



**Verified Carbon
Standard**

HEBEI CHENGDE WEICHANG YUDAOKOU PASTURE 150MW WIND FARM PROJECT

Document Prepared by Demeter Venture Uk Limited

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CONTENTS

1	PROJECT DETAILS	4
1.1	Summary Description of the Implementation Status of the Project	4
1.2	Sectoral Scope and Project Type	4
1.3	Project Proponent.....	4
1.4	Other Entities Involved in the Project.....	5
1.5	Project Start Date.....	5
1.6	Project Crediting Period.....	5
1.7	Project Location.....	6
1.8	Title and Reference of Methodology	6
1.9	Participation under other GHG Programs	7
1.10	Other Forms of Credit	7
1.11	Sustainable Development	7
2	SAFEGUARDS.....	8
2.1	No Net Harm.....	8
2.2	Local Stakeholder Consultation	9
2.3	AFOLU-Specific Safeguards.....	10
3	IMPLEMENTATION STATUS.....	11
3.1	Implementation Status of the Project Activity	11
3.2	Deviations	12
2.3.1	Methodology Deviations.....	12
2.3.2	Project Description Deviations	12
3.3	Grouped Projects.....	13
4	DATA AND PARAMETERS	13
4.1	Data and Parameters Available at Validation	13
4.2	Data and Parameters Monitored	18
4.3	Monitoring Plan	21
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	24
5.1	Baseline Emissions	24

5.2	Project Emissions.....	26
5.3	Leakage	26
5.4	Net GHG Emission Reductions and Removals.....	26
APPENDIX: < MONTHLY AND YEARLY ELECTRICTY>		28

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Hebei Chengde Weichang Yudaokou Pasture 150MW Wind Farm Project (hereinafter referred to as “the project”) is a new grid-connected renewable power generation project, which is located in Weichang Manchu & Mongolia Autonomous County, Chengde City, Hebei province, China. The project is constructed and operated by Hebei Construction Investment New Energy Co., Ltd.

The project involves in installation and operation of 100 sets of wind turbines with a unit capacity of 1.5MW. The total installed capacity of the project is 150MW, and the power generated by the project is transmitted to the North China Power Grid (hereinafter referred to as “NCPG”).

The project transmits renewable wind power to the NCPG, and substitutes for relevant power generation by fossil fuel power plants of the NCPG. Therefore, the project could reduce emission reductions. The estimated net power supplied to the grid is 312,700MWh per year. The estimated annual GHG emission reductions in the first crediting period are 329,852 tCO₂e/yr and are 258,571 tCO₂e/yr during the second crediting period.

The project began to construct on 11/05/2009 and was put into commercial operation on 27/11/2010 (i.e. the project starts date).

The first crediting period is from 27/11/2010 to 26/11/2020 while the second crediting period is from 27/11/2020 to 26/11/2030. This monitoring period is from 01/03/2020 to 30/11/2021 (640 days), in which the period from 01/03/2020 to 26/11/2020 (271 days, hereinafter referred as “P1”) belongs to the first crediting period, and the period from 27/11/2020 to 30/11/2021 (369 days, hereinafter referred as “P2”) belongs to the second crediting period. The emission reductions in P1 is 263,468 tCO₂, the emission reductions in P2 is 282,830 tCO₂. Hence, the emission reductions in this monitoring period is 546,298 tCO₂.

1.2 Sectoral Scope and Project Type

This category would fall within sectoral scope 1: energy industries (Renewable sources).

Project type: wind power project.

This project is not grouped project.

1.3 Project Proponent

Organization name	Hebei Construction Investment New Energy Co., Ltd.
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1.4 Other Entities Involved in the Project

Organization name	Demeter Venture Uk Limited
Role in the Project	Project participant
Contact person	Teng Haipeng
Title	Manager
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1.5 Project Start Date

27/11/2010 (operation date, which means the date that started to generate GHG emission reductions)

1.6 Project Crediting Period

As per the renewed VCS PD, the first crediting period is from 27/11/2010 to 26/11/2020, while the second crediting period is from 27/11/2020 to 26/11/2030.

The total crediting period is from 27/11/2010 to 16/01/2032.

This monitoring period is from 01/03/2020 to 30/11/2021 (640 days), in which the period from 01/03/2020 to 26/11/2020 (271 days, hereinafter referred as “P1”) belongs to the first crediting period, and the period from 27/11/2020 to 30/11/2021 (369 days, hereinafter referred as “P2”) belongs to the second crediting period.

1.7 Project Location

The project is located in Weichang Manchu & Mongolia Autonomous County, Chengde City, Hebei province, P.R. China. The central geographical coordinates of the project is longitude 116°57'05"E and latitude 42°11'21"N. The location of the project is provided in Fig. 1.



Figure 1. The location of the project

1.8 Title and Reference of Methodology

For P1, the project applies the approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources and monitoring methodology." (Version 10.0).

The methodology also refers to the following tools:

Tool to calculate the emission factor for an electricity system (Version 02);

Tool for the demonstration and assessment of additionality (Version 5.2).

For P2, the approved methodology applied in the project activity is ACM0002 – Consolidated methodology for grid-connected electricity generation from renewable sources” (version 20.0)¹.

