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HEBEI CHENGDE WEICHANG YUDAOKOU PASTURE 150MW WIND FARM PROJECT

Document Prepared by Beijing Shutu Technology Co.,Ltd.

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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 and the GHG emission reductions are estimated to be 329,852tCO₂e annually.

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). This VCS monitoring period covered the time from 01/10/2015 to 29/02/2020, and the emission reductions in this monitoring period are 1,566,806 tCO₂e

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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Title	Manager
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Telephone	+86-311-85278915
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1.4 Other Entities Involved in the Project

Organization name	Beijing Shutu Technology Co.,Ltd.
Role in the Project	Project participant
Contact person	Zhu Shufeng
Title	Manager
Address	610 Zhongkun building, No.1 building, No.59, Gaoliangqiaoxie Street, Haidian District, Beijing
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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

According to the registered VCS PD, the first crediting period is from 01/07/2010(The crediting period will not commence prior to the date of registration).

While according to VCS rules, the project crediting period start date is 27/11/2010 (project start data). So, the first crediting period under VCS is from 27/11/2010 to 26/11/2020, and the total crediting period would have been from 27/11/2010 to 26/11/2040 (30years).

Considering that the project has been registered under CDM on 17/01/2011 with registration number of 3476, and the crediting period under CDM would from 17/01/2011 to 16/01/2032.

According to the VCS rules, the total crediting period of this project under VCS is from 27/11/2010 to 16/01/2032 (21.15years).

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.

