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 Zhurihe Phase II Wind Farm Project
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the PDD	Version 5.0 (updated addressing to renewal of crediting period)
Completion date of the PDD	02/01/2019
Project participants	CGN Wind Power Co., Ltd. GT Advisors Limited.
Host Party	People's Republic of 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	105,544 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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CGN Inner Mongolia Zhurihe Phase II Wind Farm Project (hereinafter referred to as the proposed project) is located in the Zhurihe Town, Sonid You Qi, Xilinguole League, Inner Mongolia Autonomous Region, P. R. China. 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 25 wind turbines, each of which has a capacity of 2000kW; therefore, the total installed capacity of the proposed project is 50MW. The proposed project is expected to generate 125,573 MWh per year, which will be sold to the North China Power Grid (NCPG). It is ex-ante estimated that the project will generate average annual emission reduction of about 105,544 tCO2e.

The proposed project was registered on 30/10/2010 (Ref.3453) and the first crediting period is 30/10/2010–29/10/2017. Following the methodology (ACM0002,19.0), the emission reductions of the second crediting period (30/10/2017-29/10/2024) are estimated to be on average 105,544tonnes of CO_2 equivalent (tCO_2e) per year, and 738,808 tCO_2e over the chosen crediting period.

The proposed project will therefore help reduce GHG emissions versus the high-growth, coal-dominated business-as-usual scenario. Furthermore, the proposed project will improve air quality and local livelihoods and promote sustainable renewable energy industry development. The proposed project promotes local sustainable development through the following aspects:

- generate renewable electricity;
- reduce greenhouse gas emissions in China compared to a business-as-usual scenario;
- 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 and soot;

A.2. Location of project activity

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CGN Inner Mongolia Zhurihe Phase II Wind Farm Project lies in the middle north part of Inner Mongolia Autonomy Region of People's Republic of China. It is located at the attitude 42°27′11″(N) and latitude 112°48′03″(E). Figure 1 shows the location of project site.

Figure 1 Map showing the location of project site.

A.3. Technologies/measures

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The 25 sets of 2000kW turbines were selected. The technical design of the wind turbines is advanced and deemed to reflect current good practice, and Key Technology Parameters are listed in Table1.

Table 1. Key technology parameters of the turbine

Key Technology Parameter	Value	Source
Rotor diameter (m)	80	Equipment technology agreement
Swept area(m^2)	5027	
Cut-in wind speed (m/s)	3	
Rated wind speed (m/s)	13.5	
Cut-out wind speed (m/s)	25	
Hub height of the wind urbines (m)	80	
Capacity(kW)	2000	
Rated voltage(V)	690	
Life time(years)	20	

The net supplied power to the grid is expected to be 125,573MWh. The electricity generated from the project will be transmitted to Wenduer substation of NCPG via a 220kV transmission line.

The proposed project activity is the installation of a wind farm with an installed capacity of 50MW. The total net supplied power to the grid is expected to be 125,573MWh once fully operational. The load factor of 28.7% is derived from the Feasibility Study Report determined by the third independent design institute with the highest grade, and also the value provided to the government while applying the project for implementation approval. 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 sub-station where the project is connected to the grid.

The project activity was started construction on 10/04/2009. The first turbine was commissioned on 06/01/2010 and put into fully operation on 03/02/2012.

The quantity of annual electricity delivered to the grid by the proposed project ($EG_{export,y}$)and the electricity purchased from the grid by the proposed project ($EG_{import,y}$) will be monitored through the use of metering equipments in the substations. The main meter's precision is no less than 0.5. The electricity generation recorded by the main meter will be continuous measurement and at least monthly recording. The electricity generation will be monitored through the main meter installed in the substation. There is also a backup meter installed in this substation. If the proposed project has to share the same transformer, substation or transmission line with some other wind farms, appropriate additional meters will be 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.

Currently, the project activity shares the same transformer, substation and transmission line with three other wind farms, named CGN Inner Mongolia Zhurihe Phase I Wind Farm Project (UNFCCC ref. No. 1577, hereafter referred to as Project A), CGN Inner Mongolia Suniteyouqi Phase 3 Windfarm Project, UNFCCC Ref. 5746, hereafter referred to as Project B, commissioned on 01/05/2011) and CGN Inner Mongolia Zhurihe Phase IV Wind Farm Project,(hereafter referred to as Project C, commissioned in Aug 2013) separate meters M1~M15 meters has 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.

