المجلس العالمي للبصمة الكربونية
GLOBAL CARBON COUNCIL

Project Submission Form

V3.2 - 2020

© 2019 Global Carbon Council - All rights reserved

Contents

COVER PAGE- Project Submission Form (PSF)	
Complete this form in accordance with the instructions attached at the end of this form.	
BASIC INFORMATION	
Title of the Project Activity	**Mittraphap Wind Farm Project**
PSF version number	Version 02
Date of completion of this form	04-January-2022
Project Owner(s) (Shall be consistent with De-registered CDM Type B Projects)	Korat Wind Energy Company Limited
Country where the Project Activity is located	Thailand
GPS coordinates of the project site(s)	Refer Section A.2 of this document.
Eligible GCC Project Type as per the Project Standard (Tick applicable project type)	☒ **Type A:** ☐ Type A1 ☒ Type A2 ☐ **Type B – De-registered CDM Projects:**[1] ☐ Type B1 ☐ Type B2

[1] Owners of Type B projects shall fill in the form provided in Appendix 7.

<table>
<tr><td>Minimum compliance requirements</td><td>☒ Real and Measurable GHG Reductions
☒ National Sustainable Development Criteria (if any)
☒ Apply credible baseline and monitoring methodologies
☒ Additionality
☒ Local Stakeholder Consultation Process
☒ Global Stakeholder Consultation Process
☒ No GHG Double Counting
☒Contributes to United Nations Sustainable Development Goal 13(Climate Action)</td></tr>
<tr><td>Choose optional and additional requirements
(Tick applicable label categories)</td><td>☒ Do-no-net-harm Safeguards to address Environmental Impacts
☒ Do-no-net-harm Safeguards to address Social Impacts
☒Contributes to United Nations Sustainable Development Goals (in addition to Goal 13)</td></tr>
<tr><td>Applied methodologies
(Shall be approved bythe GCC or the CDM)</td><td>ACM0002 Grid-connected electricity generation from renewable sources, ver 20.0</td></tr>
<tr><td>GHG Sectoral scope(s) linked to the applied methodology(ies)</td><td>GHG SS1- Energy (Renewable/Non-Renewable sources)</td></tr>
<tr><td>Applicable Rules and Requirements for Project Owners
(Tick applicable Rules and Requirements)</td><td>
<table>
<tr><th colspan="2">Rules and Requirements</th><th>Reference</th><th>Version</th></tr>
<tr><td colspan="2">☒ ISO 14064-2</td><td></td><td></td></tr>
<tr><td colspan="2">☒ Applicable host country legal requirements /rules</td><td></td><td></td></tr>
<tr><td rowspan="5"></td><td>☒ Project Standard</td><td></td><td>V3.1</td></tr>
<tr><td>☐ Approved GCC Methodology (XXXXX)</td><td></td><td></td></tr>
<tr><td>☒ Program Definitions</td><td></td><td>V3.1</td></tr>
<tr><td>☒ Environment and Social Safeguards Standard</td><td></td><td>V2.0</td></tr>
<tr><td>☒ Project Sustainability Standard</td><td></td><td>V2.1</td></tr>
</table>
</td></tr>
</table>

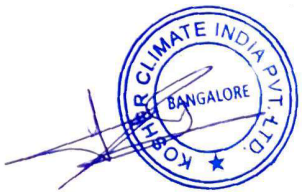
	☒ GCC Rules and Requirements[2]	☒ Instructions in Project Submission Form (PSF)-template		V3.2
		☐ Add rows if required		
	☒ CDM Rules[3]	☒ Approved CDM Methodology (XXXXX)	ACM 0002	V20.0
		☒ Tool for the demonstration and assessment of additionality	TOOL 01	V7.0
		☐ Combined tool to identify the baseline scenario and demonstrate additionality	TOOL 02	
		☒ Tool to calculate the emission factor for an electricity system	TOOL 07	V7.0
		☐ Demonstration of additionality of microscale project activities	TOOL 19	
		☐ Demonstration of additionality of small-scale project activities	TOOL 21	
		☐ Additionality of first-of-its-kind project activities	TOOL 23	
		☒ Common practice	TOOL 24	V3.1
		☒ Investment analysis	TOOL 27	V11.0
		☐ Positive lists of technologies	TOOL 32	
		☐ Guidelines for objective demonstration and assessment of barriers		
		☐ Add rows if required		
Choose Third Party External Project Verification by approved GCC Verifiers[4] (Tick applicable verification categories)	☒ GHG emission reductions (i.e., Approved Carbon Credits **(ACCs)**) ☒ Environmental No-net-harm Label (**E⁺**) ☒ Social No-net-harm Label (**S⁺**)			

[2]GCC Program rules and requirements: https://www.globalcarboncouncil.com/resource-centre.html
[3]CDM Program rules: https://cdm.unfccc.int/Reference/index.html

[4]**Note:**GCC Verifiers under the Individual Track are not eligible to conduct verifications for GCCProject Activities whose owners intend to supply carbon credits (ACCs) for use within CORSIA.

	☒ United Nations Sustainable Development Goals (**SDG$^+$**) ☐ Bronze SDG Label ☐ Silver SDG Label ☐ Gold SDG Label ☒ Platinum SDG Label ☐ Diamond SDG Label ☒ CORSIA requirements (**C$^+$**) ☐ Host Country Attestation on Double counting
Declaration to be made by the Project Owner(s)[5] (Tick all applicable statements)	The Project Owner(s) declares that: ☒The Project Activity complies with the eligibility of the applicable project type (A1, A2, B1 or B2) as stipulated by the Project Standard. ☒ The Project Activity shall start operations, and start generating emission reductions, on or after 1 January 2016. ☒ The Project Activity is eligible to be registered under the GCC program. ☒No carbon credits generated by the proposed Project Activitywill be claimed as carbon credits in any other GHG program anywhere in the world, either for compliance or voluntary purposes, for the entire 10-year GCC crediting period. ☒The proposed Project Activity, if Type A, is NOT registered as a GHG Project Activity in any other GHG program or any other voluntary program anywhere in the world. ☒The proposed Project Activity is NOT included as a component Project Activity (CPA) in a registered GHG Programme of Activities (PoA) under any GHG program (such as the CDM or any other voluntary program) anywhere in the world. ☒The proposed Project Activity is NOT a CPA that has been excluded from a registered PoA under any GHG program (such as the CDM or any other voluntary program) anywhere in the world. Provide details (if any) below for the boxes ticked above.
	☒ If a GCC project chooses to apply to use ACCs under CORSIA, the Project Owner(s) is required to declare that they are aware that they must obtain and provide to the GCC and its Registry (operated by IHS Markit) a written attestation from the host country's national focal point (e.g., Ministry of Environment or Civil Aviation Authority) or focal point's designee, as required by CORSIA Emissions Unit Eligibility Criteria, which:

[5]The "Project Owner" means the legal entity or organization that has overall control and responsibility for the Project Activity.

	☒ Confirms the avoidance of double counting as required by CORSIA; ☒ Shall be made publicly available prior to the use of units from the host country under CORSIA; and ☒ Places all responsibility on the Project Owner(s) to replace any and all doubly claimed or counted ACCs by the host country, in the GCC registry operated by IHS Markit. Provide details below for the boxes ticked above
	The Project Owner(s) declares that: ☒ All of the information provided in this document, including any supporting documents submitted to the GCC or its registry operator IHS Markit at any time, is true and correct; ☒ They understand that a failure by them to provide accurate information or data, or concealing facts and information, can be considered as negligence, fraud or willful misconduct. Therefore, they are aware that they are fully responsible for any liability that arises as a result of such actions. Provide details below for the boxes ticked above
Appendixes 1-7	Details about the Project Activity are provided in Appendixes 1 through 7 to this document.
Name, designation, date and signature of the Project Owner(s)	**On behalf of** Korat Wind Energy Company Limited  Signature: Name: Vamsi Krishna M Designation: Business Head Authorized Representative: Kosher Climate India Private Limited Date:04/01/2022

1. PROJECT SUBMISSION FORM

Section A. Description of the Project Activity

A.1. Purpose and general description of the Project Activity

The Purpose of this project activity is to generate the clean electricity from the installation of wind turbine generators and feed the generated electricity to the Thailand national grid.

The proposed project activity involves installation of 50 MW wind power project in Sukhio didtrict, in Thailand. Project is fully commissioned and operational and the total project capacity has been connected to the national Grid of Thailand through the erected distribution and transmission lines. Generated power from the project is being supplied to the government distribution companies Electricity Generating Authority of Thailand (EGAT). Project owners have signed a long term power purchase agreements with the EGAT to supply the generated power at the contracted price. The wind power project is promoted by subsidiaries of Gunkul Engineering Public Company Limited. The details of which are as follows:

Project Promoters	Project Name	Capacity (MW)	Purpose	District	Country
Korat Wind Energy Company Limited	50 Sarahnlom Wind Farm	50	Sale to EGAT	Sikhio	Thailand

Project commissioning details are provided below

Project Promoters	Installed Capacity (MW)	No of WTGs	Date of Commissioning
Korat Wind Energy Company Limited	50	25 X 2 MW WTG	20/06/2018

The project will replace average anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 86,011 tCO2e per year, thereon displacing estimated average of 151110 MWh/year amount of electricity from the generation-mix of power plants connected to the national grid, which is mainly dominated by thermal/fossil fuel-based power plant.

Baseline Scenario

The scenario existing prior to the implementation of the project activity, is electricity delivered to the grid by the project activity that 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".** This is a green field project activity. There was no activity at the site of the project participant prior to the implementation of this project activity. Hence pre-project scenario and baseline scenario is the same.

Sustainable Development Indicators

In addition to contribution to the sustainable environment by reducing the GHG emissions and reducing the dependency on fossil fuels, this project activity also contributing to the sustainable development though supporting the local community and local economy.

Social well-being: The project activity provided / provides job opportunity to local people during erection, commissioning and maintenance of the wind project. Frequency of visiting villages and nearby areas by skilled, technical and industrialist increase due to installation /site visit/operation and maintenance work related to wind power plant. This directly and indirectly positively effects the economy of villages and nearby area.

Environmental well-being: Wind power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions. The impact on land, water, air and soil is negligible. Thus, the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.

Economic well-being: The project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.

Technological well-being: The project activity is step forward in harnessing the untapped wind potential and further diffusion of the wind technology in the region. The project activity leads to the promotion and demonstrates the success of wind projects in the region which further motivate more investors to invest in wind power projects. Hence, the project activity leads to technological well-being.

A.2. Location of the Project Activity

This project is located in Dan Khun Thod Province, in Thailand the table provides details of location of the project:

Project Name	Project Promoters	Physical Address
50 MW Mittraphap Wind Farm project	Korat Wind Energy Company Limited	Nong Nam Sai and Donmuang Sikhio, Nakhon Ratchasima

The geographical coordinates of the WTGs are given below

WTG No	Latitude	Longitude
KWE-01	14.9899	101.4356
KWE-02	14.9873	101.4363
KWE-03	14.9845	101.4368
KWE-04	14.9819	101.4375
KWE-05	14.9792	101.4383
KWE-06	14.9765	101.4389
KWE-07	14.9738	101.4398
KWE-08	14.9710	101.4406
KWE-09	14.9684	101.4410
KWE-10	14.9659	101.4419
KWE-11	14.9454	101.4469
KWE-12	14.9421	101.4377
KWE-13	14.9393	101.4484
KWE-14	14.9367	101.4493
KWE-15	14.9330	101.4503
KWE-16	14.9302	101.4507
KWE-17	14.9276	101.4518
KWE-18	14.9222	101.4526
KWE-19	14.9075	101.4568
KWE-20	14.9048	101.4580

