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	CGN Inner Mongolia Duerbote Wind farm Project
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the PDD	4.0
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	95,903tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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CGN Inner Mongolia Duerbote Wind farm Project (hereinafter referred to as the proposed project) is located in Wulanhua Town, Siziwangqi County, Wulanchabu City, and Inner Mongolia Autonomous Region. The project is developed by CGN Wind Power Co., Ltd. Based on the condition of the project site, the proposed project is to install and operate 33 wind turbines, each of which has a capacity of 1500kW; therefore, the total installed capacity of Inner Mongolia Duerbote Wind farm is 49.5MW. The average lifetime of the equipment based on the manufacturer's specifications is 20 years and the full load hours estimated is 2,305 hours per year and the expected net supplied power to the grid is 114,110 MWh per year to the North China Power Grid (NCPG) on the basis of a Power Purchase Agreement (PPA).

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.

As the Grid is dominated by fossil fuel-fired power generation, the establishment of the Project Activity is leading to greenhouse gas (GHG) emission reductions. The Project Activity was registered on 24/05/2009 (Ref.2406) and the first crediting period is 20/08/2009 – 19/08/2016[1]. Following the methodology, the emission reductions of the second crediting period (20/08/2016-19/08/2023) are estimated to be on average 95,903 tonnes of CO_2 equivalent (tCO_2e) per year, and 671,321 tCO_2e over the chosen crediting period.

The net electricity supplied to the grid is continuously measured by the main meter installed at the 220kV substation of the grid company. The main meter reading records used for billing is also the main meter reading records used for emission reduction calculations. The backup meter was also installed at the 220kV substation of the power grid for the electricity measurement.

The proposed project promotes local sustainable development through the following aspects:

- reducing CO_2, SO_2 and NO_x emissions;
- creating local employment opportunity during the assembly and installation of wind turbines, and for operation of the Inner Mongolia Duerbote Wind farm;
- reducing other particulate pollutants resulting from the fossil fuel fired power plants compared with a business-as-usual scenario.

A.2. Location of project activity

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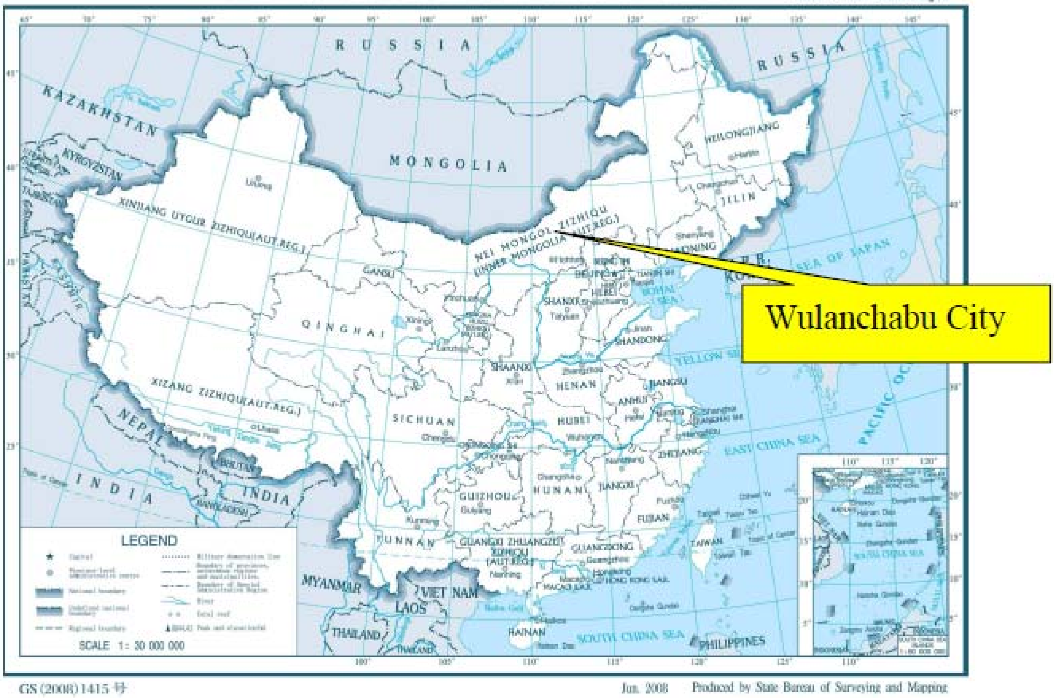
The CGN Inner Mongolia Duerbote Wind Farm lies northwest to Wulanhua Town, Siziwangqi County, Wulanchabu City of Inner Mongolia in the People's Republic of China. The center of the project is located at longitude 111°34'East and latitude 41°31'north. The average altitude of the project site is 1,490~1,580m above sea level. Figure 1 shows the location of the Inner Mongolia Duerbote Wind Farm in Inner Mongolia.

