Verification and certification report form for CDM project activities (Version 03.0)

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	Zhangjiakou Chabei Wind Farm Project (4844)
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the verification and certification report	Version 01
Completion date of the verification and certification report	26/04/2020
Monitoring period number and duration of this monitoring period	The 5th monitoring period 27/05/2018-29/02/2020
Version number of monitoring report to which this report applies	Version 02
Crediting period of the project activity corresponding to this monitoring period	Type: Renewable Start data: 27/05/2018 for the second crediting period Length: 7 years
Project participants	CGN (Chabei) Wind Power Co., Ltd. (Project owner)
Host Party	People's Republic of China
Applied methodologies and standardized baselines	Selected methodology: ACM0002, "Grid-connected electricity generation from renewable sources", (Version 19.0)
Mandatory sectoral scopes	N/A
Conditional sectoral scopes, if applicable	Sectoral scope 1: Energy industries (renewable-/non-renewable sources)
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	316,941tCO_2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	282,810tCO_2e
Name and UNFCCC reference number of the DOE	Shenzhen CTI International Certification Co., Ltd (CTI)
Name, position and signature of the approver of the verification and certification report	Zhou Lu, General Manager

SECTION A. Executive summary

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Shenzhen CTI International Certification Co., Ltd (CTI) has performed the verification of the emission reductions reported for the "Zhangjiakou Chabei Wind Farm Project" in China (UNFCCC Ref. No. 4844) for the period 27/05/2018-29/02/2020. The project is a 100.5 MW wind power farm and locates in Chabei District, Zhangjiakou City, Hebei Province, P. R. China. The geographical coordinates of the wind farm are east longitude 114.8158°and north latitude 41.4569°. The project activity was registered as a CDM project on 27/05/2011 and renewed for the second crediting period on 25/04/2019. The first crediting period is from 27/05/2011 to 26/05/2018 and the second period is from 27/05/2018-26/05/2025 (Renewable). The selected monitoring period 27/05/2018-29/02/2020 is the 5th monitoring period of the project, which is within the second crediting period 27/05/2018-26/05/2025. The project installs 67 wind turbine generators with a rated capacity of 1,500kW each, the electricity generated by the project activity was supplied to the North China Power Grid (hereafter referred to as "NCPG"), and the project is estimated to deliver 179,633 tonnes CO_2 emission reduction annually in the second crediting period.

The scope of the verification is to verify that:

- The project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD;
- The monitoring plan complies with the monitoring methodology and the actual monitoring complies with the monitoring plan, including compliance with any guidance provided by the Board regarding deviations from the provisions of a registered plan and/or methodology;
- The data and calculation of GHG emission reductions have been assessed to correctly support the emission reductions being claimed.

The verification team identified one CL in this monitoring period, and no CAR or FAR was raised. The CL was satisfactorily addressed by the project participants in the revised monitoring report (refer to Appendix 4 for further details). All changes made to the monitoring report (version 02 dated 24/04/2020) are as a result of the verification findings.

In CTI's opinion, the GHG emission reductions reported for the project in the monitoring report (version 02 dated 24/04/2020) are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0002 (Version 19.0) and the monitoring plan contained in the Project Design Document (version 2.1 dated 11/01/2019).

CTI confirmed 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 Zhangjiakou Chabei Wind Farm Project during the period 27/05/2018-29/02/2020 amount to 282,810tCO_2e.

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	Interview(s	Verification findings
1.	Team Leader	IR	Zhang	Lei	N/A	√	√	√	√
2	Team Member	IR	Wang	Guolian	N/A	√	√	√	√

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	Shunrong	N/A
2.	Approver	IR	Zhou	Lu	N/A

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 (which may be more likely to occur if personnel are unfamiliar with, or not well trained regarding, emissions processes or data recording);	Low	The project owner has established the CDM monitoring and management manual and appointed the CDM technical staffs, CDM accountant staffs and CDM manager which were trained to responsible for power meters reading and recording, auditing of these metered data. The installation and calibration of monitoring meters was also stipulated in the manual. The CDM monitoring and management manual has also established	Depending on the monitoring period being verified, conduct increased sampling 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; for example, the use of spreadsheets without adequate controls related to data	Low		Depending on the monitoring period being verified, conduct increased sampling during the months when there is a greater likelihood of errors and issues with data quality control due to project participants' leave schedules.

	changes/updates, version tracking, traceability, security, etc.		the QA/QC procedure to ensure the veracity and validity of the monitoring procedure and monitoring records. So the risk level is low.	
3.	Manual adjustment of otherwise automatically recorded activity levels; for example, manual input may be required if a flare meter becomes overloaded.	Low		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.