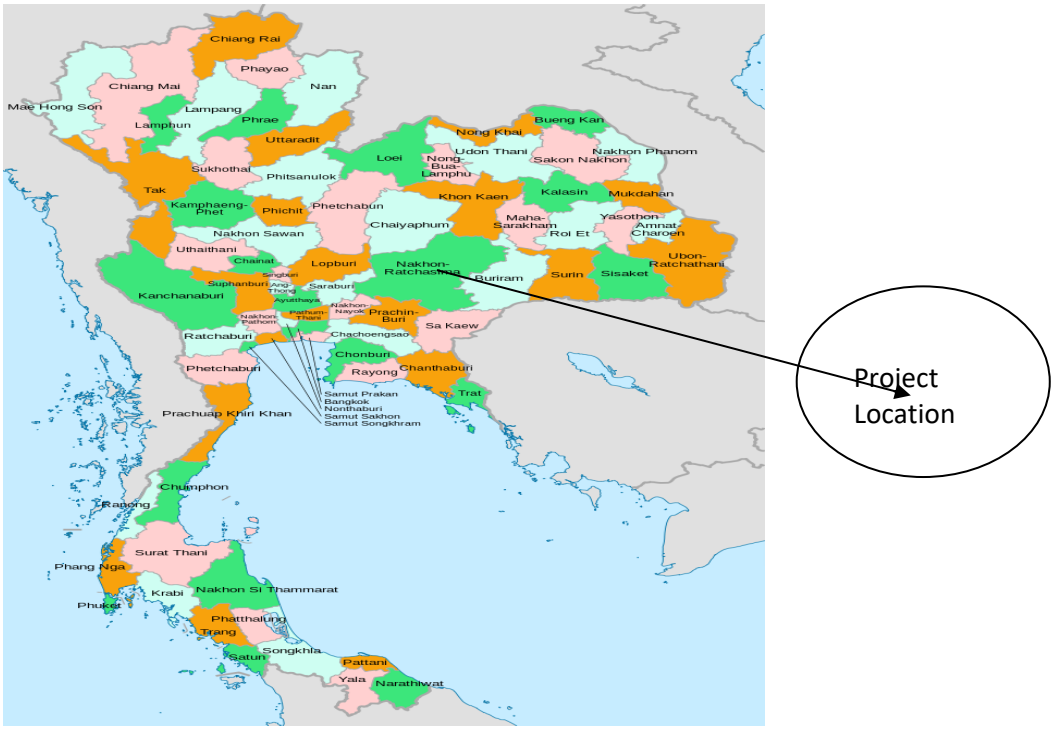


Figure 1: Project location map

A.3. Technologies/measures

The technology employed, converts wind energy to electrical energy. In wind power generation, energy of wind is converted into mechanical energy and subsequently into electrical energy. The project activity is the installation of an environmentally safe and sound technology since there are no GHG emissions associated with the electricity generation.
The life time of the both wind project is 25 years.
The technical specifications of the WTGs have been provided as below

Model	G126-2.5 MW
Manufacturer	Gamesa
Nominal Power	2500 kW
Convertor rated Voltage	690V
Rotor dia.	126.0 m
No. of Blades	3
Type of Tower	Steel tube / hybrid
Power Regulation	Pitch
Type of Generator	Double fed induction
Gearbox type	Standard three stages (1 x Planetary, 2 x Parallel shaft gears)
Hub Height	84 and 102 (standard hub height), 137(specific hub height selected for the Project)
Swept Area	12,469.0 m²
Cut in Wind Speed	3.0 m/s
Rated Wind Speed	13.0-21.0 m/s
Cut out Wind Speed	25.0 (de-rated between 22.0-25.0m/s)
IEC Class	IIIA

A.4. Project Owner(s)

Location/ Country	Project Owner(s)	Where applicable[6], indicate if the host country has provided approval (Yes/No)

[6]For example, *Project Coordination Form* is to be filled-in by Project Owners for projects located in Qatar. A written attestation from the host country's national focal point or the focal point's designee, as required by CORSIA (Refer section A.5 of the PSF guidelines).

Thailand	Korat Wind Energy Company Limited	No

A.5. Declaration of intended use of Approved Carbon Credits (ACCs) generated by the Project Activity

The Project Activity is expected to generate ACCs for a full 10-year crediting period and supply the credits to offset the following GHG emissions:

Period		Name of the Entities	Purpose and Quantity of ACCs to be supplied
From	To		
20/06/2018	19/06/2028	CORSIA	For offsetting Greenhouse gasses 860,110 tCO2 for 10-year period

Project owner confirms that the Carbon Credits (ACCs) generated from the Project Activity shall not be double counted under any other GHG mechanisms.

A.6. Additional requirements for CORSIA

Explained in Section E and F

Section B. Application of selected methodology(ies)

B.1. Reference to methodology(ies)

The United Nations approved consolidated baseline methodology applicable to this project is ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources”, Version - 20[7]
Following tools have been referred during the estimation of emission reduction calculations as per the methodology ACM0002.

- Tool to calculate the emission factor for an electricity system, Version 7.0[8].
- Tool for the demonstration and assessment of additionality, Version.7.0.0[9].
- Methodological tool “Common Practice” Version 03.1[10]
- Methodological tool “Investment Analysis” Version 11.0[11]

B.2. Applicability of methodology(ies)

[7] https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG
[8] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf
[9] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf
[10] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf
[11] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v11.0.pdf

The methodology ACM0002, Version 20.0 is applicable to the project activity under the following conditions:

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, 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 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	The project activity is the installation of a new grid 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 a 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	The proposed project activity is the installation of wind power plants/units. Therefore, the said criteria is not applicable

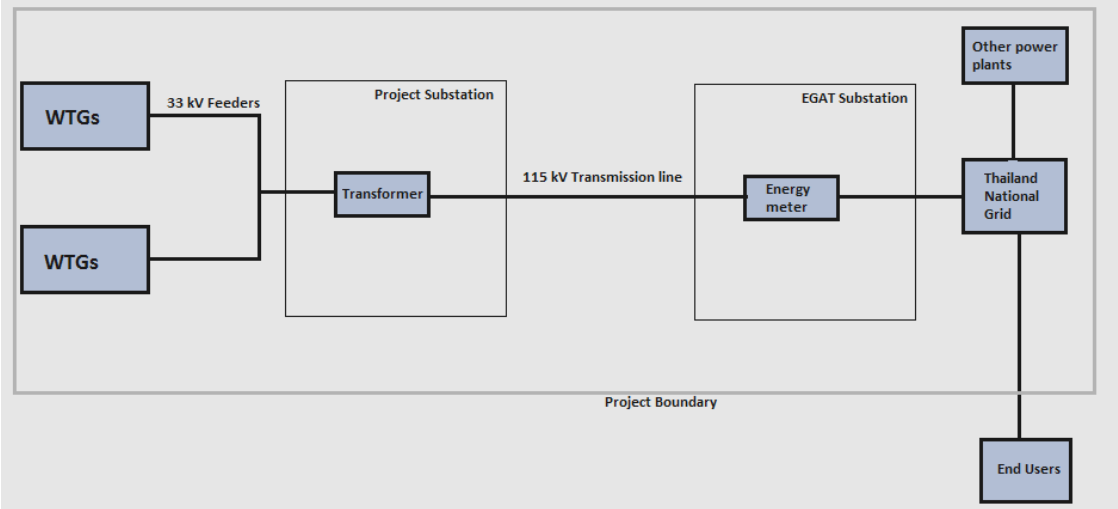
reservoirs, calculated using equation (3), is lower than or equal to 4 W/m2, all of the following conditions shall apply. (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4) is greater than 4W/m2; (ii) Water flow between reservoirs is not 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	
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, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	The proposed project activity is the installation of a wind power plants/units. Therefore, the said criteria is not applicable
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 plants/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 plants/units. Therefore, the said criteria is not applicable
In addition, the above applicability conditions, the applicability conditions of tool referred in the methodology ACM0002, version 20.0 has been referred here under:	
Tool 07: Tool to calculate the emission factor for an electricity system Version 7.0	
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).	The project activity is a greenfield wind power generation plant and hence, according to the applied methodology, 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 "TOOL07: Tool to calculate the emission factor for an electricity system".
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 wind power project, 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
Tool 01: Tool for the demonstration and assessment of additionality; Version 7.0.0,	
The use of the "Tool for the demonstration and assessment of additionality" is not mandatory for project participants when proposing new methodologies. Project participants may propose alternative methods to demonstrate additionality for consideration by the Executive Board. They may also submit revisions to approved methodologies using the additionality tool.	Since the applied technology is not a new methodology project proponent has applied this tool for the demonstration additionality in compliance with the tool. Refer to section B.5 of the PSF for the detailed applicability of this tool and additionality assessment. Hence this tool is applicable
Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	In line with the methodology requirement Project developer has applied this tool for the demonstration of additionality assessment. Hence this tool is applicable
Tool 24: Common Practice version 3.1	
This methodological tool is applicable to project activities that apply the methodological tool "Tool for the demonstration and assessment of additionality", the methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality", or baseline and monitoring methodologies that use the common practice test for the demonstration of additionality.	Project activity applies "Tool for the demonstration and assessment of additionality". Hence this tool is applicable.
Tool27: Investment analysis version 11.	
This methodological tool is applicable to project activities that apply the methodological tool "Tool for the demonstration and assessment of additionality", the methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality", the guidelines "Non-binding best practice examples to demonstrate additionality for SSC project activities", or baseline and monitoring methodologies that use the investment analysis for the demonstration of additionality and/or the identification of the baseline scenario.	Project activity applies "Tool for the demonstration and assessment of additionality". Hence this tool is applicable.

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

The project boundary includes the Wind generator, sub-stations, grid and all power plants connected to grid. The proposed project activity will evacuate power to the Thailand national grid. Therefore, the entire Thailand national grid and all connected power plants have been considered in the project boundary for the proposed project activity.



The project does not involve any other emissions sources not foreseen by the methodologies. The greenhouse gases and emission sources included in or excluded from the project boundary are shown in table below.

The table below provides an overview of the emissions sources included or excluded from the project boundary for determination of baseline and project emissions.

Source		GHG	Included?	Justification/Explanation
Baseline	Grid Connected Electricity Generation	CO_2	Yes	Main Emission Source
		CH_4	No	Minor Emission source
		N_2O	No	Minor Emission source
Project Activity	Greenfield wind Power Project activity	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH4
		N_2O	No	Project activity does not emit N_2O

B.4. Establishment and description of the baseline scenario

An Approved large-scale baseline CDM methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, Version 20.0.has been followed along with the “tool to calculate the emission factor for an electricity system, version 7.0” are used to establish the baseline scenario.

According to the methodology baseline scenario has been identified as “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 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 utilized for the assessment of additionality. Para 65 (b) of Project standard, v2, 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 2006. The Thailand adder tariff is specifically for renewable energy projects

The project activity involved setting up of wind Power generation Plant to harness the power of wind to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied to the electricity grid by the operation of grid-connected power plants (mainly by fossil fuel fired plants) and by the addition of new generation sources, as reflected in the combined margin (CM) calculations.

Hence, the baseline for the project activity is the equivalent amount of power from the national grid.

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)[12]
$EF_{grid,OM,y}$	0.5719 tCO_2/MWh	Operating margin CO_2emission factor for the project electricity system in	Calculated as the last 3 year (2014,2015 and 2016) generation-weighted average, sourced from Report „Thailand Grid Emission Factor for GHG Reduction

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

		year y	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_2emission 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 additionality of the proposed project activity is demonstrated by following the guidance provided in the GCC project Standard V 3.1.

As per the GCC Project Standard additionality can be demonstrated using the following two components

a) A legal requirement test
b) An Additionality Test either based on a Positive List test or a projects-specific additionality test.

a) Legal requirement test

As per the paragraph no 46 of the project standard V3.1 the project is not implemented by the force of law. This is a voluntary activity undertaken by the project owner without enforcing by any legal requirement in the host country. Hence project complies with the legal requirement test.

b) Additionality Test

As per the GCC Project standard V3.1 this project needs to be demonstrating the additionality test based on the Project specific additionality test.

Additionality has been demonstrated as per the applied methodology ACM0002 (Version 20.0). Methodology requires the project participant to determine the additionality based on “Tool for the demonstration and assessment of additionality”, Version 7.0.0.

The step-wise approach to establish additionality of the project activity has been followed, details of which are provided in the following paragraphs:

As per the applied methodology requirement, Additionality of the project activity is demonstrated using the Methodological tool "Tool for the demonstration and assessment of additionality" Version 07.0.0. The tool defines the following steps:

Sub Step 0: Demonstration whether the proposed project activity is the first-of-its-kind.
The proposed project activity is not the first of its kind as implementation of wind power project in the State is not first of its kind.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations
As per the applied ACM 0002 version 20.0; Para 22, *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 plant and by the addition of new generation sources.*
As the baseline scenario is prescribed by applied methodology, hence no further analysis is carried out to identify alternatives.

Step 2: Investment Analysis
As per para 29 of "Tool for the demonstration and assessment of additionality" it is determined that the proposed project activity is not an economically attractive or financially feasible option.
To conduct the investment analysis, Methodological tool: Investment analysis, version 11.0, EB 112 Annex 2 has been referred.

Sub-step 2a: Determine appropriate analysis method
As per "Tool for the demonstration and assessment of additionality" (version 07.0.0), for financial analysis of the project, the following three options are available:

Option I: Simple Cost Analysis
Option II: Investment Comparison Analysis
Option III: Benchmark Analysis

The project will generate revenues from sale of electricity; therefore, Option I is not applicable in line with para 32 of the Methodological tool: "Tool for the demonstration and assessment of additionality", version 7.0. Same applies to the Option II which is applied in case there are alternatives to the project activity as per para 42 of the "Tool for the demonstration and assessment of additionality", version 7.0.

Since, identified baseline for the proposed project activity is continuation of current practice (i.e. equivalent amount of energy would have been generated by grid electricity system through its currently operating power plants and by new capacity addition) and which is outside the direct control of the project participant, hence benchmark analysis (option III), where the returns on investment in the project activity are compared to benchmark returns that are available to any investors in the country is selected as the most appropriate method.

