Project design document form
(Version 10.1)

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

BASIC INFORMATION	
Title of the project activity	Inner Mongolia Wuliji Wind Farm Project
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the PDD	04
Completion date of the PDD	02/01/2019
Project participants	CGN Wind Power Co., Ltd. United Kingdom of Great Britain and Northern Ireland: Carbon Resource Management Ltd. Switzerland: Carbon Resource Management S.A.
Host Party	P.R. China
Applied methodologies and standardized baselines	Methodology: ACM0002 “Grid-connected electricity generation from renewable sources” (Version 19.0)
Sectoral scopes linked to the applied methodologies	Sectoral scope 1: Energy industries (renewable / non-renewable sources)
Estimated amount of annual average GHG emission reductions	98,862tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Inner Mongolia Wuliji Wind Farm Project (hereinafter referred as to "the project") is located in the Wulate Hou Qi, Bayannao'er City, Inner Mongolia Autonomous Region, and China. The objective of the project is to generate renewable electricity from wind and the generated power will be accessed to the North China Power Grid (NCPG).

Based on the real conditions of the project development, the developer is planning to install 40 wind turbines, each with a capacity of 1.25MW. The total installed capacity is 50MW. The average lifetime of the equipment based on the manufacturer's specifications is 20 years. The expected net generation of the project activity is 117,630MWh per year based on an expected load factor of 26.86% with the annual usage hours of 2,353h per year. The Project Activity was registered on 15/03/2010 (Ref.2483) and the first crediting period is 15/03/2010 – 14/03/2017. Following the methodology, the emission reductions of the second crediting period (15/03/2017-14/03/2024) are estimated to be on average 98,862 tonnes of CO_2 equivalent (tCO_2e) per year, and 692,034 tCO_2e over the chosen crediting period.

The project will assist China in stimulating and accelerating the commercialisation of grid-connected wind power technologies and markets which are an important objective of the Chinese government. The project will therefore help reduce GHG emissions versus the high-growth, coal-dominated business-as-usual scenario. Furthermore, the project will improve air quality and local livelihoods, promote sustainable renewable energy industry development.

The baseline scenario, therefore, is the same as the scenario existing prior to the implementation of the project activity, i.e. generation of electricity by grid connected power plants.

The proposed project shares the same transformer, substation or transmission line with some other wind farms; appropriate additional meters are installed at the project site so that the electricity generation can be monitored for each wind farm separately so as to calculate the share of this wind farm of the net supply to the grid. The separate meters M1~M8 are installed at the project site so that the electricity generation can be monitored for each wind farm separately so as to calculate the share of this wind farm of the total net electricity exported to the grid. M1~M4 are installed in Line1#~4# respectively to monitor the generation from the Project; M5~M8 are installed in Line5#~8# respectively to monitor the generation from other wind farm project. The location of the meters in relation to the grid, project, and other project transmission lines are displayed as Figurer 4.

The project activity will promote the local and national sustainable development powerfully in the following aspects:

- Reduce greenhouse gas emissions in China compared to a business-as-usual scenario;
- Help to stimulate the growth of the wind power industry in China;
- Create local employment opportunity during the assembly and installation of wind turbines, and for operation of the wind farm;
- Reduce other pollutants resulting from the power generation industry, compared to a business-as-usual approach, such as SO_2, NO_x and soot.

A.2. Location of project activity

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The project activity lies in the Wulate Hou Qi, Bayannao'er City, Inner Mongolia Autonomous Region, and China. The coordination of the wind farm center is as follow:

Latitude: 41°30'20'' (N)
Longitude 106°38'30'' (E)

Figure 1 the location of the wind farm

A.3. Technologies/measures

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The project developer adopts advanced commercial wind-power technology from Sewind Co., Ltd. A total of 40 turbines with a capacity 1.25MW will be installed with the total installed capacity of 50MW. Net generation is expected to be 117,630MWh per year, once the project is fully operational, which is exported to the NCPG. The project activity is expected to be operational for 20 years.

The turbine manufacturers will provide on-the-job-training for staff of the proposed wind farm before the start of operation.

The main technical specifications of the wind turbines are provided in Table 1.

Table 1 Main technical specification of the installed wind turbines

Item	Value
Type	SEC-1250
Quantity	40
Rated capacity (kW)	1250
Hub height (m)	65
Rotor diameter (m)	64
Sweep-wind area (m^2)	3217
Rated Rotate speed (rpm)	9-17.3
Cut-in speed (m/s)	2.8
Rated wind speed (m/s)	12.3
Cut-out speed (m/s)	23
Rated voltage of generator (V)	690

The power generation is monitored by the electronic control and monitoring system in the onsite office, as well as through the electricity meter at the 220kV transformer station is planned at the project site, to connect the project with the 220kV grid.

Prior to the implementation of the project activity, the electricity was generated by grid-connected power plants. Without the implementation of the project, this scenario would have continued and is considered the baseline scenario.

The technology adopted in the project activity is widely used has been proved to have no negative influence on environment. The main equipment is manufactured in the host country. No international technology is transferred from other countries to the bundle project.

A.4. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
P.R. China (host Party)	CGN Wind Power Co., Ltd.	No
United Kingdom of Great Britain and Northern Ireland	Carbon Resource Management Ltd.	No
Switzerland	Carbon Resource Management S.A.	No

A.5. Public funding of project activity

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The Project Activity has not received public funding from Parties included in Annex I.

A.6. History of project activity

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The project was registered as CDM project on 15/03/2010 the reference no. is 2483. There was a request for post-registration change of about the project and it had been approved by EB on 20 Sep 2013. The PDD is renewal of crediting period. Therefore, it can be confirmed that:

(a) The proposed CDM project activity is neither registered as a CDM project activity nor included as a component project activity (CPA) in a registered CDM programme of activities (PoA);
(b) The proposed CDM project activity is not a project activity that has been deregistered.

And confirm that:
(a) The proposed CDM project activity was not a CPA that has been excluded from a registered CDM PoA;
(b) The proposed project is not a registered CDM project activity or a CPA under a registered CDM PoA whose crediting period has or has not expired (hereinafter referred to as former project) exists in the same geographical location as the proposed CDM project activity.

A.7. Debundling

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The proposed project is a large-scale project, therefore, not applicable.

