



Verified Carbon Standard

HEBEI GUYUAN COUNTY DONGXINYING 199.5 MW WIND POWER PROJECT

Document Prepared by Demeter Venture Uk Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Hebei Guyuan County Dongxinying 199.5MW Wind Power Project (hereafter referred as “the project”) is a Greenfield grid-connected wind power project. The project is invested, constructed and operated by Hebei Construction Investment New Energy Co., Ltd.

The project will help reduce greenhouse gas (GHG) emissions generated from the high-growth, coal-dominated power generation in North China Power Grid (hereinafter referred to as NCPG). When the proposed project is operated, the electricity generated by the proposed project will displace part of the electricity from the NCPG, and thus greenhouse gas (GHG) generated by coal-fired power plants could be reduced.

The project is a newly constructed wind farm. The total capacity of the project is 199.5 MW and a total of 133 wind turbines with 1,500kW per-unit capacities were installed. The expected annual electricity supplied to the NCPG is 405,685MWh. The estimated annual GHG emission reductions are 427,936 tCO₂e/yr during the first crediting period (from 25/05/2010 to 24/05/2020), and 335,460tCO₂e/yr during the second crediting period (from 25/05/2020 to 24/05/2030).

Some important dates for the project are as follows:

The date to start construction: 25/08/2008;

The date of first wind turbine started operation: 25/05/2010;

The date of all wind turbines put into full operation: 06/10/2010;

The first crediting period is from 25/05/2010 to 24/05/2020 while the second crediting period is from 25/05/2020 to 24/05/2030. This monitoring period is from 01/03/2020 to 30/11/2021 (640 days), in which the period from 01/03/2020 to 24/05/2020 (85 days, hereinafter referred as “P1”) belongs to the first crediting period, and the period from 25/05/2020 to 30/11/2021 (555 days, hereinafter referred as “P2”) belongs to the second crediting period. The emission reductions in P1 is 107,512 tCO₂, the emission reductions in P2 is 543,433 tCO₂. Hence, the emission reductions in this monitoring period is 650,945 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
Contact person	Zhang Ling
Title	Manager
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1.4 Other Entities Involved in the Project

Organization name	Demeter Venture Uk Limited
Role in the Project	Project participant
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1.5 Project Start Date

25/05/2010 (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 25/05/2010 to 24/05/2020, while the second crediting period is from 25/05/2020 to 24/05/2030.

As per VCS scheme under which the project was registered, the project crediting period is allowable for 10 years and could be renewed twice. Considering 3*7 years CDM crediting period, it is reasonable that the total VCS crediting period was determined from 25/05/2010 to

24/05/2031, of which the first VCS crediting period is from 25/05/2010 to 24/05/2020 and the second VCS crediting period is from 25/05/2020 to 24/05/2030.

This monitoring period is from 01/03/2020 to 30/11/2021 (640 days), in which the period from 01/03/2020 to 24/05/2020(85 days, hereinafter referred as “P1”) belongs to the first crediting period, and the period from 25/05/2020 to 30/11/2021 (555 days, hereinafter referred as “P2”) belongs to the second crediting period.

1.7 Project Location

The project site is located in the south of Guyuan County, Zhangjiakou City of Hebei Province. It is about 20 km from Guyuan County. The exact geographical coordinates of the project are $115.2997^{\circ}\sim 115.7508^{\circ}\text{E}$, $41.3169^{\circ}\sim 41.5661^{\circ}\text{N}$. Figure 1 shows the location of the project:

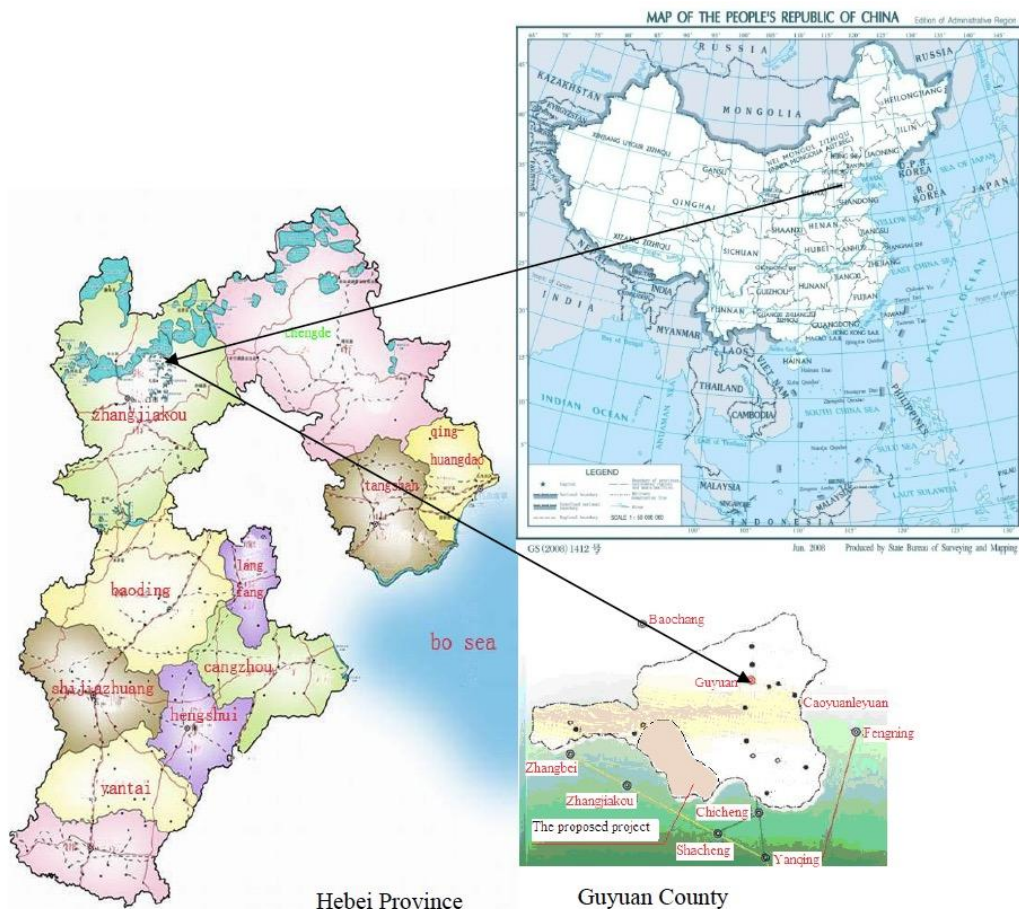


Figure 1. The location of the project

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” (Version 12.1.0).

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 05.2).

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)
- 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)

1.9 Participation under other GHG Programs

The Project has been registered as a CDM project on 15/09/2011 with registration number of 4853. It has been issued four times under CDM mechanism, covering monitoring period from 15/09/2011 to 30/09/2015. And CERs were waiting issuance request for the period from 04/10/2012 to 31/12/2012 under CDM scheme.

The credits in this monitoring period (01/03/2020- 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 15/09/2011 with registration number of 4853. It has been issued four times under CDM mechanism, covering monitoring period from 15/09/2011 to 30/09/2015. And CERs were waiting issuance request for the period from 04/10/2012 to 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.

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

2. Reduction of fossil fuel use and provide clean energy

¹ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQCOPWPGWWDN8ED5PG>

² <https://sdgs.un.org/goals/goal13>

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

The Environmental Impact Assessment of the proposed project was completed by Hebei Institute of Geographical Sciences and approved by the Environment Protection Bureau of Hebei Province on 19/11/2007. Main contents of the Environmental Impact Assessment are summarized as follows:

Ecological impact

Construction Phase

1) Impact on Foliage

The area of the buildings stated above will be all the shrub-grassland. There will be some impacts on the local vegetation during the construction period. The main impact will be eradication of local sward and the stack of earth on the lawn. But after the construction period, new trees and grass will be planted again on the site. The vegetation condition of the earth surface will recover very soon.

2) Impact on other animals

No big mammal has been found in the local area. There are only small mammals just like hare and mice.

The small animals disturbed by the construction (like the snail, the angleworm, the ant) will migrate the similar habitat conditions nearby due to their strong ability of migration. So, the

³ <https://sdgs.un.org/goals/goal7>

⁴ <https://sdgs.un.org/goals/goal8>

species diversity and population size in the area will not be obviously influenced by the proposed project during the construction phase.

3) Impact on the residents

The main air pollution sources during the construction period include dust from excavation, blasting and transportation. Some measures will be taken to reduce impact of dust, such as watering, covering and so on. In addition, the construction area is open and wide, which aids the diffusion of pollutants. Therefore, the construction will not cause much negative impact on the local air environment.

Noise will be generated by machine equipment during construction. Measures will be taken to reduce the environmental impacts of noise: choosing low-noise machines and technologies, arranging reasonable construction time, and enhancing construction management. In addition, the nearest residential area is far away from the wind farm, the neighbor hood residents will not be influenced by the noise.

So the dust and the noise generated by construction activities will have less impact on local residents.

Operation Phase

1) Impact on the local biogeocenose

There is no waste gas, waste water and solid waste in the process of wind energy. Thus, the project will not obviously affect the local biogeocenose.

2) Visual Impact

The wind turbines installed in the grassland will enhance the visual value of the grassland and demonstrate the harmonious relation between human and nature. So, the proposed project has little impact on the local scene.

3) Impact on the animals

No big mammal has been found in the local area. There are only small mammals just like hare and mice.

They may migrate back to the former sites after the completion of the project. Therefore, the project will have less impact on other propagation during the operation phase.