Sub-step 2b: Option III. Apply benchmark analysis

As per para 15 of Tool 27: Investment analysis, version 11.0 states that Required/expected returns on equity are appropriate benchmarks for equity IRR. The project participant has chosen benchmark analysis to demonstrate the additionality of the project. The project is promoted by private limited company and hence the return on equity and the risks associated with the investments for their shareholder is of primary concern. Hence, in order to analyse the financial viability of the project activity, the prime financial indicator that has been used is the post-tax equity IRR of the project activity.

Selection of Appropriate Benchmark

The benchmark has been considered in accordance with CDM Tool 27 "Investment Analysis" Version 11.0 EB 112 Annex 2, "The values in the table in the Appendix may also be used, as a simple default option".

Methodology deployed for arriving at a suitable value of Benchmark using Default Value has been described below:

- As the proposed project activity generates power utilizing wind energy, Group 1 as per para 5a of Appendix of EB 112 Annex 2 has been identified as a suitable category.

- The investment analysis has been carried out in Nominal terms. Accordingly, Default value as given in table under the Appendix, Tool 27 has been adjusted by adding suitable forecasted inflation rate taken from IMF world Economic database as no inflation forecast or inflation target published by Bank of Thailand (Central Bank of Thailand).

- Average forecasted inflation rate for the host country (Thailand) published by the IMF (International Monetary Fund) World Economic Outlook for the next five years has been considered

The decision-making year for the project is on September 2016. Hence applicable inflation rate has been chosen from the IMF databases accordingly for the estimation of resultant benchmark.

The benchmark has been computed in the following manner:

Default Value Benchmark:

The cost of equity is determined by selecting the values provided in the table of the Appendix, i.e. Default values for cost of equity (expected return on equity) in the 'Methodological tool: Investment analysis'.

The Required return on equity (benchmark) was computed in the following manner:

Nominal Benchmark[13] = {(1+Real Benchmark) *(1+Inflation rate)}-1

Where:
Default value for Real Benchmark = 10.04% (as per Appendix of EB 112, Annex 2)
Inflation Rate forecast for by (International Monetary Fund) World Economic Outlook database for Thailand.

Benchmark estimation:

The Cost of Equity has been considered using the "Methodological tool: Investment analysis" available at the time of decision making as well as the latest available value. As a conservative approach, the minimum value of benchmark has been considered as calculated using these 2 approaches.

Table under Appendix in EB 112, Annex 2 tool 27 version 11.0 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in Thailand = **10.04%**[14]

Thus, minimum cost of equity considered for calculation of Benchmark = 9.82%

5-year inflation Forecast for Thailand as IMF World Economic Outlook available at the time of investment decision and corresponding benchmark values is

Inflation rate for 5 years	Source
2.22%	World Economic Outlook database: April 2016[15]

Corresponding benchmark values applicable at the time of investment decision time:

Inflation Forecast	Benchmark
5 Years	5 Years
2.22%	12.48%

Sub-step 2c: Calculation and comparison of financial indicators

The period considered for Post Tax Equity IRR calculations is 25 years, which corresponds to the operational lifetime of the project activity.
Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, is added back to net profits for the purpose of calculating the financial indicator.

[13] As per Pg. 320 of Corporate Finance, Second Edition of Aswath Damodaran

[14] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v11.0.pdf

[15] https://www.imf.org/en/Publications/WEO/weo-database/2016/April/weo-report?c=578,&s=PCPI,PCPIPCH,PCPIE,PCPIEPCH,&sy=2016&ey=2021&ssm=0&scsm=1&scc=0&ssd=1&ssc=0&sic=0&sort=country&ds=.&br=1

Input values considered for the IRR calculation are provided below.

Particulars	Value	Unit	Source/Remarks
Capacity of the project	50	MW	Calculated
Plant Load Factor	34.50%	%	DPR
Annual Net generation	151.1100	GWh	Calculated
Project cost	4063.94	Million TBH	DPR
Debt	75%	%	DPR
Equity	25%	%	DPR
Debt	3047.96	Million TBH	Calculated
Equity	1015.99	Million TBH	Calculated
Interest rate	6.00%	%	DPR
Debt Repayment tenure	12.5	years	DPR
Moratorium	0.5	year	DPR
Operation and Maintenance per MW	1.40	Million TBH/MW	DPR
Operation and Maintenance	70.0	TBH Million	Calculated
Escalation in O & M	5%	%	DPR
Peak Tariff	4.22	TBH/kWh	DPR
Non-Preak Tariff	2.36	TBH/kWh	DPR
FT tariff (peak & non-peak)	(0.19)	TBH/kWh	DPR
Percentage of On-peak Sales	32.0%	%	Estimated based on the historical generation data of other projects
Percentage of Off-peak Sales	68.0%	%	Estimated based on the historical generation data of other projects
Depreciation Rate	4.00%	%	DPR
Corporate Tax 0-8 yrs	0.00%	%	DPR
Corporate Tax 9-13 yrs	10%	%	DPR
Corporate Tax 14-	20%	%	DPR

Post Tax Equity IRR for the project activities against the benchmark values are shown in table below. Thus, it is evident that the project is not financially attractive as the equity IRR is less below the benchmark value.

Post tax Equity IRR	Benchmark Value
4.26%	12.48%

Sensitivity Analysis

The robustness of the conclusion drawn above, namely that the project is not financially attractive, has been tested by subjecting critical assumptions to reasonable variation. As required by Annex 06 of EB 112, only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation. PP has identified the total revenue from the project activity is dependent on the Tariff, Plant Load Factor, Project Cost and O&M Costs constitute more than 20% of the project costs. These factors have been subjected to a 10% variation on either side and the results of the sensitivity analysis indicate that even after applying such variation the EIRR does not cross the benchmark.

Variation %	-10%	Normal	10%	Variation required to reach benchmark	Value required to reach benchmark
Tariff (INR/KWh)	2.68%	5.48%	8.26%	24.40%	5.285 THB/kWh (peak) & 2.948 THB/kWh (non-peak)
PLF (%)	2.86%	5.48%	8.08%	26.80%	43.75%
Project Cost (Mn INR)	7.75%	5.48%	3.68%	-24.80%	3056.08 Mn THB
O&M Cost (Mn INR)	6.06%	5.48%	4.87%	NA	NA

An analysis has been done to identify the percentage variation at which the financial indicators will equal/breach the benchmark and the probability of its occurrence. Based on sensitivity analysis it can be concluded that the proposed project activity is additional with reasonable variation in values and is not likely to reach the benchmark value. The occurrence of these events is unlikely for the following reasons:

a) **Tariff:** The Tariff rate of electricity used for investment analysis i.e Peak tariff of 4.2243 THB/kWh & Non peak tariff of 2.3567 THB/kWh is sourced from the DPR estimate applicable at the time of investment decision. The project will breach the benchmark value at a tariff variation of 24.4%. However, the actual tariff based on the PPAs signed is same as the tariff considered in the IRR calculation i.e .2243 THB/kWh & Non peak tariff of 2.3567 THB/kWh fixed for PPA tenure without any escalation which is much below the tariff value required breaching the benchmark value. Hence, 24.4% increase in tariff is unlikely.

b) **PLF:** The PLF used for investment analysis i.e 34.50% is sourced from the DPR estimate applicable at the time of investment decision and the IRR breach the benchmark value at a PLF variation of more than 26.8% increase in the estimated PLF. The increase in PLF value to breach the benchmark is highly unlikely as the estimated PLF is based on the annual wind energy density at a considered hub height of the WTGs. Equity IRR at normative PLF values are less than the

benchmark value and given the analysis above it's highly unlikely that PLF will increase above breaching value.

c) **Project Cost:** The project cost considered for investment analysis i.e., 4063.94 million THB. The cost is sourced from DPR which is based on the negotiations with Supplier. A variation of -24.8% is required for IRR to breach benchmark which is not possible as the project is already commissioned at higher cost than the required benchmark value with the EPC contractor in addition to the other costs for land, evacuation and administrative costs. The actual cost incurred in commissioning of the project is same as the estimated cost. Hence reduction of 24.8% is unlikely to happen.

d) **O&M Costs:** The sensitivity analysis reveals that O&M will breach the benchmark at negative values and is hypothetical case. Since the O&M cost is subject to escalation (as evidence by the O&M agreement) and also subject to inflationary pressure, any reduction in the O&M costs is highly unlikely.

The sensitivity analysis proves that varying the parameters does not lead to a Post Tax Equity IRR without carbon credits revenue, which will cross the benchmark value.

The carbon revenue from the project activity would provide significant number of returns from the sale of the Emission Reductions accrued from the project activity and in turn increase the financial attractiveness of the project activity and hence make the project activity more financially viable.

Step 3: Barrier analysis
Barrier analysis has not been used.

Step 4: Common practice analysis
Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB84, Annex 7:

(a) The projects are located in the applicable geographical area;
(b) The projects apply the same measure as the proposed project activity;
(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

Step (1): Calculate applicable capacity or output range as +/- 50% of the total design capacity or output of the proposed project activity:

The capacity of the project activity is 50 MW and hence the output range as per the guideline is selected to be 25 MW to 100 MW.

Step (2): Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

a) As the project is located in Thailand, therefore, the applicable geographical area is Thailand and projects in the host country Thailand have been chosen for analysis.
b) The projects applying same measure (i.e, only renewable energy through wind) are selected as the proposed project activity is wind power project.
   Therefore, all projects applying same measure (b) as the proposed project activity are candidates for similar projects.
c) The energy source used by the project activity is wind. Hence, only wind energy projects have been considered for analysis.
d) The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.
e) The capacity range of the projects is within the applicable capacity range for the chosen projects (25 MW to 100 MW)
f) The start date for the project is 02nd December 2016, As Kyoto Protocol was ratified by Thailand on 28/08/2002[16], and therefore projects which had started commercial operation between 28/08/2002 to 02nd December 2016 have been identified.

Numbers of Similar projects identified, which fulfill above-mentioned conditions are
N_{Wind} = 5[17]

Sl. No	Project Name	Capacity
1	First Korat Wind Co.,Ltd	90 MW
2	K.R.TWO Co.,Ltd.	90 MW
3	KaoKhor Win Power Co.,Ltd.	60 MW
4	WaTaBak Win Co.,Ltd	60 MW
5	PattaPalunglom Co.,Ltd.	50 MW

Step (3): *within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing*

[16] https://unfccc.int/node/61213

[17] https://www.egat.co.th/en/images/statistics/2559/eng-private-power-plant-1259.pdf

validation. Note their number N_{all}.

CDM/VCS/GS/GCC and EU-ETS project activities, which have got registered, submitted for registration or are under validation, have been excluded in this step. The list of the power plants identified is provided to the verifier. After excluding the registered, submitted for registration and under validation projects the total number of projects. List of projects have been submitted to verifier for verification.

Sl.No	Project Name	Capacity	GHG Mechanism registration No
1	First Korat Wind Co.,Ltd	90 MW	CDM-7650
2	K.R.TWO Co.,Ltd.	90 MW	CDM-7474
3	KaoKhor Win Power Co.,Ltd.	60 MW	CDM-5530
4	WaTaBak Win Co.,Ltd	60 MW	
5	PattaPalunglom Co.,Ltd.	50 MW	

After excluding the registered, submitted for registration and under validation projects the total number of projects,

N_{all}.= 2

Step (4): *within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}.*

From the projects identified above, those projects which employ "**different technologies**" have been excluded and the number of such projects has been identified as N_{diff}.

All the Nall wind power projects use the same wind technology. Hence,

N_{diff} = 0

Step (5): *calculate factor $F=1-N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.*

Calculate **$F = 1-N_{diff}/N_{all}$**

F = 1-(0/2) = **1**

$N_{all} - N_{diff}$ = 2 - 0 = 2

Outcome of Step 5:

As,

i. F = 0.5 which is greater than 0.2
ii. N_{all}-N_{diff} = 1; is not more than 3

Since* N_{all}-N_{diff} is less than 3, *the project is "not a common practice" within a sector in the applicable geographical area.

Conclusion:
As described above, project fulfils all necessary requirements of additionality specified in the 'Tool for the demonstration and assessment of additionality' v7.0.0. Hence, the project is additional.

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

As per the paragraph 54 of the methodology ACM0002 Version 20.0 emission reductions are calculated as follows

Emission Reductions

ERy=BEy−PEy

Where

ERy = Emission reductions in year *y* (t CO2e/yr)
BEy =Baseline emissions in year *y* (t CO2/yr)
PEy =Project emissions in year y (t CO2/yr)

Baseline Emissions

As per the approved consolidated Methodology ACM0002 version 20.0 that Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid- connected power plants. The baseline emissions are to be calculated as follows:

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

Where,

BE_y = Baseline emissions in year y (t CO_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 grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

AS per para 1 of ACM0002, version 20.0, when the project activity is installation of Greenfield

power plant, 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)

The $EG_{facility, y}$ is estimated from the PLF provided as per the third party engineering company report as below:

$EG_{facility, y}$ (MWh)
151110

As per the methodology combined margin grid emission factor has been calculated as per the **"Tool to calculate the grid emission factor for an Electricity System"** version 07.