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)
People's Republic of China (host)	CGN Wind Power Co., Ltd.	No
United Kingdom of Great Britain and Northern Ireland	GT Advisors Limited	No

A.5. Public funding of project activity

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There is no public funding from Annex I Parties for this proposed project.

A.6. History of project activity

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The project was registered as CDM project on 30/10/2010 the reference no. is 3453. The PDD is renewal of crediting period. Therefore, it can be confirmed that:

(a) The proposed CDM project activity is not 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 a registered CDM project activity whose crediting period has or has expired (hereinafter referred to as former project) exists in the same geographical location as the proposed CDM project activity.

It demonstrates that the proposed CDM project activity meets all conditions for registration in accordance with the applicable provisions in the project standard relating to registration of a project activity that is in the same geographical location as a former project.

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

"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

"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

"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 applicability in approved methodology ACM0002 (version 19.0) related to wind farm project are as below:

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;	a) The proposed project is the installation of a wind power plant. b) Not applicable. The proposed project is a Greenfield plant and does

(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.	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 methodology ACM0002 (version 19.0) is applicable to the project activity.

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.

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 constrains.

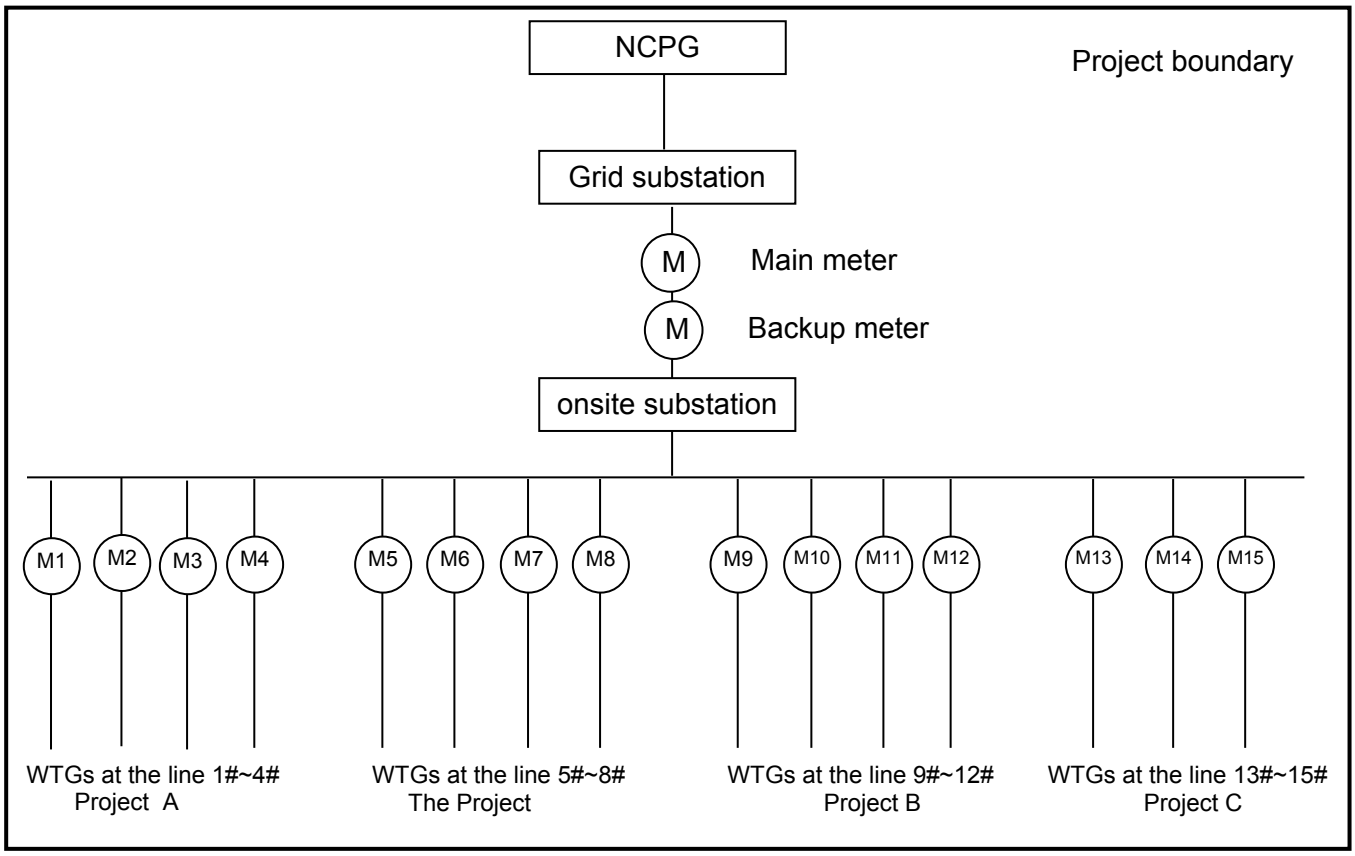
Using the boundary definitions of the Chinese DNA[1], NCPG consists of Beijing, Tianjin, Hebei, Shanxi, Shandong and Inner Mongolia power grids. The electricity transmission between different provinces in NCPG is very large and it is reasonable for the proposed project to regard NCPG as the project boundary.