Environmental Impact

Construction phase

For the dust emission generated during the construction period, treatment measures shall be taken. The measures include spraying water and enhancing construction management to avoid any influence on the ambient environment. Furthermore, the construction period is short and the local atmosphere capacity is large which aids the dust diffusion, the construction will have little influence on the local atmosphere.

The main solid waste generated from the site will be construction waste as well as the household waste from the personnel at the site. The solid waste will be carried to the landfill nearby. And both domestic sewage and the sewage from the worksite will be treated up to the standards before being discharged. So, the waste and waste water generated by construction activities will have less impact on local residents.

Operation Phase

The operating noise level of the 1500kW turbine ranges from 96dB to 104dB. Since the wind farm is far away from the village, the noise levels will be controlled and naturally attenuated by ambient conditions within the standards set as Standard of Environmental Noise of Urban Area.

The waste water from the proposed project during operation phase will only be sewage. The sewage processed by the biological septic tank will be discharged into the collecting pond. The processed sewage will be utilized to irrigate plant in the project site without discharge. Therefore, the sewage from the project during the operation phase will have less impact on the environment.

The solid waste will be mainly composed of the household garbage generated from the workers in the 220kV booster station. The solid waste will be carried termly to the landfill nearby. Therefore, impact of solid waste on the environment is considered to be insignificant.

Conclusion

The project does not have any major adverse impacts on the environment during its construction and operation phase. Therefore, this project does not do harm to local environment.

2.2 Local Stakeholder Consultation

The project owner invited the comments of local stakeholders by issuing questionnaires. Hebei Construction Investment New Energy Co., Ltd carried out the survey on the local villagers and residents, the governmental officials and so on from January 2008. The survey was conducted through distributing and collecting responses to a questionnaire which was designed by project owner.

The questions include:

What level do you know about the proposed project?	Know very well
	Know a little
	Never heard
Do you know about the Clean Development Mechanism?	know
	Don not know
Do you think which impact on the environment may be caused by the project?	Noise caused by construction
	Waste water caused by construction
	Noise caused by turbine operation
	Impact of dust on air quality
	Use of land
	Soil and water conservation
Construction waste	

	Impact on traffic
	Impact on the surrounding eco-environment
	The interference on TV and others
Impacts of the project to local environment	Positive effect
	Negative effect
	No effect
Impacts of the project to local economic development?	Beneficial
	Adverse
	No change
Whether to support the construction of the project?	Support
	Non support

Questionnaires have been distributed according to the principle of both representation and randomness in order to reflect the public opinions and comments in a fair and real manner.

The investigated stakeholders include the individuals from the construction site and the nearby Guyuan County. The stakeholders also include the group from the government and association. The investigation has taken full account into the public advice of different ages, education levels and occupations.

In addition, public comments were invited by a poster on 12/02/2008 in all the villages within a radius of five-kilometre from the proposed project, which include Dongxinying Village, Lianhuatan Village, Taiping Village. Besides the content mentioned above, the following question was added in the Notice.

- What other comments and suggestions do the respondents have for the company regarding the Project?
- What impacts on your life may be caused by the project?

81 valid responses from 82 questionnaires were collected and the following is a summary of the survey :

Comments from the questionnaires show that 100% of the investigated stakeholders agree with the project construction, and none of them objects.

18.52% of the investigated stakeholders know something about the project while 75.31% of the investigated stakeholders know very well about the project and the others never heard it; 90.12% of them know about CDM; 87.65% of them don't think it impacting their livelihoods environment while 2.47% of them think it takes little impact of the local environment and the others think it has no impact; The fields of environmental protection the public concerned mainly include noise of the construction(6.17%) , waste water caused by construction (7.41%), noise of the operation

(17.28%), construction waste (17.28%), impact of dust on air quality (1.23%), use of land (55.56%), soil and water conservation(12.35%), impact on traffic(4.94%); impact on the surrounding eco-environment (8.64%), the interference on TV and others(4.94%); 98.77% of them think it will promote the local economy. And the stakeholders are all supportive of this project.

No comments of the villagers who had seen the Notice have been received from 12/02/2008 to 12/03/2008.

In conclusion, the stakeholders are all supportive of this project.

In addition to the physical stakeholder consultations, 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 is a Greenfield grid-connected wind power project. The total installed capacity of the project is 199.5MW equipped with 133 sets of wind turbines with a unit installed capacity of 1.5MW.

Construction of the project was started on 25/08/2008. The date of first wind turbine started operation was 25/05/2010. And the date of all wind turbine started full operation was 06/10/2010.

The project applies WTG-box transformer unit to boost voltage of the generated electricity from 690V to 35kV. Then the electricity will be transmitted to the main transformers via 35kV collection lines. After boosted its voltage to 220kV by the main transformers, the electricity will be transmitted to Xiaochang Substation and exported to NCPG.

Major technical parameters of the key equipments employed by the project are illustrated in the following table.

