Project design document form

(Version 11.0)

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

BASIC INFORMATION	
Title of the project activity	CGN Dalian Xizhongdao Wind Farm Project
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the PDD	07
Completion date of the PDD	11/06/2020
Project participants	Dalian Changxingdao CGN Wind Power Co., Ltd. Statkraft Markets GmbH
Host Party	People's Republic of China
Applied methodologies and standardized baselines	ACM0002 (version 20.0) – "Grid-connected electricity generation from renewable sources".
Sectoral scopes	1 Energy industries (renewable / non-renewable sources)
Estimated amount of annual average GHG emission reductions	102,577 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The purpose of CGN Dalian Xizhongdao Wind Farm Project (hereinafter referred to as the proposed project) is to utilize wind resources for electricity generation through the construction of a wind farm with a total capacity of 48.6MW in Dalian City, Liaoning Province, P. R. China. The proposed project is invested and developed by Dalian Changxingdao CGN Wind Power Co., Ltd. The electricity generated from the project will be sold to Northeast China Power Grid (NEPG).

The purpose of the proposed project is to generate renewable power and deliver it to Northeast China Power Grid. For the proposed project,

(a) Prior to the start of implementation of the project activity, there is no power generation unit at the site of the proposed project, and the electricity was supplied by the Northeast China Power Grid which was dominated by fossil fuel-fired power plants.
(b) The project scenario is the implementation of the proposed project, the installation and operation of **27** sets of wind turbines with a total capacity of **48.6** MW which will supply an average annual generation of **112,241.7**MWh to Northeast China Power Grid and replace the same amount of electricity generated by fossil fuel-fired power plants connected to Northeast China Power Grid. According to ACM0002 applied, the proposed project is a renewable electricity generating activity.
(c) The baseline scenario of the proposed project is the electricity supply of equal amount as the proposed project from the Northeast China Power Grid. The baseline scenario of the proposed project is the same against the scenario prior to the start of the implementation of the project activity.
(d) The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the proposed CDM project power plant is connected to, i.e. NEPG. The project site includes the power plant, turbines themselves and auxiliary electric equipments that are used to support the turbines operation. The proposed project is connected to the NEPG. Therefore, the NEPG including all power plants connected is selected as the project boundary.

The proposed project is planned to install and operate 27sets wind turbines with capacity of 1.8 MW each, which amount to a total capacity of 48.6 MW. The proposed project will achieve greenhouse gas (GHG) emission reductions through the displacement of mainly fossil-fuel dominated grid connected power generation. The estimated annual net electricity generation supplied to the grid is 112,241.7 MWh and the annual full-load operation time amount to 2,309h per year. The proposed project has put into commission on 04/09/2012 due to the construction schedule.

The proposed project activity was registered on 29/12/2011 (Ref. 5446) and the first crediting period is from 31/12/2012 to 30/12/2019. This is the second crediting period, which is from 31/12/2019 to 30/12/2026. Following the methodology, the emission reductions of the second crediting period are estimated to be 102,577 tCO_2e per year, and 718,039 tCO_2e over the chosen crediting period.

The proposed project makes contribution to the sustainable development as follows:

1. GHG emission reduction

The project will help reduce the greenhouse gas GHG emissions versus the high-growth, coal-dominated business-as-usual scenario in the NEPG by reducing the electricity generation from the fossil-fuel fired power plants, particularly the emission of SOx, NOx and dust.

2. Employment opportunities

The conducting of the proposed project will create employment opportunities during the construction phase and operational period.

3. Economic improvement
The construction of the wind farm will promote local economy by contributing to local government with more tax revenues through selling power generation.

A.2. Location of project activity

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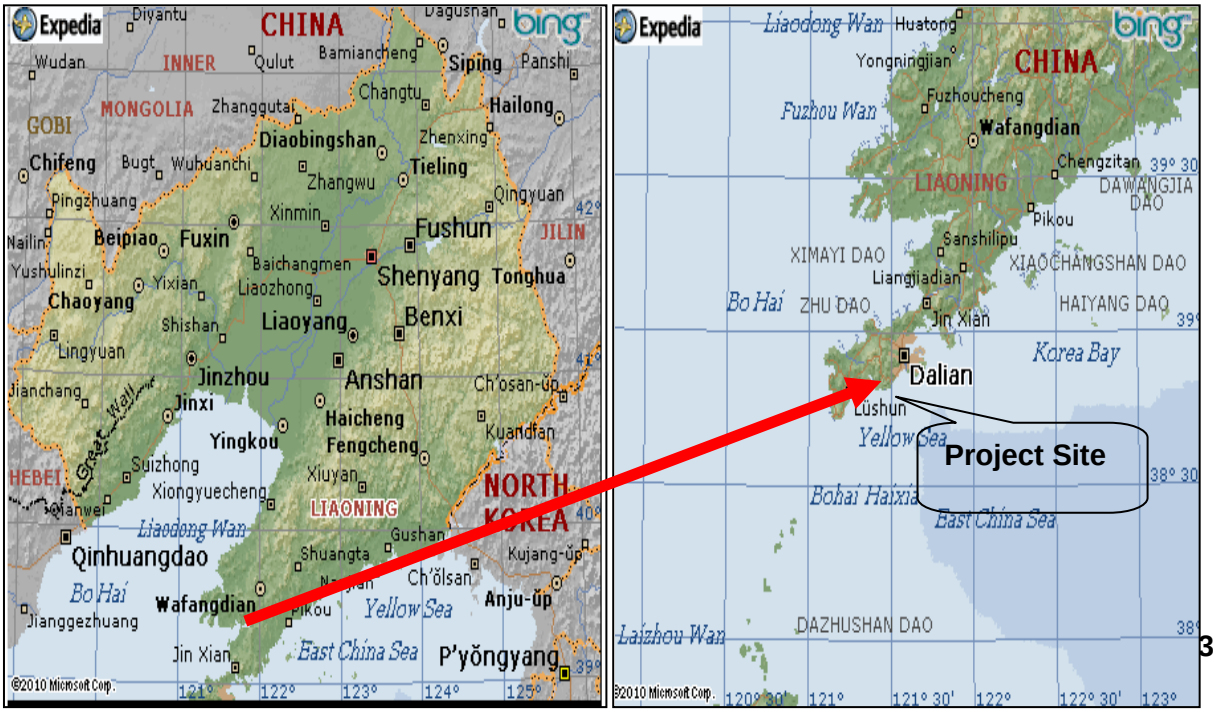
The proposed project is in Dalian City, Liaoning Province, P. R. China. The project has geographical coordinates with east longitude from 121.2703° to 121.3332° and North latitude from 39.4236° to 39.4831°. The figure A1 and A2 shows the geographical location of the proposed project.