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	Following ACM0002
		CH_4	No	Conservative/according to ACM0002
		N_2O	No	Conservative/according to ACM0002
Project activity	The proposed project	CO_2	No	According to ACM0002, the project emission for wind power plant is zero.
		CH_4	No	
		N_2O	No	

Figure 2 Flow diagram of the project boundary



B.4. Establishment and description of baseline scenario

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

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 in 2011; 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, PEy = 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:

$PE_y = 0$ (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:

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

Where:

BE_y	Is the baseline emissions in year *y* (tCO_2/yr.)
$EG_{PJ,y}$	is 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).
$EF_{grid,CM,y}$	is the combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (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:

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

Where:

$EG_{PJ,y}$	is 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).
$EF_{facility,y}$	is 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 seven steps defined in the "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 system

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

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

(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.

- 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

[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.

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

(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.

- 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.

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

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

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[5], which uses official national statistics.

$EF_{grid,OMsimple,y}$ = 0.9680tCO_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[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:

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

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

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

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

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) cannot 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	0.8405	-

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

According to ACM0002, no leakage is considered for the proposed project.

4. Emission Reductions

Emission reductions are calculated as follows:

$ERy=BEy-PEy$ (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	0.8405
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

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

$ERy = BEy - PEy$

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:

$BEy = EG_{facility,y} \times EF_{grid,CM,y}$ =125,573MWh/yr × 0.8405 tCO2/MWh =105,544tCO2e/yr

ERy = BEy – PEy =105,544tCO2e/yr – 0 tCO2e/yr =105,544tCO2e/yr

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

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)
30/10/2017-29/10/2018	105,544	0	0	105,544
30/10/2018-29/10/2019	105,544	0	0	105,544
30/10/2019-29/10/2020	105,544	0	0	105,544
30/10/2020-29/10/2021	105,544	0	0	105,544
30/10/2021-29/10/2022	105,544	0	0	105,544

30/10/2022-29/10/2023	105,544	0	0	105,544
30/10/2023-29/10/2024	105,544	0	0	105,544
Total	738,808	0	0	738,808
Total number of crediting years	7			
Annual average over the crediting period	105,544	0	0	105,544

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data/Parameter	***EG*$_{facility,y}$**
Data unit	MWh
Description	Net electricity supplied to the grid by the project in period y
Source of data	Calculated as export of electricity ($EG_{export,y}$) minus consumption of electricity ($EG_{import,y}$).
Value(s) applied	125,573 MWh/year (once fully operational)
Measurement methods and procedures	Monthly reading records of the main meter and the separate meters. Calculated by the $EG_{facility,y}=EG_{export,y}-EG_{import,y}$
Monitoring frequency	- Continuous measurement and monthly recording
QA/QC procedures	–
Purpose of data	The calculation of the baseline emission reductions.
Additional comment	-

Data/Parameter	***EG*$_{export,y}$**
Data unit	MWh
Description	The quantity of annual electricity delivered to the grid by the proposed project
Source of data	Electricity Meter
Value(s) applied	125,573
Measurement methods and procedures	Continuous measurement and at least monthly recording. Main meter is installed at Wenduer substation. Any error resulting from the meter shall not exceed 0.5%. Designated person records the readings of the main meter each month. The meters are bidirectional, which can record the import and export electricity generation.
Monitoring frequency	Continuous measurement and at least monthly recording.
QA/QC procedures	1. The export electricity supply to the grid is checked by receipt. 2. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 3. The data will be kept during the crediting period and two years after. 4. The main meter will be calibrated once per year by a qualified calibration organization in accordance with industry standards.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	***EG*$_{import,y}$**
Data unit	MWh
Description	The quantity of annual electricity purchased from the grid by the proposed project
Source of data	Electricity Meter
Value(s) applied	0