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

Parameter	Unit	Value
Type of turbine	/	FD77B
Type of generator	/	double-fed asynchronous

		motor
Nominal output	kW	1500
Rotor Diameter	m	77
Hub height	m	61.5
Rated Voltage	V	690
Cut-in wind speed	m/s	3.0
Nominal wind speed	m/s	12

During this monitoring period (01/03/2020-30/11/2021), the project operated normally. No equipment is overhauled or replaced in this monitoring period. No emergencies which may impact the methodology application and monitoring occurred during the 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

There is a crediting period deviation in this monitoring period.

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 25/05/2010. As per UNFCCC website, it was confirmed that the project activity was registered as CDM project activity on 15/09/2011. Therefore, the VCS crediting period was determined as 27/11/2010 to 15/09/2011. 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 25/05/2010 to 14/09/2032 (considering 3*7 CDM crediting period started from 15/09/2011), of which the first crediting period is from 25/05/2010 to 24/05/2020, while the second crediting period is from 25/05/2020 to 24/05/2030. The same has been described in the renewed VCS PD.

3.3 Grouped Projects

Not applicable because 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	FC_{i,m,y}
Data unit	Mass or volume unit
Description	The amount of fuel i (in a mass or volume unit) consumed by relevant power sources m in year(s) y
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/mass or volume unit of a fuel
Description	The net calorific value (energy content) per mass or volume unit of a fuel i
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	China Energy Statistical Yearbook 2005-2007
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	EF_{i,m,y}
Data unit	tCO ₂ /GJ
Description	The CO ₂ emission factor per unit of energy of the fuel i.
Source of data	2006 IPCC Guidelines 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	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Purpose of Data	Calculation of baseline emissions
Comments	NCV values used for the OM/BM calculation are based on IPCC default value which is at the lower limit of the uncertainty at a

	95% confidence interval, so it is conservative.
Data / Parameter	EG_{grid,j,y}
Data unit	MWh
Description	Net electricity generated and delivered to the grid by province j in year y
Source of data	China 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	GENE_{best,coal}
Data unit	/
Description	Best electricity supply efficiency for coal fired plant
Source of data	Notification on Determining Baseline Emission Factor of China's Grid
Value applied	37.28%
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	GENE_{best,oil,gas}
Data unit	/
Description	Efficiency level of the best technology commercially available in China for gas-fired and oil-fired power generators
Source of data	Notification on Determining Baseline Emission Factor of China's Grid
Value applied	48.81%
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	$CAP_{i,y}$
Data unit	MW
Description	Installed capacity in each province of NCPG
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	/

For monitoring period belongs to the second crediting period:

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO ₂ /MWh
Description	Simple 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 NDRC
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO ₂ /MWh
Description	Simple 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 ⁶

⁵ <http://www.mee.gov.cn/ywgz/ydqhbh/wsqtzk/202012/W020201229610353816665.pdf>

⁶ <http://www.mee.gov.cn/ywgz/ydqhbh/wsqtzk/202012/W020201229610354442145.pdf>

Value applied	0.4819
Justification of choice of data or description of measurement methods and procedures applied	Official public data from NDRC
Purpose of Data	Calculation of baseline emissions
Comments	/

Data / Parameter	Wom
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	WBM
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	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_{facility,y}
Data unit	MWh/yr

Description	<p>Net electricity supplied to the grid by the proposed project in year y (the 1st crediting period)</p> <p>Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (the 2nd crediting period)</p>									
Source of data	Calculation									
Description of measurement methods and procedures to be applied	<p>Calculation by $EG_{\text{export},y}$, $EG_{\text{import},y}$ and $EG_{\text{backupline},y}$ and cross-check with electricity receipts.</p> <p>$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backupline},y}$</p> <table border="1"> <tr> <td rowspan="2">$EG_{\text{export},y}$</td> <td>Annual electricity exported to the grid by the proposed project (for the first crediting period)</td> </tr> <tr> <td>Quantity of electricity exported to the grid by the project through the main power line (for the second crediting period)</td> </tr> <tr> <td rowspan="2">$EG_{\text{import},y}$</td> <td>Annual electricity imported from the grid to the proposed project (for the first crediting period)</td> </tr> <tr> <td>Quantity of electricity imported from the grid by the project through the main power line (for the second crediting period)</td> </tr> <tr> <td rowspan="2">$EG_{\text{backupline},y}$</td> <td>Electricity delivered to the project through the backup line (for the first crediting period)</td> </tr> <tr> <td>Quantity of electricity delivered to the project through the backup line (for the second crediting period)</td> </tr> </table>	$EG_{\text{export},y}$	Annual electricity exported to the grid by the proposed project (for the first crediting period)	Quantity of electricity exported to the grid by the project through the main power line (for the second crediting period)	$EG_{\text{import},y}$	Annual electricity imported from the grid to the proposed project (for the first crediting period)	Quantity of electricity imported from the grid by the project through the main power line (for the second crediting period)	$EG_{\text{backupline},y}$	Electricity delivered to the project through the backup line (for the first crediting period)	Quantity of electricity delivered to the project through the backup line (for the second crediting period)
$EG_{\text{export},y}$	Annual electricity exported to the grid by the proposed project (for the first crediting period)									
	Quantity of electricity exported to the grid by the project through the main power line (for the second crediting period)									
$EG_{\text{import},y}$	Annual electricity imported from the grid to the proposed project (for the first crediting period)									
	Quantity of electricity imported from the grid by the project through the main power line (for the second crediting period)									
$EG_{\text{backupline},y}$	Electricity delivered to the project through the backup line (for the first crediting period)									
	Quantity of electricity delivered to the project through the backup line (for the second crediting period)									
Frequency of monitoring/recording	Continuously measurement and monthly recording									
Value monitored	759116.945									
Monitoring equipment	The information of the electricity meter is in the following table.									
QA/QC procedures to be applied	The electricity meters are calibrated by qualified entity according to national standards. The electricity records are crosschecked with Electricity Receipts. The conservative value is used for calculation.									
Purpose of the data	Calculation of baseline emissions									
Calculation method	$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backupline},y}$									
Comments	/									
Data / Parameter	$EG_{\text{export},y}$									
Data unit	MWh									