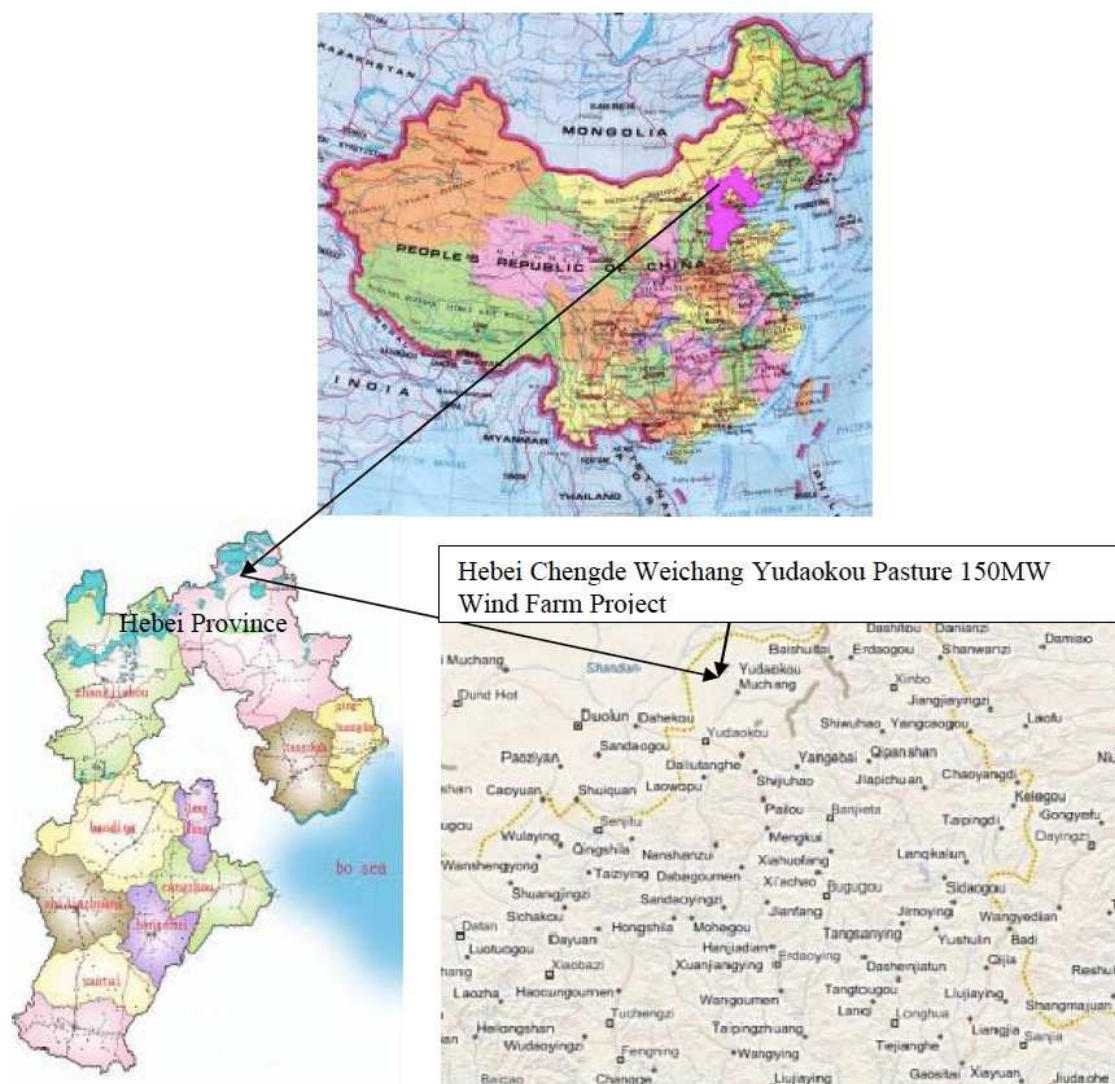


Figure 1. The location of the project

1.8 Title and Reference of Methodology

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).

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).

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.

The credits in this monitoring period (01/10/2015- 29/02/2020) 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.

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

This wind power generation project is a mean to generate renewable energy with no fossil fuels consumptions and strengthen the generation capability in the NCPG. The development of the project will contribute to the sustainable development in the energy sector, especially for the electricity industry. The main contribution includes:

- Reducing reliance on exhaustible fossil fuel;
- Reducing global emissions of greenhouses gases resulting of burning fossil fuel;
- Reducing local air pollution caused by burning fossil fuel;
- Providing sufficient electricity power for life and manufacture of local residents;
- Increasing employment opportunities and incomes for local residents, improving the life quality of local residents

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.

-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 influent 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 stake-holder 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.

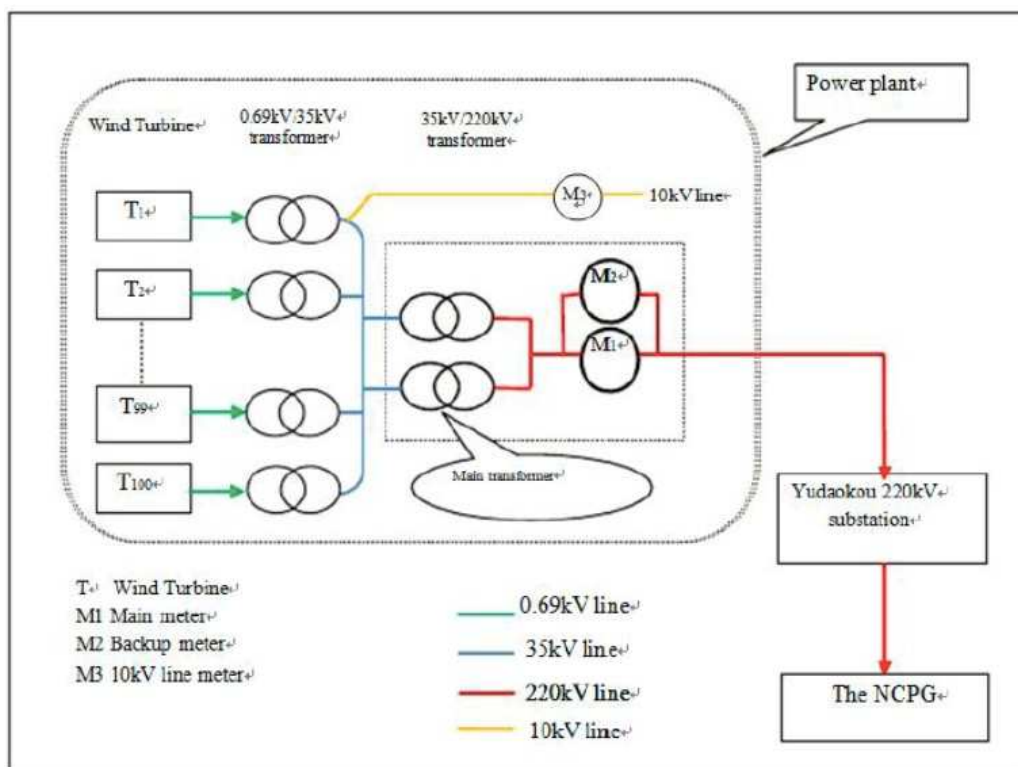


Figure 2. Flow chart of the project

The technical parameters of the installed wind turbines are shown in the table below