Figure A1. The proposed project on the map of P. R. China

Figure A2. The proposed project on the map of Dalian City, Liaoning Province, P. R. China



A.3. Technologies/measures

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The proposed project is to utilize wind resources for electricity generation in Dalian City, Liaoning Province, P. R. China. The proposed project is a grid-connected renewable energy to electricity project. The proposed project will achieve obvious greenhouse gas (GHG) emission reductions through the displacement of mainly fossil-fuel dominated grid connected power generation in NEPG.

Prior to the start of implementation of the project activity, there is no power generation unit at the site of the proposed project. The scenario is Northeast China Power Grid providing the same electricity service as the proposed project. Northeast China Power Grid is dominated by the fossil-fuel fired power plants.

The project scenario is the implementation of the proposed project and replaces the same amount of electricity generated by NEPG, which is dominated by the fossil-fuel fired power plants.

The baseline scenario of the proposed project is the same as the scenario prior to the start of the implementation of the project activity.

The proposed project involves the installation of 27 sets of wind turbines with 1.8 MW capacity each, which amounts to a total installed capacity of 48.6MW. The selected wind turbines with models of Vestas V90-1.8MW (The manufacture is Vestas Wind Technology (China) Co., Ltd.). The expected effective operating hours amount to 2,309 per year and the plant load factor is 26.36%, which was determined by a third party, Northeast Electric Power Design Institute, who is the conductor of FSR and is also professional wind power engineering designing entity. It is consistent with the requirement of EB48, Annex 11 “Guidelines for the Reporting and Validation of Plant Load Factors”. The estimated net annual power supplied to the grid is 112,241.7 MWh.

The main technical specifications of the wind turbine are provided in the following table.

Parameter		Data[1]
Model		Vestas V90-1.8MW
Quantity		27
Height of hub		80 m
Wind Turbine	Diameter	90 m
	Number of blades	3
	Rated wind speed	11 m/s
	Cut-in wind speed	4 m/s
	Cut-off wind speed	25 m/s
Generator	Rated Power	1,800 kW
	Rated voltage	690V
	Life time	20 years
	Operating hours	2,309h
	Load factor	26.36%

The proposed project will set up a main transformer in a 66 kV substation at the project site. The wind power generated will be switched through a 66 kV substation at the project site, and then connected to the Northeast China Power Grid finally.

The proposed project does not involve any technology transfer.

[1] Values of the wind turbine parameters in the table are based on the wind turbine contract, the operating hours and the load factor in the table are based on the FSR.

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)	Dalian Changxingdao CGN Wind Power Co., Ltd.	No
Germany	Statkraft Markets GmbH	No

A.5. Public funding of project activity

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There is no public funding from Parties included in Annex I is involved in this project.

A.6. History of project activity

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The project was registered as CDM project on 29/12/2011 the reference no. is 5446. 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:

(c) The proposed CDM project activity was not a CPA that has been excluded from a registered CDM PoA;
(d) 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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NA

SECTION B. Application of methodologies and standardized baselines

B.1. References to methodologies and standardized baselines

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The approved methodology applied in the proposed project activity is ACM0002 (version 20.0) – "Grid-connected electricity generation from renewable sources".
Reference:
https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG

"Tool to calculate the emission factor for an electricity system" (Version 07.0). Reference:
https://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 3.0.1). Reference:
https://cdm.unfccc.int/methodologies/Pamethodologies/tools/am-tool-11-v3.0.1.pdf

B.2. Applicability of methodologies and standardized baselines

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The proposed project is a grid-connected renewable power generation project activity that installs a new power plant at a site where no renewable power was operated prior to the implementation of

the project activity (greenfield plant). It meets all applicability conditions of methodology ACM0002 (version 20.0) which is listed as follows:

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 (7), is greater than 4 W/m^2; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m^2; 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 (7), is lower than or equal to 4 W/m^2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m^2; (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	Not applicable. The proposed project is the installation of a wind power plant.

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.	
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	The proposed project is a

biofuels is zero.	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 20.0).

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

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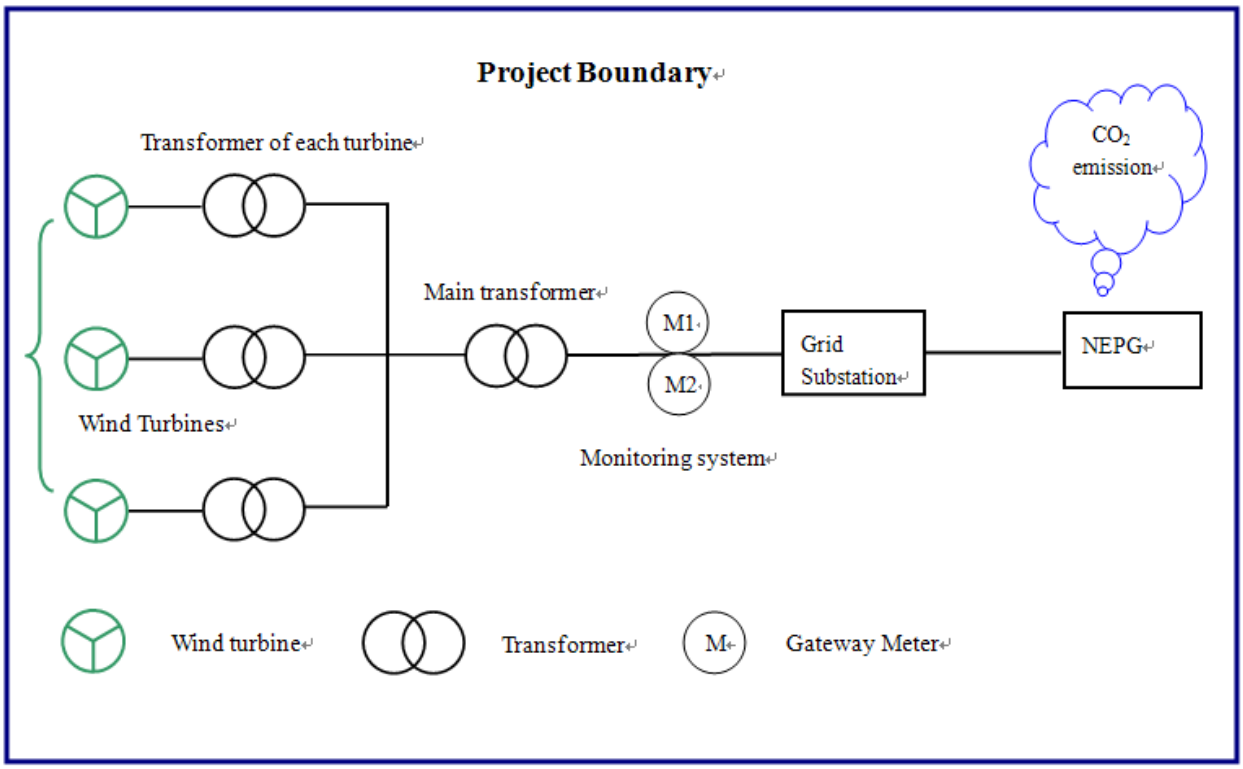
The sources and gases included in the project boundary are described in Table as below:

