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Gold Standard for the Global Goals
Key Project Information & Project Design Document (PDD)

Gold Standard for the **Global Goals**

Version 1.1 – August 2017

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KEY PROJECT INFORMATION

Title of Project:	West Huaybong 3 wind farm project
Brief description of Project:	The activity involves installation of large scale commercial wind farm in Thailand to supply clean renewable electricity to the Thailand grid. The scenario existing prior to the start of the project, which is the same as the baseline scenario, is the supply of electricity from power plants connected to the grid. The project will consist of 45 turbines 2.3 MW capacity which the total installed capacity of 103.5 MW.
Expected Implementation Date: Expected duration of Project:	14/11/2012 (Commissioning date) 25 years
Project Developer:	First Korat Wind Company Limited
Project Representative:	Kosher Climate India Private Limited
Project Participants and any communities involved:	First Korat Wind Company Limited Kosher Climate India Private Limited
Version of PDD: Date of Version:	02 01/06/2020
Host Country / Location:	Thailand
Certification Pathway (Project Certification /Impact Statements & Products	Impact Statements & Products
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG
Methodologies applied:	ACM0002: Consolidated baseline methodology for grid-connected electricity generation from renewable sources, Version 20
Product Requirements applied:	NA
Regular/Retroactive:	Retroactive
SDG Impacts:	• SDG3 -Good Health and Well-Being • SDG 7 -Affordable and Clean Energy • SDG 8 -Decent Work and Economic Growth • SDG 13 -Climate Action
Estimated amount of SDG Impact Certified	SDG 3: 1 community development activity undertaken/yr SDG 7: 232,500 MWh electricity generation/yr SDG 8: 2 Trainings for staffs/yr 40 number of jobs SDG 13: 132,339 tCO_2e emission reduction/yr

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SECTION A.   Description of project

A.1.   Purpose and general description of project

The purpose of the First Korat Wind Company with this project activity is to construct a large scale commercial wind farm in Thailand to supply clean renewable electricity to the Thailand grid. The scenario existing prior to the start of the project, which is the same as the baseline scenario, is the supply of electricity from power plants connected to the grid. The project will consist of 45 turbines 2.3 MW capacity which the total installed capacity of 103.5 MW. A wind resource and energy yield assessment performed at the project site predicts that it will yield an annual electricity production of 232.5 GWh.

It shall be noted that the project is already registered under CDM and the registration details are given below:

Project title: West Huaybong 3 wind farm project

Reference number: 7474

Registration Date: 29/10/2012

Crediting period: 01/12/2020 – 30/11/2019

We blink: https://cdm.unfccc.int/Projects/DB/RWTUV1348727249.16/view

Now PP is applying same for Gold Standard registration.

Location:

The West Huaybong 3 wind farm project is located in Nakhon Ratchasima Province in the northeast of Thailand.

How the proposed activity reduces GHG emissions

The project generates electrical energy through sustainable means without causing any negative impact on environment. Use of renewable sources for power generation contributes to mitigation of greenhouse gases emissions. Since wind power is Greenhouse Gas (GHG) emissions free, the power generated will prevent the anthropogenic gas emissions generated by fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas. Hence, the generation by the proposed activity is non-GHG source and thus reduces the proportion of fossil fuel based generation in the grid leading to lesser carbon intensive grid.

Scenario existing prior to the implementation of project activity:

There was no activity at the site prior to implementation of the project activity. Hence the scenario existing prior to the project activity is same as baseline scenario which is continual use of highly carbon intensive electricity in the Thailand national grid.

Baseline Scenario:

As the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following as per applied 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". Hence, pre-project scenario and baseline scenario are the same.

Estimated emission reduction:

The project is already registered under CDM (UNFCCC Ref No: 7474[2]). As per the CDM registered PDD, the estimation of GHG reductions by this project is limited to carbon dioxide (CO_2) only. Thus the project activity leads to an emission reduction of 165,333 **tCO_2** for the chosen crediting period of 1 year 3 months

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[2] https://cdm.unfccc.int/Projects/DB/RWTUV1348727249.16/view

(to be consistent with CDM 1st crediting period end) with the annual average emission reduction of **132,339 tCO₂e**.

Sustainable Development

The project activity will contribute to the sustainable development of Thailand by producing clean renewable electricity for use in the Thailand grid. The project will create jobs associated with site construction of the turbine towers, site facilities and access roads. At the time of submission there were no examples of large scale wind farms functioning in Thailand. The project will be an example of technology transfer because it will utilise imported wind turbines purchased from Siemens Wind Power A/S, a company incorporated in Denmark. The wind turbine supplier will provide training in concepts relevant to the equipment, systems and maintenance. The project is committed to engagement with all local stakeholders and as such a local stakeholder consultation meeting was organised to enable stakeholders concerns to be addressed.

A.2. Eligibility of the project under Gold Standard

The project activity is a wind power project and hence is automatically eligible for Gold Standard Certification as per the approved Gold Standard Activity Requirements.

GS eligibility		Justification
3.1.1.1 A Project type is automatically eligible for Gold Standard Certification if there are Gold Standard published Activity Requirements and/or Gold Standard Approved Methodologies associated with it or as referenced in Gold Standard Product Requirements. These are published to the Gold Standard website and shall be followed where provided for a given Project type.	**OK**	The project is a wind power generation activity which is automatically eligible under the project type category (b) of Renewable energy activity requirement[3]: "(*b) Project shall comprise of renewable energy generation units, such as photovoltaic, tidal/wave, wind, hydro, geothermal, waste to energy and renewable biomass:* • *Supplying energy to a national or a regional grid; or* • *Supplying energy to an identified consumer facility via national/regional grid through a contractual agreement such as wheeling*" The CDM approved methodology ACM0002, Version 20, is applied to the project activity.
3.1.1.2 For Project types not currently published to the Gold Standard website, the Project Developer may submit to Gold Standard for approval. This shall be done at minimum as part of the Preliminary Review, though it is recommended to engage with Gold Standard earlier to establish the criteria and requirements for approval.	*NA*	The project type is approved and published on the GS website.
3.1.1.3 Project types applying for Gold Standard approval are referred to the Gold Standard Vision and Mission. The Project Developer shall demonstrate how the Project would contribute to these and how the Gold Standard for the Global Goals Requirements would be met in their application for approval.	**OK**	The project activity is implementation wind power plant in Thailand. The project avoids CO₂ emissions that would have occurred in the absence of the project at the grid connected fossil fuel power plants. Hence the project avoids the GHG emission that is responsible for climate change.

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3   https://globalgoals.goldstandard.org/wp-content/uploads/2017/06/200-GS4GG-Renewable-Energy-Activity-Requirements-v1.1.pdf

		The monitoring process required to achieve the Global Goals, are also explained in the project document. Therefore, the project activity is in line with the GS vision of "Climate security and sustainable development for all" and GS mission, "To catalyse more ambitious climate action to achieve the Global Goals through robust standards and verified impacts".
3.1.1.4 In reviewing a new Project type for approval, Gold Standard may establish new Requirements to be met by the Project in order to achieve Gold Standard Design Certification and ongoing Project Certification. Where required, Gold Standard shall engage expert peer reviewers to establish these Requirements, at the Project Developer's expense.	**NA**	*Non-Applicable*
3.1.1.5 Gold Standard does not support Project types associated with geo-engineering or energy generated from fossil fuel or nuclear, fossil fuel switch, or any project that supports, enhances or prolongs such energy generation. In certain cases, concerning energy efficiency involving fossil fuels (for example, LPG stoves), an exception is made. This is captured in the relevant Activity Requirements, Gold Standard Approved Methodologies and/or Product Requirements.	**NA**	*Non-Applicable*

A.3. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

The Project proponent has complete rights on the environmental attributes and other products detailed in the report. The project has not pledged any of the aforesaid products to any party and does not involve any double counting.