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

	Technical parameters	Value
Wind turbine	Type	SL1500/77
	Manufacturer	Huarui Windpower Technology Co., Ltd
	Rotate Speed of Wheel Hub	9.7 -19r/min
	Number of Blades	3
	Fan diameter	77.4m
	Swept area	4,657m ²
	Cut in Wind Speed	3m/s
	Rated Wind Speed	12 m/s

	Cut out Wind Speed	20 m/s
Generator	Type	Asynchronous bidirectional
	Rated Capacity	1.50MW
	Rated Voltage	690V
	Rated Frequency	50Hz
Main Transformer	Type	SFZ10-100000/220
	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 (01/10/2015-29/02/2020), 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

2.3.1 Methodology Deviations

There is no methodology deviation in this monitoring period.

2.3.2 Project Description Deviations

There is no deviation in this monitoring period.

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

Data / Parameter	EGP _{j,y}
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 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	/

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 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	/

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 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	/
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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 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	/

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 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	/

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 registered PD
Justification of choice of data or description of	IPCC default value

measurement methods and procedures applied	
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	/

4.2 Data and Parameters Monitored

Data / Parameter	EG _{facility,y}
Data unit	MWh
Description	Net power supplied to the grid in year y
Source of data	This parameter is calculated monthly with on-site monitored data of electricity delivered to grid (EG _{s,y}), imported electricity from the grid (PR _{g,y}) and electricity from the grid via 10kv line (PR _{10kv,y})
Description of measurement methods and procedures to be applied	$EG_{facility,y} = EG_{s,y} - PR_{g,y} - PR_{10kv,y}$ EG_{s,y}: The electricity delivered by the Project to the grid in year y PR_{g,y}: The electricity imported by the Project from the grid in year y PR_{10kv,y}: The electricity imported by the Project from the grid via 10kV line in year y
Frequency of monitoring/recording	Continuously measured and monthly recording
Value monitored	1485339.240
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 transaction note (ETN).

Purpose of the data	Calculation of baseline emissions
Calculation method	$EG_{\text{facility},y} = EG_{s,y} - PR_{g,y} - PR_{10kV,y}$
Comments	/

Data / Parameter	EG _{s,y}																												
Data unit	MWh																												
Description	Power supplied to the grid in year y																												
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 the bi-directional meter and monthly recorded by the project owner. And it is crosschecked with the ETN. The conservative value is used for ER calculation.																												
Frequency of monitoring/recording	Measured continuously and recorded on a monthly basis																												
Value monitored	1487673.000																												
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 transaction note (ETN). The main information is shown below: <table><tr><td></td><td>Type</td><td>Serial No.</td><td>Accuracy</td><td>Calibration Date</td><td>Valid date</td></tr><tr><td rowspan="6">(M1, main meter)</td><td rowspan="6">SL7000</td><td rowspan="6">36013942</td><td rowspan="6">0.2S</td><td>06/11/2014</td><td>05/11/2015</td></tr><tr><td>30/10/2015</td><td>29/10/2016</td></tr><tr><td>24/10/2016</td><td>23/10/2017</td></tr><tr><td>19/10/2017</td><td>18/10/2018</td></tr><tr><td>10/10/2018</td><td>17/10/2019</td></tr><tr><td>08/10/2019</td><td>07/10/2020</td></tr><tr><td></td><td>SL7000</td><td>36014056</td><td>0.2S</td><td>06/11/2014</td><td>05/11/2015</td></tr></table>		Type	Serial No.	Accuracy	Calibration Date	Valid date	(M1, main meter)	SL7000	36013942	0.2S	06/11/2014	05/11/2015	30/10/2015	29/10/2016	24/10/2016	23/10/2017	19/10/2017	18/10/2018	10/10/2018	17/10/2019	08/10/2019	07/10/2020		SL7000	36014056	0.2S	06/11/2014	05/11/2015
	Type	Serial No.	Accuracy	Calibration Date	Valid date																								
(M1, main meter)	SL7000	36013942	0.2S	06/11/2014	05/11/2015																								
				30/10/2015	29/10/2016																								
				24/10/2016	23/10/2017																								
				19/10/2017	18/10/2018																								
				10/10/2018	17/10/2019																								
				08/10/2019	07/10/2020																								
	SL7000	36014056	0.2S	06/11/2014	05/11/2015																								