Source		GHG	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel-fired power plants connected into the NCPG that is displaced due to the project activity.	CO_2	Yes	Main emission sources
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.
Project activity	Project emission	CO_2	No	The project is a wind power project. Project emissions should not be considered according to ACM0002.
		CH_4	No	
		N_2O	No	

In line with the methodology, the only GHG accounted for in the calculation of the emission reductions is CO_2. The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the proposed CDM project power plant is connected to, Northeast China Power Grid is defined as the proposed project electricity system. According to the *Tool to calculate the emission factor for an electricity system* (Version 07.0), 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. Since Chinese DNA has published a delineation of the project electricity system and connected electricity systems. According to the delineations published by Chinese DNA[2], the NEPG includes the Jilin, Liaoning, Heilongjiang Power Grids. And the proposed project will be connected to Liaoning Power Grid which is part of the NEPG. Therefore, the NEPG has been selected as the relevant electricity system.The project site includes the power plant, turbines themselves and auxiliary electric equipments that are used to support the turbines operation. The proposed project is connected to the Northeast China Power Grid. Therefore, the Northeast China Power Grid including all power plants connected is selected as the project boundary.

The flow diagram of the project boundary is illustrated as follow:

[2] Source: 2017 Baseline Emission Factors for Regional Power Grids in China
http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/201812/P020181220579925103092.pdf



B.4. Establishment and description of baseline scenario

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The project 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 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 20.0) 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 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 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 electricity generation is still mainly produced by fossil fuel power plants in NCPG in recent 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, as determined in the renewal CDM-PDD, 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 renewal CDM-PDD, the baseline scenario is that the electricity delivered to the grid by the project 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 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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The key methodological steps are as follows:

1. Calculating the Baseline Emission (*BEy*)
2. Calculating the Project Emission (*PEy*)
3. Calculating the Leakage Emission (*LEy*)
4. Calculating the Emission Reduction (*ERy*)

1. Calculating the Baseline emissions

The baseline emissions (*BEy*) is the product of the baseline emissions factor ($EF_{grid,CM,y}$ in tCO_2e/MWh) calculated, times the electricity supplied by the project activity to the grid ($EG_{PJ,y}$ in MWh), as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad (1)$$

BE_y = Baseline emissions in year *y* (tCO_2 /yr)
$EG_{PJ,y}$ = 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)
$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for the project electricity system in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".

1.1 Calculation of the baseline emissions factor

Following ACM0002, the baseline emission factor *(EF_y)* is calculated as a combined margin ($EF_{grid,CM}$), consisting of the combination of operating margin ($EF_{grid,OM}$,) and build margin ($EF_{grid,BM}$,) factors according to the following seven steps defined in the "Tool to calculate the emission factor for an electricity system" (version 07.0). Data for the calculations are based on official national statistics books: China Energy Statistical Yearbook and China Electric Power Yearbook.

The key methodological steps according to the "Tool to calculate the emission factor for an electricity system" are:

STEP 1. Identify the relevant electricity systems.
STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).
STEP 3. Select a method to determine the operating margin (OM).
STEP 4. Calculate the operating margin emission factor according to the selected method.
STEP 5. Calculate the build margin (BM) emission factor;
STEP 6. Calculate the combined margin (CM) emissions factor.

Step 1. Identify the relevant electricity system

According to the *Tool to calculate the emission factor for an electricity system* (Version 07.0), 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.

Since Chinese DNA has published a delineation of the project electricity system and connected electricity systems. According to the delineations published by Chinese DNA[3], the NEPG includes the Jilin, Liaoning, Heilongjiang Power Grids. And the proposed project will be connected to Liaoning Power Grid which is part of the NEPG. Therefore, the NEPG has been selected as the relevant electricity system.

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

Two options are provided in the "Tool to calculate the emission factor for an electricity system" 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.

In China, off – grid plants are not significant as electricity grids under government control are dominant power supplier. Therefore, option I is chosen for operating margin and build margin emission factor calculation.

Step 3. Select 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, which are described under Step 4:

(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch Data Analysis OM, or
(d) Average OM.

According to the "Tool to calculate the emission factor for an electricity system" (version 07.0), the Simple OM method is applicable to the project if the low-cost resources constitute less than 50% of

[3] Source: 2017 Baseline Emission Factors for Regional Power Grids in China
http://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/201812/P020181220579925103092.pdf

total grid generation on average in the five most recent years or based on long-term averages for hydroelectric production.

The share of low-cost/must-run generation in NEPG is less than 50% of total grid generation in average of the five most recent years. The Simple OM method, therefore, is selected to calculate the Operating Margin emission factor of the proposed project.

The Simple OM can be calculated using either of the two following data vintages for years(s) y:
• (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, without requirement to monitor and recalculate the emissions factor during the crediting period, or
• (Ex-post option): If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emission factor to be updated annually during monitoring.

Here ex-ante vintage is chosen, and the $EF_{grid,OM}$ is fixed during the second crediting period.

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

(a) Simple OM

The Simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2e/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units.