Description	<p>Annual electricity exported to the grid by the proposed project (for the first crediting period)</p> <p>Quantity of electricity exported to the grid by the project through the main power line (for the second crediting period)</p>																																	
Source of data	Measured by electricity meter M1 (or M3, backup meter) and M2 (or M4, backup meter)																																	
Description of measurement methods and procedures to be applied	<p>It is continuously measured by the bi-directional meters and monthly recorded by the project owner.</p> $EG_{\text{export},y} = EG_{\text{export},y,1} + EG_{\text{export},y,2}$ <p>The total value will be crosschecked with Electricity Receipts, and the conservative value will be used for emission reductions. The accuracy of the meters are 0.2S.</p> <p>At 24:00 of the last day of each month, the meter reading were read and recorded by the project owner and grid company.</p>																																	
Frequency of monitoring/recording	Continuously measured and monthly recorded																																	
Value monitored	759531.295																																	
Monitoring equipment	The information of the electricity meter is in the following table.																																	
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Calculation method	/																																	
Comments	/																																	
Data / Parameter	$EG_{\text{import},y}$																																	
Data unit	MWh																																	

Description	Annual electricity imported from the grid to the proposed project (for the first crediting period) Quantity of electricity imported from the grid by the project through the main power line (for the second crediting period)																																	
Source of data	Measured by electricity meter M1 (or M3, backup meter) and M2 (or M4, backup meter). $EG_{import,y} = EG_{import,y,1} + EG_{import,y,2}$																																	
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 total value will be crosschecked with Electricity Receipts, and the conservative value will be used for emission reductions. 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	414.350																																	
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Purpose of the data	Calculation of baseline emissions																																	
Calculation method	/																																	
Comments	/																																	
Data / Parameter	$EG_{backupline,y}$																																	
Data unit	MWh																																	
Description	Electricity delivered to the project through the backup line (for the first crediting period)																																	

	Quantity of electricity delivered to the project through the backup line (for the second crediting period)												
Source of data	Measured by electricity meter (M5)												
Description of measurement methods and procedures to be applied	<p>This parameter is continuously measured and monthly recorded by the project owner. The value will be crosschecked with Electricity Receipts, and the conservative value will be used for emission reductions.</p> <p>At 24:00 of the last day of each month, the meter reading were read and recorded by the project owner and grid company.</p> <p>The accuracy of M5 is 0.5S</p>												
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	<p>The electricity meter is calibrated by qualified entity according to national standards. The main information is shown below:</p> <table border="1"> <thead> <tr> <th></th> <th>Type</th> <th>Serial No.</th> <th>Accuracy</th> <th>Calibration Date and valid date</th> </tr> </thead> <tbody> <tr> <td rowspan="3">M5</td> <td rowspan="3">DSSD22</td> <td rowspan="3">B24TOP8124 03001807</td> <td rowspan="3">0.5S</td> <td>17/07/2019-16/07/2020</td> </tr> <tr> <td>17/07/2020-16/07/2021</td> </tr> <tr> <td>17/07/2021-16/07/2022</td> </tr> </tbody> </table>		Type	Serial No.	Accuracy	Calibration Date and valid date	M5	DSSD22	B24TOP8124 03001807	0.5S	17/07/2019-16/07/2020	17/07/2020-16/07/2021	17/07/2021-16/07/2022
	Type	Serial No.	Accuracy	Calibration Date and valid date									
M5	DSSD22	B24TOP8124 03001807	0.5S	17/07/2019-16/07/2020									
				17/07/2020-16/07/2021									
				17/07/2021-16/07/2022									
Purpose of the data	Calculation of baseline emissions												
Calculation method	/												
Comments	/												

4.3 Monitoring Plan

1. Monitoring data

The net electricity ($EG_{\text{facility},y}$) supplied to the grid by the project will not be measured directly. It is the difference of the following parameters.