	M2(backup meter)				30/10/2015	29/10/2016
					24/10/2016	23/10/2017
					19/10/2017	18/10/2018
					10/10/2018	17/10/2019
					08/10/2019	07/10/2020
Purpose of the data	Calculation of baseline emissions					
Calculation method	/					
Comments	/					

Data / Parameter	PR _{g,y}					
Data unit	MWh					
Description	The electricity use of power plant supplied by the grid via the 220 kV line in year y					
Source of data	Measured by main meter M1 located at the output of the on-site transformer substation					
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. And it is crosschecked with the ETN. The conservative value is used for ER calculation.					
Frequency of monitoring/recording	Measured continuously and recorded on a monthly basis					
Value monitored	2333.760					
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 transaction note (ETN). The main information is shown below:					
		Type	Serial No.	Accuracy	Calibration Date	Valid date
	(M1, main meter)	SL7000	36013942	0.2S	06/11/2014	05/11/2015
					30/10/2015	29/10/2016

					24/10/2016	23/10/2017						
					19/10/2017	18/10/2018						
					10/10/2018	17/10/2019						
					08/10/2019	07/10/2020						
	M2(backup meter)	SL7000	36014056	0.2S	06/11/2014	05/11/2015						
					30/10/2015	29/10/2016						
					24/10/2016	23/10/2017						
					19/10/2017	18/10/2018						
					10/10/2018	17/10/2019						
					08/10/2019	07/10/2020						
	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
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. And it is crosschecked with the ETN. The conservative value is used for ER calculation.
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 transaction note (ETN). The main information of M3 is shown below:				
	Type	Serial No.	Accuracy	Calibration Date	Valid date
	DTS747 (M3)	2103348	1.0	06/11/2014	05/11/2015
				30/10/2015	29/10/2016
				24/10/2016	23/10/2017
				19/10/2017	18/10/2018
				10/10/2018	17/10/2019
08/10/2019	07/10/2020				
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.