The simple OM may be calculated by one of the following two 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:
(i) The necessary data for Option A is not available; and
(ii) 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
(iii) 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:

(i) The necessary data for Option A is not available, as indicated in the calculations of the DNA; and
(ii) 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 Option I is chosen in Step 2.

For the proposed project activity, the required data for the exercise of Option A is not available and those of Option B can be obtained from official sources, and also nuclear and renewable power generation are considered as low-cost / must-run power sources. Besides, off-grid power plants are not included in the calculation. Therefore, Option B is chosen to calculate the operating margin emission factor:

For Option B, 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.

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

Under this option, 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:

$$EF_{grid,OMsimple,y} = \frac{\sum_i FC_{i,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{EG_y} \quad (2)$$

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO_2 emission factor in year *y* (tCO_2e/MWh)
$FC_{i,y}$	=	Amount of fossil fuel type *i* consumed in the project electricity system in year *y* (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ / mass or volume unit)
$EF_{CO2,i,y}$	=	CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2e/GJ)
$EG_{PJ,y}$	=	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 fossil 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

Regarding parameter selection, local values of $NCV_{i,y}$ and $EF_{CO2,i,y}$ should be used where available. If no such values are available, IPCC world-wide default values are preferable. The Net Calorific Value ($NCV_{i,y}$) of each type of fossil fuel used in the calculation comes from China Energy Statistic Yearbook 2014-2016. Emission factors ($EF_{CO2,i,y}$) of each type of fossil fuel come from IPCC 2006 default values.

On the basis of the data available, the three-year (2014-2016) average operating margin emission factor is calculated by the DNA as a full-generation-weighted average of the emission factors:

$EF_{grid,OM,simple}$ = 1.1082 tCO_2e/MWh

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

In terms of vintage of data, project participants can choose between option 1 ex-ante, and option 2 ex-post data vintages. The project proponents have chosen to use the ex-ante option, and $EF_{grid,BM,y}$ is fixed for the duration of the second crediting period.

Option 1. For the second crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. This option does not require monitoring the emission factor during the crediting period.

The build margin emission factor is the generation-weighted average emission factor (tCO_2e/MWh) of all power units *m* during the most recent year *y* for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}} \quad (3)$$

Where:

$EF_{grid,BM,y}$	=	Build margin CO_2 emission factor in year *y* (tCO_2e/MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
$EF_{EL,m,y}$	=	CO_2 emission factor of power unit *m* in year *y* (tCO_2e/MWh)
m	=	Power units included in the build margin
y	=	Most recent historical year for which electricity generation data is available

Currently, it is very difficult to get the capacity margin data of power plants in China, since these data as well as net quantity of electricity generated and delivered to the grid and fuel consumption data in power unit *m* are regarded as commercial secrets or only for internal usage. Then the following deviation[4] approved by the EB was adopted to calculate the Build Margin emission factor.

According to the guidance from the CDM Executive Board for a deviation of the baseline methodology of AM0005, which had combined into the baseline methodology of ACM0002, the following deviation was adopted to calculate the Build Margin emission factor.

1) Use the efficiency level of the best technologies commercially available in the provincial/regional or national grid of China, as a conservative proxy, for fuel *i* consumption estimation to estimate the $EF_{grid,BM,y}$.

2) Use capacity additions during last several years for estimating the $EF_{grid,BM,y}$, i.e. the capacity addition over last several years, whichever results in a capacity addition that is closest to 20% of total installed capacity. For the proposed project, the data from Year 2014 to 2016 is used to calculate $EF_{grid,BM,y}$

3) Use installed capacity to replace annual power generation to estimate weights.

The BM emission factor in this PDD is calculated as following sub-steps.

Sub-step 1. Calculation of weights of CO_2 emissions of solid, liquid and gaseous fossil fuels in total emissions for power generation

$$\lambda_{Coal,y} = \frac{\sum_{i \in COAL, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \quad (4)$$

$$\lambda_{Oil,y} = \frac{\sum_{i \in OIL, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \quad (5)$$

$$\lambda_{Gas,y} = \frac{\sum_{i \in GAS, j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}}{\sum_{i,j} FC_{i,j,y} \times NCV_{i,y} \times EF_{CO_2,i,y}} \quad (6)$$

[4] Source: http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_QEJWJEF3CFBP1OZAK6V5YXPQK

Where:

$FC_{i,j,y}$ = Amount of fossil fuel type *i* consumed in province *j* in year *y* (mass or volume unit)

$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type *i* in year *y* (GJ/t or GJ/m^3)

$EF_{CO2,i,y}$ = CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2e/GJ)

Coal, *Oil* and *Gas* refer to the group of solid, liquid, and gaseous fossil fuels, respectively.

Sub-step 2: Calculation of Emission Factor of Relevant Thermal Power

$$EF_{Thermal,y} = \lambda_{Coal,y} \times EF_{Coal,Adv,y} + \lambda_{Oil,y} \times EF_{Oil,Adv,y} + \lambda_{Gas,y} \times EF_{Gas,Adv,y} \quad (7)$$

Where:
$EF_{Coal,Adv}$, $EF_{Oil,Adv}$ and $EF_{Gas,Adv}$ refer to the emission factors representing best technologies commercially available for coal, oil and gas fired power plants, respectively.

Sub-step 3: Calculation of BM of the Grid
Using the share of different type of capacity in total capacity addition as weight, the weighted average of emission factors of different type capacity is calculated as the Build Margin emission factor $EF_{grid,BM,y}$ of NEPG.

$$EF_{grid,BM,y} = \frac{CAP_{Thermal,y}}{CAP_{Total,y}} \times EF_{Thermal,y} \quad (8)$$

Where:
CAP_{Total} = The total newly added electricity generation capacity (MW)
$CAP_{Thermal}$ = The newly added electricity generation capacity of thermal power (MW)

Following the four steps above, the build margin emission factor $EF_{grid,BM,y}$ of the NEPG is calculated by DNA to be: 0.3310 tCO_2e/MWh.