[1] The first crediting period of the project is changed from 24 May 2009 to 23 May 2016.

(http://cdm.unfccc.int/Projects/DB/DNV-CUK1234928351.8/view)

Figure 1 Map showing the location of the Project



A.3. Technologies/measures

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The proposed project activity will have an installed capacity of 49.5 MW. Total net annual generation of electricity is expected to be 114,110 MWh once fully operational, with an average load factor of 26.32%. A total of 33 wind turbines of 1,500kW will be installed in the project site. The electricity generated from the project will be transmitted to Duerbote substation of NCPG via 220kV transmission line.

The turbines will be supplied by Goldwind Science & Technology Ltd. The turbine technology is introduced from Germany; and therefore, the establishment and operation of the proposed project activity will promote the technology transfer and utilization in China. The main turbine parameters are shown in table 1.

Table 1 Key Technology to be employed at the Project Wind Farm

Key Technology Parameter	Value
Type	Goldwind 82/1500
Power Rating (kW)	1500
Rotor diameter (m)	82
Swept area (m^2)	5375
Rated Rotate speed (rpm)	9-17.3
Cut-in wind speed (m/s)	3
Rated wind speed (m/s)	10.3
Cut-out wind speed (m/s)	22
Rated voltage (V)	690

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.

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 24/05/2009 the reference no. is 2406. 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; (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.	Not applicable. The proposed project is the installation of a wind power plant.
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 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.	Since the proposed project is grid connected, this condition is applicable and the emission factor has been calculated accordingly.
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

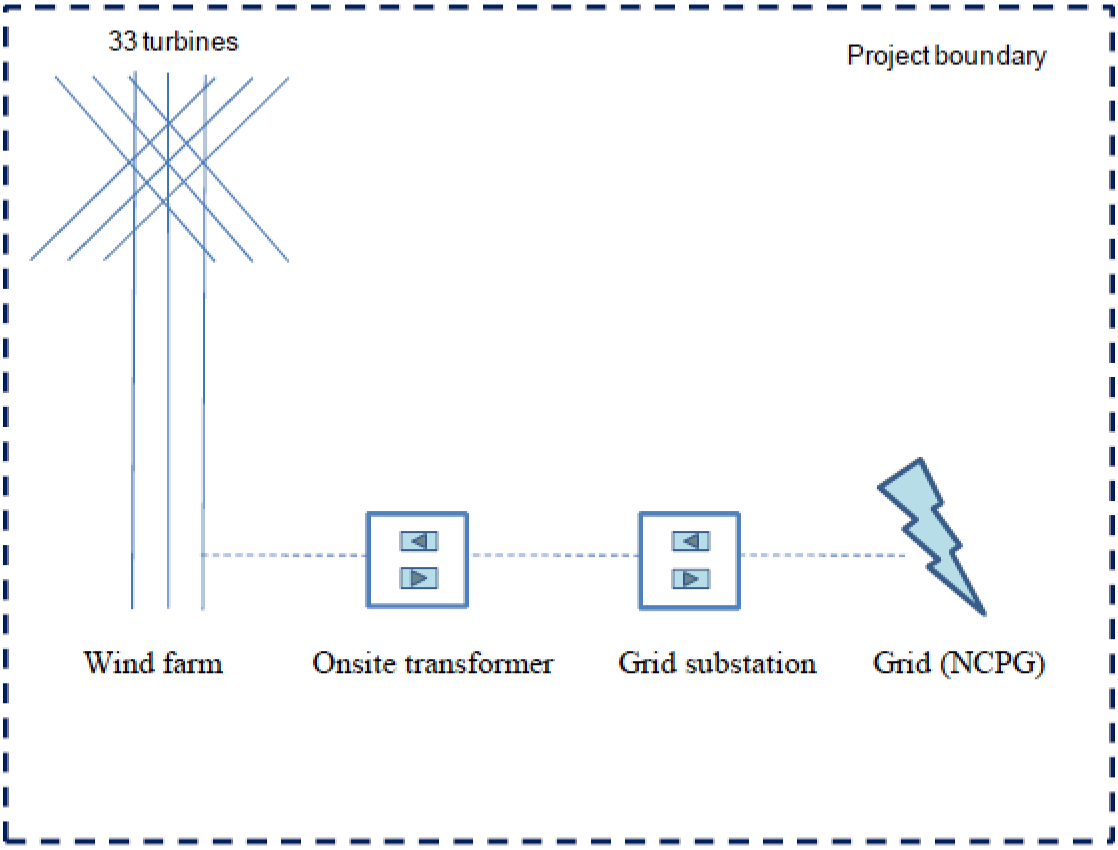
For the baseline determination only CO_2 emissions from electricity generation by fossil fuel fired power plant that is displaced due to the project activity are taken into account.