Measurement methods and procedures	Continuous measurement and at least monthly recording. Main meter is installed at Wenduer substation. Any error resulting from the meter shall not exceed 0.5%. Designated person record the readings of the main meter each month. The meters are bidirectional, which can record the import and export electricity generation.
Monitoring frequency	Continuous measurement and at least monthly recording.
QA/QC procedures	1. The import electricity supply to the grid is checked by receipt. 2. When the main meter fails to work normally, the readings of the back-up meter will be adopted. 3. The data will be kept during the crediting period and two years after. 4. The main meter will be calibrated once per year by a qualified calibration organization in accordance with industry standards.
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.7.2. Sampling plan

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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

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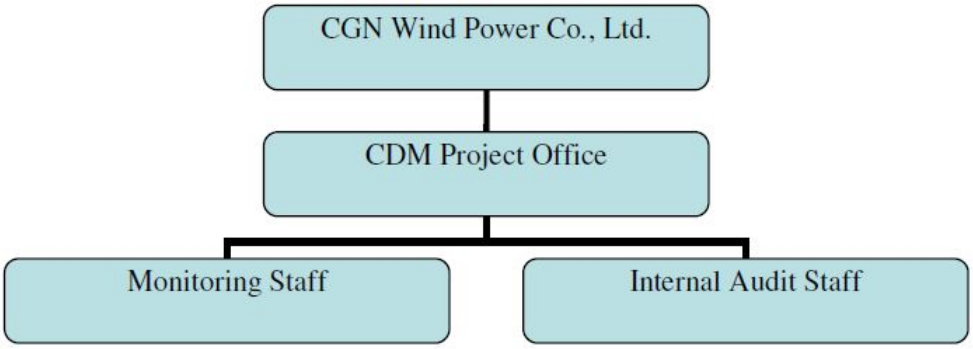
1. Monitoring and responsibility

Overall responsibility for monitoring and carrying out the monitoring following this monitoring plan lies with the project developer.

CDM manager is responsible for the monitoring and reporting of the wind farm.

The operating and management structure is illustrated as follows:



2. The monitored data

The quantity of electricity delivered to the grid by the proposed project ($EG_{export,y}$)and the electricity purchased from the grid by the proposed project ($EG_{import,y}$) will be monitored. The net electricity generation is calculated as the electricity delivered to the grid minus the electricity purchased from the grid.

3. Installation of meters

The quantity of annual electricity delivered to the grid by the proposed project ($EG_{export,y}$) and the electricity purchased from the grid by the proposed project ($EG_{import,y}$) will be monitored through the

use of metering equipments in the substations. The main and the back-up meter's precision is no less than 0.5s, and is bidirectional, recording both electricity delivered to the grid and electricity purchased from the grid. The net electricity generation will be monitored through the main meter installed in the Wenduer substation. The electricity generation recorded by the main meter will be continuous measurement and at least monthly recording. There is also a backup meter installed in this substation.

If the proposed project has to share the same transformer, substation or transmission line with some other wind farms, appropriate additional meters will be 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.

Currently, the project activity shares the same transformer, substation and transmission line with three other wind farms, named CGN Inner Mongolia Zhurihe Phase I Wind Farm Project (UNFCCC ref. No. 1577, hereafter referred to as Project A), CGN Inner Mongolia Suniteyouqi Phase 3 Windfarm Project, (UNFCCC Ref.No 5746, hereafter referred to as Project B, commissioned on 01/05/2011) and CGN Inner Mongolia Zhurihe Phase IV Wind Farm Project, (hereafter referred to as Project C, commissioned in Aug 2013). Separate meters M1~M15 has been 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. M5~M8 are installed in Line5#~8# respectively to monitor the generation from the project activity; M1~M4 are installed in Line1#~4# respectively to monitor the generation from Project A, M9~M12 are installed in Line9#~12# respectively to monitor the generation from Project B and M13~M15 are installed in Line13#~15# respectively to monitor the generation from Project C. The M1~M15 meter's precision is no less than 0.5S.