Step 6. Calculate the combined margin emission factor
The baseline emissions factor (EF_{CM}) is calculated as the weighted average of the Operating Margin emission factor and Build Margin emission factors following ACM0002. For wind projects, the default weights are as follows: w_{OM} = 0.75 and w_{BM} = 0.25:

$$EF_{grid,CM,y} = w_{OM} \times EF_{grid,OM,y} + w_{BM} \times EF_{grid,BM,y} \quad (9)$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (tCO_2e/MWh)

$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year *y* (tCO_2e/MWh)

w_{OM} = Weighting of operating margin emissions factor (%)

w_{BM} = Weighting of build margin emissions factor (%)

On the basis of these weights for the second crediting period, the combined margin emission factor is calculated, and fixed ex-ante:

$EF_{grid,CM,y}$ = 0.9139 tCO_2e/MWh

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

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

Where:

BE_y = Baseline emissions in year *y* (tCO_2 /yr)

$EG_{PJ,y}$ = 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)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for the project electricity system in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".

Calculation of $EG_{PJ,y}$

The proposed project 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, then:

$EG_{PJ,y} = EG_{facility,y}$

where:

$EG_{PJ,y}$ = 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)

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

2 Calculating the Project Emission (*PEy*)

According to ACM0002 (version 20.0), project emission of the proposed wind farm project is zero.

$PE_y = 0$

3 Calculating the Leakage Emission (*LEy*)

According to ACM0002 (version 20.0), no leakage is considered for the proposed wind farm project.

$LE_y = 0$.

4 Calculating the Emission Reduction (*ERy*)

The annual emission reductions ER_y for the project activity are calculated as the baseline emissions minus the project emissions and minus the leakage emissions. Being the project of a zero-emission activity the final GHG emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (10)$$

Where:

ER_y = Emission reductions in year *y* (tCO_2e/year)

BE_y = Baseline emissions in year *y* (tCO_2e /year)

PE_y = Project emissions in year *y* (tCO_2e year)

LE_y = Leakage emissions in year *y* (tCO_2e year)

B.6.2. Data and parameters fixed ex ante

Data/Parameter	ω_{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	ω_{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	$EF_{grid,OM,y}$
Data unit	tCO_2/MWh
Description	Simple operating margin CO_2 emission factor in year y
Source of data	2017 Baseline Emission Factors for Regional Power Grid in China
Value(s) applied	1.1082
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	2017 Baseline Emission Factors for Regional Power Grid in China
Value(s) applied	0.3310
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

>>

Based on the Feasible Study Report, the net power generation of this proposed project will be 112,241.7 MWh annually. The emission reduction ER_y by the project activity in a given year y is calculated as follows

$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$= 112,241.7MWh × 0.9139 tCO_2e/MWh = 102,577 tCO_2e

$ER_y = BE_y - PE_y - LE_y$ =102,577 - 0 -0=102,577 tCO_2e

The proposed project activity is expected to achieve 718,039 tCO_2e of net emission reductions during the second 7-year crediting period.

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)
31/12/2019-30/12/2020	102,577	0	0	102,577
31/12/2020-30/12/2021	102,577	0	0	102,577
31/12/2021-30/12/2022	102,577	0	0	102,577
31/12/2022-30/12/2023	102,577	0	0	102,577
31/12/2023-30/12/2024	102,577	0	0	102,577
31/12/2024-30/12/2025	102,577	0	0	102,577
31/12/2025-30/12/2026	102,577	0	0	102,577
Total	718,039	0	0	718,039
Total number of crediting years	3*7year			
Annual average over the crediting period	102,577	0	0	102,577

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{export,y}$
Data unit	MWh
Description	Electricity supplied by the project activity to the grid in year y.
Source of data	Meter readings at the project activity site.
Value(s) applied	112,241.7
Measurement methods and procedures	The data will be monitored by a gateway meter (M1) and a backup meter (M2). The meters will be installed at the substation. The accuracy of the meters is at least 0.5s. The monitoring data will be recorded by the project owner and the grid company.
Monitoring frequency	Continuously measurement and monthly recording
QA/QC procedures	The metering equipments will be calibrated by a qualified Meter Calibration Organization once a year according to the management standard. Power supplied to the grid will be double checked according to electricity sales receipts. Data will be archived for 2 years following the end of the last crediting period.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	$EG_{import,y}$

Data unit	MWh
Description	Electricity imported from the grid by the proposed project during year *y*
Source of data	Meter readings at the project activity site.
Value(s) applied	0
Measurement methods and procedures	The data will be monitored by a gateway meter (M1) and a backup meter (M2). The meters will be installed the substation. The accuracy of the meters is at least 0.5s. The monitoring data will be recorded by the project owner and the grid company.
Monitoring frequency	Continuously measurement and monthly recording
QA/QC procedures	The metering equipments will be calibrated by a qualified Meter Calibration Organization once a year according to the management standard. Power imported from the grid will be double checked according to electricity sales receipts. Data will be archived for 2 years following the end of the last crediting period.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data/Parameter	$EG_{fancility,\ y}$
Data unit	MWh/yr
Description	Quantity of net electricity generation supplied to the Grid by the project activity in year y.
Source of data	Calculated by $EG_{export,y}$ minus $EG_{import,y}$
Value(s) applied	In this PDD, the net electricity delivered to the Grid 112,241.7 MWh is applied.
Measurement methods and procedures	The net electricity supplied to the Grid by the proposed project will be calculated through electricity supplied by the project to the grid ($EG_{export,y}$) minus electricity purchased from the grid ($EG_{import,y}$).
Monitoring frequency	Continuously measurement and monthly recording
QA/QC procedures	Power supplied to the grid will be checked by internal verification procedure and electricity sales receipts. Data will be archived for 2 years following the end of the crediting period
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.7.2. Sampling plan

>>
NA

B.7.3. Other elements of monitoring plan

>>
The proposed project adopts the approved consolidated monitoring methodology ACM0002 “Consolidated monitoring methodology for grid-connected electricity generation from renewable sources” (version 20.0) to determine the emission reductions from the net electricity generation from the wind farm. This plan describes in more detail the process.

1. Monitoring Object

The monitoring is to justify the realistic amount of emission reduction from the CDM project. The monitoring plan will provide credible, accurate, transparent and conservative monitoring data and ensure the real, measurable, long-term GHG emission reduction from this project.

2. Management Structure

Dalian Changxingdao CGN Wind Power Co., Ltd., the owner of the proposed project, will use this document as guideline in monitoring of the project emission reduction performance and will adhere

to the guidelines set out in this monitoring plan to ensure that the monitoring is credible, transparent and conservative.