Thailand Grid Emission Factor for GHG Reduction Project/Activity dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation)[18] has been used for the calculation of emission factor.

As per the "Tool to calculate the emission factor for an electricity system" Version 07.0, EB 100, Annex 4, the following steps have been followed.

(a) **Step 1:** Identify the relevant electricity systems;
(b) **Step 2:** Choose whether to include off-grid power plants in the project electricity system (optional);
(c) **Step 3:** Select a method to determine the operating margin (OM);
(d) **Step 4:** Calculate the operating margin emission factor according to the selected method;
(e) **Step 5:** Calculate the build margin (BM) emission factor;
(f) **Step 6:** Calculate the combined margin (CM) emission 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

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

transmission lines throughout the country11 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)

Only grid connected power plants are included in the calculation, as per Option I of the "Tool to calculate the emission factor for an electricity system" version 07.0.0

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

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

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**

Data 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 CDM-PDD to the verifier for validation.

Step 4: Calculate the operating margin emission factor ($EF_{grid,OMSimple,y}$) according to the selected method

The simple OM emission factor 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 lowcost/must-run power plants/units, and based on the fuel type(s) and total fuel consumption of the project electricity system, as follows:

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

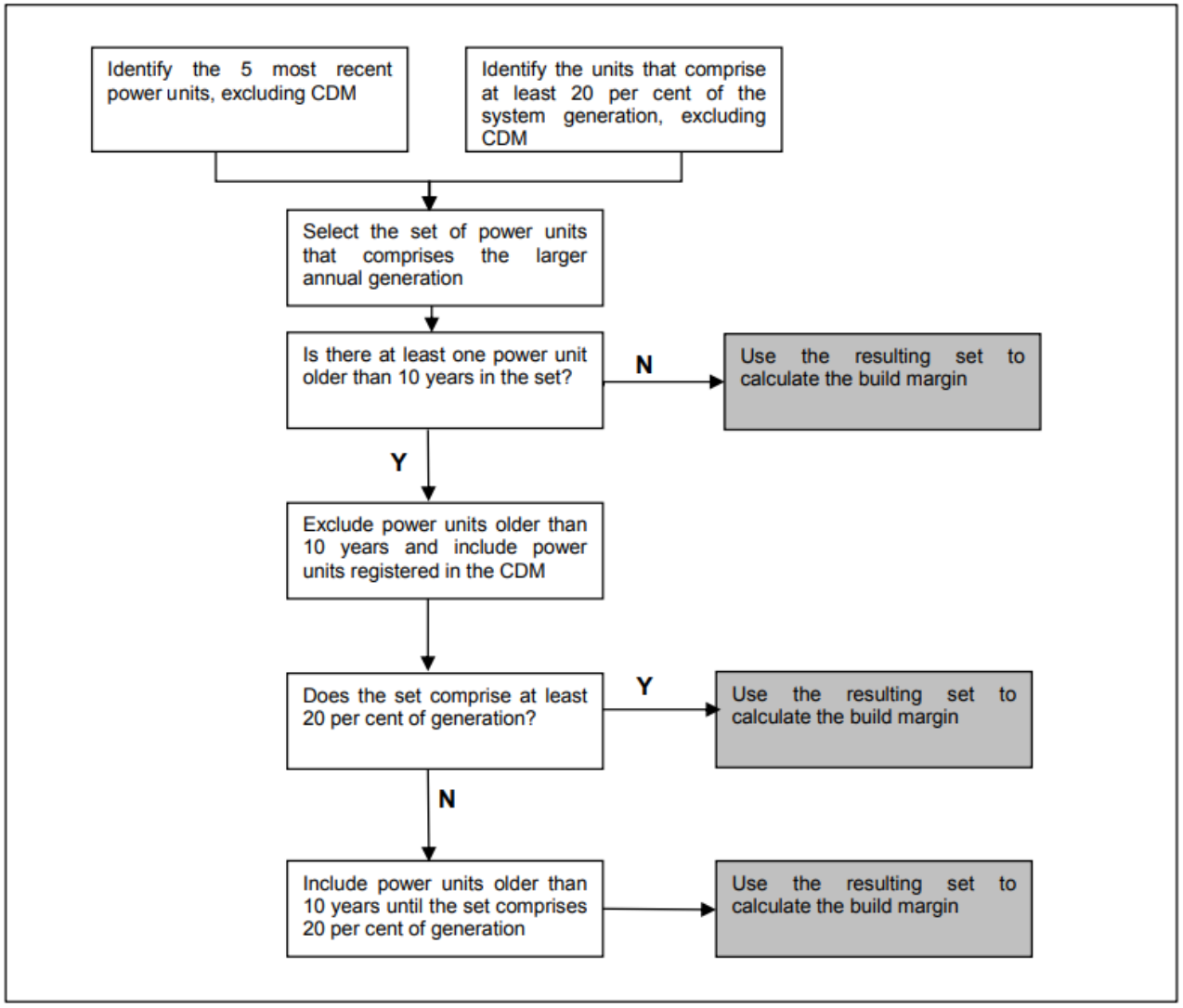
Where:
$EF_{grid,OMsimple,y}$ Simple operating margin CO2 emission factor in year y (tCO2/MWh)
$EG_{m,y}$ - Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$FC_{i,y}$ - Amount of fuel type i consumed in the project electricity system in year y (mass or volume unit)
$NCV_{i,y}$ - Net calorific value (energy content) of fuel type i in year y (GJ/mass or volume unit)

$EF_{CO2,i,y}$ - CO_2 emission factor of fuel type i in year y (t CO2/GJ)
EG_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 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

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

$EF_{OM,y}$ = 0.5719 tCO2/MWh

STEP 5: Calculate the build margin emission factor ($EF_{BM,y}$)
The project participants have chosen Option I, i.e., fixing 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 verifier for validation. 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 tCO2/MWh

STEP 6: Calculate the combined margin (CM) emissions factor

The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for intermittent and non-dispatch able generation types such as wind and solar photovoltaic, the Tool to calculate the emission factor for an electricity system, Version 07.0.0, EB 100, Annex 4, allows to weigh the operating margin and Build margin at 75% and 25%,

respectively for wind and solar projects and 50% and 50%, respectively for hydro and biomass projects.

The baseline emission factor is calculated using the combined margin approach as described in the following steps:

Calculation of Baseline Emission Factor EF_y

The baseline emission factor **EF_y** is calculated as the weighted average of the Operating Margin emission factor **($EF_{OM,y}$)** and the Build Margin emission factor **($EF_{BM,y}$)**:

$EF_y = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y}$

Where,

W_{OM} 75% weight for wind energy projects
W_{BM} 25% weight for wind energy projects
$EF_{OM,y}$ calculated as described in Steps 3&4 above (tCO_2/MWh)
$EF_{BM,y}$ calculated as described in Steps 5 above (tCO_2/MWh)

Baseline Emission factor (Thailand national grid) = 0.75*0.5719 + 0.25*0.5609
= 0.5692 tCO2/MWh

The baseline emission factor is ex-ante parameter and will remain constant throughout the crediting period.

$EF_{grid,,}$	=	Combined Margin Grid Emission Factor = 0.5692 **tCO_2/MWh**

Project Emissions:
As per the approved consolidated Methodology ACM0002 (Version 20.0) para 31: “For most renewable energy power generation project activities, PEy = 0. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

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

PEy = Project emissions in year y (t CO_2e/yr)
$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO_2/yr)
PE_{GP},y = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (t CO2e/yr)
PE_{HP},y = Project emissions from water reservoirs of hydro power plants in year y (tCO_2e/yr)

As the project activity is the installation of a new grid-connected wind Power plant and does not involve any project emissions from fossil fuel, operation of dry, flash steam or binary geothermal power plants, and from water reservoirs of hydro power plants. Therefore $PE_{FF,y}$, $PE_{GP,y}$, $PE_{HP,y}$ are equal to zero and thus, PEy = 0.

Leakage Emissions:
No other leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g., extraction, processing, transport etc.) are neglected.

Hence Emission reductions will be calculated as per the below equation

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

B.6.2. Data and parameters fixed ex ante

Data / Parameter Table 1.

Data / Parameter:	$EF_{grid,OM,y}$
Methodology reference	ACM0002
Data unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor in year y of Thailand national Grid.
Measured/calculated /default	Calculated
Data source	Report „Thailand Grid Emission Factor for GHG Reduction Project/Activity" dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation)
Value(s) of monitored parameter	0.5719
Measurement/ Monitoring equipment (if applicable)	Calculated in line with "*Tool to calculate the emission factor for an electricity system*" using data from Report „Thailand Grid Emission Factor for GHG Reduction Project/Activity" dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation) The value used is calculated ex-ante as generation based weighted average of last three years of the operating margin provided in the CEA database. Weighted average = $\sum_{i=1 \text{ to } n}$ (Net generation in operating margin in year i * Simple operating margin in year i)/$\sum_{i= 1 \text{ to } n}$ (Net generation in operating margin of year i)
Measuring/reading/ recording frequency	Not Applicable as the value is fixed ex-ante for entire crediting period.

(if applicable)	
Calculation method (if applicable)	Calculated in line with “Tool to calculate the emission factor for an electricity system”, version 7
QA/QC procedures	NA
Purpose of data	Baseline Emission calculation
Additional comments	The operating margin emission factor is a 3-year generation-weighted average (2014-2016). The operating Margin is calculated ex ante and fixed during the crediting period

Data / Parameter:	$EF_{grid,BM,y}$
Methodology reference	ACM0002
Data unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y of Thailand national Grid
Measured/calculated /default	Calculated
Data source	Report „Thailand Grid Emission Factor for GHG Reduction Project/Activity“ dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation)
Value(s) of monitored parameter	0.5609
Measurement/ Monitoring equipment (if applicable)	Calculated in line with “*Tool to calculate the emission factor for an electricity system*” using data from Report „Thailand Grid Emission Factor for GHG Reduction Project/Activity“ dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation) The value is calculated ex-ante as most recent build margin provided by the Greenhouse Gas Management Organisation database
Measuring/reading/ recording frequency (if applicable)	Not Applicable as the value is fixed ex-ante for entire crediting period.
Calculation method (if applicable)	Calculated in line with “Tool to calculate the emission factor for an electricity system”, version 7
QA/QC procedures	NA
Purpose of data	Baseline Emission calculation
Additional comments	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.

Data / Parameter:	$EF_{grid,CM,y}$
Methodology reference	ACM0002

Data unit	tCO_2/MWh
Description	Combined Margin CO2 emission factor in year y of Thailand National Grid
Measured/calculated /default	Calculated
Data source	Report „Thailand Grid Emission Factor for GHG Reduction Project/Activity" dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation)
Value(s) of monitored parameter	0.5692
Measurement/ Monitoring equipment (if applicable)	The date has been considered in accordance to the Tool to calculate emission factor of an electricity system. The tool guides to take 75% weightage of EF_{grid}, OM_{simple}, & 25% weightage of $EF_{grid,BM,y}$.
Measuring/reading/ recording frequency (if applicable)	Not Applicable as the value is fixed ex-ante for entire crediting period.
Calculation method (if applicable)	Calculated in line with "Tool to calculate the emission factor for an electricity system", version 7
QA/QC procedures	NA
Purpose of data	Baseline Emission calculation
Additional comments	The combined margin would be calculated ex-ante and fixed for the entire crediting period.

B.6.3. Ex-ante calculation of emission reductions

The ex-ante emission reductions (ERy) for the project activity are calculated as follows

$$ER_y = BE_y – PE_y – LE_y$$

Where,
ERy = Emission Reduction in tCO2/year
BEy = Baseline emission in tCO2/year
PEy = Project emissions in tCO2/year
LEy = Leakage Emissions in tCO2/year

Baseline Emissions (BEy):
The baseline emissions are the product of electrical energy baseline $EG_{PJ,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

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

AS per para 4 of ACM0002, version 20.0, when the project activity is installation of Greenfield power plant, then:

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

Where,

$EG_{facility,y}$ = Total quantity of net electricity delivered to the grid in year y (MWh/yr)
$EF_{grid,CM,y}$ = Baseline grid emission factor (t CO_2/MWh)
= 0.5692 t CO_2/MWh

The $EG_{facility, y}$ is estimated from the PLF provided as per the third-party engineering company report as below:

$EG_{facility, y}$ (MWh)
151110

As per section B.6.1 above, the combined margin grid emission factor ($EF_{grid,CM,y}$) is 0.9346 tCO_2/MWh
Hence the annual baseline emission is calculated as below:

$EG_{facility, y}$ (MWh)	**Emission factor (tCO2/MWh**	**Baseline emission (tCO2)**
151110	0.5692	86011

$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$ = 151110 MWh **x** 0.5692 tCO_2/MWh = **86011 tCO_2**

Project Emissions (PEy):

As explained in the above section B.6.2 Project emissions from the project activity is considered Zero.