The legal ownership of the project with the respective project proponent which can be confirmed via the following documents:
1. Commissioning Certificate
2. Power Purchase Agreement

A.4.   Location of project

A.4.1. Host Country
Thailand

A.4.2. Region/State/Province etc.
Nakhon Ratchasima Province

A.4.3. City/Town/Community etc.
Tambol Huaybong of Amphur Dan Khun Thot and Tambol Nong Wang of Amphur Teparak

A.4.4. Physical/Geographical location
The physical location of the wind farm is located within Tambol Huaybong of Amphur Dan Khun Thot and Tambol Nong Wang of Amphur Teparak, of Nakhon Ratchasima Province. Please refer to figure given below for more detail.
Nominal GPS co-ordinates for the project site are: N 15°12¨ 24.18", E 101°27¨ 38.71".
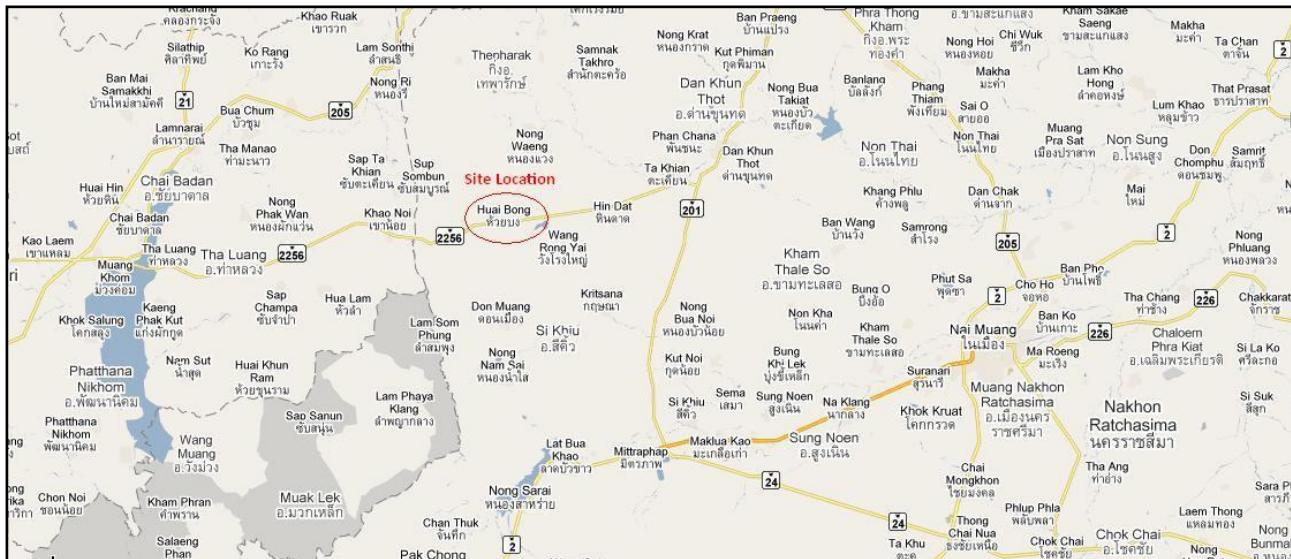
A.5. Technologies and/or measures

The West Huaybong 3 wind farm project produces renewable electricity for the Thailand national grid. Renewable electricity is generated by wind turbines exported to Thailand and installed in the North West of Nakhon Ratchasima Province. Prior to the project activity there was no equipment for generating electricity at the project site and the Thailand grid was comprised of a mixture of generation units which included fossil fuel fired power units. In the absence of the project activity, the Thailand grid would receive electricity from the existing grid-connected power plants and by the addition of new generation sources. The baseline scenario is the same as the scenario described above which existed prior to implementation of the project activity. The production of electricity in this way creates CO_2 through the combustion of fossil fuels as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system". The CO_2 emissions from these baseline power plants is the only baseline emission source identified in section B.3 of the PDD. According to data published by the Thailand Greenhouse Gas Management Organisation (TGO), the Thailand grid produces 0.5980 tCO_2e per MWh of electricity produced

The wind farm is constructed on land administered by the Agricultural Land Reform Office. The project installed 45 individual 2.3MW Siemens SWT-2.3-101 turbines, which are based on a three blade horizontal axis turbine design and have a peak co-efficient of power (cp) of 0.46. The Design Operational Life of the turbines is 20-years based on the design power curve. The planned operational life of the project is 23 years based on the assumption that the turbines will be operated beyond the technical lifetime of 20 years. A wind resource and energy yield assessment was performed at the project site which forecasts an annual electricity production of 232.5 GWh and a combined loss factor of 15.6% and a plant load factor of 25.64%. The quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity will be monitored with electricity meters located at the point of connection to the grid. The electricity meters are installed and operated in accordance with the Power Purchase Agreement (PPA) signed with the Energy Generating Authority of Thailand (EGAT). In accordance with the PPA, primary and backup export meters will be installed and the error specified by the meter manufacturer will not exceed +/- 0.2%. More details of the metering equipment are provided in section B.7. In accordance with section B.3 of the PDD, there are no project emissions associates with the project activity.

A.6. Scale of the project

The project is seeking emission reduction certification from 103.5 MW Wind Power Project. The estimated emission reduction from this project is 139,035 tCO_2/year. Since the annual estimated emission reduction is greater than 10,000 tCO_2eq, the project falls under "non-micro scale" category as per the section 1.2.3 of Renewable energy activity requirement.

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A.7. Funding sources of project

The project activity is funded by debt and equity. Debt for this project is sourced from private Bank. No public funding is involved in this project.

A.8. Assessment that project complies with 'gender sensitive' requirements

Step 1: Basic Context

<u>1M. Does the project reflect the key issues and requirements of gender-sensitive design and implementation as outlined in the gender policy? Explain how.</u>

Answer: Yes, from the pre-feasibility study stage to the operation time, from the stakeholder investigation to the employment, fair chance and gender equality to access the source, information and to reflect their opinions as a main consideration is taken by the project owner. Further, even if the customers both including suppliers and power buyer are also investigated by the project owner for gender equality issues.

<u>2M. Does the project align with existing country policies, strategies and best practices? Explain how.</u>

Answer: Thailand is one of the founding members of International Labour Organization (ILO), which formed in 1961. The country has ratified 15 ILO Conventions, one of which is the core convention related to gender inequality (C100 on equal remuneration)[4]. Also, Thailand has been a member of the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) since 1995. The implementation of the CEDAW and the Beijing Platform for Action (BPFA) have had a visible impact on the Thai's legislation in the aspects of women protection and the progress toward gender equality in the country. The legal changes that reflect gender sensitivity and women's human rights include the enactment of the Protection of Domestic Violence Victims Act (2007), the amendment made to the Penal Code to prevent women from being raped by their own spouse, and the indications of gender inequality are also implemented in the recent constitutions.

In 2015, Thailand has implemented Gender Equality Act, B.E. 2558 which Establishes the Gender Equality Promotion Committee and the Committee on Consideration of Unfair Gender Discrimination (WorLorPor). It defines the meaning of gender discrimination and sets out penalties and compensation.

Thailand is ranked 84 out of 189 countries in 2018 on its Gender Inequality Index (GII)[5]. Moreover, the Human Development Index (HDI) is for females (0.763) is on par with male (0.766), which shows the gender policies are effectively implemented in Thailand. Hence, the project implemented in Thailand complies with all the laws and policies of the gender equality as follows.

- *The project activity promotes and encourages active participation of women and men during the stakeholder meetings, giving an equal opportunity to both genders.*
- *The project provides equal employment opportunities for men and women.*
- *Equal pay for equal work is followed. No discrimination is made in the salaries of men and women.*

Hence, the project aligned with existing country policies, strategies and best practices.

Step 2: Apply Gold Standard Safeguarding Principles

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[4] ILO 2010

[5] *2018 Human Development Report (HDR),* United Nations Development Program

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3M. Does the project address the questions raised in the Gold Standard Safeguarding Principles & Requirements document? Explain how.

Answer: Yes, please see below table.