The responsibilities of the project staff are as follow:

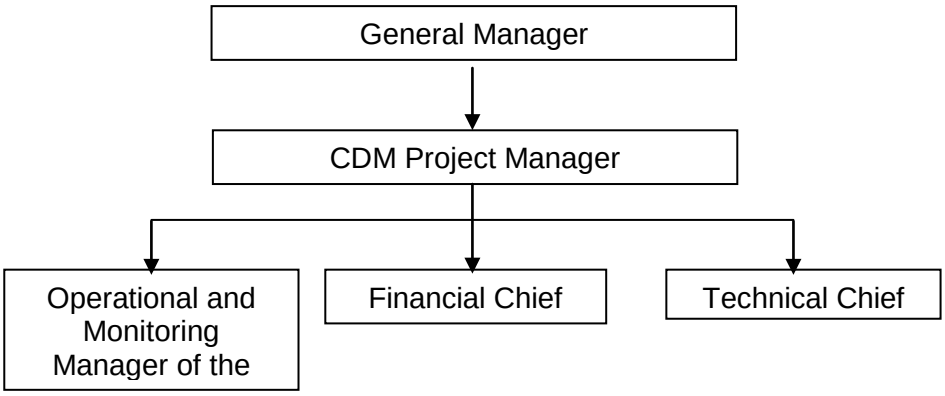
General Manager: To be responsible for supervising the whole monitoring procedure.

CDM Project Manager: To be responsible for data management and compiling monitoring report.

Operational and monitoring manager: To be responsible for collecting data and do internal audit.

Financial chief: To be responsible for collection of sales receipts.

Technical chief: To be responsible for preparing operational reports of the project activity, recording the daily operation of the wind farm, including operating periods, equipment defects, etc.



3. Monitoring Equipments

Electricity supplied by the proposed project will be monitored through the bi-directional electricity meter. Both electricity supplied to the grid by the project activity and the electricity imported from the grid to the project site will be monitored by the meters.

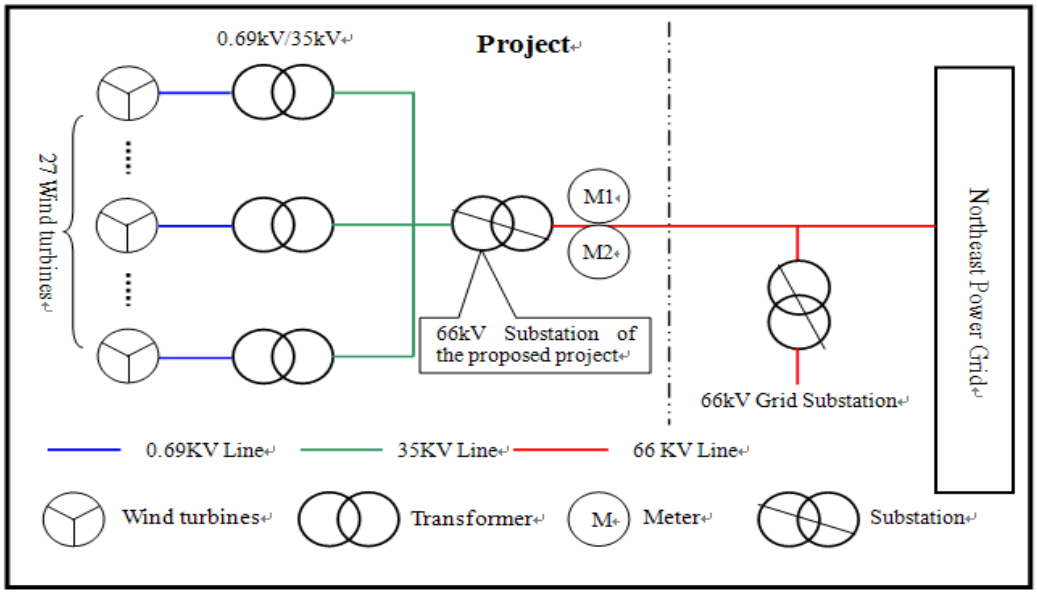
The proposed project will set up a main transformer in a 66 kV Substation at the project site. The wind power generated will be switched through a 66 kV Substation at the project site, and then connected to the new-built 220kV Grid Substation, then transmitted to the Northeast China Power Grid finally. But due to construction of the 220kV Grid Substation has not yet completed, therefore, the proposed project will connect to the outlet side of 66kV Grid Substation temporarily and then transmitted to the Northeast China Power Grid. Once the 220kV Grid Substation established, the proposed project will connect to the 220kV Grid Substation through a 66kV substation at the project site and then transmitted to the Northeast China Power Grid.

For the Temporary Plan:

The gateway meter (hereafter referred as the meter M1) and a backup meter (hereafter referred as the meter M2) will be installed at the high volt side of the 66kV Substation on the project site. The electricity generated by the proposed project will be connected to the outlet side of the 66kV Grid Substation and then transmitted to the Northeast China Power Grid. The to-grid and from-grid electricity will be cross-checked with the electricity receipts. The precision of the meters is at least 0.5s.

The receipts of the electricity supplied to the grid by this proposed project and the electricity imported from the grid will be issued based on the power purchase agreement (PPA) signed between the project entity and the power grid company and the readings from the gateway meter (M1). The net generation is calculated as exports minus imports.