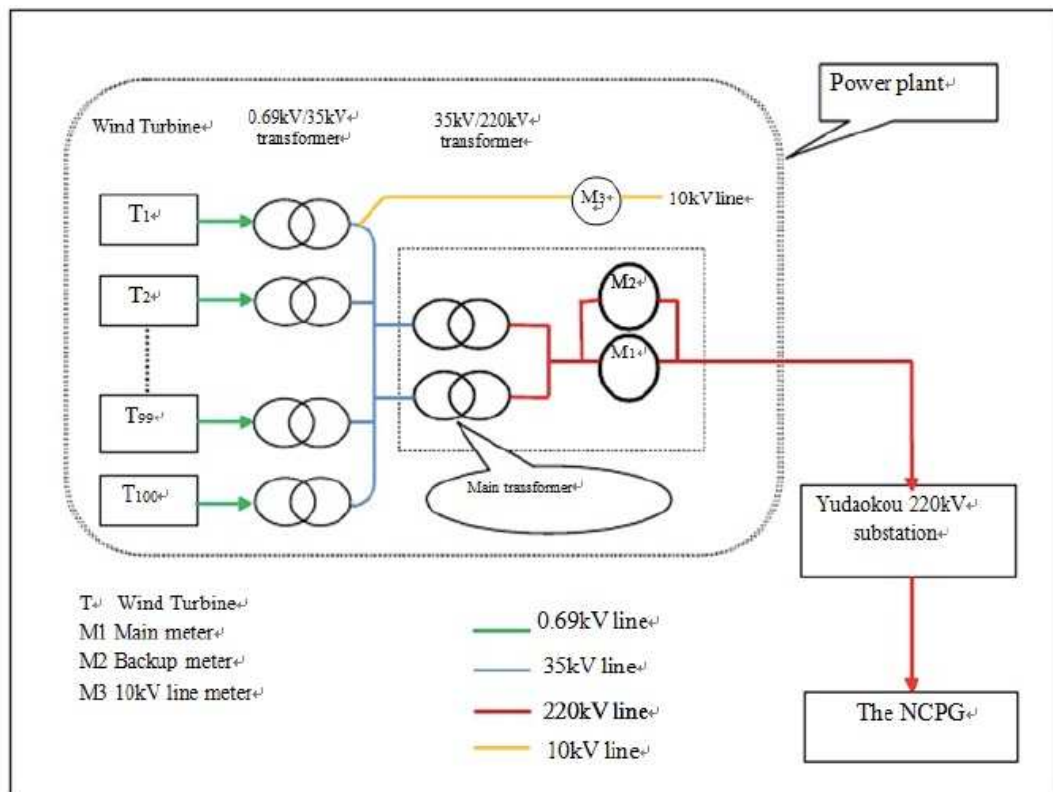


Figure 3. Monitoring point of the project

2. Monitoring System Organization Chart

The monitoring system is shown in Figure 4.

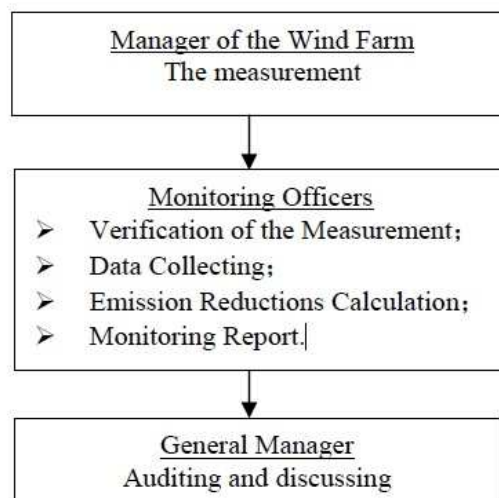


Figure 4. Monitoring structure

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 Transaction Note (hereinafter referred to as ETN) was issued by the grid company to the Project Owner. ETNs issued by the grid company were used as sales receipts 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 ETN 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 (MWh);

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

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

Table 2. Baseline emissions

Period	Electricity supplied to the grid in year y ($EG_{s,y}$) (MWh)	Electricity imported by the Project from the grid in year y ($PR_{g,y}$) (MWh)	Electricity imported by the Project from the grid via 10kV line in year y ($PR_{10kV,y}$) (MWh)	Net power supplied to the grid in year y ($EG_{\text{facility},y}$) (MWh)	$EF_{\text{grid},CM,y}$ (tCO ₂ /yr)	Baseline Emissions (tCO ₂ e)
01/10/2015-31/12/2015	78881.880	104.280	0	78777.600	1.05485	83,098
01/01/2016-31/12/2016	315622.560	473.880	0	315148.680	1.05485	332,434
01/01/2017-31/12/2017	354996.840	561.000	0	354435.840	1.05485	373,876
01/01/2018-31/12/2018	322011.360	528.000	0	321483.360	1.05485	339,116
01/01/2019-31/12/2019	360272.880	588.720	0	359684.160	1.05485	379,412

01/01/2020-29/02/2020	55887.480	77.880	0	55809.600	1.05485	58,870
Total in this monitoring period	1487673.000	2333.760	0	1485339.240		1,566,806

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 registered PD

$$ER_y = BE_y - PE_y$$

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01/10/2015-31/12/2015	83,098	0	0	83,098
01/01/2016-31/12/2016	332,434	0	0	332,434
01/01/2017-31/12/2017	373,876	0	0	373,876
01/01/2018-31/12/2018	339,116	0	0	339,116
01/01/2019-31/12/2019	379,412	0	0	379,412

01/01/2020-29/02/2020	58,870	0	0	58,870
Total	1,566,806	0	0	1,566,806

The emission reductions in the registered PD are 329,852tCO₂e/yr. This monitoring period is from 01/10/2015 to 29/02/2020(1613days). The ex-ante estimated ER for this monitoring period are $329852/365 \times 1613 = 1,457,675\text{tCO}_2$. And the actual ER for this monitoring period is 1,566,806tCO₂, which is 7.49% larger than the ex-ante estimation. This will not influence the additionality. As per the registered PD, when electricity increases 16%, the IRR would reach the benchmark of 8%.