- 1) $EG_{\text{export},y}$ is the electricity exported to the grid by the project through the main power line;
- 2) $EG_{\text{import},y}$ is the electricity imported from the grid by the project through the main power line;
- 3) $EG_{\text{backupline},y}$ is the electricity delivered to the project through the backup line.

2. Project Integrate Management

This monitoring plan has been implemented by Hebei Construction Investment New Energy Co., Ltd., the project owner. The project manager is responsible for the implementation and monitoring of the monitoring activity. There are two departments organized for data report, quality control. There is a manager responsible for data report and quality control department. The manager will take charge of the employment administration, as well as the operation implementation and monitoring; staffs will carry on the concrete assignment based on the guide of their manager

3. Metering System

The electricity generated by the project will be transmitted to on-site transformers which increase the voltage to 220 kV, and then delivered to Xiaochang Substation by 220kV transmission line. The simplified electrical grid connection diagram is shown in the following figure 2:

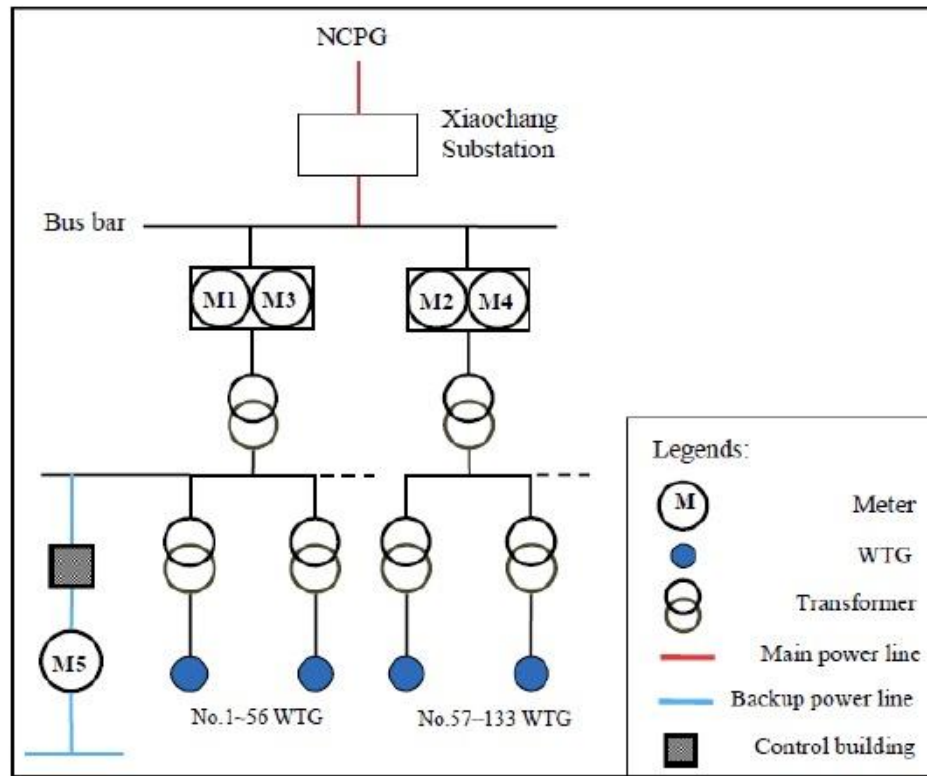


Figure 4. Simplified electrical grid connection diagram

The power line supplying electric power to the grid can also deliver power from the grid to the wind farm.

The metering equipment run in two directions and will record two readings, i.e. electricity exported to the grid ($EG_{\text{export}, y}$) and electricity imported from the grid ($EG_{\text{import}, y}$). Net electricity supplied to the grid is calculated as exports minus imports.

M1 is installed at high voltage side of No. 1 main transformer; M2 is installed at the high voltage side of No. 2 main transformer. Both M1 and M2 are bi-directional meters. M1 is used for measurement of electricity exported by Group 1 WTGs ($EG_{\text{export},y,1}$) and electricity imported from the grid by Group 1 WTGs ($EG_{\text{import},y,1}$). M2 measures electricity exported by Group 2 WTGs ($EG_{\text{export},y,2}$) and electricity imported from the grid by Group 2 WTGs ($EG_{\text{import},y,2}$).

The meter M3 and meter M4 acts as backup meter of M1 and M2 and measures electricity.

The parameters are continuously measured and monthly recorded, and the cut-off time is 24:00 on the last day of each month.