SECTION B. Application of selected methodologies and standardized baselines

B.1. Reference to methodologies and standardized baselines

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The approved large-scale consolidated methodology applied in the project is ACM0002 “Grid-connected electricity generation from renewable sources” (Version 19.0, EB100, 2018). For more information regarding the methodology please refer to
http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD

The project activity also refers to:

1. "Tool for the demonstration and assessment of additionality (version 07.0.0)".
   http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf
2. "Tool to calculate the emission factor for an electricity system" (Version 07.0).
   http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf
3. Methodological Tool: "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).
   http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

More information on the methodology and tools listed above is available at the following website:
http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

B.2. Applicability of methodologies and standardized baselines

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The approved methodology ACM0002 is applicable to the proposed project activity, because:

Applicability	Conclusion
This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).	The proposed project is the installation of a Greenfield power plant;
The methodology is applicable under the following conditions: (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	a) The proposed project is the installation of a wind power plant. b) Not applicable. The proposed project is a Greenfield plant and does not represent a capacity addition, retrofits, rehabilitations or replacement.
In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (3), is greater than 4 W/m2; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m2; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;	Not applicable. The proposed project is the installation of a wind power plant.

(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
In the case of integrated hydro power projects, project proponent shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or (b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	Not applicable. The proposed project is the installation of a wind power plant.
The methodology is not applicable to the following: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units.	a) Not applicable. The proposed project does not involve switching from fossil fuels to renewable energy at the site of the proposed project. b) Not applicable. The proposed project is a wind power plant.
In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	Not applicable. The proposed project is the installation of a wind power plant and not a retrofits, rehabilitations or replacement or capacity additions.
Applicability conditions of "Tool to calculate the emission factor for an electricity system", - Version 07.0	
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	This condition is applicable. OM, BM and CM are estimated using the tool under section B.6.3 for calculating baseline emissions.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 2: be met. Namely, the total capacity of off-grid Procedures related to off-grid power generation" should power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the	Since the proposed project is grid connected, this condition is applicable and the emission factor has been calculated accordingly.

electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	The proposed project is located in China, a non-Annex I country. Therefore, this criterion is not applicable for the project activity.
Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	The proposed project is a grid connected wind power project/ unit and does not involve emission from biofuels. Therefore, this criterion is not applicable.

Therefore, the project is in accordance with the applicability of methodology ACM0002 (Version 19.0).

B.3. Project boundary, sources and greenhouse gases (GHGs)

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Emission sources

For the baseline determination only CO_2 emissions from electricity generation by fossil fuel fired power plant that is displaced due to the project activity are taken into account.

According to the approved methodology ACM0002, the emission sources and GHGs in the project boundary are listed in Table 2.

Spatial boundary

The spatial extend of the project boundary includes the project site and all power plants connected to NCPG. NCPG is an electricity system which is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints.

Using the boundary definitions of the Chinese DNA, NCPG consists of Shandong, Beijing, Tianjin, Hebei, Shanxi, and Inner Mongolia power grids. The electricity transmission between different provinces in NCPG is very large and it is reasonable for the project to regard NCPG as the project boundary.

NCPG connects with Northeast Power Grid (NEPG) and Central China Power Grid (CCPG); the electricity transfers are from NEPG and CCPG to NCPG. Electricity transfer from NEPG and CCPG, therefore, are taken into account.

Table 2 Sources and gases in the project boundary

Source		Gas	Included	Justification/explanation
Baseline	Power supplied by NCPG	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project activity	Emissions from backup power generation	CO_2	No	According to ACM0002, the project emission for wind power plant is zero.
		CH_4		
		N_2O		

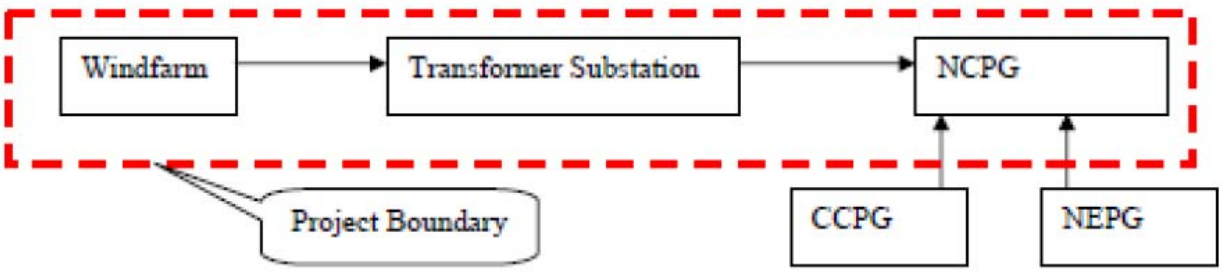

Figure 2 Flow diagram of the project boundary

B.4. Establishment and description of baseline scenario

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The Project Activity is the installation of a new Greenfield power plant, and is not a capacity addition, retrofit, rehabilitation or replacement of existing grid-connected renewable power plant/unit. Therefore, the baseline scenario is prescribed in the methodology:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

The selected methodology prescribes the baseline scenario, thus no further analysis is required. The combined margin is calculated in Section B.6 below.

According to the ACM0002 (version 19.0) and Project Standard (version 02.0), the methodological tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" (version 3.0.1) is adopted to assess the continued validity of the baseline and to update the baseline. This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by paragraph 49 (a) of the modalities and procedures of the clean development mechanism.

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

If the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period, go to Step 1.2.

- There are no new national and/or sectoral policies that could affect the baseline scenario at the time of requesting renewal of the crediting period. The current baseline complies with all relevant mandatory national and/or sectoral policies. Hence in the absence of the project activity the electricity would still have been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Step 1.2: Assess the impact of circumstances

Assess the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario.

In the situation where the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, an assessment of the changes in market characteristics is required for the renewal of the crediting period.

- The baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment. Baseline emissions are primarily derived from the fossil fuel power plants in the NCPG. The total generation produced by fossil fuel power plants accounts for 90% of total electricity generation in NCPG; and this percentage has not been changed significantly in recent 5 years. Therefore market characteristics do not have impact on the baseline emissions.

Evaluate whether the conditions used to determine the baseline emissions in the previous crediting period are still valid. Assess the availability of new fuels or raw materials and the impact of electricity or fuel prices in the identification of the current practice for the baseline emissions.

- The conditions used to determine the baseline emissions in the previous crediting period are still valid. The availability of new fuels or raw materials or the level of fuel prices has no impact on the identification of the current practice for the baseline emissions. Presently the NCPG is dominated by the fossil fuel power plants. The availability of new fuels or raw materials or the level of fuel prices has no impact on the baseline emissions.

If the new circumstances make a continued validity of the current baseline not plausible, then the current baseline needs to be updated for the subsequent crediting period.

As there are no new circumstances that make a continued validity of the current baseline not plausible, the current baseline does not need to be updated for the second crediting period.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested

This sub-step should only be applied if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology.

Assess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD or CDM-PDD-REN, exceeds the crediting period for which renewal is requested.

Take into consideration the market penetration of different technologies. Evaluate the penetration rate of different technologies that are available in the market and evaluate how they could affect the baseline.

- As determined in the CDM-PDD and CDM-PDD-REN, the baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources in NCPG, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”. The projects proponents or third party (or parties) would not undertake an investment later due. The combined margin calculation automatically takes account of any issues regarding remaining technical lifetime or market penetration.