Related tools are:

-Tool to calculate the emission factor for an electricity system (version 07.0)

-Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (version 03.0)

1.9 Participation under other GHG Programs

The Project has been registered as a CDM project on 17/01/2011 with registration number of 3476. It has been issued two times under CDM mechanism, with monitoring period from 17/01/2011 to 31/08/2011 and from 01/01/2013 to 30/09/2015. And CERs were waiting issuance request for the period from 01/09/2011-31/12/2012 under CDM scheme.

The credits in this monitoring period (01/03/2020 to 30/11/2021) has not been counted and will not be counted under other kind of GHG programs.

1.10 Other Forms of Credit

The project has been registered as a CDM project on 17/01/2011 with registration number of 3476. It has been issued two times under CDM mechanism, with monitoring period from 17/01/2011 to 31/08/2011 and from 01/01/2013 to 30/09/2015. And CERs were waiting issuance request for the period from 01/09/2011-31/12/2012 under CDM scheme.

The Project has not created another form of environmental credit, and the Project will not create other environmental credit in the future.

1.11 Sustainable Development

The project makes contribution to the sustainable development as follows:

1. GHG emission reduction

The project will help reduce the greenhouse gas GHG emissions versus the high-growth, coal-dominated business-as-usual scenario in the NCPG by reducing the electricity generation from the fossil-fuel fired power plants.

¹ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

Thus, the project achieved **SDG 13 Climate Action**².

2. Reduction of fossil fuel use and provide clean energy

The Project Activity will reduce reliance on imported fossil fuels, which will contribute to increasing China's energy security, and will also improve local air quality as it reduces the emissions of SO₂, and NO_x associated with fossil fuel use.

Thus, the project achieved **SDG 7 Affordable and Clean Energy**³.

3. Employment opportunities

The conducting of the project will create employment opportunities during the construction phase and operational period.

4. Economic Improvement

The construction of the wind farm will promote local economy by contributing to local government with more tax revenues through selling power generation.

Thus, the project achieved **SDG 8 Decent Work and Economic Growth**⁴.

2 SAFEGUARDS

2.1 No Net Harm

According to the relevant environmental law and regulations, an environmental impact assessment has been carried out, and the assessment report has been approved by the Hebei Environmental Bureau. The main assessment conclusions are as follows:

- Noise Impact on the Environment

Noise will be generated by machine equipment and vehicle during the construction period. Measures will be taken to reduce the environmental impacts of noise: choosing low-noise machines and technologies, strengthening the management and maintenance on equipment, allocate reasonable selection and layout on the plant construction site, and enhancing construction management etc. Low-noise turbine units will be employed and installed far away from the surrounding villages. Noise level will be controlled within the Class 1 requirement of Standard of Environmental Noise of Urban Area (GB 3096-93). In addition, during the operation period the nearest residential area is far away from the construction site, and there is no enterprises, schools or hospitals nearby. So, the neighbor hood residents will not be influenced by the noise.

² <https://sdgs.un.org/goals/goal13>

³ <https://sdgs.un.org/goals/goal7>

⁴ <https://sdgs.un.org/goals/goal8>

- Impact of solid waste on environment

During the construction period, the discharged waste slag will be reduced by refilling the excavated earth as much as possible, and the wastes will be piled up in designated waste disposal sites.

During the operation period, the domestic waste produced by operational workers will be collected and discharged by existing garbage disposal facilities.

- Impact on the water environment

The main water pollution includes industrial wastewater and domestic wastewater. During the construction period, the domestic wastewater will be discharged through local sewage treatment facilities. For the applied mechanical equipment is relative less, so the industrial wastewater will be also less, in addition, the industrial wastewater can be used to irrigate plant.

During the operation period, domestic wastewater will be treated by a septic tank, so the wastewater after treatment could well satisfy the requirement of Chinese Environmental Standard, which will be collected into a water collection basin for greening and so on. After those appropriate treatment measures has been taken, such wastewater will not cause negative impacts on the environment.

- Impact on the Air quality

The main air pollution sources during the construction period include excavation, blasting and transportation, and the main air pollutant is dust. Some measures will be taken to reduce impact of dust, such as watering, covering and the construction material will be pile up centralized. Therefore, the construction has little negative impact on the local air environment.

- Impact on ecological environment

The construction will cause some negative impacts on the ecological environment, such as vegetation trampled by workers and machine and covered by the dust, excavating. In order to reduce the negative impacts, the following measures will be taken: controlling construction activity within occupied land to reduce negative impacts, and, carrying away all waste slag and cleaning up the construction site to recover the original vegetation when the construction is over.

There is no rare plant and wild animal living around the project site, nor the inhabitant of birds. Therefore, the project activity has little negative influence on birds and ecological environment.

Therefore, the project does not bring negative environmental and socio-economic impacts.

2.2 Local Stakeholder Consultation

Before the start of the construction of the proposed project, the project owner has given out questionnaires to local residents to ask their opinions. The aim of these questionnaires is to collect

opinions concerning the influence the project would have on the local society, environment, economy, daily life etc.