C.2. Consideration of materiality in conducting the verification

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(1) As per the "Application of materiality in verifications (Version 02.0)" which enters into force on 01/04/2015, the project is a large-scale CDM project activity achieving total emission reductions of <300,000 tons of CO_2e per year; as such, a 2 per cent materiality threshold is applied.

(2) The parameters used for determining the project's baseline emissions are the monitoring of $EG_{export,y}$, $EG_{import,y}$, and $E_{facility,y}$ which according to the monitoring plan are recorded at 24:00 of last day of each month and the data was collected to the monthly reading records. By cross-checking all the monthly reading records against ETNs (i.e. records for sold electricity), CTI confirms that all values of parameters are accurate.

(3) No errors are identified in the additional data set, and the DOE proceeds with the remaining elements of the verification as defined in its verification plan.

SECTION D. Means of verification

D.1. Desk/document review

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The monitoring report was published on UNFCCC website on 23/03/2020. In addition to the monitoring report (Version 01 dated 10/03/2020 and updated version 02 dated 24/04/2020) /1/, CTI reviewed:

- The PDD for the project activity /21/ including the monitoring plan, the corresponding validation report /17/, validation opinion /20/ and the previous verification /18/ /19/;
- Baseline and monitoring methodology ACM0002 (version 19.0) applied by the project /25/;
- Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /22/ - /28/; and
- Other information and references relevant to the project activity /2/-/16/.

During the desk review, CTI has applied standard auditing techniques to assess the quality of information provided. The following activities were performed:

- A review of the data and information presented to verify their completeness;

- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures; and
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

D.2. On-site inspection

Duration of on-site inspection: 17/04/2020-17/04/2020				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	An assessment of the implementation and operation of the registered project activity is as per the PDD for the project activity	The project plant and the transformer station	17/04/2020	Zhang Lei Wang Guolian
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	The office of the project.	17/04/2020	Zhang Lei Wang Guolian
3.	Determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD	The office of the project.	17/04/2020	Zhang Lei Wang Guolian
4.	A cross-check between information provided in the monitoring report and data from other sources such as plant logbooks and electricity sale receipts	The project plant and the office of the project.	17/04/2020	Zhang Lei Wang Guolian
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology	The project plant, the transformer station and the office of the project.	17/04/2020	Zhang Lei Wang Guolian
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	The office of the project.	17/04/2020	Zhang Lei Wang Guolian
7.	An identification that quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters	The project plant, the transformer station and the office of the project.	17/04/2020	Zhang Lei Wang Guolian

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Liu	Yang	CGN Carbon Asset Management (Beijing) Co.,Ltd	17/04/2020	- Project design and implementation - Monitoring Plan - Monitoring data and Monitoring Report - GHG Calculations	Zhang Lei Wang Guolian
2	Wu	Yulong	CGN (Chabei) Wind Power Co., Ltd.	17/04/2020	- Project design and implementation - Technical equipment, including calibration and operation - Monitoring Plan and management procedures - Monitoring data - Data uncertainty and residual risks (QA/QC)	Zhang Lei Wang Guolian

D.4. Sampling approach

>> NA

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	-	-	-
Compliance of the project implementation and operation with the registered PDD	-	-	-
Post-registration changes	-	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tool and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	1	-	-
Assessment of data and calculation of emission reductions or net removals	-	-	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	1	-	-

SECTION E. Verification findings

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

Means of verification	Document review the monitoring report against the monitoring report form.
Findings	By checking the MR, CTI confirmed that the CDM-MR-FORM version 07 has been applied correctly and the implementation status of the project activity during the monitoring period was described in section B.1 of the MR
Conclusion	CTI confirms that the version of the CDM-MR-FORM (version 07) applied for the MR is valid at the time of MR made publicly available on the UNFCCC website and the input is according to the instructions for filling out the monitoring report form.