If the baseline scenario of the project activity is the continuation of use of the current equipment(s) without any investment and the projects proponents or third party(ies) will

undertake an investment later, but before the end of a crediting period, then the current baseline needs to be updated for that crediting period or the crediting of emission reductions should be limited to the period before the baseline equipment would cease its operation.

Therefore, the current baseline does not need to be updated for the second crediting period.

Step 1.4: Assessment of the validity of the data and parameters

Assess whether data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated. Updates should be undertaken in the following cases:

- Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC;
- Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.

If any of the data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, the current baseline needs to be updated for the subsequent crediting period.

In accordance with the methodology, the grid emission factor and all the values in its calculation are updated in section B.6.

If the application of Steps 1.1, 1.2, 1.3 and 1.4 confirmed that the current baseline as well as data and parameters are still valid for the subsequent crediting period, then this baseline, data and parameters can be used for the renewed crediting period. Otherwise, proceed to Step 2.

The original baseline scenario needs to be updated to incorporate the latest grid emission factor in accordance with the methodology.

Step 2: Update the current baseline and the data and parameters

This step is only applicable if any of the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated.

Step 2.1: Update the current baseline

Update the current baseline emissions for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity. The procedure should be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period.

As shown in step 1.1 above, in accordance with the procedures for renewal of the crediting period of a registered CDM project activity, the original baseline, as updated, remains valid taking new relevant national and/or sectoral policies and circumstances into account.

Step 2.2: Update the data and parameters

If the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid

anymore, project participants should update all applicable data and parameters, following the guidance in Step 1.4.

As discussed above in step 1.4, the grid emission factor and all the values in its calculation are updated in section B.6.

Conclusion regarding the assessment of the validity of the original baseline scenario

In accordance with the procedures for renewal of the crediting period of a registered CDM project activity, the original baseline, as updated in accordance with step 2.2 in section B.6, remains valid taking new relevant national and/or sectoral policies and circumstances into account.

B.5. Demonstration of additionality

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Not applicable for the second crediting period.

In accordance with the procedures for renewal of the crediting period of a registered CDM project activity and the applied methodology, it does not require a reassessment of the baseline scenario or additionality, it is only required to assess whether the original project baseline is still valid or has been updated taking account of new data where applicable.

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

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1. Project emissions

According to the methodology, for most renewable energy project activities, $PE_y = 0$. However, the methodology prescribes project emission calculations for geothermal, solar thermal and hydro power plant. As a wind power plant, therefore, there are no project emissions according to the methodology:

$$PE_y = 0 \quad (1)$$

2. Baseline emissions

According to the methodology, the baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad (2)$$

Where:

BE_y	=	The baseline emissions in year *y* (tCO_2/yr)
$EG_{PJ,y}$	=	The quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)
$EF_{grid,CM,y}$	=	The combined margin CO_2 emission factor for grid connected power generation in year *y* calculated (tCO_2/MWh)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for: (a) Greenfield plants, (b) retrofits and replacements; and (c) capacity additions. The Project Activity is a Greenfield plant.

(a) Greenfield renewable energy power plants

As the Project Activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, the following applies:

$$EG_{PJ,y} = EG_{facility,y} \quad (3)$$

Where:

$EG_{PJ,y}$ = The quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

$EG_{facility,y}$ = The quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

Calculation of $EF_{grid,CM,y}$

In line with the methodology, the baseline emission factor is calculated as a combined margin ($EF_{grid,CM,y}$), consisting of the combination of operating margin ($EF_{grid,OM,y}$) and build margin ($EF_{grid,BM,y}$) factors according to the following steps defined in "*Tool to calculate the emission factor for an electricity system*" .

Details of the calculations and data follow the published data from the Chinese DNA[1], which uses official national statistics.

Step 1. Identify the relevant electricity systems

For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity system. If a connected electricity system is located partially or totally in Annex-I countries, then the emission factor of that connected electricity system should be considered zero. If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used.

The DNA has published a delineation of the project electricity system and connected electricity systems, therefore these delineations are used in accordance with the Tool:

The project electricity system is the North China Power Grid (NCPG), consisting of the following provincial grids: Beijing, Tianjin, Shanxi, Hebei, Shandong, and Inner Mongolia. There are no imports from connected systems.

For the purpose of this tool, the reference system is the project electricity system. Hence electricity transfers from a connected electricity system to the project electricity system are defined as electricity imports while electricity transfers from the project electricity system to connected electricity systems are defined as electricity exports.

For the purpose of determining the build margin emission factor, the spatial extent is limited to the project electricity system, except where recent or likely future additions to the transmission capacity enable significant increases in imported electricity. In such cases, the transmission capacity may be considered a build margin source.

- There are no recent or likely future additions to transmission capacity that would enable significant increases in imported electricity; the data in the enclosed EF calculation spreadsheet shows that imports are relatively small and have not changed significantly in the period covered. Therefore, the transmission capacity is not considered a build margin source.

[1] http://qhs.mee.gov.cn/kzwsqtpf/

For the purpose of determining the operating margin emission factor, use one of the following options to determine the CO_2 emission factor(s) for net electricity imports from a connected electricity system:

(a) 0 tCO_2/MWh; or
(b) The simple operating margin emission rate of the exporting grid, determined as described in Step 4 section 6.4.1 of the Tool, if the conditions for this method, as described in Step 3 of the Tool, apply to the exporting grid; or
(c) The simple adjusted operating margin emission rate of the exporting grid, determined as described in Step 4 section 6.4.2 of the Tool; or
(d) The weighted average operating margin (OM) emission rate of the exporting grid, determined as described in Step 4 section 6.4.4 of the Tool.

o Following the calculations of the DNA, the simple operating margin option (b) is used to calculate the CO_2 emission factors for net electricity imports ($EF_{grid,import,y}$).

For imports from connected electricity systems located in Annex-I country(ies), the emission factor is 0 tonnes CO_2 per MWh.

o There are no imports from Annex-I country(ies).

Electricity exports should not be subtracted from electricity generation data used for calculating and monitoring the electricity emission factors.

o Electricity exports from the project electricity system to the connected electricity system are not subtracted from electricity generation data used for calculating and monitoring the electricity emission factors.

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.

Following the calculations of the DNA, and the statistical data available, Option I is chosen.

Step 3. Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:

(a) Simple OM; or
(b) Simple Adjusted OM; or
(c) Dispatch data analysis OM; or
(d) Average OM

The simple OM method (Option a) can only be used if any one of the following requirements is satisfied:

(a) Low-cost/must-run resources[2] constitute less than 50% of total grid generation (excluding electricity generated by off-grid power plants) in: 1) average of the five most recent years, and the average of the five most recent years shall be determined by using one of the approaches described below; or 2) based on long-term averages for hydroelectricity production.