The questions raised in the Gold Standard safeguarding principles and requirements document.	Assessment	Explanation
Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?	No	The project activities are located at barren lands, in absent of the project, no specific and special resource is available for women and affect by the construction and operation of the project. And any relevant of the project activity such as work opportunity, supply act is fair and open to any quality people.
Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?	No	No evidence to show the construction of the wind project affect men and women in marginalised or vulnerable communities.
Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?	No	During the decision, designs even operation of the project activity, the project developer, employes people base on the principle of open, fair opportunity without the discrimination on men or women.
Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?	No	The project developer gives the benefit including salary, social welfare and bonus base on the workload and position and without setting any criteria to specially benefit men or women.
Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?	No	The proposed project does not increase the workload or prevent women from engaging in other activities.
Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?	No	There is no evidence to show that the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits.
Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?	No	The nature resource of the project is only wind. Whether or not to develop the proposed project, the ability of women to access, use, develop and protect natural resource is not affect or limited.
Is there a likelihood that the	No	There is no likelihood, because the

proposed Project would expose women and girls to further risks or hazards?		propose project does not change any factor which may expose women and girls to further risks or hazards. Conversely, more gender equality principle and advance knowledges from large cities will bring to the local girl or women that encourages and educates them to protect their right and mitigate the potential risks.

Step 3: Conduct Stakeholder Consultation:

<ins>4M. Does the project apply the Gold Standard Stakeholder Consultation & Engagement Procedure Requirements? Explain how.</ins>

Answer: The project is a retroactive project. However a stakeholder consultation meeting will be conducted by inviting all relevant stakeholders including the women stakeholder.

SECTION B.   Application of selected approved Gold Standard methodology

B.1.   Reference of approved methodology

Title: Grid-connected electricity generation from renewable sources

References: Approved Large Scale Consolidated Methodology: ACM0002 "Grid-connected electricity generation from renewable sources" (Version 20)[6]

ACM0002 draws upon the following tools which have been used in the PDD:
- Methodological Tool: Tool to calculate the emission factor for an electricity system - Version 7[7].

B.2.   Applicability of methodology

Large scale methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 20 is applicable to project activities that include retrofitting, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant or construction and operation of a Greenfield power plant.

The proposed project activity is a large scale grid-connected renewable power generation project that installs a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (i.e. a Greenfield plant) and it meets each of the applicability conditions of the methodology as follows:

Applicability Criteria	Applicability status
This methodology is applicable to grid-connected renewable power generation project activities that: (a) install Greenfield power plant; (b) involve a capacity addition to (an) existing plant(s); (c) involve a retrofit of (an) existing plant(s)/unit(s); (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 activity is a Green field, Thailand national grid connected renewable power plant. Therefore, it confirms to the said criteria
The methodology is applicable under the following conditions: The project activity may include renewable energy power plant/unit	The project activity is the installation of a new grid

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	connected renewable wind power project. Thus, it meets the first applicability condition
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 or 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	The proposed project activity is the installation of new wind power plants/units. Therefore, the said criteria is not applicable

In case of hydro power plants, one of the following conditions shall apply:
   (a) The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of reservoirs; or
   (b) The project activity is implemented in an 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 calculate equation (3), is greater than 4 W/m2.
   (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density of 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 4W/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/m2shall be:
      (a) Lower than or equal to 15 MW; and
      (b) Less than 10% of the total installed capacity of integrated hydro power project
	The proposed project activity is the installation of a new wind power plant/units. Therefore, the said criteria is not applicable

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 indifferent seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river,
	The proposed project activity is the installation of wind power plant/units. Therefore, the said criteria is not applicable

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tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	
The methodology is not applicable to: (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;	The proposed project activity is the installation of wind power plant/units. Therefore, the said criteria is not applicable
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".	The proposed project activity is the installation of wind power plant/unit. Therefore, the said criteria is not applicable
In addition, the above applicability conditions of the methodology, the Tool to calculate emission factor of electricity system (version 7) referred in the methodology has been justified here under:	
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 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, the conditions specified in "Appendix 2: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid 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 project activity 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 project activity is located in Thailand, 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 bio fuels is zero	The project activity is a grid connected wind power project and therefore, this criterion is not applicable for the project activity

B.3. Project boundary

As per the applied baseline and monitoring methodology ACM0002, the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project power plant is connected to.

The project boundary for the purpose of calculating project and baseline emissions consists of the physical wind farm site and the Thailand electrical grid. The only relevant emission source is the CO_2 emissions from

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electricity generation in fossil fuel fired power plants that are displaced due to the project activity. For more details refer to the table below.

For the purpose of GHG mitigation/sequestration following table shall be completed (delete if not required)

	Source	GHGs	Included?	Justification/Explanation
Baseline scenario	Emission from grid connected fossil fuel power plants	CO_2	Yes	Main emission source.
		CH_4	No	Minor emission source.
		N_2O	No	Minor emission source.
Project scenario	NA	CO_2	No	The project is a wind power project. Project emissions are not applicable according to ACM0002.
		CH_4	No	
		N_2O	No	
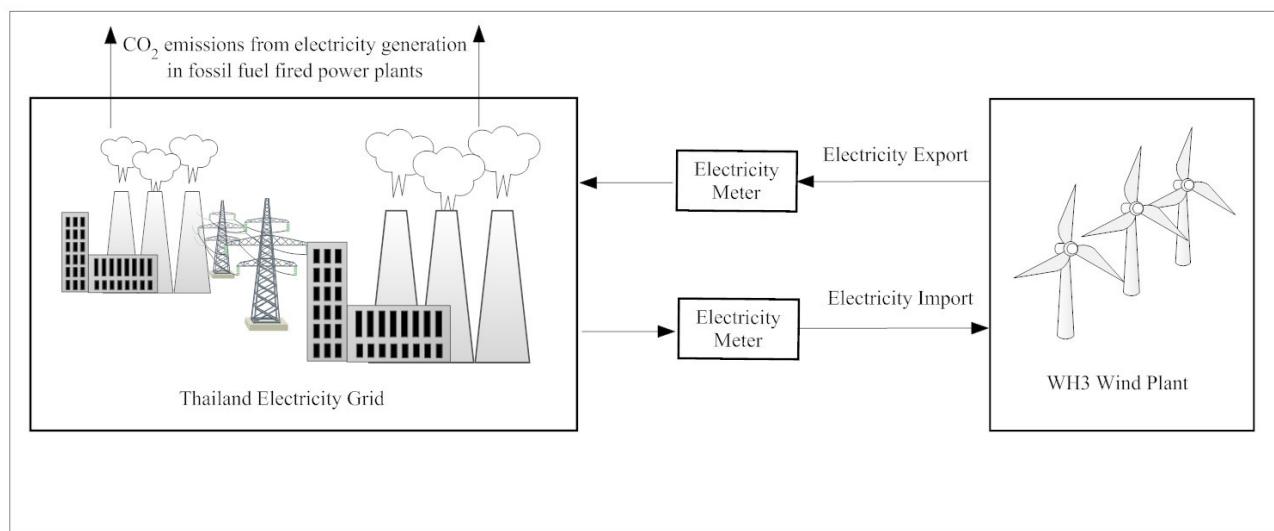
Project boundary & emission source

B.4. Establishment and description of baseline scenario

The baseline scenario is specified in ACM0002 section II. For project activities which involve the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

If the project activity is the installation of a Greenfield power plant, the baseline scenario is 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 combined margin for the Thailand grid is published by the Thailand Greenhouse Gas Management Organisation which is the DNA of Thailand.

ACM0002 also specifies a step-wise approach for identifying the baseline for project activities which involve the retrofit or replacement of existing grid-connected renewable power plant/unit(s) at the project site. The project activity is a new renewable power plant; therefore the step-wise approach is not applicable.

The "Tool for the demonstration and assessment of additionality" requires the consideration of EB guidance on national/local/sectoral policies in the calculation of financial indicators utilised for the assessment of additionality. EB22, Annex 3, specifies that national policies or regulations that give comparative advantage to less emissions-intensive technologies (E- policies) may be excluded if the national policy or regulation was implemented after 11 November 2001. Wind power projects are eligible to receive an

adder tariff in accordance with the National Energy Policy Council (NEPC) policy for „adder payments‟ which was approved by the NEPC in the third resolution of its 106th meeting (3/2006) on 4 September 20065. The Thailand adder tariff is specifically for renewable energy projects which are less carbon intensive than conventional sources of electricity and the tariff can be fully attributed to policy changes at the national level. As such, the adder tariff can be excluded.

The combined margin ($EF_{grid,CM,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM). Calculations for this combined margin must be based on data from an official source (where available) and made publically available.