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

Spatial boundary

The spatial extent of the proposed project boundary includes CGN Inner Mongolia Duerbote Wind Farm site and all power plants connected physically to the NCPG.

Figure 2 Flow diagram of the project boundary



According to the delineation of grid boundaries as provided by the DNA of China, the NCPG, including Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia and Shandong, is the project electricity system, which is defined by the spatial extent of the power plants that can be dispatched without significant transmission constrains. The electricity transmission between different provinces in the NCPG is very large and it is unreasonable for the proposed project to regard the Provincial Power Grid as the project boundary.

The connected electricity system is the Northeast Power Grid (NEPG) which consists of three provincial grids: Jilin, Liaoning and Heilongjiang and Central China Power Grid (CCPG) which consists of six provincial grids: Jiangxi, Henan, Hubei, Hunan, Chongqing and Sichuan.

Table 2 Emission sources and GHG included in the project boundary

Source		Gas	Included	Justification/explanation
Baseline	Grid	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project activity	None	CO_2	No	According to ACM0002, the project emission of renewable energy project activity is zero.
		CH_4		
		N_2O		

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[2], 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.

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.

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

- 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.

- 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.

- 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[3] 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

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

[3] 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.

(ii) Approach 2

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

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.

- 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[4]. 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.

- 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.

<u>Step 4. Calculate the operating margin emission factor according to the selected method</u>

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

<u>(a) Simple OM</u>

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;

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

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[5], which uses official national statistics.

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

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

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

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[6] 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:

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

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.

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

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

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

<u>Step 6. Calculate the combined margin emission factor</u>

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.

<u>(a) Weighted average CM</u>

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	**$\eta_{fuel-type,y}$**
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:

$BE_y = EG_{facility,y} \times EF_{grid,CM,y}$ = 114,110MWh/yr × 0.84045 tCO_2/MWh = 95,903 tCO_{2e}/yr

$ER_y = BE_y – PE_y$ = 95,903 tCO_2e/yr – 0 tCO_{2e}/yr = 95,903 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)
20/08/2016-19/08/2017	95,903	0	0	95,903
20/08/2017-19/08/2018	95,903	0	0	95,903
20/08/2018-19/08/2019	95,903	0	0	95,903
20/08/2019-19/08/2020	95,903	0	0	95,903
20/08/2020-19/08/2021	95,903	0	0	95,903

20/08/2021-19/08/2022	95,903	0	0	95,903
20/08/2022-19/08/2023	95,903	0	0	95,903
Total	671,321	0	0	671,321
Total number of crediting years	7			
Annual average over the crediting period	95,903	0	0	95,903