A special stakeholder consultation meeting of the project was held from 10:00 to 11:00 AM on 02/11/2008 at the meeting room of the project site, Chengde City. In order to make the potential stakeholders receive notification and information of the meeting, the project owner published a bulletin for the stakeholders meeting on the nearby residents' areas, from October 28, 2008. In the bulletin, the companies notified all the potential stakeholders that they could have detailed information on the proposed project.

During the meeting, the project owner invited the participants to express their comments and concerns about the project and CDM.

Main questions of the meeting and questionnaires are as follows:

- What is the main fuel that local residents used for heating and cooking?
- Will the project have a negative impact on the local residents?
- Will the construction of the project cause any pollution? Do the residents think that the noise unendurable? Does the noise have any impact on the lives of the local residents?
- Will the project have any negative impact on the habitat of birds? Is the project site the main flight way of migratory birds?
- Will the project have any negative impact on local ecological environment?
- Will the construction improve the communicating condition?
- Will the project bring any benefit for the local residents?
- Do the local residents support CDM project?
- Do local residents agree with the construction of the project?

40 questionnaires were distributed, and all were recollected, of which, 30% is from women, 40% is from people graduated from senior high school or lower school, 100% is from people elder than twenty years old, and the investigation results show the following:

- 60% of the investigated residents use firewood for heating and cooking, and the rest 40% use gas or coal for heating and cooking.
- 85% of investigated residents think the wind farm will bring benefit to their lives; other investigated residents think the wind farm will not influence their lives.
- 100% of the investigated residents think the construction of wind farm will not cause negative impact on their lives.
- 100% of investigated residents think the wind farm will not cause negative impact on the environment.
- 100% of investigated residents think the wind farm will not cause noise pollution.

- 100% of the investigated residents think the project site is not the main flight way of migratory birds.
- 100% of the investigated residents agree the proposed project to apply as CDM project.
- 100% of investigated residents agree with the construction of the project.

20 representatives (which is different from the people who give the questionnaires) of local residents, the representatives of local government and consultants attended this meeting, and the project owner has done the record of the meeting.

Through the investigation and stakeholder meeting, it was learned that all stakeholders, having considered that wind power is a renewable energy and will not cause negative impacts on the environment, agree to the construction of the wind farm. There are no residents living around the project. So the wind farm will not cause negative impacts on local residents. The wind farm site is located off the main flight path of migratory birds and only a few migratory birds stay around the wind farm, there will be no negative influence on birds. The project will provide sufficient electric power for social life and manufacture, increase the employment ratio and incomes of the local residents, improve life quality of local residents, and accelerate the development of social economy. Overall, the project will cause little negative impact on local residents and environment. All stakeholders support the construction of the project and the application as CDM project.

In addition, for continuous communication with local stakeholders, the project owner public its office telephone to local people and put a grievance book in the office of the company. Anyone who have comments on the project could write on the book or leave message by phone. And after these years' operation, no negative comments were received from local people.

2.3 AFOLU-Specific Safeguards

This project is not an AFOLU project. Therefore, this section is not applicable.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project installed 100 sets of wind turbines with a unit capacity of 1,500 kW and total capacity of 150MW. Electricity generated by the Project is delivered to NCPG via a 220kV transmission line.

The wind power generation process of the project is showed in Figure 2.

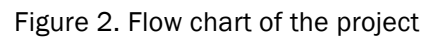


Table 1. Main technical parameters of key equipment in the Project

12

Main Transformer	Rated Frequency	50Hz
	Rated Voltage	High side: 242kV Low side: 38.5kV

The project began to construct on 11/05/2009 and was put into commercial operation on 27/11/2010. During this monitoring period (01/03/2020 to 30/11/2021), the Project monitoring activities were implemented in line with the monitoring plan.

The wind farm operated normally. No equipment is overhauled or replaced in this monitoring period. No emergencies which may impact the methodology application and monitoring occurred during this monitoring period.

3.2 Deviations

3.2.1 Methodology Deviations

There is no methodology deviation in this monitoring period.

3.2.2 Project Description Deviations

The project was registered under VCS version 3. In the Verification Report of initial VCS monitoring period, it was mentioned that the project started operation since 27/11/2010. As per UNFCCC website, it was confirmed that the project activity was registered as CDM project activity on 17/01/2011. Therefore, the VCS crediting period was determined as 27/11/2010 to 17/01/2011. As per VCS scheme under which the project was registered, the project crediting period is allowable for 10 years and could be renewed twice. Therefore, the total VCS crediting period was determined from 27/11/2010 to 16/01/2032 (considering 3*7 years CDM crediting period), of which the first crediting period is from 27/11/2010 to 26/11/2020, while the second crediting period is from 27/11/2020 to 26/11/2030. The same has been described in the renewed VCS PD.