(i) Approach 1

$$Share_{LCMR} = \text{average}\left[\frac{EG_{LCMR_{y-4}}}{total_{y-4}}, \ldots, \frac{EG_{LCMR_y}}{total_y}\right]$$

(ii) Approach 2

$$Share_{LCMR} = \frac{average\left(EG_{LCMR_{y-4}}, \ldots, EG_{LCMR_y}\right)}{average\left(total_{y-4}, \ldots, total_y\right)}$$

Where:

$Share_{LCMR}$	=	The share of the low cost/must run resources (%)
EG_{LCMRy}	=	The electricity generation supplied to the project electricity system by the low cost/must run resources in year *y* (MWh)
$totall_y$	=	The total electricity generation supplied to the project electricity system in year *y* (MWh)
y	=	The most recent year for which data is available

(b) The average amount of load (MW) supplied by low-cost/must-run resources in a grid in the most recent three years is less than the average of the lowest annual system loads (LASL) in the grid of the same three years.

o The approach 1 is chosen for calculation and low-cost/must-run resources constitute less than 50% of total grid generation in average of the five most recent years[3]. Therefore, the project participants chose to use the simple OM method (option (a)).

The simple OM emissions factor can be calculated using either ex-ante or ex-post data vintages. The project participants have chosen to use the ex-ante option, and $EF_{grid,OM,y}$ is fixed for the duration of the second crediting period.

Ex ante option: If the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.

The date of the publication of the most recent official data for the calculation of the emission factor prior to the start of validation was 20/12/2018.

Power plants registered as CDM project activities should be included in the sample group that is used to calculate the operating margin if the criteria for including the power source in the sample group apply.

[2] Low-cost/must-run resources are defined as power plants with low marginal generation costs or dispatched independently of the daily or seasonal load of the grid. They include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If a fossil fuel plant is dispatched independently of the daily or seasonal load of the grid and if this can be demonstrated based on the publicly available data, it should be considered as a low-cost/must-run.

[3] http://qhs.mee.gov.cn/kzwsqtpf/

o Details of the calculations and data follow the published data from the Chinese DNA, which uses official national statistics. This data does not exclude CDM projects.

Step 4. Calculate the operating margin emission factor according to the selected method

The Simple OM method (Option a) was chosen in Step 3 above.

(a) Simple OM

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating sources serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated by one of the following options:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit; or
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:

(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation (i.e. if Option I has been chosen in Step 2).

Following the calculations of the DNA, Option B is chosen. The criteria for Option B are met:

(a) The necessary data for Option A is not available, as indicated in the calculations of the DNA; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources, and the quantity of electricity supplied to the grid by these sources is known; and
(c) Option I is chosen in Step 2.

Option B: Calculation based on total fuel consumption and electricity generation of the system

The simple OM emission factor is calculated based on the net electricity supplied to the grid by all power plants serving the system, not including low-cost/must-run power plants/units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

$$EF_{grid,OMsimple,y} = \sum_i (FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}) / EG_y \quad (4)$$

Where:

$EF_{grid,OMsimple,y}$	=	The simple operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
$FC_{i,y}$	=	The amount of fuel type *i* consumed in the project electricity system in year *y* (mass or volume unit)
$NCV_{i,y}$	=	The net calorific value (energy content) of fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	The CO_2 emission factor of fuel type *i* in year *y* (tCO_2/GJ)
EG_y	=	The net electricity generated and delivered to the grid by all power sources serving the system, not including low-cost/must-run power plants/units, in year *y* (MWh)
i	=	All fuel types combusted in power sources in the project electricity system in year *y*

y = The relevant year as per the data vintage chosen in Step 3

For this approach (simple OM) to calculate the operating margin, the subscript m refers to the power plants/units delivering electricity to the grid, not including low-cost/must-run power plants/units, and including electricity imports to the grid. Electricity imports should be treated as one power plant.

Based on the data available, the three-year average operating margin emission factor is calculated as a full-generation-weighted average of the emission factors. Details of the calculations and data follow the published data from the Chinese DNA[4], which uses official national statistics.

$EF_{grid,OMsimple,y}$ = 0.9680 tCO_2/MWh

Step 5. Calculate the build margin (BM) emission factor

In terms of vintage of data, the project participants chose Option 1, ex-ante, and $EF_{grid,BM,y}$ is fixed for the duration of the second crediting period:

Option 1: For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE.

The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which electricity generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \sum_m (EG_{m,y} \times EF_{EL,m,y}) / \sum_m EG_{m,y} \quad (5)$$

Where:

$EF_{grid,BM,y}$ = The build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$ = The net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$ = The CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m = The power units included in the build margin
y = The most recent historical year for which electricity generation data is available

Due to the limited availability of data on individual power units, the published grid emission factor calculations from the Chinese DNA uses the approved deviation[5] to calculate the build margin emission factor. The deviation is applied as follows:

- Generation *capacity* is used in formula (5) above, instead of generation.
- The newly added generation capacity that has been added to the grid most recently, and that comprises 20 percent of total installed capacity in the latest year for which data is available is used as the sample group of power units m to calculate the build margin. This option comprises a larger sample than the five units built most recently.
- The efficiency level of the best technology commercially available in the provincial/regional or national grid of China is used, as a conservative proxy, to determine the CO_2 emission factor of thermal power plants using each fuel type.

Using this deviation, formula (5) can be re-written as follows:

$$EF_{grid,BM,y} = \sum_m (CAP_{m,y} \times EF_{EL,m,y}) / \sum_m CAP_{m,y} = \sum_m Share_{CAP,m,y} \times EF_{EL,m,y} \quad (5\text{-dev})$$

[4] http://qhs.mee.gov.cn/kzwsqtpf/

[5] M-DEV0004, DNV (07/10/2005), see http://cdm.unfccc.int/Projects/deviations/87512.

Where:

$EF_{grid,BM,y}$	=	The build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$CAP_{m,y}$	=	The added generation capacity by plant type m in year *y* (MW)
$EF_{EL,m,y}$	=	The CO_2 emission factor of plant type m in year *y* (tCO_2/MWh)
$Share_{CAP,m,y}$	=	The share of added generation capacity by plant type m in year *y* (%)
m	=	The plant type included in the build margin (thermal, hydro, nuclear, other)
y	=	The most recent historical year for which data is available

The CO_2 emission factor of all plant types other than thermal power plants is taken as zero.