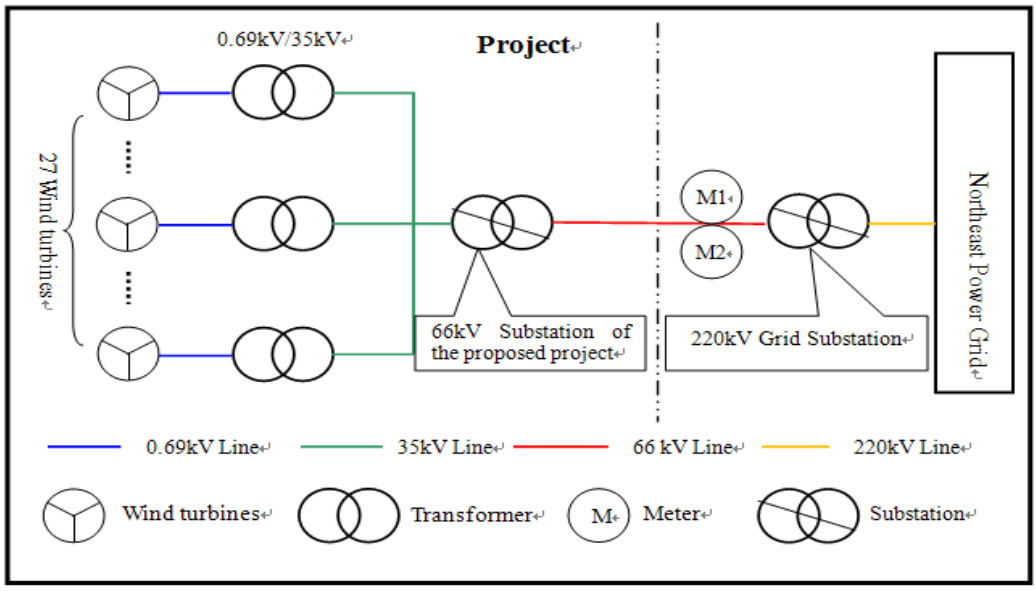
A diagram of the temporary plan shows how parameters are monitored is presented as follows:



For the Final Plan:
When the 220kV Grid Substation established, the proposed project will connect to the 220kV Grid Substation. And the gateway meter (hereafter referred as the meter M1) and a backup meter (hereafter referred as the meter M2) will be installed at the low volt side of the 220kV Grid Substation. The electricity generated by the proposed project will be connected to the grid through the 220kV Grid Substation. The to-grid and from-grid electricity will be cross-checked with the electricity receipts. The precision of the meters is at least 0.5s.

The receipts of the electricity supplied to the grid by this proposed project and the electricity imported from the grid will be issued based on the power purchase agreement (PPA) signed between the project entity and the power grid company and the readings from the gateway meter (M1). The net generation is calculated as exports minus imports.

A diagram of the final plan shows how parameters are monitored is presented as follows:



The metering equipment are calibrated and checked for accuracy so that the metering equipment shall have sufficient accuracy within the agreed limits. The metering equipments are calibrated and

checked annually by qualified third party for accuracy. The records will be supplied to the wind farm operator, and maintained by the operator.

If any error is 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.

4. Monitoring procedure

The electricity supplied to the grid and the electricity imported from the grid will base on the meter installed at project site. The receipts of the electricity supplied to the power grid by this proposed project and the electricity imported from the power grid will be issued based on the power purchase agreement (PPA) signed between the project entity and the power grid company and the readings from the metering equipment.

The net generation is calculated as exports minus imports. The electricity exchanged between the proposed project and NEPG via the Grid Substation is cross-checked by the project owner and the grid company, the metered values of electricity exported and imported will confirmed by the two sides.

5. Quality Assurance and Quality Control

The workers are trained to be competent and the metering equipments are calibrated and sealed as per the industry practices at regular intervals, with the purpose to provide credible, accurate, transparent and conservative monitoring data and ensure the real, measurable, long-term GHG emission reduction from this project.

Monthly net on-grid electricity supplied data will be approved and signed off by the Manager before it is accepted and stored. This audit will check compliance with monitoring procedures in this monitoring plan. This internal audit will also identify potential improvements to procedures to improve monitoring and reporting in future years. The monitoring officers will also attend a training session organized by the CDM consultant. The purpose of training is to assure those staffs are competent to conduct the monitoring plan, thus to make the monitored data accurate.

Emergency Procedure:

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

In case metering equipment is damaged: The project entity and the grid company will jointly calculate a conservative estimate of power supplied to the grid. A statement will be prepared indicating

- ► the background to the damage to metering equipment
- ► the assumptions used to estimate net supply to the grid for the days for which no record could be recorded
- ► the estimation net electricity generation supplied to the grid. The statement will be signed by both a representative of the project entity as well as a representative of the grid company.

The project entity will furthermore document all efforts taken to restore normal monitoring procedures.

6. Data Management System

The CDM manual sets out the procedures for tracking information from the primary source to the end-data calculations in paper document format. Physical documentation such as paper-based maps, diagrams and environmental assessment will be collated in a central place, together with this monitoring plan. In order to facilitate auditors' reference of relevant literature relating to the proposed project activity, the project material and monitoring results will be made available.

At the end of each month, the monitoring data will be filed in a spreadsheet and stored electronically, and the paper-based printout should be also archived. Furthermore, the project owner collects the sales receipts for the electricity supplied to the grid as a cross-check, and

compiled the monitoring report including the monitoring data and relevant evidence at the end of each crediting year.

All the data will be kept for two years following the end of the last crediting period.

7. Monitoring Report

The monitoring report is prepared by the CDM project manager alone or with designated third party. The project developer and/or the designated third party have to make sure that the format and content of the monitoring report are consistent with the monitoring methodology in the registered PDD.

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

>>

15/08/2010 (Substation Construction and Installation Contract signed date, which is considered as the earliest date of the proposed project)

C.2. Expected operational lifetime of project activity

>>

20 years 0 month

C.3. Crediting period of project activity

C.3.1. Type of crediting period

>>

Renewable (the second period)

C.3.2. Start date of crediting period

>>

31/12/2019

C.3.3. Duration of crediting period

>>

7 years 0 months

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>

The environmental impact assessment report for this project was approved by Dalian Environmental Protection Bureau on 28th December 2009. A summary of conclusion of the report is illustrated as below:

Ambient air

The impact on ambient air quality of the proposed project is mainly from dust during construction stage. The excavation work is the primary emission source, however, it is a ground source and the particle size is quite large so that dust will deposit quickly on the ground. Immediately replant the areas where construction has completed, and by sprinkling water frequently and timely clearing can reduce the dust pollution. When the project is in operational period, there will be no air pollutions. In conclusion, the proposed project will not pose any threat on the quality of ambient air.

Impact from noise

There is some noise caused by operation of equipments. However, the location arrangement of wind turbines is serious considered to avoid adverse influence to the residents. The distance between the proposed project and local residents is longer than 500m, which will reach the National Standard through range attenuation. Hence, the noise will not impact the work and daily life of local residents.

Electromagnetic impact
The electromagnetic pollution generated from operation of the wind blades has limited effect, whereas no wireless communication facilities exist within, so the electronic magnetic pollution to the surrounding environment is insignificant.