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 meter installed at the 220kV substation, monitoring electricity exported to the grid and imported from the grid by the project.
Value(s) applied	114,110 MWh/yr once fully operational
Measurement methods and procedures	Net electricity generated by the proposed project activity will be continuously measured and monthly recorded through the metering equipments. Calculated from supply to the grid and imports from the grid.
Monitoring frequency	Continuous measurement and monthly recording
QA/QC procedures	The metering equipment are calibrated and checked for accuracy by the qualified third party periodically in accordance with industry standards (Chinese electric industry regulation DL/T448-2000). Monthly net generation data will be approved and signed off by CDM manager before it is accepted and stored. The metering data will be double-checked against sales receipts. The metering equipments shall have sufficient accuracy so that the specification of the meters should be 0.5s or more precise than 0.5s.
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.7.2. Sampling plan

>>

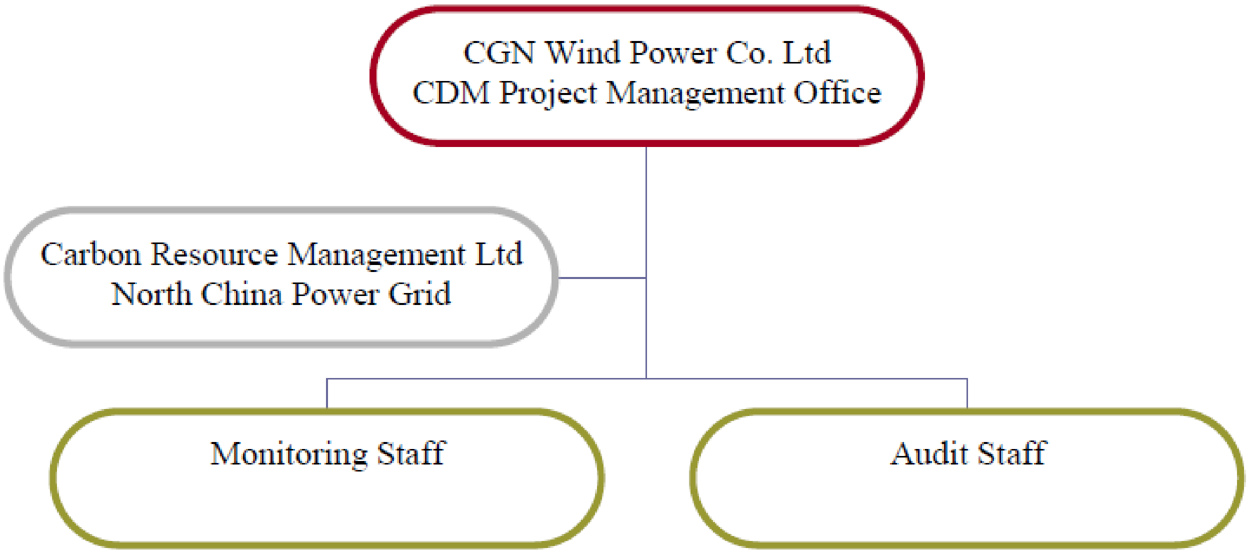
Not applicable. None of the data and parameters monitored in section B.7.1 above are to be determined by a sampling approach.

B.7.3. Other elements of monitoring plan

>>

Overall responsibility for monitoring and carrying out the monitoring following this monitoring plan lies with CGN Wind Power Co., Ltd. The company will establish a CDM project management office and assign dedicated people responsible for the monitoring and reporting of the generation and emission reductions of the project activity.

The operating and management structure is illustrated as followed:



I. Introduction

CGN Inner Mongolia Duerbote Wind farm Project adopts the Revision to the approved consolidated monitoring methodology ACM0002 (version 19.0) to determine the emission reductions from the net electricity generation from the wind farm. This plan describes in more detail the process.

2. Responsibility

Overall responsibility for monitoring and carrying out the monitoring following this monitoring plan lies with CGN Wind Power Co., Ltd. CDM manager of CGN Wind Power Co., Ltd is responsible for the monitoring and reporting of the wind farm.

CGN Wind Power Co., Ltd, in co-operation with Wulanchabu Power Grid Company and existing wind farm experienced experts will train the staff carrying out the monitoring work.

A CDM Manual will be compiled within 3 months of registration of the proposed project activity.