The CO_2 emission factor of thermal power plants is weighted on the basis of the emissions from each of the fuel types in the latest year for which data is available, and using the average net energy conversion efficiency of the best technologies commercially available (advanced) power plants in China for each fuel type.

$$EF_{thermal,y} = \sum_m (EF_{m,Adv,y} \times \lambda_{m,y}) \quad (6)$$

Where:

$EF_{thermal,y}$	=	The CO_2 emission factor of the best technologies commercially available thermal power plants in year *y* (tCO_2/MWh)
$EF_{m,Adv,y}$	=	The CO_2 emission factor of the best technologies commercially available power plants using fuel type m in year *y* (tCO_2/MWh)
$\lambda_{m,y}$	=	The share of emissions of fuel type m in year *y* (%)
m	=	The fuel type of thermal plant (coal/solid, oil/liquid, gas)
y	=	The most recent historical year for which data is available

Using the equation of option A2 from guidance in Step 4 section 6.4.1 of the Tool, the CO_2 emission factor of advanced power plants using fuel type m can be calculated as follows:

$$EF_{m,Adv,y} = EF_{CO2,m,y} \times 3.6 / \eta_{m,y} \quad (7)$$

Where:

$EF_{m,Adv,y}$	=	The CO_2 emission factor of the best technology commercially available power plants using fuel m in year *y* (tCO_2/MWh)
$EF_{CO2,m,y}$	=	The average CO_2 emission factor of fuel type m in year *y* (tCO_2/GJ)
$\eta_{m,y}$	=	The average net energy conversion efficiency of the best technologies commercially available power plants using fuel type m in year *y* (%)
m	=	The fuel type of thermal plant (coal/solid, oil/liquid, gas)
y	=	The relevant year as per the data vintage chosen

The build margin emission factor is calculated using this methodology in the enclosed EF calculation spreadsheet:

$EF_{grid,BM,y}$ = 0.4578 tCO_2/MWh

Step 6. Calculate the combined margin emission factor

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:

(a) Weighted average CM; or
(b) Simplified CM.

Option (a) is the preferred option. Option (b) can not be used as the proposed project activity does not take place in an LDC or in a country with less than 10 registered projects. Therefore, Option (a) is chosen.

(a) Weighted average CM

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM} \quad (8)$$

Where:

$EF_{grid,OM,y}$	=	The operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM}	=	The weighting of operating margin emissions factor (%)
$EF_{grid,BM,y}$	=	The build margin CO_2 emission factor in year y (tCO_2/MWh)
w_{BM}	=	The weighting of build margin emissions factor (%)

According to the Tool, the default values for w_{OM} and w_{BM} for wind projects in the first crediting period and the subsequent crediting period, which should be used, are: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature).

Based on these weights for the second crediting period, the combined margin emission factor is calculated, and fixed ex-ante for the duration of the second crediting period (conservatively rounded down to the fourth digit) as given below.

	CO_2 emission factor (tCO_2/MWh)	**Weighting (%)**
Operating margin (see step 4)	0.9680	75%
Build margin (see step 5)	0.4578	25%
Combined margin	0.84045	-

These parameters will be recalculated at any renewal of the crediting period.

Baseline emissions (BE_y) now can be calculated as the annual net generation of the Proposed Project Activity (EG_y) multiplied by the combined margin CO_2 emission factor ($EF_{grid,CM,y}$).

3. Leakage

No leakage emissions are considered in the methodology. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport). These emissions sources are neglected.

4. Emission reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \quad (9)$$

Where:

ER_y	=	The emission reductions in year y (tCO_2e/yr)
BE_y	=	The baseline emissions in year y (tCO_2/yr)
PE_y	=	The project emissions in year y (tCO_2e/yr)

B.6.2. Data and parameters fixed ex ante

Data/Parameter	$FC_{i,y}$
Data unit	Mass or volume
Description	The amount of fossil fuel *i* consumed in the project/connected electricity system in year *y*
Source of data	China Energy Statistical Yearbook
Value(s) applied	Same as used by the DNA for the official emission factor calculations
Choice of data or measurement methods and procedures	Data accepted and used by the DNA for the official emission factor calculations.
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/Parameter	$NCV_{i,y}$
Data unit	GJ/mass or volume unit
Description	Net caloric value of fossil fuel type *i* consumed in the project/connected electricity system in year *y*
Source of data	China Energy Statistical Yearbook
Value(s) applied	Same as used by the DNA for the official emission factor calculations
Choice of data or measurement methods and procedures	National average default values, accepted and used by the DNA for the official emission factor calculations.
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/Parameter	$EF_{CO2,i,y}$
Data unit	tCO_2/GJ
Description	CO_2 emission factor of fossil fuel type i in year y
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied	Same as used by the DNA for the official emission factor calculations
Choice of data or measurement methods and procedures	The IPCC default values at the lower level of 95% confidence interval are accepted and used by the DNA for the official emission factor calculations and are the default value in the tool.
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/Parameter	EG_y
Data unit	MWh
Description	Net electricity generated and delivered in the project electricity system in year *y*
Source of data	China Electric Power Yearbook
Value(s) applied	Same as used by the DNA for the official emission factor calculations
Choice of data or measurement methods and procedures	Data accepted and used by the DNA for the official emission factor calculations.
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/Parameter	$\eta_{fuel\text{-}type,y}$
Data unit	%
Description	Average net energy conversion efficiency of the best technologies commercially available in China using solid, liquid and gas fuels
Source of data	Chinese DNA
Value(s) applied	Same as used by the DNA for the official emission factor calculations
Choice of data or measurement methods and procedures	Data accepted and used by the DNA for the official emission factor calculations.
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/Parameter	$Share_{CAP,m,y}$
Data unit	%
Description	Share of added generation capacity by plant type m in year *y*
Source of data	Chinese DNA
Value(s) applied	Same as used by the DNA for the official emission factor calculations
Choice of data or measurement methods and procedures	Data accepted and used by the DNA for the official emission factor calculations.
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

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(s) applied	75
Choice of data or measurement methods and procedures	Follow the "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

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(s) applied	25
Choice of data or measurement methods and procedures	Follow the "Tool to calculate the emission factor for an electricity system" (Version 07.0,)
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/Parameter	$EF_{grid,OMsimple,y}$
Data unit	tCO_2/MWh
Description	Simple operating margin CO2 emission factor in year *y*
Source of data	Calculated follow the "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value(s) applied	0.9680
Choice of data or measurement methods and procedures	Calculated follow the "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2/MWh
Description	Build margin CO_2 emission factor in year *y*
Source of data	Calculated follow the "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value(s) applied	0.4578
Choice of data or measurement methods and procedures	Calculated follow the "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor in year *y*
Source of data	Calculated follow the "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Value(s) applied	0.84045
Choice of data or measurement methods and procedures	Calculated follow the "Tool to calculate the emission factor for an electricity system" (Version 07.0)
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

B.6.3. Ex ante calculation of emission reductions

>>

In accordance with the methodology, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Using the formulae presented in Section B.6.1., the baseline emissions are calculated from the net electricity supplied by the Project Activity to the grid and the combined margin emission factor of the grid. The annual net generation is estimated based on long-term averages in the Feasibility Study Report; the combined margin emission factor is calculated in section B.6.1. above. The ex-ante calculations of baseline emissions and emission reductions, therefore, are as follows:

$BE_y = EG_{facility,y} \times EF_{grid,CM,y} =$ 117,630MWh/yr × 0.84045 tCO_2/MWh = 98,862 tCO_{2e}/yr

$ER_y = BE_y - PE_y =$ 98,862 tCO_{2e}/yr – 0 tCO_{2e}/yr = 98,862 tCO_{2e}/yr

The ex-ante calculations of estimated emission reductions are included in the ER calculation spread sheet.