The total exported electricity generated by the Project, Project A, Project B, Project C and the total imported electricity from the grid purchased by the Project, Project A, Project B and Project C is continuously measured by the main meter installed at the Wenduer substation.

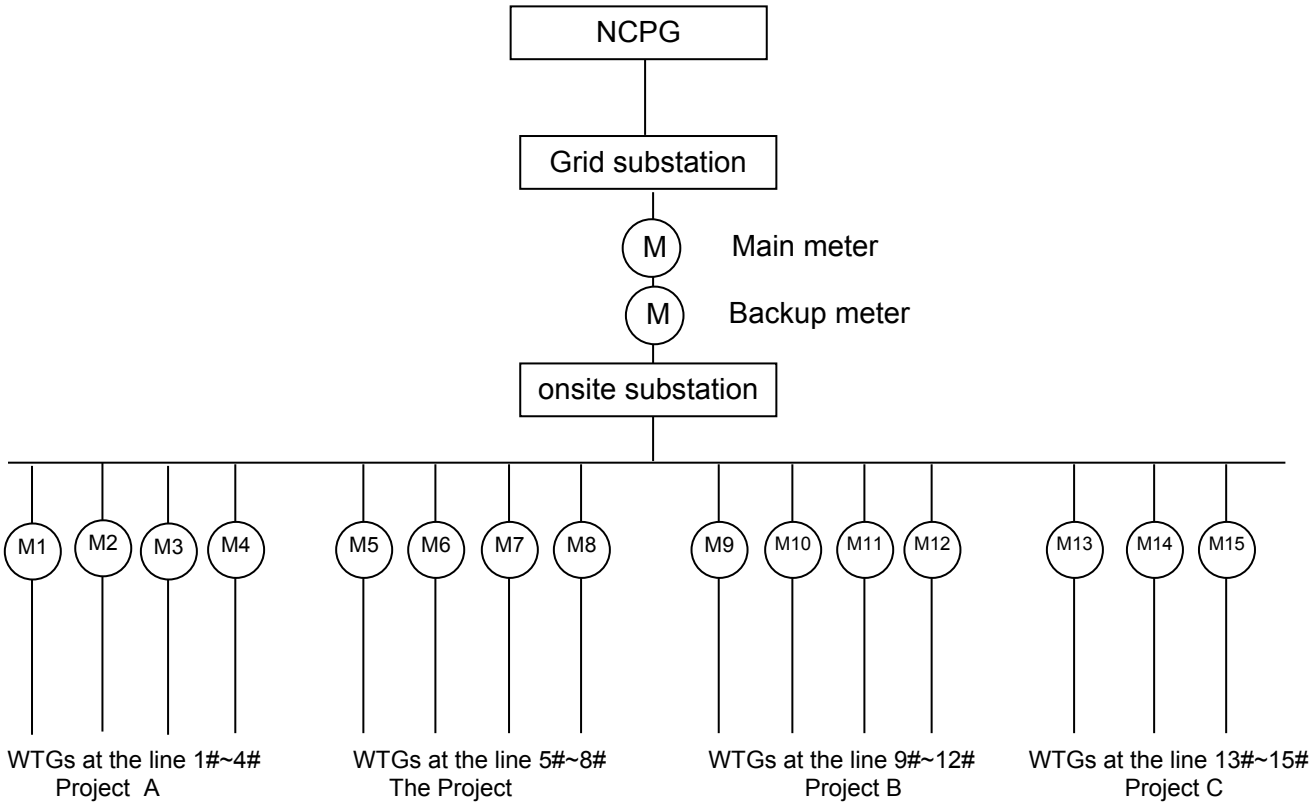
The net electricity supplied by the project activity ($EG_{facility,y}$) is calculated as follows:
$EG_{facility,y} = EGy = EG_{export,\ y} - EG_{import,\ y}$

The electricity generation can be monitored respectively to calculate the share of this wind farm of the total exported electricity to the grid ($EG_{export,\ total}$).

$EG_{export,\ y} = EG_{export,\ total} * EG_{project} / (EG_{project} + EG_{others})$
$EG_{import,\ y} = EG_{import,\ total}$

$EG_{export,\ y}$ is the quantity of annual electricity delivered to the grid by the Project;
$EG_{export,\ total}$ is total exported electricity to the grid based on the data metered by the main meter at the substation;
$EG_{import,\ total}$ is total imported electricity from the grid based on the data metered by the main meter at the substation;
$EG_{import,\ y}$ is the quantity of annual electricity purchased from the grid by the Project, EG_{import}, $y=EG_{import,total}$ which is conservative
$EG_{project}$ is the electricity generation of the Project based on the data metered by separate meters at the project site;
EG_{others} is the electricity generation of Project A, Project B and Project C based on the data metered by other separate meters;
$EG_{facility,y}$ and EG_y is the net electricity supplied to the grid by the Project.