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

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By checking the validation report /16/, the previous verification report /18/ /19/ and the validation opinion /20/ of the project listed in EB website, CTI confirmed that no remaining forward action requests were identified from the validation and previous verifications

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

Means of verification	CTI conducted the document review and performed on-site assessment with project participants to: - An assessment of the implementation and operation of the registered project activity is as per the PDD for the project activity - A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology.
Findings	The project is a 100.5 MW wind power farm and locates in Chabei District, Zhangjiakou City, Hebei Province, P. R. China. The project installs 67 wind turbine generators with a rated capacity of 1,500kW each. The details of installed turbines with respect to installation and capacity have been verified by CTI through checking the wind turbine nameplate and turbine purchase agreement /16/ during on-site visit to be consistent with description indicated in the approved updated PDD /21/. The first wind turbine was put into commercial operation in 25/03/2011 and the last wind turbine was put into commercial operation in 05/2011 /12/. The electricity generated by the project activity was supplied to the NCPG, which can be confirmed by the Power purchase agreement (PPA) signed between CGN (Chabei) Wind Power Co., Ltd. and Zhangjiakou Power (Group) Co., Ltd /4/. All the monitoring system in operation period is consistent with the description in the approved updated PDD. The control system at the power plant is automated and assures continuous operation, including monitoring on malfunction of equipment. By checking the daily operation and maintenance records /7/, CTI can confirm that no serious malfunction happened and the plant was under a normal operation as

	expected in this monitoring period.
Conclusion	The verification team confirmed through visual inspection and document review that all physical features of the proposed CDM project activity including data collection systems and storage systems have been implemented in accordance with the approved updated PDD.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[1]

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N/A. It is confirmed during on-site visit that the project activity is not involved in any temporary deviations during the monitoring period

E.4.2. Corrections

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N/A. It is confirmed during on-site visit that the project activity is not involved in any corrections during the monitoring period.

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

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The start date of crediting period is 27/05/2011, which is changed from 01/07/2011.
Refer to https://cdm.unfccc.int/Projects/DB/DNV-CUK1306154648.92/view

E.4.4. Inclusion of a monitoring plan

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N/A. The registered PDD has included the monitoring plan.

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

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N/A. It is confirmed during on-site visit that the project activity is not involved in any permanent changes during the monitoring period.

E.4.6. Changes to the project design

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N/A. It is confirmed during on-site visit that the project activity is not involved in any changes to the project design during the monitoring period.

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

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N/A

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

Means of verification	CTI conducted the document review and performed on-site assessment with the compliance check of the monitoring plan with the applied methodology including applicable tools.

[1] 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).

Findings	All parameters stated in the monitoring plan are in compliance with the applied methodology, i.e. ACM0002 (version 19.0), and monitored and reported appropriately. The monitoring report lists each parameter required by the monitoring plan and the information flow (i.e. from data generation, aggregation, recording, calculation and reporting) for these parameters is provided. On-site training for the CDM related procedures including monitoring, recording and reporting was verified to be in place and their implementation was confirmed by interview with the key operators and observing the operation.
Conclusion	CTI confirmed that the monitoring plan is in accordance with the approved methodology applied by the project activity, i.e. ACM0002 (version 19.0) /25/.

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	"Data and parameters fixed ex ante" in the MR are checked against the approved updated PDD /21/
Findings	The parameter $EF_{grid, CM, y}$ is emission factor of the grid, which was determined ex-ante at the validation stage and has been updated during the second crediting period 27/05/2018-26/05/2025.
Conclusion	CTI verified and confirmed that the emission factor used in the monitoring report is in compliance with the updated PDD.