3.3 Grouped Projects

Not applicable as this is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

For monitoring period belongs to the first crediting period:

Data / Parameter	EGP _{j,y}
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Data unit	MWh
Description	The Generation of Power Sources j in (years) y (2002-2006, including Shandong, Shanxi, Hebei, Tianjin, Beijing, Inner Mongolia)
Source of data	China Electric Power Yearbook 2003-2007 China Energy Statistical Yearbook 2007
Value applied	Annex 3 of approved CDM PDD
Justification of choice of data or description of measurement methods and procedures applied	Official Statistical Data
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	GEN_{import,y}
Data unit	MWh
Description	The Power Transmitted from the NEPG to the NCPG in (years) y (2004-2006) The Power Transmitted from the CCPG to the NCPG in (years) y (2006)
Source of data	Abstract of Electric Power Industry Statistics 2005-2006
Value applied	Annex 3 of approved CDM PDD
Justification of choice of data or description of measurement methods and procedures applied	Official Statistical Data
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	PR_y
Data unit	%
Description	The rate of internal electricity consumption of thermal power plants in year (s) y (2004-2006, including Shandong, Shanxi, Hebei, Tianjin, Beijing, Inner Mongolia)
Source of data	China Electric Power Yearbook 2005-2007
Value applied	Annex 3 of approved CDM PDD
Justification of choice of data or description of measurement methods and procedures applied	Official Statistical Data

Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$FC_{i,y}$
Data unit	10^4 t or 10^8 m^3
Description	The Fuel i Consumption of project electricity system in (years) y (2004-2006, including Shandong, Shanxi, Hebei, Tianjin, Beijing, Inner Mongolia)
Source of data	China Energy Statistical Yearbook, 2005-2007
Value applied	Annex 3 of approved CDM PDD
Justification of choice of data or description of measurement methods and procedures applied	Official Statistical Data
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$NCV_{i,y}$
Data unit	GJ/ fuel in a mass or volume unit
Description	The $NCV_{i,y}$ of Fuel i in a mass or volume unit in year y
Source of data	China Energy Statistical Yearbook 2007
Value applied	Annex 3 of approved CDM PDD
Justification of choice of data or description of measurement methods and procedures applied	Official Statistical Data
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$EF_{CO_2,i,y}$
Data unit	tC/TJ
Description	The Emission Factor of Fuel i in a mass or volume unit in year y
Source of data	2006 IPCC Guideline for National Greenhouse Gas Inventories
Value applied	Annex 3 of approved CDM PDD
Justification of choice of data or description of measurement methods and procedures applied	IPCC default value

Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$\eta_{best,coal}$
Data unit	%
Description	Commercially available coal power plant corresponding to the best practice in terms of efficiency
Source of data	2008 Baseline Emission Factors for Regional Power Grids in China-2008 the calculation of baseline BM emission factor for Regional Power Grids in China
Value applied	37.28%
Justification of choice of data or description of measurement methods and procedures applied	National Fixed Value
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$\eta_{best,oil/gas}$
Data unit	%
Description	Commercially available oil and gas power plant corresponding to the best practice in terms of efficiency
Source of data	2008 Baseline Emission Factors for Regional Power Grids in China-2008 the calculation of baseline BM emission factor for Regional Power Grids in China
Value applied	48.81%
Justification of choice of data or description of measurement methods and procedures applied	National Fixed Value
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$CAP_{y,j}$
Data unit	MW
Description	The Installed Capacity of Power Sources j in (years) y (2004-2006, Shandong, Shanxi, Hebei, Tianjin, Beijing, Inner Mongolia)
Source of data	China Electric Power Yearbook 2005-2007
Value applied	Annex 3 of the registered PD

Justification of choice of data or description of measurement methods and procedures applied	Official Statistical Data
Purpose of Data	Calculation of baseline emissions
Comments	/

For monitoring period belongs to the second crediting period:

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO ₂ /MWh
Description	Operating margin CO ₂ emission factor in year y
Source of data	“2019 Baseline Emission Factors for Regional Power Grids in China” issued by China DNA ⁵
Value applied	0.9419
Justification of choice of data or description of measurement methods and procedures applied	Official public data from Chia DNA
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO ₂ /MWh
Description	Build margin CO ₂ emission factor in year y
Source of data	“2019 Baseline Emission Factors for Regional Power Grids in China” issued by China DNA ⁶
Value applied	0.4819
Justification of choice of data or description of measurement methods and procedures applied	Official public data from MEE
Purpose of Data	Calculation of baseline emissions

⁵ <http://www.mee.gov.cn/ywgz/ymqhbh/wsqtz/202012/W020201229610353816665.pdf>

⁶ <http://www.mee.gov.cn/ywgz/ymqhbh/wsqtz/202012/W020201229610354442145.pdf>

Comments	/
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Data / Parameter	W _{OM}
Data unit	%
Description	Weighting of operating margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value applied	75
Justification of choice of data or description of measurement methods and procedures applied	Based on the requirements of "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	W _{BM}
Data unit	%
Description	Weighting of build margin emissions factor
Source of data	"Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value applied	25
Justification of choice of data or description of measurement methods and procedures applied	Based on the requirements of "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of Data	Calculation of baseline emissions
Comments	/

4.2 Data and Parameters Monitored

Data / Parameter	EG _{facilityy}
Data unit	MWh
Description	Net power supplied to the grid in year y (for the first crediting period)