PEy = 0

Leakage Emissions (LEy):

As explained in the above section B.6.2 Project emissions from the project activity is considered Zero.

LEy =0
Emission Reductions (ERy):

ERy = BEy-PEy-LEy

Since the project and leakage emissions are estimated as zero

$$ERy = BEy = 86{,}011\ tCO_2$$

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

Year	Baseline emissions	Project emissions	Leakage	Emission reductions
	(tCO_2 e)	(tCO_2 e)	(tCO_2 e)	(tCO_2 e)
20-Jun-2018 to 19-Jun-2019	86,011	0	0	86,011
20-Jun-2019 to 19-Jun-2020	86,011	0	0	86,011
20-Jun-2020 to 19-Jun-2021	86,011	0	0	86,011
20-Jun-2021 to 19-Jun-2022	86,011	0	0	86,011
20-Jun-2022 to 19-Jun-2023	86,011	0	0	86,011
20-Jun-2023 to 19-Jun-2024	86,011	0	0	86,011
20-Jun-2024 to 19-Jun-2025	86,011	0	0	86,011
20-Jun-2025 to 19-Jun-2026	86,011	0	0	86,011
20-Jun-2026 to 19-Jun-2027	86,011	0	0	86,011
20-Jun-2027 to 19-Jun-2028	86,011	0	0	86,011
Total	**860110**	0	0	**860110**
Total number of crediting years	10			
Annual Average over the crediting period	**86011**	0	0	**86011**

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter:	$EGf_{acility,y}$
Methodology reference	ACM0002
Data unit	MWh/Year
Description	Quantity of net electricity generation supplied by the project (wind) plant/unit to the grid in year y
Measured/calculated/default	Measured & calculated
Data source	Monthly Energy Meter reading
Value(s) of monitored parameter	151110
Measurement/ Monitoring equipment	Data Type: Measured & Calculated. Monitoring equipment: Energy meters of accuracy class 0.2s

	Archiving Policy: Paper & Electronic. Location of Energy Meter: EGAT/PEA Substation These meters are two-way meter through which export and import data will be continuously monitored. These data will be printed and recorded on a monthly basis. Additionally, back up meter also installed.
Measuring/reading/ recording frequency	Measurement: Continuous Recording: Monthly
Calculation method (if applicable)	The Net electricity supplied to the grid by each wind project is estimated as below Net electricity = Export – Import
QA/QC procedures	The export reading shall be crosschecked with the Invoice raised by the developer to EGAT/PEA The import reading shall be crosschecked with the invoice raised by EGAT/PEA to developer. The meter(s) shall be calibrated and maintained by the EGAT/PEA. The meters will be calibrated at least once in a year by EGAT/PEA/authorised representative. Meter & Calibration Details are provided below this table.
Purpose of data	Baseline Emission Calculations.
Additional comments	-

Energy Meter Details:

Paramater	**Details**
Meter Number	Main: 51515178 Check: 51515179
Accuracy	0.2s
Location	Sikhiu 2 Substation
Calibration frequency	1 Year

B.7.2. Monitoring-program of risk management actions

There were no harm identified form the project and hence no mitigations measures are applicable.

B.7.3. Sampling plan

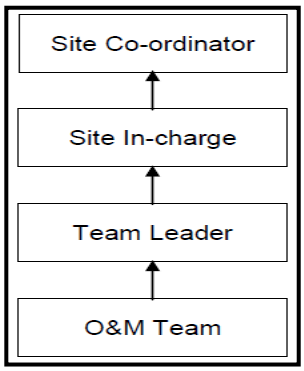
No Sampling plan is required.

B.7.4. Other elements of the monitoring plan

Project developer has entered into agreement with the respective WTG Suppliers for the operation and maintenance of WTGs. And the wind project developer has entered into agreement with the O&M contractor for the operation and maintenance of the project. O&M contractor will provide a monthly report, which includes generation data, major breakdown events and machine availability. Project manager is responsible for recording of monthly meter readings of export and import. Monthly power export and import data will be sent regularly to site in charge of each project separately.

Monitoring roles and responsibilities:

The data for the project is compiled by the O&M Contractor and subsequently stored by the PP, the reporting and data flows as per the below mentioned flow chart starting from Site O&M team which monitors day to day operational data and monthly recording. The reporting responsibilities for the project are described below;



The Site In-charge will be responsible for carrying out internal auditing and QA/QC. All the values from generation record will be checked with Monthly Energy reading report and invoices for consistency. In case there are any non-conformances identified. The Site In-charge will investigate the error and revise the record to correct it. In any case where values have slightest of variation in different records the most conservative value will be taken in the project monitoring report.

Personal Training:

The project employs qualified and experienced persons for plant operation. The training period shall be for three months, as this would be adequate and necessary to ensure proper imparting of the objective. The training course will be thoroughly and meticulously designed, highlighting the objectives, salient features, operational aspects and trouble shooting.

Emergency preparedness:

In case Main meter or Check meter is found to be outside the acceptable limits of accuracy or faulty or not functioning properly, it will be repaired, recalibrated or replaced as soon as possible. In the event that the Main meter is not in service as a result of maintenance, repairs or testing, the Check meter will be used for readings

Data recording & archiving: The project proponent shall maintain data both in electronic form and hard copies. The monitored data shall be archived till 2 years after the completion of crediting period.

Monitoring Process at project site
Developer will monitor the quantity of electricity exported to the grid and imported to the project activity using the electricity meters installed in the wind power plant, which undertaken by EGAT. Both electricity meters will measure the amount of electricity continuously and record electronically. The O&M operator also manually record amount of the electricity import and export meter to the grid from meters in the log book monthly. The monitoring reports will be checked and discussed periodically.

All monitored data will be stored for at least two years after the end of crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Oversight and accountability:
The possibility of oversight is unlikely as the energy meter readings are recorded jointly by PP and EGAT/PEA which is the basis for the electricity billings. Also a backup meter is available to crosscheck any considerable difference in the energy reading.

Internal auditing and QA/QC
No requirement of internal audit for the data monitored as the data is measured by the energy meter installed by EGAT (government authority) and the reading is recorded every month by jointly by PP & representative from EGAT. The main energy meter readings are verified against the reading of the backup meter to check any considerable variation. In case, considerable variation found, then either main meter reading or check meter reading whichever lower will be considered. The electricity readings recorded are used for electricity invoicing to EGAT/PEA. Hence, the data collected is of high accuracy and authorized by EGAT/PEA.

Handling Non-conformities
Not applicable as the energy meter recording is done my EGAT and hence no internal audit will be carried out to verify the data.

Section C. Start date, crediting period type and duration

C.1. Start date of the Project Activity

As per the paragraph 38 of the project standard V3.0, start of commercial operations has been considered as the start date. Hence project commissioning date (COD), on which project is connected to grid and started generating power and exporting to the grid there by started generating GHG emission reductions is considered as start date.

Start date of the project activity is 20/06/2018 which is the commissioning date

Since the project start date is after 1st January 2016. Hence complies with the GCC project standard guidelines.

C.2. Expected operational lifetime of the Project Activity

25 Years 00 Months.

C.3. Crediting period of the Project Activity

C3.1. Fixed crediting period

The crediting period is fixed crediting period for 10 Years.

C3.2. Start date of the crediting period

20/06/2018

C3.3. Duration of the crediting period

10 years from 20/06/2018 to 19/06/2028

Section D. Environmental impacts

D.1. Analysis of environmental impacts

The project activity does not involve any major construction activity. It primarily requires the installation of WTGs, interfacing the generators with the National Electricity Board by setting up HT transmission lines and installation of other accessories. Wind Energy project activity operations do not result in direct air pollution, noise pollution. Thus, there is no any significant impact due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

D.2. Environmental impact assessment

As per the Enhancement and Conservation of National Environment Quality Act B.E. 2535 (1992) wind power projects in Thailand do not require an Environmental Impact Assessment ("EIA") study. However, based on the regulation of the ERC, wind power projects with a capacity of more than 1MW require an Initial Environmental Examination ("IEE") report. This includes public consultation activities and adherence to a Code of Practice ("CoP") as a guideline for project owners before construction phase to make sure that projects will not contribute to negative environmental impact. Project developer has prepared an IEE report for the project and submitted for verification.

1. A study on the existing environment shows that the construction and operation period would not affect much change on the physical environment, such as the terrain, soil characteristics and geology.
2. The project doesn't impact the air quality during the operation of the life time of the project.

3. Noise level during the operation of the WTGS are very minimum and since all the WTGs are installed away from the villages it doesn't affect the quality of life.
4. The study on the biological environment shows that the project's construction and development is expected to have a low impact on forest and wildlife resources.
5. The results of the study on human use values show that the development/construction and operation phases of the project will not cause any impact on land use, agriculture, waste management and public utilities in the project and adjacent areas.
6. The study shows that revenue will be allocated to governmental agencies at the state and local levels as long as the project continues on the land which contributes to the social and economic issues.
7. The development of the project is expected to have no significant impact on tourist attractions and archaeological sites that are located in the study area. Local people in the area are expected to view the project as new potential attraction that would help to draw tourist.

Overall, the IEE report concludes that implementation of the wind power project does not have any adverse impacts on the geology, Air quality, Noise quality, Human values, social and economic issues in the project area.

Section E. Environmental and social safeguards

The main purpose of the environment and social safeguard assessment is to identify, evaluate and manage environmental and social impacts that may arise due to implementation and operation of the project the wind power project

E.1. Environmental safeguards

>>

Impact of Project Activity on		Information on Impacts, Do-No-Harm Risk Assessment and Establishing Safeguards									Project Owner's Conclusion	
		Description of Impact *(both positive and negative)*	**Legal requirement / Limit**	**Do-No-Harm Risk Assessment**			**Risk Mitigation Action Plans**		**Do-No-Harm Residual Risk Assessment**		**Self-Declaration**	
				Not Applicable *(No actions required)*	**Harmless** *(No actions required)*	**Harmful** *(Actions required)*	**Operational Controls**	**Program of Risk Management Actions**	**Re-evaluate Risks**	**Monitoring**	**Explanation of Conclusion**	**The Project Activity will not cause any harm**
Environmental impacts on the identified categories[19] indicated below.	*Indicators for environmental impacts*	*Describe anticipated environmental impacts, both positive and negative from all sources (stationary and mobile), that may result from the Project Activity, within and outside the project boundary, over which the Project Owner(s) has control, and beyond what would reasonably be expected to occur in the absence of the Project Activity.*	*Describe the applicable national regulatory requirements /legal limits related to the identified risks of environmental impacts.*	*If no environmental impacts are anticipated, then the Project Activity is unlikely to cause any harm (is safe) and shall be indicated as **Not Applicable** (No actions required)*	*If environmental impacts are anticipated, but are expected to be in compliance with applicable national regulatory requirements/ below the legal limits, then the Project Activity is unlikely to cause any harm (is safe) and shall be indicated as **Harmless** (No actions required)*	*If environmental impacts are anticipated that will not be in compliance with the applicable national regulatory requirements or are likely to exceed legal limits, then the Project Activity is likely to cause harm (may be un-safe) and shall be indicated as **Harmful** (Actions required).*	*Describe the operational controls and best practices, focusing on how to implement and operate the Project Activity, to reduce the risk of impacts that have been identified as **Harmful**.*	*Describe the Program of Risk Management Actions (refer to Table 3), focusing on additional actions (e.g., installation of pollution control equipment) that will be adopted to reduce the risk of impacts that have been identified as **Harmful**.*	*Re-evaluate risks after Risk Mitigation Action Plans have been developed (refer to previous two columns) for impacts that have been identified as Harmful. Indicate whether the risks have been eliminated or reduced and, where appropriate, indicate them as **Harmless** (No actions required)*	*Describe the monitoring approach and the parameters to be monitored for each impact that has been identified as Harmful and described in the PSF (refer to Table 3).*	*Describe how the Project Owner has concluded that the Project Activity is likely to achieve the identified Risk Mitigation Action Plan targets for managing risks to levels that are unlikely to cause any harm.*	*Confirm that the Project Activity risks of negative environmental impacts are expected to be managed to levels that are unlikely to cause any harm (Mark +1 for **Yes** or and -1 for **No**)*
Environmental Safeguards												
Environment - *Air*	*SO_x emissions*	The wind power project does not cause any	National Environmental Board No.36 B.E.2553	Not applicable.	No action required.	No action required	Not applicable	Not Applicable	Not Applicable	Not Applicable	According to the National Environmental Board notification 36 B.E.2553 (2010) Wind power plants in Thailand does not require any EIA and excluded from getting consent	NA

[19] sourced from the CDM SD Tool and the sample reports are available (https://www4.unfccc.int/sites/sdcmicrosite/Pages/SD-Reports.aspx)