The combined margin of the Thailand national grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
$EF_{grid,CM,y}$	0.5692 tCO$_2$/MWh	Combined margin CO$_2$ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Report 'Thailand Grid Emission Factor for GHG Reduction Project/Activity' dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation)[9]
$EF_{grid,OM,y}$	0.5719 tCO$_2$/MWh	Operating margin CO$_2$ emission factor for the project electricity system in year y	Calculated as the last 3 year (2014, 2015 & 2016) generation-weighted average, sourced from Report 'Thailand Grid Emission Factor for GHG Reduction Project/Activity' dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation)
$EF_{grid,BM,y}$	0.5609 tCO$_2$/MWh	Build margin CO$_2$ emission factor for the project electricity system in year y	Report 'Thailand Grid Emission Factor for GHG Reduction Project/Activity' dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation)

The baseline case is in compliance with all applicable legal and regulatory requirements references.

B.5.   Demonstration of additionality

The project is already registered with UNFCCC. Please refer section B.5 of the CDM PDD[10] for additionality justification.

B.6.   Sustainable Development Goals (SDG) outcomes

B.6.1.   Relevant target for each of the three SDGs

SDG Goal	Relevant SDGs Targets	Corresponding Indicator
SDG 3: Ensure healthy lives and promote wellbeing for all at all ages	**3.8** Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.	Health Camps, Knowledge and information dissemination regarding natural disasters

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[9] http://ghgreduction.tgo.or.th/images/Grid_Emission_Factor_2559_-_Finalised.pdf

[10] https://cdm.unfccc.int/UserManagement/FileStorage/FL5Z70NOAIUY9PTCSJ8G4VEXW2MB63

SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	7.2: By 2030, increase substantially the share of renewable energy in the global energy mix	Electricity produced and supplied to the grid in MWh
SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	1) Number of trainings provided to employees 2) Employment generated due to project activity during construction as well as O&M phase.
SDG 13: Take urgent action to combat climate change and its impacts	Goal: Integrate climate change measures into national policies, strategies and planning	Emission reductions in tCO$_2$

B.6.2. Explanation of methodological choices/approaches for estimating the SDG outcome

The company has a Corporate Social Responsibility Policy in place. In sync with the overall policy, the company conducts regular surveys during construction as well as O&M phases in the villages near project locations to check the requirement of facilities by the villages. Based on the surveys, PP identifies and works on several scope(s) of developmental activities such as health camps, distribution of furniture & sports kits in schools, toilet requirements in government schools, drinking water requirements etc. Apart from these activities, some or all of which will be conducted in any given year, following SDGs will be impacted every year:

SDG Goal	Monitoring Plan
SDG 3: Ensure healthy lives and promote wellbeing for all at all ages	Parameter: Health Camps, Knowledge and information dissemination regarding natural disasters Method: Monitored through Community development activities records and photographic collection Frequency: Annual QA/QC procedures: The community development activity data is achieved at head office for at least 2 years. Purpose: To record the no. of community development activities activities and trainings provided to the stakeholders through the project activity
SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Parameter: Electricity produced and supplied to the grid in MWh Method: Monitored through energy meter. Net electricity will be calculated by electricity authority and O&M operator on monthly basis and provided in the share certificate. Frequency: Monthly QA/QC procedures: Net electricity supplied to the grid by the project activity will be cross checked with invoices submitted to electricity authority. The meter(s) shall be calibrated on a regular basis. Purpose: To measure the electricity produced and supplied to the grid
SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Parameter: (1) Number of trainings provided to employees (2) Employment generated due to project activity during construction as well as O&M phase. Method: Ongoing data collection and storage under HSE records & HR Records. Frequency: Annual QA/QC procedures: Transparent data collection, analysis and reporting. Purpose: To identify and record the no. of trainings provided to the employees as well as employment generated due to project activity
SDG 13: Take urgent action to combat climate	Parameter: Emission reductions in tCO$_2$ Method: Using processes and equations provided under the applied

change and its impacts	methodology ACM0002
	<u>Frequency:</u> Every monitoring period
	<u>QA/QC procedures:</u> Transparent data collection, analysis, calculation and reporting.
	<u>Purpose:</u> To calculate emissions avoided due to the project activity

B.6.3. Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs

Relevant SDG Indicator	SDG13 : Take urgent action to combat climate change and its impacts
Data/parameter	**EF $_{CM, y}$**
Unit	tCO2/MWh
Description	Combined margin CO_2 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 version 7
Source of data	Thailand Greenhouse Gas Management Organisation (TGO), the Designated National Authority (DNA) of Thailand for 2016. http://ghgreduction.tgo.or.th/images/Grid_Emission_Factor_2559_-_Finalised.pdf
Value(s) applied	0.5692
Choice of data or Measurement methods and procedures	The combined margin CO_2 emission factor for the Thailand grid is published by the DNA of Thailand.
Purpose of data	Baseline Emission calculation
Additional comment	The combined margin is calculated ex-ante and fixed for the entire crediting period

Relevant SDG Indicator	SDG13 : Take urgent action to combat climate change and its impacts
Data/parameter	$EF_{BM,y}$
Unit	tCO2/MWh
Description	B Build 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 version 7"
Source of data	Thailand Greenhouse Gas Management Organisation (TGO), the Designated National Authority (DNA) of Thailand for 2016 http://ghgreduction.tgo.or.th/images/Grid_Emission_Factor_2559_-_Finalised.pdf
Value(s) applied	0.5609
Choice of data or Measurement methods and procedures	The combined margin CO_2 emission factor for the Thailand grid is published by the DNA of Thailand.
Purpose of data	Baseline Emission calculation
Additional comment	The Build Margin would be calculated ex ante and fixed during the crediting period. For ex ante calculation the most recent data (2016) available has been used and the build margin is thus calculated.

Relevant SDG Indicator	SDG13 : Take urgent action to combat climate change and its impacts
Data/parameter	$EF_{grid,OM,y}$

Unit	tCO2/MWh
Description	Operating margin CO$_2$ 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 version 7"
Source of data	Thailand Greenhouse Gas Management Organisation (TGO), the Designated National Authority (DNA) of Thailand for 2016 http://ghgreduction.tgo.or.th/images/Grid_Emission_Factor_2559_-_Finalised.pdf
Value(s) applied	0.5719
Choice of data or Measurement methods and procedures	The combined margin CO$_2$ emission factor for the Thailand grid is published by the DNA of Thailand.
Purpose of data	Baseline Emission calculation
Additional comment	The operating margin emission factor is a 3-year generation-weighted average (2014, 2015 & 2016). The operating Margin is calculated ex ante and fixed during the crediting period

B.6.4. Ex ante estimation of outcomes linked to each of the three SDGs

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The methodology ACM0002 is applicable to grid-connected renewable power generation project activities including hydro, wind, geothermal, solar, wave and tidal power. Some project activities such as hydro and geothermal projects may involve project emissions that should be accounted for using the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE$_y$ = Project emissions in year y (tCO2e/yr)
PE$_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO2/yr)
PE$_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO2e/yr)
PE$_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (tCO2e/yr)

PE$_{FF,y}$ is required to be calculated for geothermal and solar thermal projects which also use fossil fuel for electricity generation. The project activity is not a geothermal or solar thermal project therefore this emissions source is not relevant.

PE$_{GP,y}$ is required to be calculated for geothermal project activities where fugitive emissions of carbon dioxide and methane occur due to release of non-condensable gases from produced steam. The project activity is not a geothermal or solar thermal project therefore this emissions source is not relevant.

PE$_{HP,y}$ is required to be calculated for hydro power projects that result in new reservoirs and projects that result in increase of existing reservoirs. The project activity is not a hydro project therefore this emissions source is not relevant.

As such, there are no project emissions for the wind power project and PE$_y$ = 0.