	Quantity of net electricity generation supplied by the project plant to the grid in year y (for the second crediting period)									
Source of data	This parameter is calculated monthly with on-site monitored data of $EG_{s,y}$, $PR_{g,y}$ and $PR_{10kV,y}$.									
Description of measurement methods and procedures to be applied	$EG_{facility,y} = EG_{s,y} - PR_{g,y} - PR_{10kV,y}$ Where: <table border="1"> <tr> <td rowspan="2">$EG_{s,y}$</td><td>Power supplied to the grid in year y (for the first crediting period)</td></tr> <tr> <td>The electricity delivered by the Project to the grid in year y (for the second crediting period)</td></tr> <tr> <td rowspan="2">$PR_{g,y}$</td><td>The electricity use of power plant supplied by the grid via the 220 kV line in year y (for the first crediting period)</td></tr> <tr> <td>The electricity imported by the Project from the grid in year y (for the second crediting period)</td></tr> <tr> <td rowspan="2">$PR_{10kV,y}$</td><td>The electricity imported by the project from the grid via the 10 kV line (for the first crediting period)</td></tr> <tr> <td>The electricity imported by the Project from the grid via 10kV line in year y (for the second crediting period)</td></tr> </table>	$EG_{s,y}$	Power supplied to the grid in year y (for the first crediting period)	The electricity delivered by the Project to the grid in year y (for the second crediting period)	$PR_{g,y}$	The electricity use of power plant supplied by the grid via the 220 kV line in year y (for the first crediting period)	The electricity imported by the Project from the grid in year y (for the second crediting period)	$PR_{10kV,y}$	The electricity imported by the project from the grid via the 10 kV line (for the first crediting period)	The electricity imported by the Project from the grid via 10kV line in year y (for the second crediting period)
$EG_{s,y}$	Power supplied to the grid in year y (for the first crediting period)									
	The electricity delivered by the Project to the grid in year y (for the second crediting period)									
$PR_{g,y}$	The electricity use of power plant supplied by the grid via the 220 kV line in year y (for the first crediting period)									
	The electricity imported by the Project from the grid in year y (for the second crediting period)									
$PR_{10kV,y}$	The electricity imported by the project from the grid via the 10 kV line (for the first crediting period)									
	The electricity imported by the Project from the grid via 10kV line in year y (for the second crediting period)									
Frequency of monitoring/recording	Continuously measured and monthly recording									
Value monitored	591,807.035									
Monitoring equipment	The information of the electricity meter is in the following table.									
QA/QC procedures to be applied	The electricity meter is calibrated by qualified entity according to national standards. The electricity records are crosschecked with electricity receipts.									
Purpose of the data	Calculation of baseline emissions									
Calculation method	$EG_{facility,y} = EG_{s,y} - PR_{g,y} - PR_{10kV,y}$									
Comments	/									

Data / Parameter	$EG_{s,y}$
Data unit	MWh
Description	Power supplied to the grid in year y (for the first crediting period) The electricity delivered by the Project to the grid in year y (for the second crediting period)
Source of data	Measured by M1 located at the output of the on-site 220kV transformer substation.

Description of measurement methods and procedures to be applied	It is continuously measured by main meter M1 and backup meter M2, and monthly recorded by the project owner. The meters are installed at the output of the on-site 220kV transformer substation. M2 works as backup meter for M1 when there is failures in M1. The meter readings are crosschecked with the electricity receipts. The conservative value is used for ER calculation.					
Frequency of monitoring/recording	At 24:00 of the last day of each month, the meter reading were read and recorded by the project owner and grid company.					
Value monitored	592,481.165					
Monitoring equipment	The information of the electricity meter is in the following table.					
QA/QC procedures to be applied	The electricity meter is calibrated by qualified entity according to national standards. The electricity records are crosschecked with electricity receipts. The main information is shown below:					
		Type	Serial No.	Accuracy	Calibration Date	Valid date
	M1 (main meter)	SL7000	36013942	0.2S	08/10/2019	07/10/2020
					08/10/2020	07/10/2021
					08/10/2021	07/10/2022
	M2 (backup meter)	SL7000	36014056	0.2S	08/10/2019	07/10/2020
					08/10/2020	07/10/2021
					08/10/2021	07/10/2022
	Purpose of the data	Calculation of baseline emissions				
Calculation method	/					
Comments	/					

Data / Parameter	PR_{gy}
Data unit	MWh
Description	The electricity use of power plant supplied by the grid via the 220 kV line in year y (for the first crediting period) The electricity imported by the Project from the grid in year y (for the second crediting period)
Source of data	Measured by M1 located at the output of the on-site 220kV transformer substation.

Description of measurement methods and procedures to be applied	It is continuously measured by main meter M1 and backup meter M2, and monthly recorded by the project owner. The meters are installed at the output of the on-site 220kV transformer substation. M2 works as backup meter for M1 when there is failures in M1. The meter readings are crosschecked with the electricity receipts. The conservative value is used for ER calculation.					
Frequency of monitoring/recording	At 24:00 of the last day of each month, the meter reading were read and recorded by the project owner and grid company.					
Value monitored	Measured continuously and recorded monthly.					
Monitoring equipment	674.130					
QA/QC procedures to be applied	The information of the electricity meter is in the following table.					
	The electricity meter is calibrated by qualified entity according to national standards. The electricity records are crosschecked with electricity receipts. The main information is shown below:					
		Type	Serial No.	Accuracy	Calibration Date	Valid date
	M1 (main meter)	SL7000	36013942	0.2S	08/10/2019	07/10/2020
					08/10/2020	07/10/2021
					08/10/2021	07/10/2022
	M2 (backup meter)	SL7000	36014056	0.2S	08/10/2019	07/10/2020
					08/10/2020	07/10/2021
					08/10/2021	07/10/2022
	Purpose of the data	Calculation of baseline emissions				
Calculation method	/					
Comments	/					