		SOx emissions in the project scenario. However, in the baseline scenario (grid) some of the fossil fuel power plants may have emitted SOx emissions on which data is not available and can't be quantified.	(2010) on Ambient Air Quality Standard (PM2.5).							to operate against any pollution control standards. However, the in the baseline scenario (grid) some of the fossil fuel power plants may have emitted SOx emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	
	NO_x emissions	Not Applicable	National Environmental Board No.36 B.E.2553 (2010) on Ambient Air Quality Standard (PM2.5).	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	According to the National Environmental Board notification 36 B.E.2553 (2010) Wind power plants in Thailand does not require any EIA and excluded from getting consent to operate against any pollution control standards. However, the in the baseline scenario (grid) some of the fossil NA Project Submission Form 78 of 119 fuel power plants may have emitted NOx emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	Not Applicable
	CO_2 emissions	The project reduces the CO2 emissions from entering into atmosphere by generating power from wind energy which would have been otherwise generated from the Fossil fuel-based power plants in the absence of project activity which	National Environmental Board No.36 B.E.2553 (2010) on Ambient Air Quality Standard (PM2.5).	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	The generated electricity by the project activity will be continuously measured and the related CO_2 emission reduction will be calculated according to the applied methodology ACM0002.	According to the National Environmental Board notification 36 B.E.2553 (2010) Wind power plants in Thailand does not require any EIA and excluded from getting consent to operate against any pollution control standards. However, in the baseline scenario (grid) some of the fossil fuel power plants may have emitted CO2 emissions, which has been calculated by the combined margin emission factor as mentioned in the PSF. Therefore, emission reductions are expected to be reduced which will be regularly monitored and verified ex-post and therefore is eligible to be	+1

		has been calculated by the combined margin emission factor as mentioned in the PSF									scored.	
	CO emissions	Not Applicable	National Environmental Board No.36 B.E.2553 (2010) on Ambient Air Quality Standard (PM2.5).	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	to the National Environmental Board notification 36 B.E.2553 (2010) Wind power plants in Thailand does not require any EIA and excluded from getting consent to operate against any pollution control standards. However, the in the baseline scenario (grid) some of the fossil fuel power plants may have emitted CO emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	Not Applicable
	Suspended particulate matter (SPM) emissions	Not Applicable	National Environmental Board No.36 B.E.2553 (2010) on Ambient Air Quality Standard (PM2.5).	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Fly ash emissions	Not Applicable	National Environmental Board No.36 B.E.2553 (2010) on Ambient Air Quality Standard (PM2.5).	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	to the National Environmental Board notification 36 B.E.2553 (2010) Wind power plants in Thailand does not required any EIA and excluded from getting consent to operate against any pollution control standards. However, the in the baseline scenario (grid) some of the fossil fuel power plants may have emitted fly ash emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	NA
	Non-Methane Volatile Organic	Not Applicable	National Environmental Board No.36 B.E.2553 (2010) on	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	to the National Environmental Board notification 36 B.E.2553 (2010) Wind power plants in Thailand does not required any EIA and excluded from getting	Not Applicable

	Compounds (NMVOCs)		Ambient Air Quality Standard (PM2.5).								consent to operate against any pollution control standards. However, the in the baseline scenario (grid) some of the fossil fuel power plants may have emitted NM/VOCs emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored	
	Odor emissions	Not Applicable	National Environmental Board No.36 B.E.2553 (2010) on Ambient Air Quality Standard (PM2.5).	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	to the National Environmental Board notification 36 B.E.2553 (2010) Wind power plants in Thailand does not require any EIA and excluded from getting consent to operate against any pollution control standards. However, the in the baseline scenario (grid) some of the fossil fuel power plants may have emitted Odor emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	Not Applicable
	Noise Pollution	Since the wind power project contains the rotational blades with mechanical gear it will create some noise in the region during some times when the wind shear is changing its direction. Hence it may has the negative impact on the local people.	Thai noise standard Notification of Environmental Board No. 15 B.E. 2540 (1997) under the Conservation and Enhancement of National Environmental Quality Act B.E. 2535 (1992) and Notification of Pollution Control Department, Maximum Sound Level (Lmax) should not exceed 115 dB(A)	Not Applicable	Harm less Project proponent has chosen the location away from the local habitat. There is no settlement with in 500m to 1 KM radius from the project boundary. Hence the noise levels in the residential area	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Noise pollution levels cannot be monitored. However, Project owner will keep interview the local people and maintain the grievance register at the project site office and local public places to register any compliant/concerns regarding the project activity.	Wind turbines do make some noise. The carefully designed rotor blades with low rotational speed along with good noise insulation generator help limit noise emission. Typically, at 200 m the sound from a modern, medium-sized wind turbine would be about 45 dB, quieter than a typical living room. At 400 m, the sound would be no louder than leaves rustling in a gentle breeze. By keeping enough distance from built-up or other noise sensitive areas, noise pollution is avoided. Existing ambient noise levels are typical for a rural area with a small population. Noise sources may include wind, birds, tractors, motor bike and vehicle. Project owner has already chosen the project location away from the local habitat to	Though the impact is negative on the environment since the project owner has mitigated the possibility of the risk of impact during the project implementation this indicator is scored as (0).

					nearer to the project area is within the statutory limits of the host country. Hence there is no impact on the society due to the implementation of the projects activity. Hence						mitigate the reach of noise to the local village people. However, Project owner will keep interview the local people and maintain the grievance register at the project site office and local panchayat office to register any compliant/concerns regarding the project activity.	
	Others	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Add more rows if required											
Environment *- Land*	*Solid waste Pollution from Plastics*	Not Applicable	Hazardous Substance Act, B.E. 2535 (1992)	Not Applicable	No Action required	No Action required	Not Applicable	Not Applicable	No Action required	Not Applicable	No significant plastic waste is expected from the project activity during operational phase Hence, this parameter will not be scored.	Not Applicable
	Solid waste Pollution from Hazardous wastes	Not Applicable	Hazardous Substance Act, B.E. 2535 (1992)	Not Applicable	No Action required	No Action required	Not Applicable	Not Applicable	No Action required	No Action required	No significant solid waste will be generated from the project. However, project management will follow following measures 1. Provide separate containers for 3 types of waste i.e., general wastes, recyclable wastes and hazardous waste. – 2. Collect wastes in appropriate containers with cover lid, separate by type of waste before contacting the agencies authorized by the government to pick up for further disposal. – 3. Reuse the recycle wastes	Not Applicable

											as much as possible or collect and sell to buyers 4. proper disposal of Hazardous Waste (DG oil, if DG is installed) through actual user, waste collector or operator of the disposal facility, in accordance with the regulatory guidelines. Hence, this parameter will not be scored.	
	Solid waste Pollution from Bio-medical wastes	Not Applicable	Hazardous Substance Act, B.E. 2535 (1992)	Not Applicable	No Action required	No Action required	Not Applicable	Not Applicable	No Action required	Not Applicable	No significant bio-medical waste will be generated from the project activity. Hence,, this parameter will not be scored.	Not Applicable
	Solid waste Pollution from E-wastes	Not Applicable	Hazardous Substance Act, B.E. 2535 (1992)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable			Being the wind power project no significant E- waste will be generated from the project activity. impact. Hence, this parameter will not be scored.	Not Applicable
	Solid waste Pollution from Batteries	Not Applicable	Hazardous Substance Act, B.E. 2535 (1992)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Solid waste Pollution from end of life products/ equipment	Not Applicable	Hazardous Substance Act, B.E. 2535 (1992)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Project management is responsible to maintain records and dispose all products after ending lifecycle as per applicable law and it will not applicable for the project activity Hence, this parameter will not be scored	Not Applicable
	Soil Pollution from Chemicals (including Pesticides , heavy metals, lead, mercury)	Not Applicable	Hazardous Substance Act, B.E. 2535 (1992)	Not Applicable	No action required	No action required	Not Applicable	Not Applicable	No action required	Not Applicable	No significant soil pollution from chemicals during operation phase of the project activity However, in the baseline scenario (grid) some of the fossil fuel power plants may have emitted soil emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	Not Applicable
	Soil erosion	Not Applicable	Hazardous Substance Act, B.E. 2535 (1992)	Not Applicable	No action required	No action required	Not Applicable	Not Applicable	Not Applicable	No action required	There is no chance of soil erosion during operation phase of the project activity However, the in the baseline scenario	Not Applicable

											(grid) some of the fossil fuel power plants may have emitted soil erosion emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	
	Others	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Add more rows if required											
Environment *- Water*	*Reliability/ accessibility of water supply*	Not Applicable	Notification of the Industrial Estate Authority of Thailand No.45 B. E.2541 (1998) regarding Industrial Effluent Standard for Industrial Estate.	Not Applicable	No Action required	No Action required	Not Applicable	Not Applicable	Not Applicable	No Action required	Water requirement is nill for the wind power projects. However, in the baseline scenario (grid) some of the fossil fuel power plants may have emitted accessibility of water emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	Not Applicable
	Water Consumption from ground and other sources	Not Applicable	No standard available	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No ground water will be consumed in all sites of the project activity & necessary permission to be obtained from concerned local authority in case use ground water in future. However, in the baseline scenario (grid) some of the fossil fuel power plants may have emitted water consumption emissions, on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	Not Applicable
	Generation of wastewater	Not Applicable	No.45 B. E.2541 (1998) regarding Industrial Effluent Standard for Industrial Estate.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No waste water will be generated from the wind power projects. However, The project has methods to manage wastewater through construction of temporary	Not Applicable

											water drainage system along the same line with permanent water drainage system for rainfall drainage. Moreover, the project will provide portable toilets for labourers to avoid the release of sewage within the project area. Therefore, the impacts on surface water and groundwater are considered unlikely to cause environmentimpact.. However, the in the baseline scenario (grid) some of the fossil fuel power plants may have generation of waste water on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	
	Wastewater discharge without/with insufficient treatment	Not Applicable	No.45 B. E.2541 (1998) regarding Industrial Effluent Standard for Industrial Estate.	Not Applicable	No action required	Not Applicable	Not Applicable	Not Applicable	No action required	Not Applicable	No waste water will be generated from the wind power projects. However, The project has methods to manage wastewater through construction of temporary water drainage system along the same line with permanent water drainage system for rainfall drainage. Moreover, the project will provide portable toilets for labourers to avoid the release of sewage within the project area. Therefore, the impacts on surface water and groundwater are considered unlikely to cause environmentimpact.. However, the in the baseline scenario (grid) some of the fossil fuel power plants may have generation of waste water on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	Not Applicable
	Pollution of	Not Applicable	No.45 B. E.2541 (1998) regarding	Not Applicable	No action required	Not Applicable	Not Applicable	Not Applicable	No action required	Not Applicable	No waste water will be generated from the wind power projects.	Not Applicable

	Surface, Ground and/or Bodies of water		Industrial Effluent Standard for Industrial Estate.								However, the project has methods to manage wastewater through construction of temporary water drainage system along the same line with permanent water drainage system for rainfall drainage. Moreover, the project will provide portable toilets for laborers to avoid the release of sewage within the project area. Therefore, the impacts on surface water and groundwater are considered unlikely to cause environment impact. However, the in the baseline scenario (grid) some of the fossil fuel power plants may have generation of waste water on which data is not available and can't be quantified and therefore the emission reductions cannot be quantified and therefore this parameter will not be scored.	
	Others	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
	Add more rows if required											
Environment – *Natural Resources*	*Conserving mineral resources*	Not Applicable	Minerals Act, B.E. 2560 (A.D. 2017)	Not Applicable	No action required	No action required	Not Applicable	Not Applicable	No action required	Not Applicable	This is wind project activity and it is not using any natural minerals. therefore, this parameter will not be scored	Not Applicable
	Protecting / enhancing plant life	Not Applicable	Plant Varieties Protection Act B.E. 2542 (1999)	Not Applicable	No action required	No action required	Not Applicable	Not Applicable	No action required	Not Applicable	The project activity has been implemented in barrel land and no trees have been removed from the site due to project activity. therefore, this parameter will not be scored.	Not Applicable
	Protecting / enhancing species diversity	Possible bird and bat hits may occur at the early stage of project operation Once the local birds and bats	No national regulatory and requirements identified.	Harmless	-	-	Not Applicable	Not Applicable	Not Applicable	Monitoring of bird and bat hits around the individual wind turbines.	Mitigation measures outlined in EIA report will be taken in case of any incidence occurred. Therefore, the project is unlikely to cause any harm.	+1

		get used to the operation of wind turbine, the possibility will decrease.										
	Protecting / enhancing forests	Negative	The Forest (Conservation) Act 1980 & 1981	Not Applicable	No action required	No action required	Not Applicable	Not Applicable	No action required	Not Applicable	No forest land has been used for the project activity. therefore, this parameter will not be scored.	Not Applicable
	Protecting / enhancing other depletable natural resources	Negative	National Reserved Forests Act, B.E. 2507 (A.D. 1964)	Not Applicable	No action required	No action required	Not Applicable	Not Applicable	No action required	Not Applicable	The project activity has been implemented in barrel land and no trees have been removed from the site due to project activity or no other natural resource has been used to operate project activity therefore this parameter will not be scored.	Not Applicable
	Conserving energy	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Nil
	Replacing fossil fuels with renewable sources of energy	The wind power project replaces fossil fuel with the renewable wind energy for the power generation by installing the wind power plant which would have been otherwise generated from the fossil fuel dominant grid connected power plants in the absence of the project activity.	No legal standard available.	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Continuous monitoring of electricity generation. Record will be maintained	The project activity supplies renewable energy to the grid. Hence this parameter will be scored.	+1
	Replacing ODS with non-ODS refrigerants	Negative	In Thailand, there are no comprehensive e regulations and standards to ODS and non ODS	Not Applicable	No action required	No action required	Not Applicable	Not Applicable	No action required	Not Applicable	No impact Therefore this parameter will not be scored.	Not Applicable

	Others											
	Add more rows if required											

Note: If the score is: (a) zero or greater, the overall impact is neutral or positive and there is no net harm; and (b) less than zero, the overall impact is negative and there is net harm to Environment.Score is obtained after adding the individual scores in each of the rows in the last column of the above table.