E.6.2. Data and parameters monitored

Means of verification	CTI conducted document review and performed on-site assessment with project participants to: - A review of information flows for generating, aggregating and reporting the monitoring parameters; - Determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD; - A cross-check between information provided in the monitoring report and data from other sources such as plant logbooks and electricity sale receipts; - An identification that quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.
Findings	The monitoring has been carried out in accordance with the monitoring plan. CTI confirms that all parameters stated in the monitoring plan are monitored and reported appropriately. All parameters required to be monitored by the monitoring plan as per the monitoring methodology ACM0002 (version 19.0) and the management system were assessed during the site visit. The monitoring report lists each parameter required by the monitoring plan and the information flow (i.e. from data generation, aggregation, recording, calculation and reporting) for these parameters is provided. The information flow for each parameter in further verified in the following sections:

	(1) $EG_{export,\ y}$ is the quantity of annual electricity exported to the grid by the proposed project; *(2) $EG_{import,y}$ is the quantity of annual electricity imported from the grid by the proposed project;* (3) *$EG_{facility,y}$ is the quantity of net electricity generation supplied by the project plant/unit to the grid in year y;* The verification team has on-site checked the location of the meters against the diagram of power connection system and found them to be consistent, and also installed in accordance with the PDD. All the monitoring facilities and system have been verified by CTI during on-site visit. On 24:00 of the last day of every month, the Grid Company together with the project owner recorded the meters' readings of electricity export and import into the monthly reading records /8/ and issued the electricity transaction notes (ETNs, used as records for sold electricity) /10/. Data in the monthly reading records were used to the report, through a cross check with the ETNs, and the conservative values from electricity export and import were applied to calculate the net electricity supplied to the grid by the project /2/. The data reported in the monitoring report and ERs calculation spreadsheet can cover the monitoring period from 27/05/2018-29/02/2020, and checked by the verification team. Supporting references and data required to determine the net electricity delivered to the grid is found to be complete and transparent.
Conclusion	Monitoring of data and parameters related to the GHG emission reductions in the project activity has been carried out in accordance with the monitoring plan.

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	The documents review was carried out. Particular attention was paid to the frequency of measurements, the quality of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s), and the quality assurance and quality control procedures.
Findings	The meters installed for the project activity have been calibrated periodically as per the relevant industrial standard by the accredited qualified third party to ensure the monitoring equipment' accuracy and in good conditions. The relevant information of meters' calibration is listed as below:

Item	Main Meter	Backup Meter
SN	96212980	96212981
Accuracy class	0.2s	0.2s
Calibration frequency	Annual	

Calibration date	01/08/2017 31/07/2018 30/07/2019
Valid period	01/08/2017-29/07/2020
Calibration entity	Center of North China Electric Power Research Institute

Calibration records and accreditation certificates /13//14/ have been verified by the verification team. In the approved updated PDD, it stated "The error resulting of the meters will not exceed 0.5%". The actual accuracies of meters installed are verified to be 0.2s for Main meter and Backup meter, which is in line with the information in the PDD and in compliance with the calibrating standards "Verification Regulation of Electrical Energy Meters with Electronics (JJG596-2012)". The calibration frequency of meters is annual, which is consistent with the information in the PDD as "The metering equipment is calibrated and checked for accuracy by a qualified entity in accordance with industry standards".

Hence, CTI can thus confirm that the meters' accuracy and calibration interval are in line with the requirement of the monitoring plan of the approved updated PDD, and the calibrations of meters are verified to be valid for the whole reporting period.

By checking the meters through the on-site visit and crosschecking against the calibration reports of the meters, CTI found the meters have been calibrated periodically. However, the detailed descriptions for the calibration information of the electricity meters was not found in the MR. The CL1 is raised.

The verification team checked the updated MR, and confirmed that all the calibration information of the meters has been described. So, CL1 is closed.

Conclusion	The project participant updated the MR. CL1 is closed. The meters have been installed and calibrated in accordance with the monitoring plan. The meters' accuracy and calibration interval are in line with the requirement of the approved updated PDD, and the calibrations of meters are verified to be valid for the whole reporting 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	Cross-checking the baseline GHG emissions calculation in the MR against that in the ER spreadsheet and the updated PDD.
Findings	According to the applied methodology ACM0002 (version 19.0), the baseline GHG emissions (BE_y) are calculated from net electricity supplied to the grid by the proposed project ($EG_{facility,y}$) multiplied by the baseline emission factor ($EF_{grid,CM,y}$); As verified in section E.6.1, the baseline emission factor ($EF_{grid,CM,y}$) is confirmed to be 0.84045 tCO_2e/MWh. Quantity of net electricity generation supplied by the project plant/unit to the grid in year y ($EG_{facility,y}$) is calculated as the following equation: $EG_{facility,y} = EG_{export,y} - EG_{import,y}$ Data in the monthly reading records were used to report, through a cross check with the

ETNs (i.e. records for sold electricity), the most conservative values were applied to the electricity exported to and imported from the grid by the project activity, which was checked by the verification team in the ER spreadsheet /2/.