Baseline Emissions
Baseline emissions include only CO2 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 to be calculated as follows:

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

Where:

BE$_y$ = Baseline emissions in year y (tCO2/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 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)

In accordance with the *Tool to calculate the emission factor for an electricity system, version 2.2.1 (EB63 Annex 19)* the emissions factor EFgrid,CM,y can be calculated using either an *ex ante* option at the validation stage or *ex post* for the year in which the project activity displaces electricity. The *ex ante* option is chosen and the combined margin published by the DNA of Thailand for years 2007, 2008, 2009 will be used to calculate emission reductions throughout the first crediting period. A description of the data used to calculate the combined margin is provided in Annex 3 and the step-wise approach used by the DNA of Thailand to calculate the emissions factor of the electricity system is described as follows:

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 systems
For the purpose of determining the electricity emission factor, the project electricity system is defined as the electricity transmission system of Thailand which is a single system connected by transmission lines throughout the country[11] and owned by the Electricity Generating Authority of Thailand (EGAT). Electricity imports from a connected electricity system are included and as per Tool to calculate emission factor of an electricity system, for the purpose of determining the operating margin emission factor, 0 tCO$_2$/MWh is applied.

STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional)
The inclusion of off-grid power plants is an optional step. For the purpose of the Thailand grid, Option I is applied and only grid power plants are included in the calculation.

STEP 3: Select a method to determine the operating margin (OM)
The calculation of the operating margin emission factor (EFgrid,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.

The simple OM method (Option a) is used for this study as the low-cost/must-run resources (LC/MR) constitute less than 50% of total electricity production. The share of low-cost/must run power plants in the last two years are in the range of 4.55% to 6.69% as shown in the below table.

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[11] The study of emission factor for an electricity system in Thailand 2009, DNA of Thailand, page 2

ปี พ.ศ.	การผลิตพลังงานไฟฟ้ารวม (GWh)	LC/MR Analysis			
		Hydro	RE	Total LC/MR	% of LC/MR
2555	166,446	8,431	2,701	11,132	6.69
2556	164,826	5,412	3,427	8,839	5.36
2557	168,685	5,164	3,993	9,157	5.43
2558	169,040	3,724	4,230	7,954	4.71
2559	169,168	3,019	4,685	7,704	4.55

Source: EGAT(2017)

As per tool to calculate emission factor for an electricity system (Version 07), The simple OM method (option a) can only be used if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. Since the low cost/must run resources constitute less than 50% of total grid generation as seen from the average of five most recent years, the Simple OM method can be used to calculate the Operating Margin Emission factor.

PP has chosen ex ante option, thus, no monitoring and recalculation of the emissions factor during the crediting period is required. PP has considered a data vintage of 3-year generation-weighted average, based on the most recent data available at the time of submission of the PDD to the DOE for validation.

STEP 4: Calculate the operating margin emission factor according to the selected method
The simple OM emission factor for Option B is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units

The simple OM may be calculated:

 Option A: Based on the net electricity generation and a CO2 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.

Thailand Greenhouse Gas Management Organisation (Public Organisation) has published the Thailand Grid Emission Factor for GHG Reduction Project/Activity on 28/09/2017 based on detailed authenticated information obtained from EGAT. This provides information about the Combined Margin Emission Factor of Thailand national grid. The Combined Margin is calculated ex ante using the guidelines provided by the UNFCCC in the "Tool to calculate the emission factor for an electricity system, Version 07". We have, therefore, used the Combined Margin data published in the Grid Emission Factor for GHG Reduction Project/Activity, for calculating the Baseline Emission Factor.

As per "Tool to calculate the emission factor for an electricity system", Option B ("Calculation based on total fuel consumption and electricity generation of the system") is used to calculate simple OM emission factor. Where Option B is used, 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:

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

Where,

$EF_{grid,OMsimple,y}$ = Simple operating margin CO2 emission factor in year y (tCO2/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 of fossil fuel type i in year y (GJ/mass or volume unit)

|	
$EF_{CO2,i,y}$	= CO2 emission factor of fossil fuel type i in year y (tCO2y/GJ)
EG_y	= Net electricity generated & delivered to the grid by all power units serving the system, not including LC/MR 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 three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option)

As per the Thailand emission factor database published on 28th September 2017 weighted average operating margin is as below:

EF $_{OM, y}$ = 0.5719 tCO$_2$/MWh

STEP 5: Calculate the build margin (BM) emission factor

The build margin emission factor is calculated ex-ante for the first crediting period as per Option 1. The build margin emissions factor is the generation-weighted average emission factor (tCO2/MWh) of a sample group of power units, during the most recent year *y* for which power generation data is available. The Sample group of power units *m* used to calculate the build margin should be determined via the procedure summarised in the diagram of the Tool:
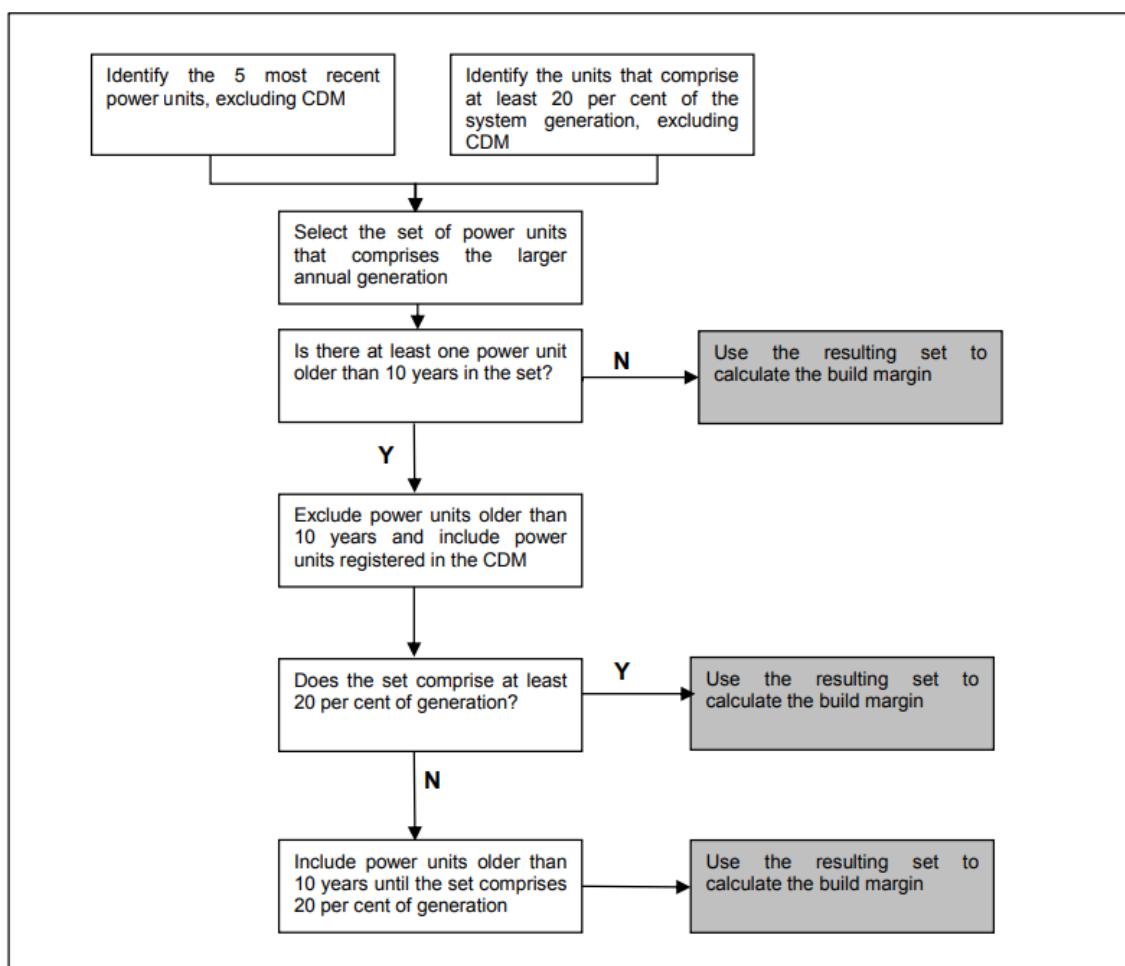
Following this procedure, AEGSET >/20% is larger than AEGSET 5-units and all of these power units started supplying electricity to the grid less than 10 years ago, therefore AEGSET >/20% is applied as power units *m* for the Build Margin.