Net Score:	**+3**
Project Owner's Conclusion in PSF:	The Project Owner confirms that the Project Activity will not cause any net harm to the environment.

E.2. Social Safeguard

>>

Impact of Project Activity on		**Information on Impacts, Do-No-Harm Risk Assessment and Establishing Safeguards**									**Project Owner's Conclusion**	
		Description of Impact (*both positive and negative*)	**Legal requirement /Limit**	**Do-No-Harm Risk Assessment**			**Risk Mitigation Action Plans**		**Do-No-Harm Residual Risk Assessment**		**Self-Declaration**	
				Not Applicable (*No actions required*)	**Harmless** (*No actions required*)	**Harmful** (*Actions required*)	**Operational Controls**	**Program of Risk Management Actions**	**Re-evaluate Risks**	**Monitoring**	**Explanation of Conclusion**	**The Project Activity will not cause any harm**
Social impacts on the identified categories[20] indicated below.	*Indicators for social impacts*	*Describe the impacts on society and stakeholders, both positive and negative, that may result from constructing and operating of the Project Activity.*	*Describe the applicable national regulatory requirements / legal limits related to the identified risks of social impacts.*	*If no social impacts are anticipated, then the Project Activity is unlikely to cause any harm (is safe) and shall be*	*If social impacts are anticipated, but are expected to be in compliance with applicable national regulatory requirements/*	*If social impacts are anticipated that will not be in compliance with the applicable national regulatory requirements/ legal limits, then the Project Activity is likely to cause harm*	*Describe the operational controls and best practices, focusing on how to implement and operate the Project Activity, to reduce the risk of impacts that have*	*Describe the Program of Risk Management Actions (refer to Table 3), focusing on additional actions (e.g., construction of crèche for workers) that will be adopted to*	*Re-evaluate risks after Risk Mitigation Actions plans have been developed (refer to previous two columns) for impacts that have been identified*	*Describe the monitoring approach and the parameters to be monitored for each impact that has been identified as Harmful and to be described in the PSF (refer to Table 3).*	*Describe how the Project Owner has concluded that the Project Activity is likely to achieve the identified Risk Mitigation Action Plan targets for managing risks to levels that are unlikely to cause any harm.*	*Confirm that the Project Activity risks of negative social impacts are expected to be managed to levels that are unlikely to cause any harm (Mark +1 for **Yes** or*

[20] sourced from the CDM SD Tool and the sample reports are available (https://www4.unfccc.int/sites/sdcmicrosite/Pages/SD-Reports.aspx)

				*indicated as **Not Applicable** (No actions required)*	*legal limits, then it the Project Activity is unlikely to cause any harm (is safe) and shall be indicated as **Harmless** (No actions required)*	*(may be unsafe) and shall be indicated as **Harmful** (Actions required).*	*been identified as **Harmful**.*	*reduce the risk of impacts that have been identified as **Harmful**.*	*as Harmful. Indicate whether the risks have been eliminated or reduced and, where appropriate, indicate them as **Harmless** (No actions required)*			*and -1 for **No**)*
Social Safeguards												
Social - *Jobs*	*Long-term jobs (> 1 year) created/ lost*	There is a positive impact of the project activity on the creation of long-term jobs during its operational life time.	No regulation	Harmless	Not applicable	No action required	No action required	No Action required	No action required	Number of people employed by the project will be monitored through checking payroll records or the social insurance.	There is no mandatory law to generate permanent employment from the project activity, however, project proponent has been decided to provide training to the local people & generate permanent employment for local people. Therefore, this parameter will be scored	+1
	New short-term jobs (< 1 year) created/ lost	There is a positive impact of the project activity on the creation of jobs during its construction and operational life time	No regulation	Harmless	No action required	No action required	Not applicable	Not applicable	Not applicable	Local labor force has been employed during construction period	There is no mandatory law to generate permanent employment from the project activity, however, project proponent has been decided to provide training to the local people & generate permanent employment for local people Therefore this parameter will be scored.	+1
	Sources of income generation increased / reduced	There is positive impact of the project activity in creating new sources of revenue and/or increased income of the old and new small enterprises established in	No regulation	Not applicable	No action required	No action required	Not applicable	Not applicable	No action required	This will be monitored through employment Records or attendance register or through letter from the O&M contractor	Local income has been increased due to local employment generation from the project activity. Hence this parameter will not be scored	+1

		the neighborhood of the project due to increased economic activity in the area.										
Social - *Health & Safety*	*Disease prevention*	Not applicable	No regulation	Not applicable	No action required	No action required	Not applicable	Not applicable	No action required	Not applicable	It will be ensured that proper and adequate number of toilets is constructed for the Laboure's so that hygienic conditions prevail in the site area. Therefore, this parameter will not be scored.	NA
	Reducing / increasing accidents	Not applicable	Factory Act, B.E. 2535 (1992) & EHS policy of Project Developer	Not applicable	No action required	No action required	Not applicable	Not applicable	No action required	Not applicable	The project proponent will provide regular safety training to their workers about the accident hazards and risk related to specific works and preventive measures for avoiding accidents at site Therefore this parameter will not be scored.	NA
	Reducing / increasing crime	Not applicable	Crime comes under law & order of local government authority and there is no legal requirement from local authority to project proponent to liable to reduce crime.	Not applicable	No action required	No action required	Not applicable	Not applicable	No action required	Not applicable	Project activity will increase local employment so there is no chance to increase crime in the local area due to the wind projects. Therefore this parameter will not be scored.	NA
	Reducing / increasing food wastage	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Use a 2-bin system so that food waste and recyclables viz. paper, plastic, glass, scrap metal waste etc. are segregated and stored in designated waste bins/ containers. Therefore, this parameter will not be scored.	NA
	Reducing / increasing indoor air pollution	Not applicable	Notification of the National Environmental Board, No. 36, B.E. 2553 (2010), issued under the Enhancement and	Not applicable	No Action required	No Action required	Not applicable	Not applicable	No Action required	Not applicable	Wind power plants doesnot cause to any kind of air pollution. hence it can be assumed that no chance of increasing air pollution from project activity. Therefore, this parameter will not be scored.	NA

			Conservation of National Environmental Quality Act B.E.2535 (1992) Ambient air quality standard									
	Efficiency of health services	Not applicable	Public *Health Act, B.E. 2535 (1992)*	Not applicable	No action required	No action required	Not applicable	Not applicable	No action required	Not applicable	Health services are limited in villages falls under project activity. Project proponent shall conduct health camp in all villages as per their CSR commitment throughout the operation time of the project activity Therefore this parameter will not be scored.	NA
	Sanitation and waste management	Not applicable	No local regulation available	Not applicable	No action required	No action required	Not applicable	Not applicable	No action required	Not applicable	Not Applicable	NA
	Other health and safety issues	Not applicable	Standard of Safety Occupational Health and Working Environment for Construction Work B.C. 1998, Ministry of Interior.	No action required	No action required	Not applicable	Not applicable	Not applicable	No action required	Not applicable	All health & safety issue at project sites to be mitigate as per EHS policy of project developer company and local regulation. Therefore this parameter will not be scored.	NA
	Add more rows if required	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not Applicable
Social - *Education*	*Job related training imparted or not*	Project involves training of new people on project technology.	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Training records will be maintained	Project owner confirms that by training the people on new technology it will upgrade their skills and creates positive impact. Hence it will be scored	+1
	Educational services improved or not	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not Applicable
	Project-related knowledge	Project activity transfers knowledge on	No mandatory regulation	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Training records will be maintained	Stakeholder consultation meeting was done before starting of project work where project Owner was informed about the	Not applicable

	disseminatio n effective or not	new renewable energy technology									project and taken their comments. Further meeting can be planned in future as per stakeholder request. Therefore, this parameter will not be scored.	
	Other educational issues	Not applicable	Not applicable	No action require d	No action require d	Not applicable	Not applicable	Not applicable	No action required	Not applicable	Not Applicable	Not applicable
	Add more rows if required											Not applicable
Social - *Welfare*	*Improving/ deteriorating working conditions*	Not applicable	EHS policy of project company	Not applica ble	No action require d	No action required	Not applicable	Not applicable	No action required	Not applicable	There is no chance to deteriorating working conditions as Project Owner will maintain high working culture for their employee with complying EHs guideline & local regulation Therefore this parameter will not be scored	NA
	Community and rural welfare	Not applicable	CSR Policy of Project Company	Not applica ble	No action require d	No action required	Not applicable	Not applicable	Not applicable	Not applicable	Project owner will provide the basic livelihood needs to the local rural people like sanitation and health and nutritional needs through the company CSR policy. This parameter will not be scored	NA
	Poverty alleviation (more people above poverty level)	Not applicable	No local regulation	Not applica ble	No action require d	No action required	Not applicable	Not applicable	Not applicable	Not applicable	The objective of the project company is to assist project sites to reduce poverty and enhance economic growth, human well-being, and development effectiveness by addressing the gender disparities and inequalities that are barriers to development, and by assisting member countries in formulating and implementing their gender and development goals Therefore this parameter will not be scored.	NA
	Improving / deteriorating wealth distribution/ generation of income and assets	Not applicable	No local regulation	Not applica ble	No action require d	No action required	Not applicable	Not applicable	Not applicable	Not applicable	Local community might chose to work during the construction of access roads and other project components and as security guards for the plant. There is also a likelihood of reduced dependence on agriculture for income. Therefore this parameter will not be score	NA
	Increased or / deteriorating municipal revenues	Not applicable	No local regulation	Not applica ble	No action require d	No action required	Not applicable	Not applicable	Not applicable	Not applicable	Projects are not falling under municipal areas, hence this parameter will not be scored.	NA

	Women's empowerment	Not applicable	No local regulation	Not applicable	No action required	No action required	Not applicable	Not applicable	Not applicable	Not applicable	Project Company will take initiative for Promoting gender equality, empowering women. The women's participation in the consultation needs to be ensured Therefore this parameter will not be scored.	NA
	Reduced / increased traffic congestion	Not applicable	No local regulation	Not applicable	No action required	No action required	Not applicable	Not applicable	Not applicable	Not applicable	Adequate training on traffic and road safety operations will be imparted to the drivers of project vehicles. Road safety awareness programs will be organized in coordination with local authorities on traffic safety rules and signage during construction & operation phase of the project Therefore this parameter will not be scored.	NA
	Other social welfare issues	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
	Add more rows if required											

Note: If the score is: (a) zero or greater, the overall impact is neutral or positive and there is no net harm; and (b) less than zero, the overall impact is negative and there is net harm to society.Score is obtained after adding the individual scores in each of the rows in the last column of the above table.

Net Score:	+4
Project Owner's Conclusion in PSF:	The Project Owner confirms that the Project Activity will not cause any net harm to society.