Impact from Solid waste
There is mainly some waste of stone, bricks or domestic waste in the construction stage and basically no solid waste in the operational period. Solid waste will be collected and handled properly. Hence, it will not result any environmental impact.

Impact from Wastewater
There is mainly domestic wastewater with fairly small quantities in construction stage, and primary treatment methods will be first applied, small-scale septic tanks should be built on the site, through which the wastewater can finally reuse after treatment. Therefore, the impact of wastewater is limited and mitigated.

Impact on ecological environment
The proposed project will both permanently and temporarily occupy some land (mostly farmland), the temporarily occupied land will be ecologically restored for original use. Such restoration measures will include land re-surfacing, re-vegetation, and etc. As for the permanently occupied land, ecological compensation measures will be applied to the adjacent area to offset the impact on ecosystem.

There are some migrating birds in the project field during Spring and Autumn, but the proposed project field is not the stop field of the migrating birds and flight altitude of the migrating birds is higher than the altitude of the wind turbines. Therefore, the project construction will not influence the migration of birds.

D.2. Environmental impact assessment

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The Project use clean renewable energy to generate electricity whose environmental impact comply with relevant environmental laws and regulations in the host country. The environmental impacts of the proposed project are not considered significant.

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

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In July 2010, the staff from the project owner held a local stakeholder consultation meeting to discuss the environment impact and the CDM progress of the proposed project primarily with the stakeholders and sent out the questionnaires to the surrounding area of the proposed project for the comments of the proposed project construction. The staff from the project owner sent out 50 copies of questionnaire in a random way, 46 pieces of reply were received. Among the interviewees, 20 of them have educational level of middle school, 15 of high school, 6 of technical secondary school and 5 of collage; 31 of them are farmers, 15 of them are workers.

The questions regarding the proposed project were mainly as follows:

How do you think the general condition of the local environmental quality?

Do you currently experience electromagnetic interference when watching TV at home?
Are there any negative impacts of the proposed project on the everyday life of local residents?
Is the proposed project going to help improve the living and/or working environment?
How the proposed project impact the acoustic environment (noise) quality?
Which is the environmental topic that concerns you the most during the construction and operation of the proposed project?
Do you support the proposed project?

E.2. Summary of comments received

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The summary of questionnaire survey is listed as the following:

- 29 (63%) of them think the local environmental quality is very well, 16 (35%) of them think it is general, and the remainder is unsure;
- 43 (93%) of them currently do not experience electromagnetic interference when watching TV at home, 1 (2%) of them thinks it is not well, and the remainder is unsure;
- 43 (93%) of them think there will not be any negative impacts on their everyday life, and the remainder is unsure;
- 30 (65%) of them think the proposed project will help improve their living and/or working environment, 6 (13%) of them think it will not help improve their living, and the remainder is unsure;
- 37 (80%) of them are unsure whether the proposed project will make noise, and the remainder think it will not make noise;
- Regarding the construction and operation of the propose project, 32 (70%) of them are most concerned with electromagnetic interference, 11 (24%) of them are most concerned with the noise level, and 3 (6%) of them are most concerned with wastewater from the project;
- 32 (70%) of them support the implementation of the proposed project, and the remainder is unsure.

The summary of local stakeholders meeting:
The local community possesses basically positive comments on the effects of the proposed project. The interviewees considered that local social, economic and environmental development would be beneficial from the proposed project. The response was overall supportive to the project implementation.

E.3. Consideration of comments received

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During the survey local residents support the propose project as they showed in the questionnaires. Some people express their concerns about the negative impacts of the project, but they don't think it is serious. About the environment impacts of the project, the requirements in the EIA report will be strictly conducted by the project owner and be supervised by the municipal environmental protection bureau. Therefore, the proposed project can be carried out as planned.

SECTION F. Approval and authorization

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The letter of approval (LoA) from DNA of China was issued on 13/06/2011, which has been provided to the DOE for validation.
Reference:

https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1322203633.02/view

The letter of approval (LoA) from DNA of Germany was issued on 20/02/2019, which has been provided to the DOE for validation.
Reference:
https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1322203633.02/view

Appendix 1. Contact information of project participants

Organization name	Dalian Changxingdao CGN Wind Power Co., Ltd.
Country	P.R.China.
Address	No.2 Building, Area 12 of Advanced Business Park, No.188 West of South 4th Ring Road.
Telephone	+86 (0)10 6370 5765
Fax	+86 (0)10 6370 5875
E-mail	cgnwind@163.com
Website	-
Contact person	Shi Lei

Organization name	Statkraft Markets GmbH
Country	Germany
Address	Derendorfer Allee 2a, 40476, Düsseldorf
Telephone	+31 (0)20 795 7842, +31 (0)650 690 312
Fax	+31 (0)20 795 7899
E-mail	peter.sprengers@statkraft.com
Website	/
Contact person	Peter Sprengers

Appendix 2. Affirmation regarding public funding

There is no public funding for CGN Dalian Xizhongdao Wind Farm Project.

Appendix 3. Applicability of methodologies and standardized baselines

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

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

NA

Appendix 5. Further background information on monitoring plan

NA

Appendix 6. Summary report of comments received from local stakeholders

There is no comments received for CGN Dalian Xizhongdao Wind Farm Project.

Appendix 7. Summary of post-registration changes

The project was registered on 29/12/2011. The start date of the first crediting period was changed from 01/01/2012 to 31/12/2012.

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Document information

Version	*Date*	*Description*
11.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
10.1	28 June 2017	Revision to make editorial improvement.
10.0	7 June 2017	Revision to: • Improve consistency with the "CDM project standard for project activities" and with the PoA-DD and CPA-DD forms; • Make editorial improvement.
09.0	24 May 2017	Revision to: • Ensure consistency with the "CDM project standard for project activities" (CDM-EB93-A04-STAN) (version 01.0); • Incorporate the "Project design document form for small-scale CDM project activities" (CDM-SSC-PDD-FORM); • Make editorial improvement.
08.0	22 July 2016	EB 90, Annex 1 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revision to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Make editorial improvement.

Version	*Date*	*Description*
05.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1; • Change the reference number from F-CDM-PDD to CDM-PDD-FORM; • Make editorial improvement.
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.
04.0	13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for CDM project activities” (EB 66, Annex 8).
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.

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