Electricity exported to the grid by the project activity:

Period	Values from meter reading (MWh)	Values from ETN (MWh)	Verified (MWh)
	A	B	C=Min(A, B)
27/05/2018-31/05/2018*	2928.560	2928.560	2,928.560
01/06/2018-30/06/2018	15242.397	15242.397	15,242.397
01/07/2018-31/07/2018	11645.940	11645.940	11,645.940
01/08/2018-31/08/2018	12626.833	12626.833	12,626.833
01/09/2018-30/09/2018	16477.901	16477.901	16,477.901
01/10/2018-31/10/2018	16419.167	16419.167	16,419.167
01/11/2018-30/11/2018	22015.127	22015.127	22,015.127
01/12/2018-31/12/2018	23937.662	23937.662	23,937.662
01/01/2019-31/01/2019	18968.220	18968.220	18,968.220
01/02/2019-28/02/2019	9961.498	9961.498	9,961.498
01/03/2019-31/03/2019	21458.055	21458.055	21,458.055
01/04/2019-30/04/2019	19077.877	19077.877	19,077.877
01/05/2019-31/05/2019	19350.350	19350.350	19,350.350
01/06/2019-30/06/2019	12295.366	12295.366	12,295.366
01/07/2019-31/07/2019	8915.692	8915.692	8,915.692
01/08/2019-31/08/2019	13113.004	13113.004	13,113.004
01/09/2019-30/09/2019	9792.551	9792.551	9,792.551
01/10/2019-31/10/2019	15863.451	15863.451	15,863.451
01/11/2019-30/11/2019	17674.610	17674.610	17,674.610
01/12/2019-31/12/2019	22378.089	22378.089	22,378.089
01/01/2020-31/01/2020	19283.450	19283.450	19,283.450
01/02/2020-29/02/2020	8324.343	8324.343	8,324.343
Total	337750.143	337750.143	337,750.143

Electricity imported from the grid by the project activity:

Period	Values from meter reading (MWh)	Values from ETN (MWh)	Verified (MWh)
	D	E	F=Max(D, E)
27/05/2018-31/05/2018*	6.769	6.769	6.769
01/06/2018-30/06/2018	80.620	80.620	80.620

01/07/2018-31/07/2018	88.785	88.785	88.785
01/08/2018-31/08/2018	15.233	15.233	15.233
01/09/2018-30/09/2018	55.820	55.820	55.820
01/10/2018-31/10/2018	46.893	46.893	46.893
01/11/2018-30/11/2018	75.669	75.669	75.669
01/12/2018-31/12/2018	78.825	78.825	78.825
01/01/2019-31/01/2019	25.258	25.258	25.258
01/02/2019-28/02/2019	80.589	80.589	80.589
01/03/2019-31/03/2019	98.582	98.582	98.582
01/04/2019-30/04/2019	40.334	40.334	40.334
01/05/2019-31/05/2019	49.285	49.285	49.285
01/06/2019-30/06/2019	40.003	40.003	40.003
01/07/2019-31/07/2019	37.096	37.096	37.096
01/08/2019-31/08/2019	99.118	99.118	99.118
01/09/2019-30/09/2019	83.285	83.285	83.285
01/10/2019-31/10/2019	52.223	52.223	52.223
01/11/2019-30/11/2019	38.690	38.690	38.690
01/12/2019-31/12/2019	33.305	33.305	33.305
01/01/2020-31/01/2020	30.445	30.445	30.445
01/02/2020-29/02/2020	94.568	94.568	94.568
Total	1,251.395	1,251.395	1,251.395

*The notification of the electricity exported and imported by the project in May 2018 issued by the power grid company /11/.