Data / Parameter	PR_{10 kV,y}
Data unit	MWh
Description	The electricity imported by the project from the grid via the 10 kV line (for the first crediting period) The electricity imported by the Project from the grid via 10kV line in year y (for the second crediting period)

Source of data	Measured by M3 located at the 10kV line of the project.				
Description of measurement methods and procedures to be applied	It is continuously measured by the bi-directional meter and monthly recorded by the project owner. The meter is installed on the main transmission line of the Project. The meter readings are crosschecked with the electricity receipts. The conservative value is used for ER calculation. At 24:00 of the last day of each month, the meter reading were read and recorded by the project owner and grid company.				
Frequency of monitoring/recording	Continuously measured and monthly recorded				
Value monitored	0				
Monitoring equipment	The information of the electricity meter is in the following table.				
QA/QC procedures to be applied	The electricity meter is calibrated by qualified entity according to national standards. The electricity records are crosschecked with electricity receipts. The main information of M3 is shown below:				
	Type	Serial No.	Accuracy	Calibration Date	Valid date
	DTS747 (M3)	2103348	1.0	08/10/2019	07/10/2020
				08/10/2020	07/10/2021
				08/10/2021	07/10/2022
Purpose of the data	Calculation of baseline emissions				
Calculation method	/				
Comments	/				

4.3 Monitoring Plan

1. Monitoring data

The main data to be monitored are:

The power supplied to the grid ($EG_{s,y}$),

The electricity use of power plant supplied by the grid ($PR_{g,y}$),

The electricity imported by the Project from the grid via the 10kV backup line in year y ($EG_{10kVtoPJ,y}$)

The monitoring point is in the following figure 3.

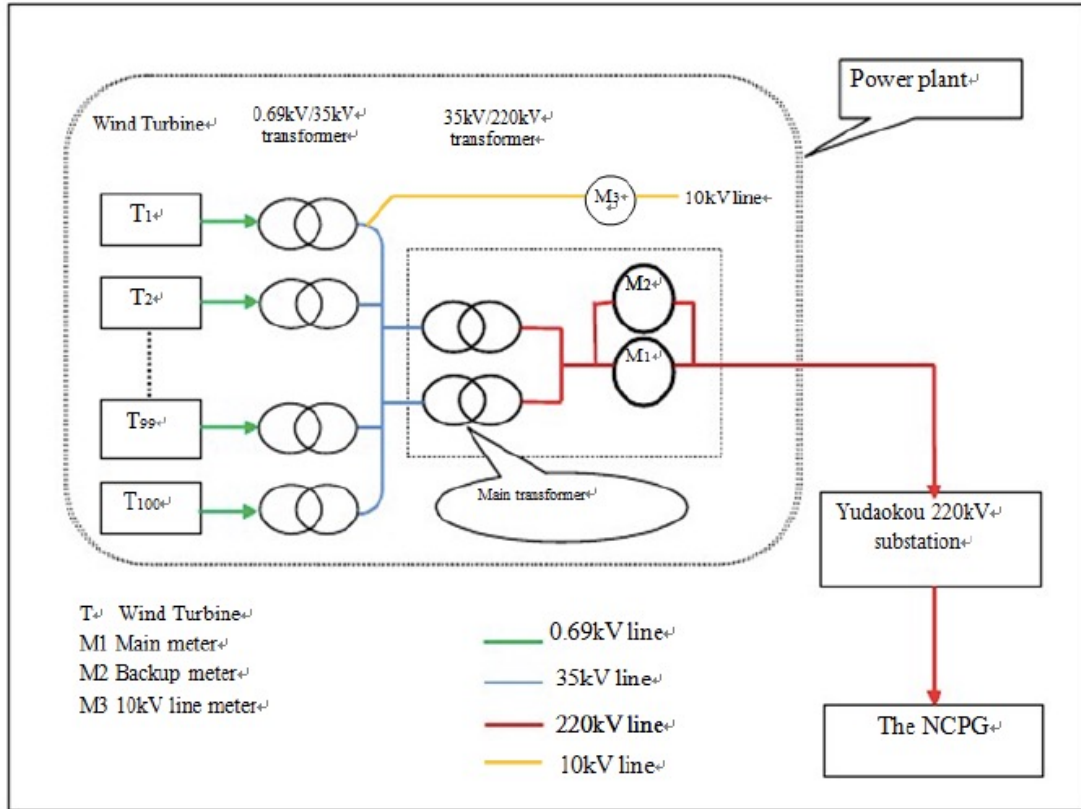


Figure 3. Monitoring point of the project

2. Monitoring System Organization Chart

The monitoring system is shown in Figure 4.