3. Training

The CDM project management office will assign and train the dedicated people carrying out the monitoring work. Mr. Zhao Jingjing will complete the monitoring personnel training before the registration, further training work will be completed with the preliminary verification.

4. Installation of meters

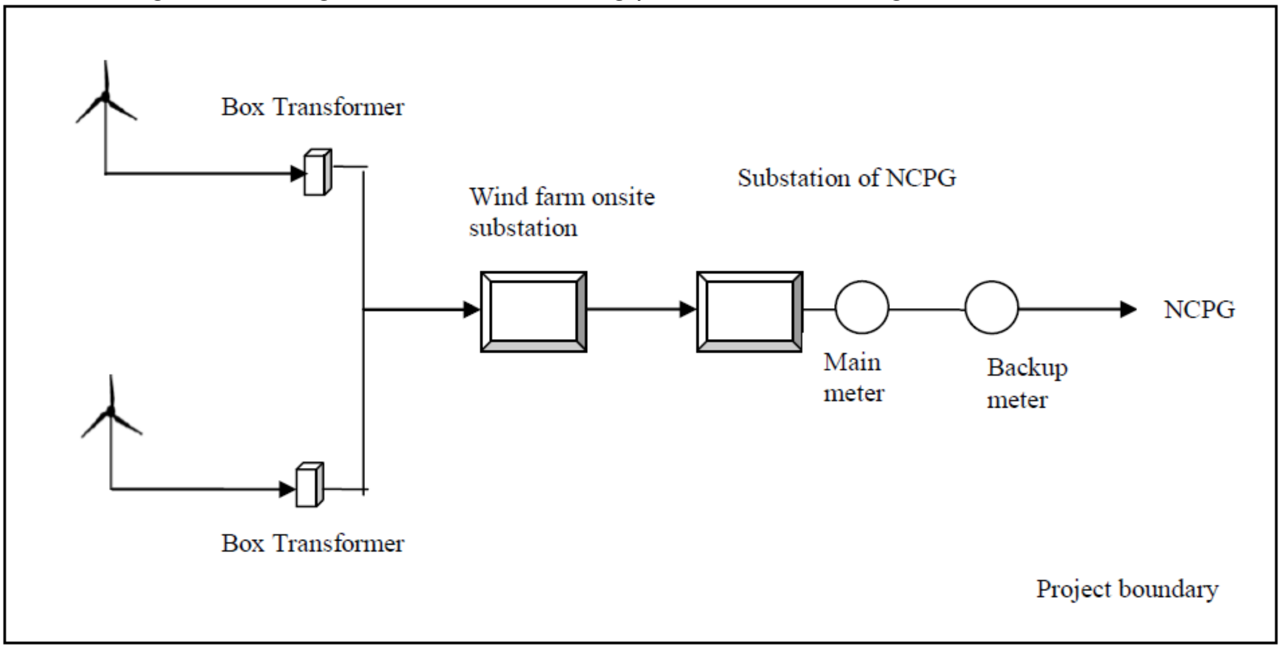
The net electricity supplied to the grid is continuously measured by the main meter installed at the 220kV substation of the grid company. This main meter is bidirectional and has two-way metering, recording both electricity exports to the grid (Gen) and imports from the grid (Cons); net electricity supplied to the grid by the project (EG_y) is calculated as exports minus imports.

Every month the project developer obtains the monthly monitoring results based on the data presented in the electricity transaction notes (including Gen and Cons) issued by the power grid substation. The amount of net electricity generation is calculated according to the data monitored by the main meter is sufficient for the purpose of billing and emission reductions, as long as the error in the main meter is within the agreed limits. The main meter reading records used for billing is also the main meter reading records used for emission reduction calculations. The backup meter was also installed at the 220kV substation of the power grid for the electricity measurement.

The meter readings were double checked with the sales receipts, and in the procedure of the calculation of the ERs, the conservative values are selected, which means that the minimum value of the electricity exported and the maximum value of the electricity imported are chose. All data

required for verification and issuance are backed-up and retained for at least two years after the end of the crediting period or the last issuance of CERs of the Project, whichever occurs later.