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
15/03/2017-14/03/2018	98,862	0	0	98,862
15/03/2018-14/03/2019	98,862	0	0	98,862
15/03/2019-14/03/2020	98,862	0	0	98,862
15/03/2020-14/03/2021	98,862	0	0	98,862
15/03/2021-14/03/2022	98,862	0	0	98,862
15/03/2022-14/03/2023	98,862	0	0	98,862
15/03/2023-14/03/2024	98,862	0	0	98,862
Total	692,034	0	0	692,034
Total number of crediting years	7			
Annual average over the crediting period	98,862	0	0	98,862

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Following approved methodology ACM0002, the data that is required to be monitored to establish the emission reductions, is the net electricity generation (EG_y).

Data/Parameter	EG_y
Data unit	MWh
Description	Net electricity supplied to the grid by the Project in period y
Source of data	Electricity meters (bi-directional, i.e. recording generation and consumption)
Value(s) applied	117,630 (once fully operational)
Measurement methods and procedures	Electricity meters are installed at the onsite substation (the main meter) and the separate meters installed at the project site (M1, M2, M3, M4, M5, M6, M7, M8) to monitor the power output generated. The net power output supplied to the grid is measured continuously and recorded automatically. The accuracy of the meters will be at least 0.5S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.
Monitoring frequency	Continuous measurement and monthly recording
QA/QC procedures	1. The net electricity supply to the grid is double checked by receipt of sales. 2. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 3. A back-up meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 4. Proportion of the monitored data is 100%. 5. The data will be kept during the crediting period and until two years after the end of the crediting period.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	EG_{export_total}
Data unit	MWh
Description	Quantity of annual electricity exported to the grid by the project and other wind farm project
Source of data	Electricity meter: Main meter.
Value(s) applied	-
Measurement methods and procedures	The quantity of annual electricity exported to the grid will be monitored continuously through the main meter installed at onsite substation. The accuracy of the meters will be at least 0.5S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.
Monitoring frequency	Continuous measurement and monthly recording
QA/QC procedures	1. The electricity supply to the grid is cross-checked against receipt of sales. 2. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 3. A back-up meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 4. The data will be kept during the crediting period and until two years after the end of the crediting period.
Purpose of data	Calculation of baseline emissions
Additional comment	The Project shares the same transformer, substation and transmission line with other wind farm, the share of this wind farm of the electricity supply to the grid is accounted for proportionally to generation of the project and other wind farm.

Data/Parameter	EG_{import_total}
Data unit	MWh
Description	Quantity of annual electricity imported from the grid by the project and other wind farm project
Source of data	Electricity meter: Main meter.
Value(s) applied	-
Measurement methods and procedures	The quantity of annual electricity imported from the grid will be monitored continuously through the main meter installed at onsite substation. The accuracy of the meters will be at least 0.5S, meeting the national standard. A designated person from the grid company and the project company jointly record the readings of the meters at the onsite substation each month.
Monitoring frequency	Continuous measurement and monthly recording
QA/QC procedures	1. The electricity supply to the grid is cross-checked against receipt of sales. 2. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 3. A back-up meter is installed at the onsite substation to check the main meter. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 4. The data will be kept during the crediting period and until two years after the end of the crediting period.
Purpose of data	Calculation of baseline emissions
Additional comment	The Project shares the same transformer, substation and transmission line with other wind farm, the share of this wind farm of the electricity supply to the grid is accounted for proportionally to generation of the project and other wind farm.

Data/Parameter	$E_{project}$
Data unit	MWh
Description	Quantity of electricity generation from the project activity metered by the separate meters

Source of data	Separate meters (M1, M2, M3, M4) installed at project site
Value(s) applied	-
Measurement methods and procedures	The quantity of electricity generation from the project activity will be monitored continuously through the separate meters (M1, M2, M3, M4) installed at project site. The accuracy of the meters will be at least 0.5S, meeting the national standard.
Monitoring frequency	Continuous measurement and monthly recording
QA/QC procedures	1. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 2. The data will be kept during the crediting period and until two years after the end of the crediting period.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	E_{others}
Data unit	MWh
Description	Quantity of electricity generation from other projects metered by the other separate meters
Source of data	Other separate meters (M5, M6, M7, M8) installed at project site
Value(s) applied	-
Measurement methods and procedures	The quantity of electricity generation from other projects will be monitored continuously through the other separate meters (M5, M6, M7, M8) installed at project site. The accuracy of the meters will be at least 0.5S, meeting the national standard.
Monitoring frequency	Continuous measurement and monthly recording
QA/QC procedures	1. The meters are calibrated once per year by a qualified organization according to the related national standards and regulations (Chinese electricity industry regulation DL/T448). 2. The data will be kept during the crediting period and until two years after the end of the crediting period.
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.7.2. Sampling plan

>>

Not applicable. None of the data and parameters monitored in section B.7.1 above is to be determined by a sampling approach.

B.7.3. Other elements of monitoring plan

>>

The aim of the monitoring plan is to make sure that the net electricity generation delivered to the grid is monitored completely, consistently, reliably and precisely. The details are summarized as follows:

1. Monitoring subject

The main data monitored are the net electricity generation delivered to the grid by the project.

2. Monitoring management structure

In order to obtain reliable monitoring data, the project developer will establish a monitoring management framework prior to the starting of the crediting period. Clear responsibilities will be assigned to all staff involved in the CDM project. A monitoring director will be appointed who has

the overall responsibilities for the monitoring of the project, other staff will be responsible for the data recording, data collecting, data archiving and emission reductions calculation. The detailed structure is as follows:

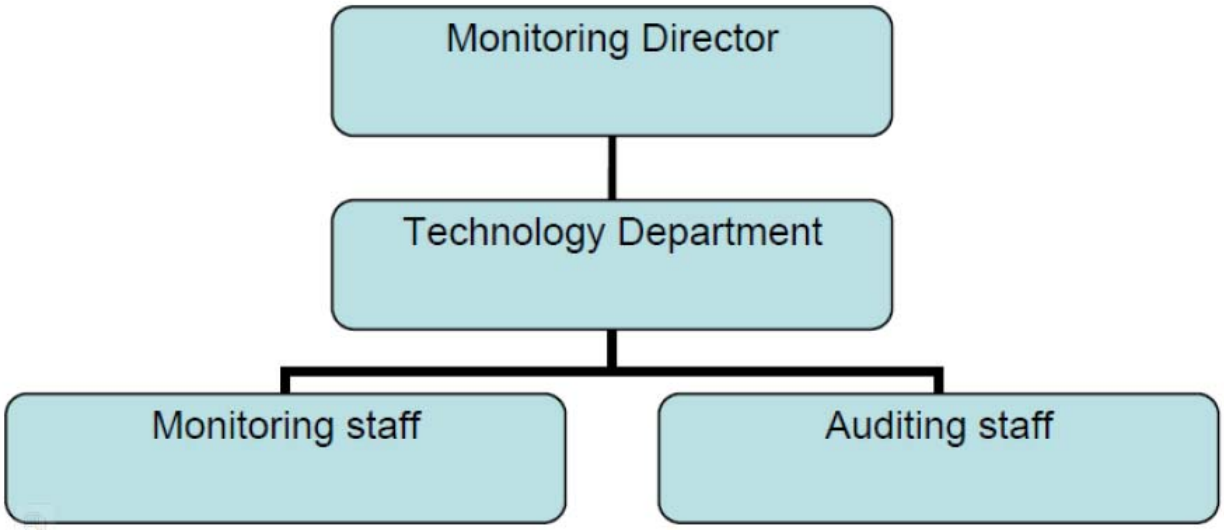

Figure 3 CDM management structure of the project

3. Monitoring apparatus and installation:

The proposed project shares the same transformer, substation or transmission line with some other wind farms; appropriate additional meters are installed at the project site so that the electricity generation can be monitored for each wind farm separately so as to calculate the share of this wind farm of the net supply to the grid.

The net electricity supplied by the project activity (EG_y) is calculated as follows:

$EG_y = EG_{total} * E_{project} / (E_{project} + E_{others})$
$EG_{total} = EG_{export\_total} - EG_{import\_total}$

Where:
EG_y is the quantity of net electricity supplied to the grid by the Project in period y;
EG_{total} is the total net electricity supplied to the grid based on the data metered by the main meter;
$E_{project}$ is the electricity generation from the project activity metered by the separate meters;
E_{others} is the electricity generation from other projects metered by the other separate meters;
EG_{export_total} is the quantity of annual electricity exported to the grid by the project and other wind farm project;
EG_{import_total} is quantity of annual electricity imported from the grid by the project and other wind farm project.

The separate meters M1~M8 are installed at the project site so that the electricity generation can be monitored for each wind farm separately so as to calculate the share of this wind farm of the total net electricity exported to the grid. M1~M4 are installed in Line1#~4# respectively to monitor the generation from the Project; M5~M8 are installed in Line5#~8# respectively to monitor the generation from other wind farm project. The location of the meters in relation to the grid, project, and other project transmission lines are displayed as following diagram:

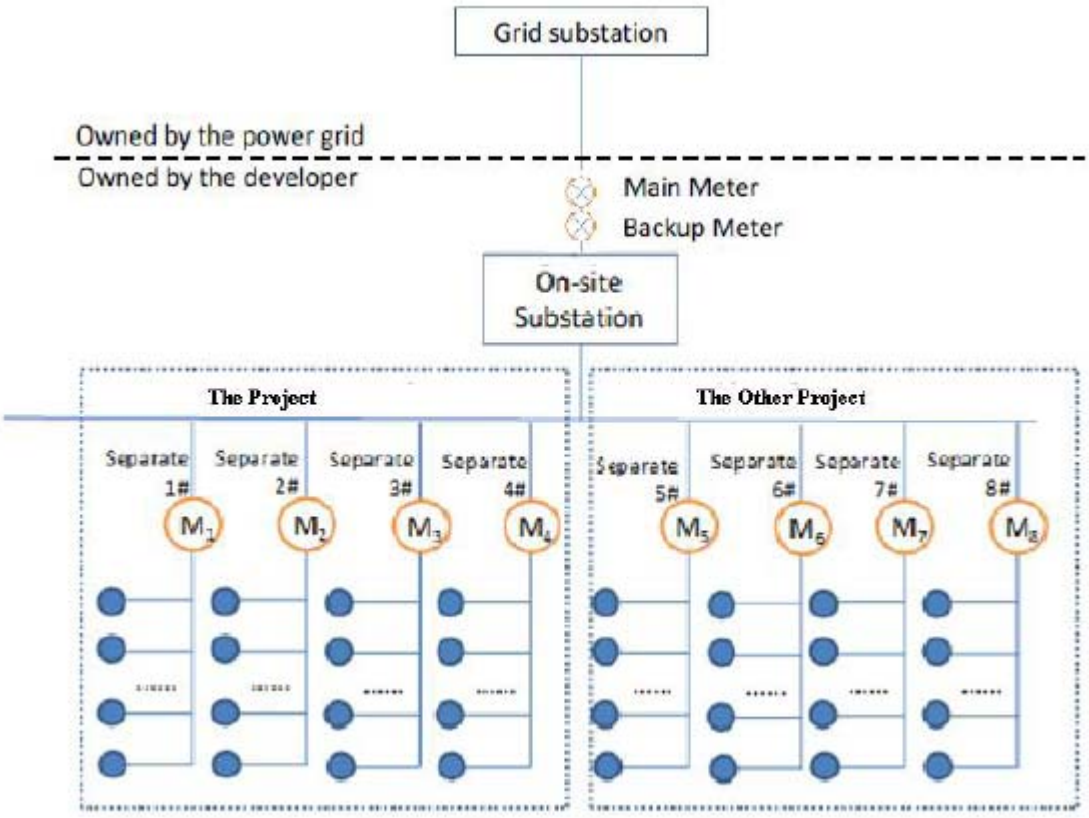

Figure 4 Meters diagram

The generation and consumption data as recorded by the grid company and the project company, and provided to the project developer, will be cross-checked against sales receipts.

4. Data monitoring

The readings of the main meter and separate meters are used for calculating the emission reductions when the main meter and separate meters are in normal operation state. The monitoring processes are as follows:

(1) The meter readings from the main meter and separate meters are recorded daily;

(2) The designated persons from the grid company and the project company jointly record the main meter readings of the power to/from the grid monthly;

(3) The project developer provides the power grid company with a settling accounts sheet about the net electricity supplied to the grid monthly;

(4) The project developer provides the power grid company with a sale receipt after the power grid company has confirmed the settling accounts sheet, and archives a copy of the sale receipt;

(5) The project developer provides the DOE with the readings of the main meter at onsite substation and separate meters at project site and the copy of sale receipt.

5. Quality control

1) Calibration of meters

The calibration of meters is conducted by a qualified organization in compliance with the national standard and sectional regulations to ensure the accuracy. The meters will be calibrated once per year. The meters must be sealed after calibration.