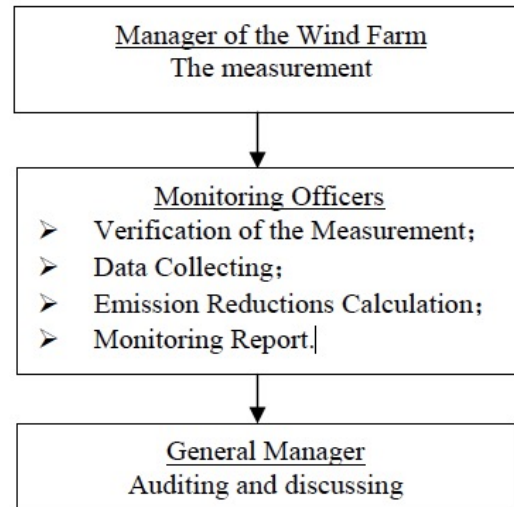


Figure 4. Monitoring structure

A chief monitoring officer will be appointed by the project owner, who will supervise and verify metering and recording, collect data (meter's data reading, sales/purchasing invoices), calculate emission reductions and prepare monitoring reports.

3. Data Collection and management

The exported and imported electricity are continuously monitored and monthly recorded by the working staff and reviewed by auditor. The project owner summarized and recorded readings of the electricity meter at 24:00 of the last day of each month in Monthly Production Report of the Project. After the data was confirmed by the grid company, the monthly Electricity receipts was issued by the grid company to the Project Owner. Electricity receipts issued by the grid company were used for crosscheck.

All paper documents are copied. All electrical files are backup by hard disk and kept after 2 years after the end of crediting period.

4. QA/QC procedures

All the electricity meters are calibrated annually by qualified third party according to national industry standard. And all the metering data is cross checked with the Electricity receipts and the conservative value will be used for emission reductions.

The accuracy of the M1 and M2 is 0.2S. The accuracy of the M3 is 1.0.

5. Emergency procedures

During this monitoring period, the Project was operated smoothly and no emergency happened.

If abnormal operation happens, on-site operators should immediately report to team manager. The team manager takes the responsibility to handle the erroneous measurement as follows:

- If the reason for erroneous measurement is the malfunction of the meter(s), use the data automatically obtained and saved by the computer system as backup.
- If the erroneous measurement is caused by employees in charge of recording, use the data automatically obtained and saved by the computer system as backup. At the same time, training courses shall be rearranged for relevant employees to ensure the correct implementation of the monitoring plan, so as to prevent error.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

According to ACM0002, the baseline emission during this verification period is calculated as

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

Where:

BE_y is the baseline emissions (tCO₂e)

$EG_{\text{facility},y}$ is Net power supplied to the grid in year y (for the first crediting period) / Quantity of net electricity generation supplied by the project to the grid in year y (for the second crediting period) (MWh);

$EF_{\text{grid,CM},y}$ is the CO₂ emission factor of the NCPG, which is fixed in the first crediting period and the second crediting period (tCO₂e/MWh)

On the basis of these weights for the first crediting period, the combined margin emission factor is calculated, and are fixed ex-ante for the duration of the **first crediting period** as 1.05485 tCO₂e/MWh.

On the basis of these weights for the second crediting period, the combined margin emission factor is calculated, and are fixed ex-ante for the duration of the **second crediting period** as follows:

	CO ₂ emission factor (tCO ₂ /MWh)	Weighting
Simple operating Margin Emissions Factor ($EF_{\text{grid,OM simple},y}$)	0.9419	0.75

Build Margin Emissions Factor ($EF_{grid, BM, y}$)	0.4819	0.25
Baseline Emissions Factor ($EF_{grid, CM, y}$)	0.8269	

The yearly electricity volume and baseline emissions are listed in following table 2.

Table 2. Baseline emissions

Period	$EG_{s, y}$ (MWh)	$PR_{g, y}$ (MWh)	$PR_{10kV, y}$ (MWh)	$EG_{facility, y}$ (MWh)	$EF_{grid, CM, y}$ (tCO_2/yr)	Baseline Emissions (tCO_2e)
01/03/2020-26/11/2020 (P1) ⁷	250,053.555	284.880	0.000	249,768.675	1.05485	263,468
27/11/2020-30/11/2020 (P2)	35,392.400	25.530	0.000	35,366.870	0.82690	29,244
01/01/2021-30/11/2021 (P2)	307,035.210	363.720	0.000	306,671.490	0.82690	253,586
Total in this monitoring period	592,481.165	674.130	0.000	591,807.035		546,298

The monthly data are shown in appendix 1.

5.2 Project Emissions

According to the ACM0002, the emission of wind power project activity is zero, i.e. $PE_y=0$.

5.3 Leakage

According to ACM0002, the leakage of wind power project is not needed to be considered.

5.4 Net GHG Emission Reductions and Removals

In according with the approved CDM PDD,

$$ER_y = BE_y - PE_y$$

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
01/03/2020-26/11/2020 (P1)	263,468	0	0	263,468

⁷According to Electric Quantity Confirmation issued by the Grid Company, $EG_{s, y}$ and $PR_{g, y}$ is 32,311.470 MWh and 22.560MWh during 01/11/2020 to 26/11/2020, and $EG_{s, y}$ and $PR_{g, y}$ is 22,00.360 MWh and 5.260MWh during 27/11/2020 to 30/11/2020..