Net electricity supplied to the grid by the project is calculated on a monthly basis as:

$$EG_{\text{facility},y} = EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backupline},y}$$

Where:

$EG_{\text{facility},y}$ is the calculated power generation from the proposed project;

$EG_{\text{export},y}$ is the electricity exported to the grid through the main power line metered by the instruments at M1 and M2 (or backup meter M3 and M4);

$EG_{\text{import},y}$ is the electricity imported from the grid through the main power line metered by the instruments at M1 and M2 (or backup meter M3 and M4);

$EG_{\text{backupline},y}$ is the electricity delivered to the project through the backup line metered by the instruments at M5.

In case of emergencies and when the wind farm does not produce enough power for auxiliary power use, the project will use the power from grid through the backup line. Power delivered to the project through a backup power line ($EG_{\text{backupline},y}$) is metered by M5 which is operated by the grid company.

4. Quality Assurance and Quality Control Procedure

Particular QC staff will be appointed by the Project Owner to take the overall responsibility of calibrating monitoring equipment, managing and processing the monitored data.

The metering equipment will be properly calibrated and checked annually by an independent third party according to relevant national standard or other national standard, to ensure its accuracy. The accuracy of meter M1, M2, M3 and M4 which have been installed are 0.2s. The accuracy of meter M5 is 0.5s.

All the electricity data are recorded by the working staff and then checked by the team manager.

5. Information collection and management

All physical documents including the readings in electronic and manual form will be stored by the project owner. All data collected as part of monitoring will be kept at least for 2 years after the end of the last crediting period by the project owner.

6. Procedure of emergency handling

In case metering equipment is damaged and no reliable readings can be recorded, the project owner will estimate net supply by the project activity according to the following procedure:

a. In case the main meter is damaged only:

By reading the backup meter.

b. In case both the main meter and the backup one are damaged:

The project owner and the grid company will jointly calculate a conservative estimate of power supplied to the grid. A statement will be prepared indicating

- The background to the damage to metering equipment
- The assumptions used to estimate net supply to the grid for the days for which no record could be recorded the estimation of power supplied to the grid.

7. Monitoring Report

The Project owner will annually prepare a monitoring report which will include a summary of metering values of power supplied to and received from the grid, a report on calibration and a calculation of emission reductions.

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 electricity supplied to the grid by the proposed project in year y (for the 1st crediting period) / Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (for the 2nd crediting period) (MWh);

$EF_{grid,CM,y}$ is the CO₂ emission factor of the NCPG, which is fixed in the first and 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 tCO₂/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 ($EF_{grid,OM\ simple,y}$)	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	$EG_{export,y}$ (MWh)	$EG_{import,y}$ (MWh)	$EG_{backuptline,y}$ (MWh) ⁷	$EG_{facility,y}$ (MWh)	$EF_{grid,CM,y}$ (tCO ₂ /yr)	Baseline Emissions (tCO ₂ e)
01/03/2020-24/05/2020 (P1) ⁸	101,992.528	70.613	0	101,921.915	1.05485	107,512
25/05/2020-31/12/2020 (P2)	272,821.694	138.677	0	272,683.017	0.82690	225,481
01/01/2021-30/11/2021 (P2)	384,717.073	205.060	0	384,512.013	0.82690	317,952
Total in this monitoring period	759,531.295	414.350	0	759,116.945	/	650,945

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.

⁷ There is no electricity imported from the grid through the 10kV line during this monitoring period.

⁸ The $EG_{PJtoGRID,y}$ and $EG_{GRIDtoPJ,y}$ during 01/05/2020 to 24/05/2020 and 25/05/2020 to 31/05/2020 based on Monthly Meter Reading records and Electricity receipts. These data have been confirmed by the grid company.

5.4 Net GHG Emission Reductions and Removals

In according with the registered PD

$$ER_y = BE_y - PE_y$$

Crediting PeriodYear	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	332,993	0	0	332,993
01/01/2021-30/11/2021	317,952	0	0	317,952
Total	650,945	0	0	650,945

The estimated annual emission reductions in the registered PD are 427,936 tCO₂e/yr during the first crediting period (from 25/05/2010 to 24/05/2020), and 335,460tCO₂e/yr during the second crediting period (from 25/05/2020 to 24/05/2030).

This monitoring period is from 01/03/2020 to 30/11/2021 (640 days, 85 days in the first crediting period and 555 days in the second crediting period).