The net electricity supplied to the grid by the project (EG_y) can be calculated as below:
EG_y= Gen- Cons
The line diagram showing all relevant monitoring points is as following:



According to the registered PDD, if in the future, some other wind farms share the same transformer, substation or transmission line with this wind farm, the appropriate separate meters will also be installed in the project site so that the electricity generation can be monitored respectively to calculate the share of this wind farm of the net supply to the grid.

Should any additional generating capacity be installed, sharing transmission and transformer facilities as well as the metering equipment at the 220kV substation with the proposed project activity, net generation recorded by the main meter at the 220kV substation will be allocated between the proposed project activity and any such added capacity on the basis of generation as recorded by meters onsite.

If such additional capacity is installed, the output data from turbines and other relevant data will be monitored and be used to calculate the share of the project in the overall net output, and the net electricity supplied by the project activity ($EG_{project}$) will be calculated as follows:

$$EG_{project} = EG_{total} * E_{project} / (E_{project} + E_{others})$$

Where:
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.

The meter readings were double checked with the sales receipts, and in the procedure of the calculation of the ERs, the conservative values are selected, which means that the minimum value of the electricity exported and the maximum value of the electricity imported are chose.

5. Calibration
The metering equipments are calibrated and checked for accuracy in accordance with Chinese electric industry regulation DL/T448-2000. The metering equipments shall have sufficient accuracy so that the specification of the meters should be 0.5s or more precise than 0.5s. The net

generation output registered by the meters alone will suffice for the purpose of billing and emission reduction verification as long as the error in the meters is within the agreed limits.

Both meters shall be jointly inspected and sealed on behalf of the parties concerned and shall not be interfered with by either party except in the presence of the other party or its accredited representatives.

Calibration is carried out by the qualified entity with the records being supplied to CGN Wind Power Co., Ltd every year, and these records will be maintained by CGN Wind Power Co., Ltd.

All the meters installed shall be tested by qualified entity after: the detection of a difference larger than the allowable error in the readings of both meters; the repair of all or part of meter caused by the failure of one or more parts to operate in accordance with the specifications.

If any errors are detected the party owning the meter shall repair, recalibrate or replace the meter giving the other party sufficient notice to allow a representative to attend during any corrective activity.

6. Monitored data
Grid-connected electricity generated by the proposed project will be continuously measured by the metering equipment at the 220kV substation (interconnection facility connecting the facility to the grid).

Every month CGN Wind Power Co., Ltd will obtain the on-grid electricity generation from the 220kv substation and monthly recorded the data.

Should any previous months reading of the main meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the net generation output shall be determined by:

(a) First, by reading backup meter, unless a test by either party reveals it is inaccurate;

(b) If the backup system is not within acceptable limits of accuracy or operation is performed improperly CGN Wind Power Co., Ltd and the North China Power Grid shall jointly prepare an reasonable and conservative estimate of the correct reading, and provide sufficient evidence that this estimation is reasonable and conservative when DOE undertakes verification; and

(c) If the North China Power Grid and CGN Wind Power Co., Ltd fail to agree then the matter will be referred for arbitration according to agreed procedures.

7. Quality control
Monthly net generation data will be approved and signed off by CDM manager before it is accepted and stored.

This audit will check compliance with operational procedures in this monitoring plan.

This internal audit will also identify potential improvements to procedures to improve monitoring and reporting in future years.

8. Data management system
Physical document such as paper-based maps, diagrams and environmental assessments will be collated in a central place, together with this monitoring plan. In order to facilitate auditors' reference of relevant literature relating to the CGN Inner Mongolia Duerbote Wind farm Project, the project material and monitoring results will be indexed. All paper-based information will be stored by the technology department of CGN Wind Power Co., Ltd and all the material will have a copy for backup.

And all data including calibration records are archived electronically and kept until 2 years after the end of the total crediting period of the CDM project.

9. Reporting and verification

- Wulanchabu Power Grid Company reads main meter and reports the result to North China Power Grid Company and the readings are confirmed by CGN Wind Power Co., Ltd monthly.
- CGN Wind Power Co., Ltd records readings from the on site meter monthly.
- CGN Wind Power Co., Ltd carries out an internal audit on the readings and calculations.
- CGN Wind Power Co., Ltd, after the internal audit, reports the readings, grid data and calculations to the DOE for verification.