The location of the main meter, backup meter, separate meters in transmission lines in relation to the grid, the Project, Project A ,Project B and Project C are displayed as following diagram:



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. All the meters are 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

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.

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. Reporting and Verification

The steps required to meet the requirements for emissions reduction monitoring include:
• Designated person reads main meter and reports the result to power company and project owner monthly.
• The proposed project records readings from the backup meter monthly.
• The proposed project carries out an internal audit on and reports the readings to the DOE.
The project owner will facilitate the verification through providing the DOE all required necessary information.

B.8. Start date of project activity

>>
15/03/2009
The starting date of a CDM project activity is the earliest of the date(s) on which the implementation or construction or real action of a project activity begins/has begun. The starting date of the proposed project is the signing date of Equipment Purchase Contract, as this is the earliest date

B.9. Expected operational lifetime of project activity

>>
20y-0m from commissioning

B.10. Crediting period of project activity

B.10.1. Type of crediting period

>>
Renewable crediting period (second).

B.10.2. Start date of crediting period

>>
30/10/2017 (2nd crediting period)

B.10.3. Duration of crediting period

>>
7y-0m

SECTION C. Environmental impacts

C.1. Analysis of environmental impacts

>>

An Environmental Impact Assessment (EIA) for the CGN Inner Mongolia Zhurihe Phase II Wind Farm Project has been completed by 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.

The main impacts identified in the EIA are summarised below.

1 The analysis of the environment impact in the construction period

- Construction machine and construction activity will generate noise. Noise attenuation calculations show that at a distance of 1000m from the sound source, the noise will decrease to 31dB(A), which can satisfy the Class A requirement of Standard of Noise Limits for Construction Site (GB 3096-93). The nearest residential area is further than 1000m from the wind farm, so the impact of construction noise to the local region is light.
- The solid waste during construction period is mainly the soil and garbage. The soil will be used to backfill the road and the surrounding area of the wind farm. Therefore, the solid waste will do no harm to the local environment.
- The main air pollution during the construction period comes from the machines and transportation vehicles. Some measures will be taken to reduce impact of dust, such as sprinkling, covering and so on. Therefore, the construction will not cause much negative impact on the local air environment.
- The waste water from construction is mainly the waste water from construction staff and from the construction activity. The small quantity of waste water from the staff will be treated by septic tank and the deposit will be moved out to be disposed with the solid waste. So, it will not
- The project temporarily takes some grass ground for construction use. The occupied land will be restored according to its characteristics after construction of the project and will ensure its reutilization.

Overall, it will not make the negative impact on the ecological system in the project site.

2. Conclusion

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

C.2. Environmental impact assessment

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

SECTION D. Local stakeholder consultation

D.1. Modalities for local stakeholder consultation

>>

In March 2008, the project owner carried out a survey of the local villagers and residents in the area. A 1 page questionnaire was designed to fill in and has the following sections:

Project introduction
Respondent's basic information and education level
Questions:

1. Do you agree with the development 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?

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 survey is summarized in SectionD.2 below.

D.2. Summary of comments received

>>

Following is a summary of the local survey. The survey forms are available from the project owner.

The statistic of opinion:

- 100% of respondents agreed with the development of the project.
- 100% respondents believed that the project construction will not do harm to the environment.
- 100% believed that the project construction will do no harm to the ecosystem.
- 98% believed that the project construction will have no impact to the environment of living, studying and working and 2% didn't make any suggestions.
- 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.

D.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 E. Approval and authorization

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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	China
Address	No.188,West of South 4th Ring Road
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E-mail	larnhart@hotmail.com
Website	/
Contact person	Chen Sui

Organization name	GT Advisors Limited
Country	United Kingdom of Great Britain and Northern Ireland
Address	29-31 Castle Street, High Wycombe, Buckinghamshire, HP13 6RU
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Fax	/
E-mail	dg@gt-advisors.co.uk
Website	/
Contact person	Daniel Gupta

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

There are no post-registration changes of the proposed project activity