27/11/2020-31/12/2020 (P2)	29,244	0	0	29,244
01/01/2021-30/11/2021 (P2)	253,586	0	0	253,586
Total	546,298	0	0	546,298

Crediting Period	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01/03/2020-31/12/2020	292,712	0	0	292,712
01/01/2021-30/11/2021	253,586	0	0	253,586
Total	546,298	0	0	546,298

The estimated annual GHG emission reductions in the first crediting period are 329,852 tCO₂e/yr and are 258,571 tCO₂e/yr during the second crediting period. This VCS monitoring period covered the time from 01/03/2020 to 30/11/2021 (640 days, 271 days in the first crediting period and 369 days in the second crediting period).

The emission reductions claimed are 546,298 tCO₂e in this monitoring period (i.e. 640 days). Compared with expected emission reductions 506,308 tCO₂e (calculated as 329,852/365*271+258,571/365*369) in the approved CDM PDD and renewed VCS PD, the reported emission reductions in this monitoring period are 7.90% larger than the expected, which is considered to be in the reasonable variation range.

This will not impact the additionally of the project activity as the sensitivity analysis of the project activity shows that the IRR will not exceeds benchmark until an 16% increase in Grid-connected electricity. The main reason for the electricity generation increase is that the wind flow in this monitoring period are larger than the designing value in the FSR, the management skills of the plant improves gradually and the wind power accommodation capacity of the grid is increasing.

APPENDIX: < MONTHLY AND YEARLY ELECTRICITY >

Period	EGs,y			PRg,y			PR10KV,y	EGfacility,y
	Data from monthly meter reading records (MWh)	Data from electricity receipts (MWh)	Conservative value (MWh)	Data from monthly meter reading records (MWh)	Data from electricity receipts (MWh)	Conservative value (MWh)		
	A	B	C=min(A,B)	D	E	F=max(D,E)		
01/03/2020-31/03/2020	29,088.650	29,088.650	29,088.650	41.920	41.920	41.920	0.00	29046.730
01/04/2020-30/04/2020	30,018.760	30,018.760	30,018.760	33.560	33.560	33.560	0.00	29985.200
01/05/2020-31/05/2020	25,379.065	25,379.065	25,379.065	38.910	38.910	38.910	0.00	25340.155
01/06/2020-30/06/2020	22,993.170	22,993.170	22,993.170	27.640	27.640	27.640	0.00	22965.530
01/07/2020-31/07/2020	24,800.530	24,800.530	24,800.530	30.180	30.180	30.180	0.00	24770.350
01/08/2020-31/08/2020	27,300.850	27,300.850	27,300.850	29.040	29.040	29.040	0.00	27271.810
01/09/2020-30/09/2020	28,104.880	28,104.880	28,104.880	33.160	33.160	33.160	0.00	28071.720
01/10/2020-31/10/2020	30,056.180	30,056.180	30,056.180	27.910	27.910	27.910	0.00	30028.270
01/11/2020-26/11/2020	32,311.470	32,311.470	32,311.470	22.560	22.560	22.560	0.00	32288.910
Total in 2020(P1)	248,053.555	248,053.555	248,053.555	284.880	284.880	284.880	0.000	247,768.675
27/11/2020-30/11/2020	2,200.360	2,200.360	2,200.360	5.260	5.260	5.260	0.00	2195.100
01/12/2020-31/12/2020	33,192.040	33,192.040	33,192.040	20.270	20.270	20.270	0.00	33171.770
Total in 2020(P2)	62,392.400	62,392.400	62,392.400	71.530	71.530	71.530	0.000	62,320.870
Total in 2020 (P1+P2)	310,445.955	310,445.955	310,445.955	356.410	356.410	356.410	0.000	310,089.545
01/01/2021-31/01/2021	30,300.260	30,300.260	30,300.260	35.820	35.820	35.820	0.00	30264.440
01/02/2021-28/02/2021	29,817.640	29,817.640	29,817.640	41.720	41.720	41.720	0.00	29775.920

01/03/2021-31/03/2021	26,100.630	26,100.630	26,100.630	33.550	33.550	33.550	0.00	26067.080
01/04/2021-30/04/2021	25,150.980	25,150.980	25,150.980	28.960	28.960	28.960	0.00	25122.020
01/05/2021-31/05/2021	25,368.190	25,368.190	25,368.190	30.190	30.190	30.190	0.00	25338.000
01/06/2021-30/06/2021	20,200.160	20,200.160	20,200.160	47.830	47.830	47.830	0.00	20152.330
01/07/2021-31/07/2021	26,718.930	26,718.930	26,718.930	20.190	20.190	20.190	0.00	26698.740
01/08/2021-31/08/2021	25,793.420	25,793.420	25,793.420	38.170	38.170	38.170	0.00	25755.250
01/09/2021-30/09/2021	30,107.290	30,107.290	30,107.290	26.740	26.740	26.740	0.00	30080.550
01/10/2021-31/10/2021	33,293.050	33,293.050	33,293.050	30.950	30.950	30.950	0.00	33262.100
01/11/2021-30/11/2021	34,184.660	34,184.660	34,184.660	29.600	29.600	29.600	0.00	34155.060
Total in 2021(P2)	307,035.210	307,035.210	307,035.210	363.720	363.720	363.720	0.000	306,671.490
Total in this monitoring period	592,481.165	592,481.165	592,481.165	674.130	674.130	674.130	0.000	591,807.035