The calibration records must be archived together with other monitoring records. When the main meter or back-up meter have a breakdown, the party finding the breakdown should tell another party and inform the qualified calibration organization to check, calibrate, test and treat the meter so as to recover the normal monitoring state.

2) Emergency treatment

When the main meter, back-up meter or separate meters have a breakdown, the electricity generation difference will be treated as follows:

(1) When one of the main meter and back-up has a breakdown, the readings of the other meter will be adopted;

(2) If both the main meter and back-up meter have breakdowns, the Project Company and Power Company shall jointly prepare a reasonable and conservative estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative.

(3) If separate meters have breakdowns, the Project Company and Power Company shall jointly prepare a reasonable and conservative estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative.

6. Data management

All monitoring data and records will be archived in electronic format as well as on paper. The electronic documents will be backed up on compact disc or hard disc. The project developer will also keep copies of sale receipts and prepare a monitoring report at the end of each year, which includes the net electricity generation, the monitoring data summary, the calibration records, and the emission reductions calculation.

All the electronic and paper documents will be archived during the crediting period plus two years.

7. Training program

The project developer will train all related staff before the start of the crediting period. The training contains CDM knowledge, operational regulations, quality control (QC), data monitoring requirements and data management regulations, etc.

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

>>
28/07/2008 (date of signing of the equipment purchase agreement)

C.2. Expected operational lifetime of project activity

>>
20y

C.3. Crediting period of project activity

C.3.1. Type of crediting period

>>
Renewable crediting period (second).

C.3.2. Start date of crediting period

>>
15/03/2017 (2nd crediting period)

C.3.3. Duration of crediting period

>>
7y

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
The Environment Impact Assessment is prepared by Inner Mongolia Autonomous Region in November 2007 and approved by Environment Protection Bureau of Inner Mongolia Autonomous Region in May 2008.

According to the Environmental Impact Assessment (EIA), the environment impacts of the project are summarised below:

1. The analysis of the environment impact during the construction period

The environmental impacts during the construction period are as follows:

Noise: the project will meet the restrictive construction boundary noise values during the construction stage. Therefore, the noise is not considered to negatively impact local residential areas.

Dust: the dust will be produced during the construction period by the machines. The impact of dust can be erased by sprinkling and covering the materials in the windy days.

Solid waste: the main solid wastes produced during the construction period are construction waste and garbage from the construction workers. Garbage will be collected and will be sent to landfill. The construction wastes will be used for backfilling, foundations and road construction.

Waste water: waste water will be treated and reused.

2 The analysis of the environment impact in operation period

The environment impacts during the construction period are as follows:

Waste water: a small quantity of waste water will be produced by the project management staff during operation. The waste water will be treated and will be used for sprinkling the vegetation.

Noise: the noise from the wind turbines is expected to be 53~33DB (A) at a distance of 50~150 meters, meeting the “Industry Enterprise Factory Boundary Noise Standard”. Therefore, the noise of the wind farm is not considered to have a negative impact on local residents during the operational period.

Solid waste: the main solid waste during the operational period is generated by the project management staff. All the waste produced will be collected and sent to landfill.

D.2. Environmental impact assessment

>>
Environmental impacts are not considered significant. The Environmental Protection Bureau of Inner Mongolia Autonomous Region approved the EIA

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

>>

In February 2008, the project developer has sent out questionnaires to the stakeholders in the directly affected area, requesting comments on the proposed project construction. 40 copies of questionnaires were distributed, and 40 copies were returned. The age of the participating stakeholders was in the range of 26 to 70 years old.

The main content of the questionnaire is as follow:

Name		Sex	
Profession		Age	
Education(√)	Junior Middle School or Below ☐Junior Middle School ☐ Senior Middle School ☐ University or Above ☐		
Job(√)	Farmer ☐ Worker ☐ Officer ☐ Student ☐ Teacher ☐Other☐		
1、Do you think the project will influence the natural scenery?	Yes ☐	No ☐	Unconcerned ☐
2、Do you think the project will influence the ecosystem?	Yes ☐	No ☐	Unconcerned ☐
3、Do you think the project will influence the surrounding area?	Yes ☐	No ☐	Unconcerned ☐
4、Do you think the project will be helpful to the local economy?	Yes ☐	No ☐	Unconcerned ☐
5、 Do you agree the construction of the project?	Yes ☐	No ☐	Unconcerned ☐
6、 What about your opinion about the proposed project?			

E.2. Summary of comments received

>>

All stakeholders gave a positive opinion to the project, and supported the construction of the project.

The results of the questionnaires are as follows:

- 100% agreed to the construction of the project;
- 100% thought the project would be helpful to the local economy;
- 95% thought the project would not influence the surrounding area, the other people were unconcerned about the problem;
- 97.5% thought the project would not influence the natural scenery; the others were unconcerned about the problem;
- 92.5% thought the project would not influence the ecosystem; the other people were unconcerned about the problem.

Conclusion from the survey:

The survey shows that the proposed project has strong local among the local people. They all believe the proposed project will promote the local economic development and will improve the life level of the local people. All the respondents agree the project construction.

E.3. Consideration of comments received

>>

The villagers are all supportive of the proposed project and to date there has been no need to modify the project design according to the comments received.

The project owner has an overall environment-friendly plan to guarantee that the project has the minimum negative impact on the environment during the project construction and operation.

SECTION F. Approval and authorization

>>

The letters of approval for the Project Activity are available and had been uploaded with the registration.

Appendix 1. Contact information of project participants

Organization name	CGN Wind Power Co., Ltd.
Country	People's Republic of China
Address	No.2 Building, Area 12 of Advanced Business Park, No.188, west of South 4th Ring Road, Beijing
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Website	-
Contact person	Chen sui

Organization name	Carbon Resource Management Ltd.
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Fax	+44 20 7016 1421
E-mail	deliveries@carbonresource.com
Website	www.carbonresource.com
Contact person	Clarke A Nicholas

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Fax	+41 22 781 6611
E-mail	deliveries@carbonresource.com
Website	www.carbonresource.com
Contact person	David Fransen

Appendix 2. Affirmation regarding public funding

Not applicable. There is no public funding from UNFCCC Annex 1 parties for the project.

Appendix 3. Applicability of methodologies and standardized baselines

The applicability of the selected methodology is described in B.2.

Appendix 4. Further background information on ex ante calculation of emission reductions

All the details on ex ante calculation of emission reductions are described in B.6.

Appendix 5. Further background information on monitoring plan

All the details on monitoring plan are described in B.7.

Appendix 6. Summary report of comments received from local stakeholders

Comments received from local stakeholders during registration validation and the corresponding response has been displayed at the project interface.

Appendix 7. Summary of post-registration changes

The project was registered on 15/03/2010. The project revised monitoring plan and was approved by EB on 20/09/2013.