Using the equation given in the step 5 for the OM calculation, the Built margin is calculated for the year 2016 is as below:

$$EF_{BM,y} = 0.5609 \text{ tCO2/MWh}$$

<u>STEP 6:</u> Calculate the combined margin (CM) emissions factor The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

where:

$EF_{grid,BM,y}$ = Build margin CO_2 emissions factor in year y (tCO2/MWh)

$EF_{grid,OM,y}$ = Operating margin CO_2 emissions factor in year y (tCO2/MWh)

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

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

For wind power project, the default values for weightings are: w_{OM} = 0.75 and w_{BM} = 0.25 for the first crediting period and subsequent crediting periods.

Full details of the calculation of the above Steps 1-6 are outlined in the excel sheet provided with this PDD. The resulting calculation of the combined margin is as follows:

Parameter			Value	Units
Operating Margin	:	$EF_{OM,y}$	0.5719	tCO₂e/MWh
Build Margin	:	$EF_{BM,y}$	0.5609	
Combined Margin Thailand,grid,y	:	EF	=0.5719*75%+0.5609*25%	
Combined Margin Thailand,grid,y	:	EF	0.5692	

The calculation of $EG_{PJ,y}$ is defined for: (a) greenfield plants, (b) retrofits and replacements, and (c) capacity additions. If 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, then:

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

Where:

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

Hence the annual baseline emission is calculated as below:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y} = 219,300 \text{ MWh} \times 0.5692 \text{ tCO}_2/\text{MWh} = \textbf{124,825 tCO}_2$$

Leakage

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

Emission reductions

Emission reductions are calculated as follows:

$ER_y = BE_y - PE_y$
Where:

ER_y	=	Emission reductions in year y (t CO2e/yr)
BE_y	=	Baseline emissions in year y (t CO2/yr)
PE_y	=	Project emissions in year y (t CO2e/yr)

<u>**Ex-Ante calculation:**</u>
Emission Reduction
The methodology ACM0002 states that leakage emissions are not required to be considered, therefore the emission reductions are calculated as:
$ER_y = BE_y - PE_y$
$ER_y = 139,035 - 0 = 139,035 \ tCO_2e$

Parameter	Description of Value Applied	Value	Units
BE_y	Calculated as per ACM0002 and shown below	139,035	tCO_2e
PE_y	In accordance with equation (1) of ACM0002 the project emissions for wind power projects is zero.	0	tCO_2e
ER_y	Calculated as $BE_y - PE_y$	139,035	tCO_2e

Baseline Emissions
The total baseline emissions from existing grid connected power plants are calculated as:
$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$
$BE_y = 232,500 \times 0.5692 = 132,339 \ tCO_2e$

Parameter	Description of Value Applied	Value	Units
$EG_{PJ,y}$	Wind Farm Energy Yield Analysis Report	232,500	MWh
$EF_{grid,CM,y}$	Published by the Thailand Greenhouse Gas Management Organisation (TGO), the DNA of Thailand.	0.5692	tCO_2/MWh
BE_y	Calculated as $EG_{PJ,y} \times EF_{grid,CM,y}$	132,33935	tCO_2e

B.6.5. Summary of ex ante estimates of each SDG outcome

Year	Baseline estimate	Project estimate	Net benefit
2018 (01/07/2018 to 31/12/2018)	44,234	0	44,234
2019 (01/01/2019 to 30/11/2019)	121,099	0	121,099
Total	165,333	0	165,333
Total number of crediting years	1 year 3 months		
Annual average over the crediting period	132,339	0	132,339

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B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Relevant SDG Indicator	SDG 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix
Data / Parameter	$EG_{facility,y}$
Unit	MWh/year
Description	Quantity of net electricity generation supplied by the project plant to the grid in year y
Source of data	Monitored at the project activity site with electricity meters and calculated by subtracting imported electricity from exported electricity.
Value(s) applied	232,500 (Estimation)
Measurement methods and procedures	The net electricity will be measured with bi-directional electricity meters recording both the amount of electricity exported and imported to/from the grid by the project plant. A backup bi-directional meter will be installed and used to measure electricity exports and imports if the primary meter fails. Electricity will be measured continuously and recorded monthly. A separate grid connection may be installed to enable backup electricity to be imported from the PEA. A backup meter will not be installed on the import line. If the primary import meter on this backup electricity line fails, the data for that month will be replaced with data from the month with the highest electricity consumption recorded during the monitoring period. Net electricity will be calculated by subtracting total imported electricity from total exported electricity
Monitoring frequency	Measurement: Continuous Recording: Monthly
QA/QC procedures	Measurement results will be cross checked with records for sold electricity. In accordance with the PPA regarding the export meter, the error specified by the meter manufacturer will not exceed +/- 0.2%. In case of meter failure, and a replacement export meter is required, it may be installed and the error specified by the meter manufacturer will not exceed +/- 0.2%. If a backup electricity supply is installed by the PEA then an import meter will be installed on the backup supply line. The error specified by the meter manufacturer will not exceed +/- 0.5%. The PPA specifies that the meters shall be calibrated once during each calendar year (the maximum time between two calibration events is 24 months). The backup line electricity meter will also be calibrated once per calendar year.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	SDG 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all
Data / Parameter	Livelihood of the poor
Unit	Health Camps, Knowledge and information dissemination regarding natural disasters

Description	-
Source of data	Community Development Activity records and photographic evidence
Value(s) applied	PP conducted survey during construction phase of the project in the villages near project locations to check the requirement of facilities by the villages. From the survey, PP has identified several scope of developmental activities such as health camps, furniture, sports kits and toilet requirements in government schools, drinking water requirements etc. PP has started implementing the community development activities. During the monitoring period the community development activities like: • Construction of Toilets at schools • Establishment of water purifier with cooler • Organization of Health camps • Training on agricultural, irrigation and fertilizers techniques by agricultural professionals The project has positive impact on this parameter as there were no socially oriented development activities before the project activity. Thus, the project has positive impact on the indicator.
Measurement methods and procedures	-
Monitoring frequency	Yearly Once
QA/QC procedures	-
Purpose of data	To monitor the contribution to SDG 3 (Ensure healthy lives and promote well-being for all at all ages)
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	SDG 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
Data / Parameter	Quantitative employment and income generation
Unit	• Cost spent for O&M • Number of O&M staffs involved in the project
Description	Total employment generated due to the implementation of project activity and the amount spent for O&M activities due to the project.
Source of data	Plant employment records
Value(s) applied	The total number of O&M staffs employed by the O&M service provider and Project Proponent for the operation & maintenance of the project activity are around 50. The cost of O&M is as mentioned earlier in the report is for the project per year, which helps in creating service based jobs in the project region. The parameter has a positive impact as the project results in direct employment and income generation.
Measurement methods and procedures	Employment records
Monitoring frequency	Yearly Once
QA/QC procedures	-
Purpose of data	To monitor the contribution to SDG 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all)
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	Safeguarding Principle 4.2.2: Erosion and/or Water Body Instability
Data / Parameter	Soil Erosion
Unit	-
Description	**General soil erosion and sediment control measures would include:** • Keep open areas of excavation to a minimum and construction activities restricted to dry months to avoid heavy rainfalls; • Using existing roads and lanes used by land owner. • Stockpiles of materials placed away from drainage lines and formed with sediment control structures placed immediately down slope; • Construction debris and excavated material were cleared up at regular intervals • Excavated material stock piled and used for backfilling of foundations, platforms etc. • Minimization of traffic in construction zones and use of a dedicated parking area, i.e. site compound; • Re-vegetation taken up as necessary after construction, in order to reduce the risk of soil erosion. **Specific mitigation measures followed in the operational phase of the project:** • Proper drainage controls such as culverts, cut-off trenches shall be used to ensure proper management of surface water runoff to prevent erosion. • Waste oil generated shall be stored separately in containers in a secured location in the maintenance room. The storage location and the containers are properly marked. • The waste / used waste oil from the transformers to be disposed of to authorized vendor. A hazardous waste inventory is maintained as per the provisions of appropriate rules. The possibility of soil erosion due to the project operation is negligible to none. Hence, does not involve many mitigation measures.
Source of data	Project O&M HSE logbook, or interview with maintenance staff.
Value(s) applied	-
Measurement methods and procedures	The O&M log book records all the parameters as listed: • Hazardous waste generated, disposed, any spillages • Waste oil generated, disposed, any spillages • Leakage of any diesel or waste oil The same O&M HSE log book is submitted to DOE. This parameter has a neutral (0) impact as there has been no incidence of oil leakage or inappropriate disposal of hazardous or waste oil during the monitoring period.
Monitoring frequency	Yearly Once
QA/QC procedures	-
Purpose of data	To monitor compliance to Safeguarding Principle 4.2.2 (Erosion and/or Water Body Instability & 4.3.4 (Release of pollutants)
Additional comment	-