The emission reductions claimed are 650,945 tCO₂e in this monitoring period (i.e. 640 days). Compared with expected emission reductions 609,739 tCO₂e (calculated as 427,936/365*85+335,460/365*555) in the approved CDM PDD and renewed VCS PD, the reported emission reductions in this monitoring period are 6.76% 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 14.4% 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 SUPPLY >

Period	EG _{export,y}					EG _{import,y}					EG _{backuptline,y} (MWh)	EG _{facility,y} (MWh)
	Data from Monthly meter reading records EG _{export,y,1} (MWh)	Data from Monthly meter reading records EG _{export,y,2} (MWh)	Data from Monthly meter reading records (MWh)	Data from Electricity Receipts (MWh)	Conservative value (MWh)	Data from Monthly meter reading records EG _{import,y,1}	Data from Monthly meter reading records EG _{import,y,2}	Data from Monthly meter reading records (MWh)	Data from Electricity Receipts (MWh)	Conservative value (MWh)		
	A	B	C=A+B	D	E=MIN(C,D)	F	G	H=F+G	I	J=MAX(H,I)		
2020/03/01~2020/03/31	18690.116	20601.138	39291.254	39191.384	39191.384	19.210	8.220	27.430	29.470	29.470	0.000	39161.914
2020/04/01~2020/04/30	17124.282	16436.430	33560.712	33461.072	33461.072	8.762	10.291	19.053	20.990	20.990	0.000	33440.082
2020/05/01~2020/05/24	15520.036	13920.112	29440.148	29340.072	29340.072	16.281	1.972	18.253	20.153	20.153	0.000	29319.919
Total in 2020 (P1)	51334.434	50957.680	102292.114	101992.528	101992.528	44.253	20.483	64.736	70.613	70.613	0.000	101921.915
2020/05/25~2020/05/31	1000.260	1090.170	2090.430	1890.590	1890.590	0.000	0.000	0.000	0.000	0.000	0.000	1890.590
2020/06/01~2020/06/30	21432.639	13531.225	34963.864	34863.512	34863.512	10.268	4.339	14.607	16.555	16.555	0.000	34846.957
2020/07/01~2020/07/31	13691.816	15990.036	29681.852	29582.491	29582.491	8.993	10.082	19.075	21.038	21.038	0.000	29561.453
2020/08/01~2020/08/31	13520.016	20973.123	34493.139	34393.669	34393.669	7.934	13.226	21.160	23.195	23.195	0.000	34370.474
2020/09/01~2020/09/30	28177.105	16083.022	44260.127	44160.847	44160.847	13.286	4.400	17.686	18.964	18.964	0.000	44141.883
2020/10/01~2020/10/31	27479.431	15080.182	42559.613	42460.191	42460.191	10.237	10.510	20.747	21.785	21.785	0.000	42438.406
2020/11/01~2020/11/30	20893.573	23007.175	43900.748	43801.338	43801.338	9.465	8.537	18.002	19.719	19.719	0.000	43781.619
2020/12/01~2020/12/31	28798.631	12970.513	41769.144	41669.056	41669.056	9.882	6.270	16.152	17.421	17.421	0.000	41651.635
Total in 2020 (P2)	154993.471	118725.446	273718.917	272821.694	272821.694	70.065	57.364	127.429	138.677	138.677	0.000	272683.017
2021/01/01~2021/01/31	18974.983	14365.008	33339.991	33239.995	33239.995	10.182	4.083	14.265	15.985	15.985	0.000	33224.010
2021/02/01~2021/02/28	22013.627	14863.176	36876.803	36776.825	36776.825	12.903	1.906	14.809	16.571	16.571	0.000	36760.254
2021/03/01~2021/03/31	28025.724	12538.468	40564.192	40463.747	40463.747	8.776	7.804	16.580	17.993	17.993	0.000	40445.754
2021/04/01~2021/04/30	17903.667	23001.276	40904.943	40805.229	40805.229	9.653	3.390	13.043	15.027	15.027	0.000	40790.202

2021/05/01~2021/05/31	12745.034	16007.689	28752.723	28652.957	28652.957	16.020	8.720	24.740	26.255	26.255	0.000	28626.702
2021/06/01~2021/06/30	16238.903	15083.621	31322.524	31222.587	31222.587	7.195	10.119	17.314	19.199	19.199	0.000	31203.388
2021/07/01~2021/07/31	15923.168	14033.276	29956.444	29856.913	29856.913	12.883	5.380	18.263	20.264	20.264	0.000	29836.649
2021/08/01~2021/08/31	12247.665	18328.188	30575.853	30475.817	30475.817	9.237	8.620	17.857	19.261	19.261	0.000	30456.556
2021/09/01~2021/09/30	12755.613	19077.379	31832.992	31732.837	31732.837	10.557	6.200	16.757	18.689	18.689	0.000	31714.148
2021/10/01~2021/10/31	19013.280	23291.902	42305.182	42205.163	42205.163	12.351	5.380	17.731	20.345	20.345	0.000	42184.818
2021/11/01~2021/11/30	21265.369	18119.604	39384.973	39285.003	39285.003	9.286	4.920	14.206	15.471	15.471	0.000	39269.532
Total in 2021(P2)	197107.033	188709.587	385816.620	384717.073	384717.073	119.043	66.522	185.565	205.060	205.060	0.000	384512.013
Total in this monitoring period	403434.938	358392.713	761827.651	759531.295	759531.295	233.361	144.369	377.730	414.350	414.350	0.000	759116.945