Section F. United Nations Sustainable Development Goals (SDG)

>>

UN-level SDGs	UN-level Target	Declared Country-level SDG	Defining Project-level SDGs					Project Owner(s)'s Conclusion	
			Project-level SDGs	**Project-level Targets/ Actions**	**Project-level Indicators**	**Contribution of Project-level Actions to SDG Targets**	**Monitoring**	**Explanation of Conclusion**	**Are Goal/ Targets Likely to be Achieved?**
Describe UN SDG targets and indicators *See: https://unstats.un.org/sdgs/indicators/indicators-list/*	*Describe the UN-level target(s) and corresponding indicator no(s)*	*Has the host country declared the SDG to be a national priority? Indicate Yes or No*	*Define project-level SDGs by suitably modifying and customizing UN/ Country-level SDGs to the project scope.* ***For guidance see:****Integrating the SDGs into Corporate Reporting- A Practical Guide: https://www.unglobalcompact.org/docs/publications/Practical_Guide_SDG_Reporting.pdf* *Case-study from Coca-Cola and other organizations to develop organization-wide SDGs (page 114):*https://pub.iges.or.jp/pub/realising-transformative-potential-sdgs	*Define project-level targets/actions, by suitably modifying and customizing UN/Country-level targets to the project scope. Define the target date by which the Project Activity is expected to achieve the project-level SDG target(s). Refer to the previous column for guidance*	*Define project-level indicators by suitably modifying and customizing UN/Country-level indicators to the project scope or creating a new indicator(s). Refer to the previous column for guidance*	*Describe and justify how actions taken under the Project Activity are likely to result in a direct positive effect that contributes to achieving the defined project-level SDG targets and is additional to what would have occurred in the absence of the Project Activity*	*Describe the monitoring approach and the monitoring parameters to be applied for each project-level SDG target and Indicator*	*Describe how the Project Owner has concluded that the project is likely to achieve the identified Project level SDGs target(s).*	*Describe whether the project-level SDG target(s) is likely to be achieved by the target date (Yes or No)*
Goal 1: End poverty in all its forms everywhere	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture	NA	NA	NA	NA	NA	NA	NA	NA	NA

Goal 3. Ensure healthy lives and promote well-being for all at all ages	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 5. Achieve gender equality and empower all women and girls	5.C Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels	YES	Equal employment opportunities and pay scales for both men and women in the project activities.	Equal working opportunity for both men and women	Equal working opportunity for both men and women	Project owner implement and maintain the HR policy to ensure that no gender discrimination should be entertained while employing the workforce and paying the wages for the project activity 100% probability and equal pay packages will be provided to the both men and women employees.	Project proponent monitors the parameter through Employment register for cross checking the nos and values.	Project proponent concludes that by strictly implementing the company policy men & women have equal rights and no discrimination will be tolerated against women. Project is already implemented and hence the targeted SDG is already is being under implementation.	YES Since the project activity is already operational Project activity targeted SDG is likely to be achieved during the project entire crediting period.
Goal 6. Ensure availability and sustainable management of water and sanitation for all	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 7. Ensure	7.2 By 2030,	YES	The project generates electricity	Project target to	Project	Project owner	Project O&M team at	Project has	YES

access to affordable, reliable, sustainable and modern energy for all	increase substantially the share of renewable energy in the global energy mix. 7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology. 7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and		from the sustainable and renewable wind source and contributes to increase the share of renewable energy mix in the global energy mix. Project uses advanced WTG technology which is cleaner source of energy which avoids the equivalent amount of fossil fuel consumption for the power generation in the absence of the project activity. Project activity thus promotes investment into the cleaner technology based power generation projects. By installing advanced wind energy technology project owner also promotes upgraded cleaner technology solutions and infrastructure in the power generation sector in the host country.	generate and feed 151110 MWh/year wind based electricity for entire lifetime of the project activity into the national grid. Project has already started contributing to the SDG 7 from its start date	target to generate and feed 151110 MWh/year wind based electricity for entire lifetime of the project activity into the national grid.	ensures and undertake following actions to contribute to the SDGs. 1. Signed Power purchase agreement with consumers to ensure the consumption of generated power by the end consumer. 2.Ensures optimum plant efficiency to reduce outages and maximum generation. 3.Educate customers about consumption patterns to optimize renewable energy use	project site continuously monitors the Quantity of net electricity generation supplied by the project (wind) plant. Main and Check meters are installed at the substation by the electricity utility to measure the net exported electricity from the plant . The value of net electricity generation supplied to the grid as per Monthly Meter Reading Report forms which can be cross-checked from the invoice raised to Consumer. .	already commissioned to national grid and feeding the renewable power to the grid. Hence complied to the SDG. No 7	Since the project activity is already operational Project activity targeted SDG is likely to be achieved during the project entire crediting period.

	land-locked developing countries, in accordance with their respective programmes of support								
Goal 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 8.8 Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	No	Project activity supports creation of short term and long term job opportunities during the construction and operation of the project activity. Supports economic productivity through technology up gradation and innovation through training of labour in high intensive sector. Project protects labour rights and promotes safe and secure working environments. Supports a transition to a low-carbon society through employment training for former fossil fuel industry employees	Project creates new employment and generates income for 50 no of people during the project lifetime. Through Project activity economic development has been achieved in the project location by creating opportunities to the other allied services and indirect employment.	Project creates new employment and generates income for 50 no of people during the project lifetime.	1. Employment per the national labour and company law. 2. Maintains company HR policy to create standard operating procedures (SOPs) to follow and maintain safe and secure work environment 3. paying the wages as per the minimum wages act of the country.	Project owner monitors the implantation of the policies and employee grievances if any through the separate HR manager and site in charge. Quantity of employment will be monitored through employment records.	Project has already commissioned and achieving the Goal targets. Hence complied to SDG No 8	YES Targeted SDG is likely to be achieved during the entire crediting period.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities 9.4.1CO2 emission per unit of value added	No	Project activity involves up gradation to advanced WTG technology which is clean and resilient infrastructure from the conventional fossil fuel based power plant technology. Supports advanced industrialization by providing zero greenhouse gas and non-polluting clean electricity. Support industrialization through local hiring, procurement, and training and skills development. .	Project activity involves installation of 50 MW wind project in Thailand.	Project activity reduces 86011 tCO_2 per annum and 860110 tCO_2e during the crediting period.	Project O&M team continuously work to reduce the plant outages and trying to achieve the maximum grid availability to generate and feed the maximum renewable energy to the grid	O&M team monitors the real time generation from the plant and calculated equivalent CO2 reductions. Plant outage and grid availability can be monitored through realtime scada data and O&M records.	Project has already commissioned and started reducing the emissions. Hence complied to the SDG No.9	YES Targeted SDG is likely to be achieved during the entire crediting period.
Goal 10. Reduce inequality within and among countries	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 12. Ensure sustainable consumption and production patterns	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 13. Take	13.3	No	Project activity generates	Project activity	Project	Ensure	O&M team	Project has	YES

urgent action to combat climate change and its impacts	Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning 13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions		renewable energy based electricity and mitigates the CO2 emissions which would have been generated from the fossil fuel based power plants.	involves installation of 50 MW wind project in Thailand.	activity reduces 86011 tCO_2 per annum and 860110 tCO_2e during the crediting period.	optimum generation from the plant to the grid	monitors the real time generation from the plant and calculated equivalent CO2 reductions.. Main and Check meters are installed at the substation by the electricity utility to measure the net exported electricity from the plant. The value of net electricity generation supplied to the grid as per Monthly Joint Meter Reading Report forms (B-Forms) the basis for calculation of the emission reductions; which can be cross-checked from the invoice raised to Consumer.	already commissioned and started reducing the emissions. Hence complied to the SDG No.13	Targeted SDG is likely to be achieved during the entire crediting period.

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development	NA	NA	NA	NA	NA	NA	NA	NA	NA

SUMMARY	Targeted	Likely to be Achieved
Total Number of SDGs	**5**	**5**
Certification label (Bronze, Silver, Gold, Platinum, or Diamond) for the ACCs as defined in the PSF	**Platinum**	**Platinum**

Section G. Local stakeholder consultation

G.1. Modalities for local stakeholder consultation

According to the host country policy the Enhancement and Conservation of National Environment Quality Act B.E. 2535 (1992) and regulation of Energy Regulation Commission (ERC) Wind Power Project developers has to conduct a detailed assessment of Initial Environmental Examination (IEE) study including the public local stakeholder consultation activities before the construction of the project activity to make sure that projects will not contribute to negative environmental impact.

In compliance to the above, Project developer has conducted a local stakeholder consultation meeting and IEE study and submitted the IEE report to the Office of Natural Resources and Environmental Policy and Planning (ONEP).

The physical Local stakeholder consultation was carried out by inviting the local stakeholders through public notice. The notice was for all Local stakeholders and not a gender specific. Since project is developed in particular site, for project, the nearby local villagers are most relevant and who are directly and indirectly may be affected. Thus putting public notice at project site/nearby village involves engagement of all stakeholders for the project activity.

LSC meeting details are presented in below table.

Project Developer	Capacity	Date of LSC	Location
Korat Wind Energy Company Limited	50 MW	08/02/2012 8:30 AM to 12:00 PM	Nong Nam Sai and Donmuang Sikhio, Nakhon Ratchasima

The Project representatives presented the salient features of the project activity to the stakeholders including the impact of project activity on Social, economic and environmental safeguards with the implementation of the project. The stakeholders also acknowledged the socio-economic benefits of the project activity including improved infrastructure in the region, and employment opportunities for local residents. The opinions expressed by the local stakeholders and the respective responses were recorded.

IEE report with stakeholder meeting details is submitted to verifier for verification.

G.2. Summary of comments received

A summary of the comments and queries from the stakeholders are presented below along with the responses from the representatives of the project participants:

Comment / Query from Stakeholder	Response from Representative of the Project Participant
Is there any risk with the project activity? How safe are the wind turbines?	The wind energy technology is proven technology in the entire world. The technology

	supplier has installed the same technology in many parts of world. Also, regular O&M is undertaken in the wind turbines. Hence, the wind turbines are very much safe and no risk associated with the turbine
What is the life of the project?	25 years
Does the project create local employment	Yes, the project activity provides employment to local people curing the construction and operation Maintenance of the project activity. The technical jobs can be provided only to qualified personal. However, the first preference will is given to local people. The people from other locations are recruited only when the local people with required skill sets are not available.
What is the benefit of wind energy?	Wind energy is a clean and pollution free energy generation source which will reduce the equivalent amount of energy that would have been supplied by the fossil fuel-based power plants which emit the GHG gasses into the atmosphere.
Does the project activity effect the rainfall?	No, the project does not affect the rainfall
Does the project activity affect the groundwater?	No, the project does not affect the groundwater.
Any CSR activities will be conducted to our village?	You can provide your requirements to the site in charge through village representative. The activities will be undertaken based on the priority and fund availability

G.3. Consideration of comments received

There were no concerns raised by the local stakeholders. The potential benefits of the project activity for the local stakeholders were acknowledged

No negative comments have been received on project activity from any of the local stakeholders consulted. As all comments were very positive about the project, no further action is required.

There were no further comments raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region.

Section H. Approval and authorization

No host country approval is required hence N/A.

Appendix 1. Contact information of project owners

Organization name	Korat Wind Energy Company Limited
Country	Thailand
Address	1038 Nakornchaisri Rd., Nakornchaisri, Dusit, Bangkok, 10300
Telephone	+66 2242 5800
Fax	-
E-mail	kittiphat@gunkul.com
Website	www.gunkul.com
Contact person	Mr. Kittiphat Chayathipkul

Appendix 2. Affirmation regarding public funding

Not Applicable

Appendix 3. Applicability of methodology(ies)

Please refer section B.2

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

Not applicable

Appendix 5. Further background information on monitoring plan

Not applicable

Appendix 6. Summary report of comments received from local stakeholders

Refer Section G.2

Appendix 7. Summary of de-registered CDM project (Type B)

Not Applicable

DOCUMENT HISTORY

Version	Date	Comment
V 3.2	31/12/2020	▪ The name of GCC Program's emission units has been changed from "Approved Carbon Reductions" or ACRs to "Approved Carbon Credits" or ACCs.
V 3.1	17/08/2020	▪ Editorial revisions made ○ Revised Table in section B.7.2 on Monitoring-program of risk management actions ○ Revised Table in section E.1 on Environmental Safeguards ○ Revised Table in section E.1 on Social Safeguards ○ Revised Table in section F on United Nations Sustainable Development Goals (SDG)
V 3.0	05/07/2020	▪ Revised version released on approval by Steering Committee as per GCC Program Process; ▪ Revised version contains following changes: ○ Change of name from Global Carbon Trust (GCT) to Global Carbon Council (GCC); ○ Considered and addressed comments raised by Steering Committee: ➢ during physical meeting (SCM 01, dated 29 Oct 2019, Doha Qatar); and ➢ electronic consultations EC01-Round 01 (15.09.2019 – 25.09.2019), EC01-Round 02 (27.03.2020 – 27.06.2020). ○ Feedback from Technical Advisory Board (TAB) of ICAO on GCC submission for approval under CORSIA[21];
V 2.0	25/06/2019	▪ Revised version released for approval by the GCC Steering Committee. ▪ Revised version includes additional details and instructions on the information to be provided, consequent to the latest developments world-wide (e.g., CORSIA EUC).
V 1.0	01/11/2016	Initial version released under the GCC Program Version 1

[21]See ICAO recommendation for conditional approval of GCC at https://www.icao.int/environmental-protection/CORSIA/Documents/TAB/Excerpt_TAB_Report_Jan_2020_final.pdf

المجلس العالمي للبصمة الكربونية
GLOBAL CARBON COUNCIL

A member of

GORD
المنظمة الخليجية للبحث والتطوير
Gulf Organisation for Research & Development