Relevant SDG Indicator/Safeguarding Principle	Safeguarding Principle 4.3.1: Landscape Modification and Soil

Data / Parameter	Maintenance of Landscape visual impact
Unit	Aesthetics
Description	Detailed ESIA study conducted to understand if any of the location needs to be altered.
	Locals were consulted wherever the wind power plant location or access road was in vicinity to a settlement.
	Drainage facilities are constructed in the plant in order to reduce the risk of soil erosion.
Source of data	Project Grievance register, or interview with local villagers
Value(s) applied	-
Measurement methods and procedures	-
Monitoring frequency	Yearly Once
QA/QC procedures	-
Purpose of data	To monitor compliance to Safeguarding Principle 4.3.1 (Landscape Modification and Soil)
Additional comment	-

B.7.2. Sampling plan

Not Applicable

B.7.3. Other elements of monitoring plan

Details of Data to be Monitored:
The emission reductions achieved by the project will be monitored and calculated in accordance with the methodology ACM0002. The methodology defines the equations and monitoring parameters for calculating emission reductions. On-site data collection will involve metering the net electricity supplied by the project activity to the grid. Any auxiliary consumption imported to the West Huaybong 3 facilities from the grid will be metered to enable net electricity to be calculated

Monitoring Procedure
Electricity exported to the grid will be monitored continuously with the bi-directional electricity meters of the power authority. In case any electricity is imported into the project facilities for auxiliary consumption (during plant shut down), this electricity will also be monitored continuously with the bidirectional meter of the power authority. In case a back-up line is brought to the site, this will also be monitored for auxiliary consumption. Monthly records will be used to calculate the net electricity generation supplied by the project plant to the grid.

Data Management
Monthly meter readings will be conducted by the power authority. After receiving the receipt of power sales from the power authority, the meter data will be input into an electronic data file. West Huaybong 3 operations personnel will check the data file for consistency and completeness. At the end of the monitoring period, the entire data file will be printed and reviewed by the Responsible Manager. An electronic copy of the data file will be backed up in the West Huaybong 3 head office at least once per month

All data collected as part of the monitoring process will be retained for at least two years after the end of the crediting period during which the data was recorded.

Quality Assurance
The following quality assurance measures will be taken relating to the monitoring equipment and its installation and operation:
- Prior to operation, the Responsible Manager will validate that the monitoring equipment is calibrated according to the appropriate standards.
- All monitoring equipment will be located in secure locations to prevent accidental damage

- Routine calibration of all monitoring equipment will be performed to ensure that the data remains accurate.

To ensure the quality of the recorded data, all relevant personnel will be trained in accordance with this monitoring plan.

Quality Control Procedures

To ensure malfunction is identified promptly, the operations personnel will check the data records and report any data outages or inconsistencies in the data to the Responsible Manager. Any equipment faults or loss of data will be recorded in an operational log with details of the fault and length of time over which data was affected. All meter data will be checked against the official receipts

In accordance with the PPA, the error specified by the manufacturer of the export meter will not exceed +/- 0.2%. In case of meter failure, replacement export meters may be installed and the error specified by the meter manufacturer will not exceed +/-0.2%. The meters will be calibrated once during each calendar year (the maximum time between two calibration events is 24 months).

SECTION C.   Duration and crediting period

C.1.   Duration of project

C.1.1. Start date of project

15/08/2011 (Date the company issued the Notice to Proceed to the turbine suppler Siemens Wind Power A/S)

C.1.2. Expected operational lifetime of project

23 years 0 months

C.2.   Crediting period of project

C.2.1. Start date of crediting period

01/09/2018

C.2.2. Total length of crediting period

01/09/2018 to 30/11/2019
1 year 3 month (considering the end date of CDM 1st crediting period)

SECTION D.   Safeguarding principles assessment

D.1.   Analysis of social, economic and environmental impacts

Safeguarding principles	Assessment questions	Assessment of relevance to the project (Yes/potentially/no)	Justification	Mitigation measure (if required)
3.1 Human Rights	1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any	No	1. During construction and operation of the project the project proponent respected all the human rights. The project is not in any kind of conflict	Not Required

	kind as defined in the Universal Declaration of Human Rights. 2. The Project shall not discriminate with regards to participation and inclusion.		with the livelihood of local people. Project proponent had conducted stakeholder's consultation and sought their opinion. 2. The project will not employ any personnel based on gender, race, religion, sexual orientation or any other basis. As the Constitution of the host country prohibits discrimination on the basis of a person's race, sex, religion, place of birth, or social status. Thailand, as the host country of the project, is a party to Universal Declaration of Human Rights[12]	
3.2 Gender Equality and Women's Rights	The Project shall complete the following gender assessment questions in order to inform Requirements, below: 1. Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits? 2. Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)? 3. Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?	No	1. The project does not decrease women´s access to or control of resources. 2. No, there is no possibility of adverse effect. 3. No, the Project does consider gender roles and in fact actively engages both women and men. Community meetings are scheduled considering participation by both Men and Women.	Not Required

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[12] http://www.thaiembassy.org/unmissionnewyork/en/relation/80917-Human-Rights.html

4. Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?	**4.** The project does not discriminate on basis of gender, caste or religion.	
5. Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?	**5.** No the Project was not designed to increase women´s workload nor add care responsibilities.	
6. Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?	**6.** There is no place for discrimination against women in this Project. The project does not discriminate on basis of gender, caste or religion.	
7. Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?	7. The Project will not limit women´s ability regarding natural resources. The project being wind power project thus does not have any major impact on natural resources of the region.	
8. Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?	**8.** No the Project will not expose women and girls to further risks or hazards.	
The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women.	The project proponent has a grievance cell which would look into compalints.	
1. Sexual harassment and/or any forms of violence against women -	1. There is no such risk for the project. Participation	

	address the multiple risks of gender-based violence, including sexual exploitation or human trafficking. 2. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls. 3. Restriction of women's rights or access to resources (natural or economic). 4. Recognise women's ownership rights regardless of marital status - adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources. Projects shall apply the principles of nondiscrimination, equal treatment, and equal pay for equal work, specifically: 1. Where appropriate for the implementation of a Project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities. 2. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status.		in the project is 100% voluntary. The project proponent has a grievance cell which would look into compalints. **2.** The project does not involve in slavery, imprisonment or coercion of women and girls. **3.** The Project will not restrict women´s rights or access regarding natural resources. The project proponent does not discriminate on gender, caste, religion etc. **4.** Marital status is completely irrelevant to the Project. The project proponent does not discriminate on gender, caste, religion etc. Yes, the Project has equal opportunity for women and men to contribute both in volunteer and working positions **1.** The project proponent has a stipulated HR policy that takes into account participation by both men and women. Further, the CSR projects designed are implemented for equal participation of both men and women. **2.** There is no limit on the access to Project participation and benefits from either of these conditions.	