Net electricity generation supplied by the Project to the grid ($EG_{facility,y}$)

From	To	$EG_{export,y}$	$EG_{import,y}$	$EG_{facility,y}$
		C (MWh)	F (MWh)	C-F (MWh)
27/05/2018	29/02/2020	337750.143	1,251.392	336,498.748

Hence, the emission reductions for this monitoring period was calculated as:

$BE_y = EG_{facility,y} \times EF_{grid,CM,y} = 336,498.748MWh \times 0.84045tCO_{2e}/MWh = 282,810tCO_2e$

Conclusion: The verification team has confirmed that the calculation of the baseline emissions is correct.

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

Means of verification	Cross-checking the project GHG emissions calculation in the MR against that in the ER spreadsheet and the approved updated PDD.
Findings	Project GHG emissions in the MR, ER spreadsheet is zero, which is in line with that

	in the approved updated PDD.
Conclusion	The verification team has confirmed that the calculation of the project emissions is correct.

E.8.3. Calculation of leakage GHG emissions

Means of verification	According to the applied methodology ACM0002 (version 19.0), the leakage of the project is not considered.
Findings	According to the applied methodology ACM0002 (version 19.0), the leakage of the project is not considered.
Conclusion	According to the applied methodology ACM0002 (version 19.0), the leakage of the project is not considered.

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

Means of verification	Cross-checking the data applied for ER calculation with all the relevant documents as listed in Appendix 3, and the ER calculation in the MR against that in the ER spreadsheet and the approved updated PDD.
Findings	According to the applied methodology ACM0002 (version 19.0), the emission reductions are determined as the difference between the baseline emissions, project emissions and leakage: $ER_y = BE_y - PE_y - L_y$ As verified in section E.8.3, the PE_y and L_y are 0, Thus, the emission reductions for the project are accounted as follows: $ER_y = BE_y = 282{,}810 tCO_{2e}$
Conclusion	The verification team has confirmed that the calculation of the emission reductions is correct.

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

Means of verification	The section E.5 of MR (Version 02) is cross-checked against the approved updated PDD.
Findings	The emission reductions claimed are 282,810 tCO_2e in this monitoring period (i.e. 644 days) and the yearly expected emission reductions 179,633 tCO_2e (365 days) in the approved updated PDD (corresponding to 316,941 tCO_2e for this monitoring period). The actual emission reductions reported are lower than the expected value.
Conclusion	CTI verified the input data for calculating emission reductions and the calculating process, and confirmed the result were complete and transparent.

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

Means of verification	The section E.6 of MR (Version 02) is cross-checked against the approved updated PDD.
Findings	The reported emission reductions in this monitoring period are lower than the

	expected.
Conclusion	Considering the project owner strictly implements the scheduling requirements of Measure Center of Center of North China Electric Power Research Institute, which leads the actual net electricity supplied to the grid lower than the estimated value, CTI is able to confirm that the actual power supply and also emission reductions reported in this monitoring period are reasonable and appropriate.

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 section E.4 of MR (Version 02) is cross-checked against the approved updated PDD version 2.1.
Findings	As verified in section E.8.4, the emission reductions achieved during the first commitment period and the period from 01/01/2013 onwards are broken-down and verified by the verification team as

Item	Actual values achieved up to 31/12/2012	Actual values achieved from 01/01/2013 onwards (27/05/2018-29/02/2020)
ER_y (tCO_2)	N/A	282,810

Conclusion	CTI verified the input data for calculating emission reductions and the calculating process, and confirmed the result were complete and transparent.

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

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

E. 10. Global stakeholder consultation

Means of verification	For the 5th monitoring period, the monitoring report (Version 01 dated 10/03/2020) was made publicly available by CTI on the CDM website: https://cdm.unfccc.int/Projects/DB/DNV-CUK1306154648.92/CP/BA3MKQ8NMKFDJKN5K5NUPPHDQUZGUS/iProcess/CTI1584930476.01/view For the monitoring report for the 5th monitoring period, stakeholders may submit comments, in English, within 14 days of publication of the monitoring report, to the DOE through a dedicated interface on the UNFCCC CDM website as per para. 187 of the CDM project cycle procedure (version 02.0) /26/.
Findings	None
Conclusion	During the global stakeholder consultation period, no comments regarding this project were received.

