y}$ value of 2015, 2016 and 2017 are calculated and compared with the actual ER achieved during this monitoring period. See MR (version 2). 2. Yes, more information is added. The net electricity supplied to the grid during this current monitoring period is 306,481MWh, which is 5.52% higher than the value in the PDD (137,500MWh/yr*771d/365d = 290,445MWh). If plus the net electricity supplied to the grid during the monitoring period (01/01/2018-31/12/2020) i.e. 334,392MWh , then the total amount of net electricity supplied to the grid for the two monitoring periods (i.e. 22/11/2015-31/12/2020, 1,867days) is 640,873MWh (=306,481MWh+334,392MWh), which is 9% less than the value in the PDD (137,500MWh/yr*1,867d/365d=703,321MWh); See MR (version 2) for details.				

Documentation provided by project participant	
/1/-V2	
DOE assessment	**Date:** 15/10/2021
1. The MR is revised accordingly, CTI confirmed that the related information has been added. The grid emission factor is ex post determined and the calculation result for each vintage year during this monitoring period is 9.32%, 13.33% and 8.39% higher than the ex-ante figure (0.5687 tCO_2e/MWh). By using the actual grid emission factor for ex ante ER value calculation, CTI confirmed that the ER amounts achieved in 2015 and 2017 are lower than the PDD estimated and only 2016 higher, which is confirmed as reasonable for the wind project. 2. The MR is revised accordingly, CTI confirmed that the description is updated accordingly. Via comparing the actual value of net electricity supplied to the grid with the estimated value in latest approved PDD/3/, CTI confirmed that net electricity supplied to the grid during this current monitoring period is 306,481MWh, which is 5.52% higher than the value in the PDD (137,500MWh/yr*771d/365d = 290,445MWh), which is confirmed within a reasonable fluctuation range for the wind power project depending on the wind sources based on the expertise of verification team. Furthermore, due to the verification of 2nd monitoring period (01/01/2018 to 31/12/2020) was conducted together with 1st verification, via checking the total amount of net electricity supplied to the grid for the two monitoring periods (i.e. 22/11/2015-31/12/2020, 1,867days), CTI confirmed that the actual value of net electricity supplied to the grid is 640,873MWh (=306,481MWh+334,392MWh), which is 9% less than the value in the PDD (137,500MWh/yr*1,867d/365d= 703,321MWh), hence, CTI verified that the electricity value was fluctuated and there is no risk of significant higher value occurred for a long period. CL 07 is closed.	

Table 3. CAR from this verification

CAR ID	01	**Section no.**	B.1	**Date: 30/09/2021**
Description of CAR				
1. The construction start date of project is not provided. 2. The energy flow direction is missing in the technical processes diagram. Revision is requested.				
Project participant response				**Date:** 08/10/2021
1. Added. The construction date of the project is 28/08/2014. See MR (version 2); 2. The energy flow direction is added in the technical diagram. See MR (version 2).				
Documentation provided by project participant				
/1/-V2 /10/				
DOE assessment				**Date:** 15/10/2021
1. The revised description in MR is checked, CTI confirmed that the construction start date 28/08/2014 of project is provided which is confirmed as correct by checking the Letter of Notice to proceed/10/. 2. The revised description in MR is checked, CTI confirmed that the energy flow direction has been added in the technical processes diagram which is verified as consistent with the PDD and actual status of project by checking the Energy Purchase Agreement/9/. CAR 01 is closed.				

CAR ID	02	**Section no.**	C	**Date: 30/09/2021**
Description of CAR				
For monitoring system, 1. Role of general manager is not provided. 2. The actual status of the monitoring system needs to be stated but not the future tense.				
Project participant response				**Date:** 08/10/2021
1. Yes, role of General Manager is provided in the MR (version 2). 2. Yes, revised, see MR (version 2).				
Documentation provided by project participant				
/1/-V2				
DOE assessment				**Date:** 15/10/2021
1. The revised description in MR is checked, CTI confirmed that the role of general manager is added which is confirmed as actual via interview with representatives of project owner. 2. The revised description in MR is checked, CTI confirmed that the actual status of the monitoring system has been stated and no future tense is applied which is verified as correct. CAR 02 is closed.				

CAR ID	03	**Section no.**	C	**Date: 30/09/2021**

Description of CAR	
1. The locations of main meters and backup meters are not consistent with the PDD. 2. The relationship between the two main meters and value of electricity exported to the grid ($EG_{export,y}$) and imported from the grid ($EG_{import,y}$) is not provided. 3. The energy flow direction is missing in the monitoring system diagram. Revision is requested.	
Project participant response	**Date:** 08/10/2021
1. Yes, revised, see MR (version 2). 2. Yes, revised. The net electricity supplied to grid ($EG_{facility,y}$) is the difference between the electricity exported to the grid ($EG_{export,y}$) and imported from the grid ($EG_{import,y}$), i.e. $EG_{export,y}$ - $EG_{import,y}$. See MR (version 2). 3. Yes, the energy flow direction is added in the monitoring system diagram. See MR (version 2).	
Documentation provided by project participant	
/1/-V2 /9/	
DOE assessment	**Date:** 15/10/2021
1. The revised description in MR is checked, CTI confirmed that the locations of main meters and backup meters are updated in line with the PDD and verified as same to the actual situation via checking the Energy Purchase Agreement/9/. 2. The revised description in MR is checked, CTI confirmed that the relationship has been added. Value of electricity exported to the grid ($EG_{export,y}$) and imported from the grid ($EG_{import,y}$) is the sum of the two main meters. 3. The revised description in MR is checked, CTI confirmed that the energy flow direction has been added in the monitoring system diagram which is verified as consistent with the PDD and actual status of project by checking the Energy Purchase Agreement/9/. CAR 03 is closed.	

Table 4. FAR from this verification

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

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Document information

Version	*Date*	*Description*
04.0	6 April 2021	Revision to: • Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN); • Make structural and editorial improvements.
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.

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