	3. Ensure that these conditions do not limit the access of women or men, as the case may be, to Project participation and benefits. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.		3. There are no such conditions that limit the access of women or men for participation. The project is aligned to Thailand's strategy for elimination of all discrimination. Thailand is also party to Convention 100 (Equal remuneration) since 1999 and 111 on Discrimination in employment/occupation since 2017 to prevent any form of discrimination[13]	
3.3 Community Health, Safety and Working Conditions	The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community.	No	The project is in compliance with all relevant local and national laws. The Project does not threaten human health or environment and does not adversely affect the health of the workers and the community.	Not Required
3.4.1 Sites of Cultural and Historical Heritage	Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, or practices)?	No	The project does not alter, damage or remove any cultural heritage.	Not Required
3.4.2 Forced Eviction and Displacement	Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	No	The project does not involve and is not complicit in involuntary resettlement of peoples in any way. The Project Developer has also obtained all necessary clearances from nodal agencies and NOCs from all relevant authorities for establishing the project.	Not Required
3.4.3 Land Tenure and Other Rights	1. The Project Developer shall identify all such sites/matters potentially affected by the Project. For all such sites/matters identified the Project shall respect and	No	1. The project has all the legal, customary rights on the land and does not require any change to land tenure arrangements. The proponent has also obtained necessary clearances from relevant government agencies for	Not Required

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[13] http://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102843

	safeguard: (a) Legal rights, or (b) Customary rights, or (c) Special cultural, ecological, economic, religious or spiritual significance of people shall be demonstrably promoted/protected. 2. Changes in legal arrangements must be in line with relevant law and regulation and must be carried out in strict adherence with such laws. All legal disputes must be resolved prior to Project being carried out in such areas. All such changes must be demonstrated as having been agreed with free, prior and informed consent. 3. The Project Developer must hold uncontested land title for the entire Project Boundary to complete Project Design Certification.		establishing the plant. 2. This is not applicable as the project does not require any change to land tenure arrangements. 3. The project developers holds the land title for the all the land covered in the project activity.	
3.4.4 Indigenous Peoples	Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No	The project is a wind power project and it is not located on land/territory claimed by any indigenous peoples.	Not Required
3.5 Corruption	The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	No	The proponent confirms that there is no corruption involved in the project activity. The host country has strict laws and robust arrangements to prevent such activities. Thailand is a party to United Nation Convention against Corruption since 9 Dec 2003[14]:	Not Required
3.6.1 Labour Rights	1. The Project Developer shall ensure that there is no forced labour and that all	No	1. The proponent assures that there will be no	Not Required

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[14] https://treaties.un.org/pages/viewdetails.aspx?src=ind&mtdsg_no=xviii-14&chapter=18&lang=en#EndDec

	employment is in compliance with national labour and occupational health and safety laws, with obligations under international law, and consistency with the principles and standards embodied in the International Labour Organization (ILO) fundamental conventions. Where these are contradictory and a breach of one or other cannot be avoided, then guidance shall be sought from Gold Standard.		bonded or forced labor during construction and operation of the project activity. Uniform policy will be implemented for all employees. The host country has robust laws in place prohibiting forced and compulsory labor. Thailand is a party to ILO convention 29 (since 1969) and 105 (since 1999) on elimination of forced and compulsory labour[15].
	2. Workers shall be able to establish and join labour organisations.		2. The proponent confirms that all the fundamental rights of the employees will be respected.
	3. Working agreements with all individual workers shall be documented and implemented. These shall at minimum comprise: (a) Working hours (must not exceed 48 hours per week on a regular basis), AND (b) Duties and tasks, AND (c) Remuneration (must include provision for payment of overtime), AND (d) Modalities on health insurance, AND (e) Modalities on termination of the contract with provision for voluntary resignation by employee, AND Provision for annual leave of not less than 10 days per year, not including sick and casual leave.		3. Working agreements with all individual workers are documented and implemented.
	4. The Project Developer shall justify that the employment model applied is locally and culturally appropriate.		4. The Project Developer ensures that local workers/employees are preferred, to the extent possible, for employment during construction as well as operation phase of the project ensuring skill development in the local populace.
	5. Child labour, as defined by the ILO Minimum Age Convention is not allowed. The Project Developer shall		5. Child labor is strictly

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[15] http://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102843

	use adequate and verifiable mechanisms for age verification in recruitment procedures. Exceptions are children for work on their families' property as long as: (a) Their compulsory schooling (minimum of 6 schooling years) is not hindered, AND (b) The tasks they perform do not harm their physical and mental development, AND (c) The opinions and recommendations of an Expert Stakeholder shall be sought and demonstrated as being included in the Project design. 6. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures.		prohibited in the country. The proponent assures that no child labor will be employed during construction and operation of the plant. The project proponent has a set mechanism to ensure the age of all the temporary/ permanent employees during the life time of the project. Thailand is also a party to convention 138[16] on Minimum Age since 2004 and Convention 182 on Worst Forms of Child Labour since 2001. 6. The Project Developer has an active HSE team which ensures that all employees are given appropriate equipment and training. The same is properly documented and appropriate measures taken in case of emergencies.	
3.6.2 Negative Economic Consequences	1. The Project Developer shall demonstrate the financial sustainability of the Projects implemented, also including those that will occur beyond the Project Certification period. 2. The Projects shall consider economic impacts and demonstrate a consideration of potential risks to the local economy and how these have been taken into account in Project design, implementation, operation and after the Project. Particular focus shall be given to vulnerable and marginalised social groups in targeted communities and that benefits are socially-	No	1. Financial Sustainability of the project has been discussed under Section B.5 of the registered CDM PDD. The calculations are for the entire life of the project. 2. There are no negative economic impacts or potential risks to the local economy due to the project activity.	Not Required

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[16] http://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102843

	inclusive and sustainable.			
4.1.1 Emissions	Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	The project is a wind power project and does not lead to any greenhouse gas emissions in project scenario.	Not Required
4.1.2 Energy Supply	Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	The project is connected to the grid, as well as being a wind power project it will be a net provider of power to the local grid.	Not Required
4.2.1 Impact on natural water patterns and flow	Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The project being a wind power project will not have any such impacts.	Not Required
4.2.2 Erosion and/or water body stability	1. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? If 'Yes' or 'Potentially' proceed to question 2. 2. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?	No	1. The project activity has developed activities for prevention of soil erosion by various landscaping measures. 2. The project area is not susceptible to excessive erosion or water body instability.	Not Required
4.3.1 Landscape modification and soil	Does the Project involve the use of land and soil for production of crops or other products?	No	The project does not involve the use of land and soil for production of crops or other products.	Not Required
4.3.2 Vulnerability to Natural Disaster	Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	The Project will not be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions.	Not Required
4.3.3 Genetic Resources	Could the Project be negatively impacted by the	No	The project does not have any impact by used of	Not Required

	use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?		GMOs.	
4.3.4 Release of pollutants	Could the Project potentially result in the release of pollutants to the environment?	No	The project being a wind power project does not lead to release of any pollutants.	Not Required
4.3.5 Hazardous and Non-hazardous Waste	Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The project during operational phase uses various type of oil/lubricants, grease which are classified as hazaordous. These waste are handled in line with hazardous waste management rules and are disposed off accordingly.	Not Required
4.3.6 Pesticides and fertilizers	Will the Project involve the application of pesticides and/or fertilisers?	No	The Project will not involve the application of pesticides and/or fertilisers.	Not Required
4.3.7 Harvesting of forests	Will the Project involve the harvesting of forests?	No	The Project does not involve the harvesting of forests.	Not Required
4.3.8 Food	Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The Project does not have any impact on the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives.	Not Required
4.3.9 Animal Husbandry	Will the Project involve animal husbandry?	No	The Project will not involve animal husbandry.	Not Required
4.3.10 High Conservation Value Areas and Critical Habitats	Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	The Project does not affect or alter largely intact or HCV ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified.	Not Required
4.3.11 Endangered Species	1. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)? 2. Does the Project potentially impact other areas where endangered species may	No	1. There are no endangered species identified as potentially being present within the Project boundary. 2. The Project does not impact other areas where	Not Required

	be present through transboundary affects?		endangered species may be present through transboundary affects.	

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from stakeholders

The project is a retroactive project. The LSC feedback round will be conducted after the preliminary review.

E.2. Summary of comments received

The project is a retroactive project. The LSC feedback round will be conducted after the preliminary review.

E.3. Report on consideration of comments received

The project is a retroactive project. The LSC feedback round will be conducted after the preliminary review.

Appendix 1.   Contact information of project participants

Organization name	First Korat Wind Company Limited
Registration number with relevant authority	
Street/P.O. Box	All Seasons Place, 87/1, Wireless road, Lumpini, Patumwan
Building	25th Floor, Capital Tower
City	Bangkok
State/Region	-
Postcode	10330
Country	Thailand
Telephone	+66(0) 2106 8000
Fax	-
E-mail	kelly@windenergyholding.com
Website	
Contact person	
Title	Director
Salutation	Mr.
Last name	DALLAS
Middle name	
First name	Kelley
Department	
Mobile	-
Direct fax	
Direct tel.	-
Personal e-mail	kelly@windenergyholding.com

Appendix 2.   Summary of post registration design changes

NA

Revision History

Version	Date	Remarks
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1	10 July 2017	Initial adoption