SECTION F. Internal quality control

>>

This final verification report including the initial findings underwent a technical review before being submitted to PP and requesting issuance of CERs of the project activity according to CTI internal procedure. The

technical reviewers were not part of the verification team, and the technical review was independently of the verification team.

SECTION G. Verification opinion

>>

In CTI's opinion, the GHG emission reductions reported for the project in the monitoring report (version 02 dated 24/04/2020) are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0002 (version 19.0) and the monitoring plan contained in the Project Design Document (version 2.1 dated 11/01/2019).

CTI confirmed 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 Zhangjiakou Chabei Wind Farm Project during the period 27/05/2018-29/02/2020 amount as follows:

Baseline emissions: 282,810 tCO_2e

Project emissions: 0 tCO_2e

Leakage: 0 tCO_2e

Emission reductions: 282,810 tCO_2e

SECTION H. Certification statement

>>

Shenzhen CTI International Certification Co., Ltd (CTI) has performed the verification of the emission reductions that have been reported for the CDM project activity 4844 "Zhangjiakou Chabei Wind Farm Project" in China for the period 27/05/2018-29/02/2020.

The verification is based on the baseline and monitoring methodology ACM0002 (version 19.0), the validated and approved updated PDD (version 2.1 dated 11/01/2019) and the monitoring report (version 02 dated 24/04/2020). The verification consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project participants; iii) resolution of outstanding issues and the issuance of the final verification and certification report.

The project participants 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 confirmed 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 "Zhangjiakou Chabei Wind Farm Project" in China during the period 27/05/2018-29/02/2020 amount to 282,810 tCO_2e.

Zhang Lei

Mr. Zhang Lei
Team Leader
26/04/2020

Shunrong Lin

Ms. Shunrong Lin
Technical Reviewer
26/04/2020

Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
NCPG	North China Power Grid
CTI	Shenzhen CTI International Certification Co., Ltd
DOE	Designated Operational Entity
EF	Emission Factor
ER	Emission Reduction
ETN	Electricity Transaction Note
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
MR	Monitoring Report
PDD	Project Design Document
PPA	Power Purchase Agreement
PS	Project Standard
tCO_2e	Tonnes of CO_2 equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

Mr. Zhang Lei

Satisfies the requirements of the Certification Body of CTI and is hereby appointed as:

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

Qualification in the scope and technical area	
Scope	Technical area
SS 1: Energy industries (renewable/nonrenewable sources)	TA 1.1: Thermal energy generation
	TA 1.2: Energy generation from renewable energy sources
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 13: Waste handling and disposal	TA 13.1: Waste handling and disposal
	TA 13.2: Animal waste management

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:

Lin Wu Wu Lin

Technical competent manager
Shenzhen, 01/01/2018

Ms. Wang Guolian

Satisfies the requirements of the Certification Body of CTI and is hereby appointed as:

Qualification as						
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 5: Chemical industry	TA 5.1: Chemical industry
	TA 5.2: Caprolactam, nitric and adipic acid
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

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:

Lin Wu Wu Lin

Technical competent manager

Shenzhen, 01/01/2018

Ms. Shunrong Lin

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

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

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
SS 14: Afforestation and reforestation	TA 14.1: Afforestation and reforestation
SS 15: Agriculture	TA 15.1: Agriculture