CGN Wind Power Co., Ltd will facilitate the verification through providing the DOE with all required necessary information at any stage.

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

>>
29/04/2008 (date of the purchase contract of the turbine)

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

>>
20/08/2016 (2nd crediting period)

C.3.3. Duration of crediting period

>>
7y

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
Environmental Impact Assessment (EIA) for the Inner Mongolia Duerbote Wind farm has been completed in October 2007 by of Inner Mongolia Power Exploration & Design Institute assigned by the Project owner, and has been approved by the Environmental Protection Bureau of Inner Mongolia Autonomous Region in November 2007. Here is a summary of the EIA.

1 The analysis of the environment impact in the construction period

- Construction machinery and construction activity will generate noise. However, since the nearest local residential area is far away from the wind farm site and local atmosphere environment capacity is very large, the impact of construction noise to the local region is minimal.

- The waste water from construction is mainly sewage from construction workers. This small quantity of waste water will be treated by deposition in a septic tank near the wind farm, and therefore it will not have a significant impact on the environment. A new sewage system will be

built for long term use during operations. All the waste water from construction work is used for eliminating dust. So the water during construction period will have no impact on the local environment.

・ The air pollution from the proposed project is mainly dust emitted by the construction activity with emission source in a low position and the diameter of the particulate is relative large, so the impact by the dust emitted is limited within the construction site. Major measures for dust control are spreading water on the construction site and setting temporary covering on the construction materials.

・ The project temporarily disturbs some grass cover for construction use. The occupied land will be restored after construction. Overall, land use impact on the local residents arising from the project is considered to be insignificant.

2 The analysis of the environment impact in operation period

・ The noise from blades of wind power machine rotating during project construction is avoided mainly by selecting low noise equipment. Furthermore the residential regions are far away from the wind farm, so the noise does not influence the residential districts nearest to the site.

・ Solid waste and liquid waste will be produced by operation staff during operation period. The emitted waste quantity is very small and will have no significant impact on the environment after treatment.

・ The major concern of the impact to the ecological environment by the operation of the wind farm is the potential damage to birds, especially to the birds migrating during night time. From the research focused on this issue, it is stated that the chance of crashing by birds with wind generating sets are relative low. Moreover, the places with large number of night-migrating birds are excluded during project site selection process, which indicates minimal chance of collision between the birds and generators. The impact to local birds by the operation of the proposed project is very small.

Conclusion

The wind farm does not put much pressure on the local environment when generating renewable power. However it will bring great environmental benefit as well as the social benefit.

D.2. Environmental impact assessment

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

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

>>

In March 2008, the staff from CGN Wind Power Co., Ltd. carried out a survey of the local villagers and residents in Wulanhua Town. 1 page questionnaire was designed to fill in and has the following sections:

· Project introduction
· Respondent’s basic information and education level
· Questions on:

1. Do they agree with the development and construction of the project?
2. Will the project have a negative impact on your environment of living, studying and working?
3. Will the project have a negative impact on the environment, such as noise, water and electromagnetism?

4. Will the project have a negative impact on the ecosystem?
5. Do you think the proposed project will have promotion in local economic development?
6. Do you have some suggestion about the project?

E.2. Summary of comments received

>>

Following is a summary of the local survey. The survey forms are available from the project owner. The questionnaires were sent to 50 households and the survey had a 100% response rate. The result of the survey indicated the support to the project.

The statistic of opinion:

- Education level of the respondents: Elementary school (10%), Junior high school (26 %), high school (42 %), University level and above (22%).
- Gender of the respondents: Male (36 %) and female (64 %).
- 100% of respondents agreed with the development of the project.
- 100% respondents believed that the project construction will not do harm to the environment.
- 98% believed that the project construction will do no harm to the ecosystem and 2% didn't make any suggestions.
- 100% believed that the project construction will have no impact to the environment of living, studying and working.
- 100% believed that the project construction will have positive impact on local economic development.

Conclusions from the survey

The survey shows that the proposed project has strong local support among the local people. They all believe the proposed project will promote the local economic development and agree the project construction.

E.3. Consideration of comments received

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The villagers and local government 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

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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

NA