The increase of electricity output is mainly caused by better than expected wind resources and improvement on curtailment of wind power from the project by the local grid. Also more experienced operation and management skills have played an important role as well.

APPENDIX: < MONTHLY ELECTRICITY >

Period	Electricity supplied to the grid in year y			Electricity imported by the Project from the grid in year y (PR _{g,y})			Electricity imported by the Project from the grid via 10kV line in year y (PR _{10kV,y})	Net power supplied to the grid in year y (EG _{facility,y})
	EGs,y (MWh)	ETN (MWh)	Conservative value (EGs,y)	Meter readings of PR _{g,y}	ETN (MWh)	Conservative value (PR _{g,y})	PR10KV, y	
01/10/2015-31/10/2015	22380.600	22380.600	22380.600	40.920	40.920	40.920	0	22339.680
01/11/2015-30/11/2015	27341.160	27341.160	27341.160	23.760	23.760	23.760	0	27317.400
01/12/2015-31/12/2015	29160.120	29160.120	29160.120	39.600	39.600	39.600	0	29120.520
Total in 2015	78881.880	78881.880	78881.880	104.280	104.280	104.280	0	78777.600
01/01/2016-31/01/2016	26456.760	26456.760	26456.760	19.800	19.800	19.800	0	26436.960
01/02/2016-28/02/2016	33139.920	33139.920	33139.920	25.080	25.080	25.080	0	33114.840
01/03/2016-31/03/2016	40241.520	40241.520	40241.520	11.880	11.880	11.880	0	40229.640
01/04/2016-30/04/2016	39177.600	39177.600	39177.600	36.960	36.960	36.960	0	39140.640
01/05/2016-31/05/2016	25816.560	25816.560	25816.560	46.200	46.200	46.200	0	25770.360
01/06/2016-30/06/2016	12338.040	12338.040	12338.040	54.120	54.120	54.120	0	12283.920

01/07/2016-31/07/2016	11604.120	11604.120	11604.120	89.760	89.760	89.760	0	11514.360
01/08/2016-31/08/2016	12922.800	12922.800	12922.800	48.840	48.840	48.840	0	12873.960
01/09/2016-30/09/2016	15925.800	15925.800	15925.800	43.560	43.560	43.560	0	15882.240
01/10/2016-31/10/2016	28509.360	28509.360	28509.360	29.040	29.040	29.040	0	28480.320
01/11/2016-30/11/2016	32068.080	32068.080	32068.080	59.400	59.400	59.400	0	32008.680
01/12/2016-31/12/2016	37422.000	37422.000	37422.000	9.240	9.240	9.240	0	37412.760
Total in 2016	315622.560	315622.560	315622.560	473.880	473.880	473.880	0	315148.680
01/01/2017-31/01/2017	32528.760	32528.760	32528.760	39.600	39.600	39.600	0	32489.160
01/02/2017-28/02/2017	42679.560	42679.560	42679.560	77.880	77.880	77.880	0	42601.680
01/03/2017-31/03/2017	55544.280	55544.280	55544.280	29.040	29.040	29.040	0	55515.240
01/04/2017-30/04/2017	41531.160	41531.160	41531.160	33.000	33.000	33.000	0	41498.160
01/05/2017-31/05/2017	30662.280	30662.280	30662.280	18.480	18.480	18.480	0	30643.800
01/06/2017-30/06/2017	14654.640	14654.640	14654.640	73.920	73.920	73.920	0	14580.720
01/07/2017-31/07/2017	13782.120	13782.120	13782.120	56.760	56.760	56.760	0	13725.360
01/08/2017-31/08/2017	15348.960	15348.960	15348.960	73.920	73.920	73.920	0	15275.040
01/09/2017-30/09/2017	16539.600	16539.600	16539.600	83.160	83.160	83.160	0	16456.440
01/10/2017-31/10/2017	21976.680	21976.680	21976.680	42.240	42.240	42.240	0	21934.440
01/11/2017-30/11/2017	36367.320	36367.320	36367.320	17.160	17.160	17.160	0	36350.160
01/12/2017-31/12/2017	33381.480	33381.480	33381.480	15.840	15.840	15.840	0	33365.640
Total in 2017	354996.840	354996.840	354996.840	561.000	561.000	561.000	0	354435.840
01/01/2018-31/01/2018	30022.080	30022.080	30022.080	26.400	26.400	26.400	0	29995.680
01/02/2018-28/02/2018	18827.160	18827.160	18827.160	6.600	6.600	6.600	0	18820.560
01/03/2018-31/03/2018	33434.280	33434.280	33434.280	27.720	27.720	27.720	0	33406.560
01/04/2018-30/04/2018	46978.800	46978.800	46978.800	46.200	46.200	46.200	0	46932.600
01/05/2018-31/05/2018	25901.040	25901.040	25901.040	58.080	58.080	58.080	0	25842.960
01/06/2018-30/06/2018	14518.680	14518.680	14518.680	30.360	30.360	30.360	0	14488.320
01/07/2018-31/07/2018	20539.200	20539.200	20539.200	101.640	101.640	101.640	0	20437.560
01/08/2018-31/08/2018	12701.040	12701.040	12701.040	50.160	50.160	50.160	0	12650.880