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, 01/01/2018

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	CGN Carbon Asset Management (Beijing) Co.,Ltd	Monitoring Report for Zhangjiakou Chabei Wind Farm Project	Version 01 dated 10/03/2020 and version 02 dated 24/04/2020	Project participant
/2/	CGN Carbon Asset Management (Beijing) Co.,Ltd	Emission reduction calculation spreadsheet for Zhangjiakou Chabei Wind Farm Project	Version 01 dated 10/03/2020	Project participant
/3/	CGN (Chabei) Wind Power Co., Ltd.	Business licence for CGN (Chabei) Wind Power Co., Ltd.		Project participant
/4/	CGN (Chabei) Wind Power Co., Ltd. and Jilin Power (Group) Co., Ltd	Power purchase agreement for Zhangjiakou Chabei Wind Farm Project		Project participant
/5/	CGN (Chabei) Wind Power Co., Ltd.	CDM Monitoring Manual	06/2013	Project participant
/6/	CGN (Chabei) Wind Power Co., Ltd.	Planning and records of training for on-site staff	02/06/2018 12/06/2019	Project participant
/7/	CGN (Chabei) Wind Power Co., Ltd.	Operation log sheets	27/05/2018-29/02/2020	Project participant
/8/	CGN (Chabei) Wind Power Co., Ltd.	Monthly reading records	27/05/2018-29/02/2020	Project participant
/9/	CGN (Chabei) Wind Power Co., Ltd.	Diagram of power connection system		Project participant
/10/	Jibei Power (Group) Co., Ltd.	Monthly electricity transaction notes	27/05/2018-29/02/2020	Project participant
/11/	The power grid company	The notification of the electricity exported and imported by the project in May 2018	11/03/2020	Project participant
/12/	CGN (Chabei) Wind Power Co., Ltd. and Jibei Power (Group) Co., Ltd.	Grid Connection Dispatch Agreement for Zhangjiakou Chabei Wind Farm Project		Project participant
/13/	CNAS	Accreditation certificate of Measure Center of North China Electric Power Research Institute	Issued on 08/07/2015, valid to 08/07/2017 Issued on 10/07/2017, valid to 09/07/2023	Project participant
/14/	North China Electric Power Research Institute	Calibration certificates for meter	Issued on 01/08/2017, 31/07/2018 and 30/07/2019	Project participant
/15/	Quality and Technical Inspection Bureau of the People's Republic of China	Verification Regulation of Electrical Energy Meters with Electronics (JJG596-2012)		Others
/16/	Zhangjiakou Chabei Wind Farm Project and Xinjiang Gold Wind Science and Technology Co., Ltd.	Wind turbines purchase agreement	28/07/2010	Project participant
/17/	DNV	Validation report for project activity	Version 03 dated 09/05/2011	Others
/18/	BVC	1st verification report for project activity	Version 01 dated 16/10/2012	Others

/19/	CTI	3rd verification report for project activity	Version 02 dated 09/09/2017	Others
/20/	CTC	Validation opinion	Version 01 dated 11/01/2019	Others
/21/	CGN Carbon Asset Management (Beijing) Co.,Ltd.	Registered and Updated Project Design Document for project activity	Version 1.2 dated 21/02/2011 Version 2.1 dated 11/01/2019	Project participant
/22/	EB	CDM validation and verification standard for project activities	version 02.0	EB
/23/	EB	CDM project standard for project activities	version 02.0	EB
/24/	EB	CDM project cycle procedure for project activities	version 02.0	EB
/25/	EB	Grid-connected electricity generation from renewable sources- ACM0002	Version 19.0	EB
/26/	EB	Standard for application of the global warming potential to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol, Annex 3 of EB69	13/09/2012	EB
/27/	EB	Guideline-Completing the monitoring report form	Version 07.0	EB
/28/	EB	Guideline- Completing the verification and certification report form for CDM project activities	Version 03.0	EB
/29/	EB	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	version 03.0.1	EB

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

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

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

Table 2. CL from this verification

CL ID	1	**Section no.**	D.1	**Date:** 17/04/2020
Description of CL				
Detailed descriptions for the calibration information of the electricity meters need to be addressed under section D.2 of MR.				
Project participant response				**Date:** 19/04/2020
The calibration information of the electricity meters has been added. Please see the MR (version 2.0) for the detailed information.				
Documentation provided by project participant				
Calibration report, updated MR (version 2.0)				
DOE assessment				**Date:** 20/04/2020
The calibration information has been addressed in the updated MR and verified by CTI. CL 1 is closed				

Table 3. CAR from this verification

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

Table 4. FAR from this verification

FAR ID	NA	**Section No.**	NA	**Date:** NA
Description of FAR				
NA				
Project participant response				**Date:** NA
NA				
Documentation provided by project participant				
NA				
DOE assessment				**Date:** NA
NA				

Document information

Version	*Date*	*Description*
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.

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: project activities, verifying and certifying