01/09/2018-30/09/2018	19558.440	19558.440	19558.440	55.440	55.440	55.440	0	19503.000
01/10/2018-31/10/2018	25384.920	25384.920	25384.920	38.280	38.280	38.280	0	25346.640
01/11/2018-30/11/2018	33396.000	33396.000	33396.000	11.880	11.880	11.880	0	33384.120
01/12/2018-31/12/2018	40749.720	40749.720	40749.720	75.240	75.240	75.240	0	40674.480
Total in 2018	322011.360	322011.360	322011.360	528.000	528.000	528.000	0	321483.360
01/01/2019-31/01/2019	34595.880	34595.880	34595.880	62.040	62.040	62.040	0	34533.840
01/02/2019-28/02/2019	18597.480	18597.480	18597.480	73.920	73.920	73.920	0	18523.560
01/03/2019-31/03/2019	37026.000	37026.000	37026.000	22.440	22.440	22.440	0	37003.560
01/04/2019-30/04/2019	28649.280	28649.280	28649.280	21.120	21.120	21.120	0	28628.160
01/05/2019-31/05/2019	45342.000	45342.000	45342.000	29.040	29.040	29.040	0	45312.960
01/06/2019-30/06/2019	14341.800	14341.800	14341.800	66.000	66.000	66.000	0	14275.800
01/07/2019-31/07/2019	20289.720	20289.720	20289.720	72.600	72.600	72.600	0	20217.120
01/08/2019-31/08/2019	12546.600	12546.600	12546.600	84.480	84.480	84.480	0	12462.120
01/09/2019-30/09/2019	23319.120	23319.120	23319.120	69.960	69.960	69.960	0	23249.160
01/10/2019-31/10/2019	31037.160	31037.160	31037.160	43.560	43.560	43.560	0	30993.600
01/11/2019-30/11/2019	38860.800	38860.800	38860.800	17.160	17.160	17.160	0	38843.640
01/12/2019-31/12/2019	55667.040	55667.040	55667.040	26.400	26.400	26.400	0	55640.640
Total in 2019	360272.880	360272.880	360272.880	588.720	588.720	588.720	0	359684.160
01/01/2020-31/01/2020	34391.280	34391.280	34391.280	33.000	33.000	33.000	0	34358.280
01/02/2020-29/02/2020	21496.200	21496.200	21496.200	44.880	44.880	44.880	0	21451.320
Total in 2020	55887.480	55887.480	55887.480	77.880	77.880	77.880	0	55809.600
Total in this monitoring period	1487673.000	1487673.000	1487673.000	2333.760	2333.760	2333.760	0	1485339.240