# THEPARAK WIND IN THAILAND

Document Prepared by: Kosher Climate India Private Limited
Contact Information: vamsi@kosherclimate.com

| | |
|---|---|
| **Project Title** | THEPARAK WIND IN THAILAND |
| **Version** | 03 |
| **Report ID** | T1MR-04 |
| **Date of Issue** | 14-February-2024 |
| **Project ID** | VCS 2002 |
| **Monitoring Period** | 01-August -2022 to 31-May-2023 (including both the days) |
| **Prepared By** | Kosher Climate India (P) Limited |
| **Contact** | Zee Plaza, No.1678,<br>Ground Floor, 27th Main Road,<br>Sector 2, HSR Layout, Bengaluru,<br>Karnataka 560102, India<br>Mobile: +91- 9945343475<br>Ph: +91- 80- 49931177<br>Email: vamsi@kosherclimate.com, narendra@kosherclimate.com |

## CONTENTS

# 1 PROJECT DETAILS

## 1.1 Summary Description of the Implementation Status of the Project

The proposed project activity involves the installation of Wind Turbine Generators (WTG) in Nakhon Ratchasima of Thailand (T1 Wind farm). The project is developed by Theparak Wind Co., Ltd, Thailand. Theparak Wind Co., Ltd is a subsidiary of Wind Energy Holding Co., Ltd.

The purpose of the project activity is to generate clean electricity with utilization of wind energy. The project consists of 30 numbers of GE 137 Wind Turbine Generators (WTGs) of 3.0 MW capacities each. The project WTGs are installed in the Nongwang, Bueng Prue and Samnaktakhro sub-districts of Thepharak District, Nakhonratchasima Province in Thailand.

All the WTGs of the project activity were commissioned on 27-November-2018. The WTGs are operational continuously since commissioning without any major outages.

The electricity generated by the project is exported to the Thailand National grid. The project activity will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. Since wind power is Greenhouse Gas (GHG) emissions free, the power generated will prevent the anthropogenic gas emissions generated by fossil fuel based thermal power stations comprising coal, natural gas, diesel, and bunker oil.

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

The estimation of GHG reductions by this project is limited to carbon dioxide ($CO_2$) only. Thus, the project activity leads to an emission reduction of 156,167 $tCO_2e$ per year or 1,561,670 $tCO_2e$ for the chosen crediting period of 10 years.

The current monitoring period chosen is from 01-August -2022 to 31-May-2023 (inclusive of first & last date) and the GHG emission reductions calculated are 124,587 $tCO_2e$

The Audit history is provided in the below table

| Audit Type | Period | Program | VVB Name | Number of years |
|---|---|---|---|---|
| Joint Validation & verification | 27- November-2018 to 31-October- 2019 | VCS | Earthood Services Private Limited | 11 months |

| | | | | |
|---|---|---|---|---|
| **verification** | 01- November – 2019 to 31- December- 2020. | VCS | LGAI Technological Center, S. A | 1 year 2 months |
| **Verification** | 01-January -2021 to 31-July -2022 | VCS | 4K Earth Science Pvt Ltd, | 1 year 7 months |
| **Verification** | 01-August -2022 to 31-May-2023 (On going) | VCS | 4K Earth Science Pvt Ltd, | 10 months |
| **Total** | **27- November – 2018 to 31- May – 2023.** | **VCS** | - | **4 years 6 months** |

## 1.2 Sectoral Scope and Project Type

Sectoral Scope : 01- Energy Industries (Renewable/Non-Renewable Sources)

Project Type: Type I

Methodology:

ACM0002: Grid-connected electricity generation from renewable sources, version 19.0

The project is not a AFOLU projects or GCS projects or grouped projects, or projects with multiple project activity instance

## 1.3 Project Proponent

| | |
|---|---|
| **Organization name** | Theparak Wind Co., Ltd |
| **Contact person** | Phattarapol Pongwattanavijid |
| **Title** | Manager |
| **Address** | 25th Floor , Capital Tower, All Seasons Place, 87/1, Wireless road, Lumpini, Patumwan, Bangkok 10330, Thailand |
| **Telephone** | +66(0) 2106 8000 |
| **Email** | phattarapol@windenergyholding.com |

## 1.4 Other Entities Involved in the Project

| | |
|---|---|
| **Organization name** | Kosher Climate India Private Limited |
| **Role in the Project** | Authorized Representative |
| **Contact person** | Vamsi Krishna |
| **Title** | Global Business Head |
| **Address** | Zee Plaza, No.1678, Ground Floor, 27th Main Road, Sector 2, HSR Layout, Bengaluru, Karnataka 560102, India |
| **Telephone** | +91-99453 43475 |
| **Email** | vamsi@kosherclimate.com, narendra@kosherclimate.com |

## 1.5 Project Start Date

The start date for this project is 27-November-2018. This is the date of commissioning of the project.

## 1.6 Project Crediting Period

1st Crediting period: 27-November-2018 to 26-November-2028(inclusive of first and last date).

Length of 1st Crediting period: 10 years

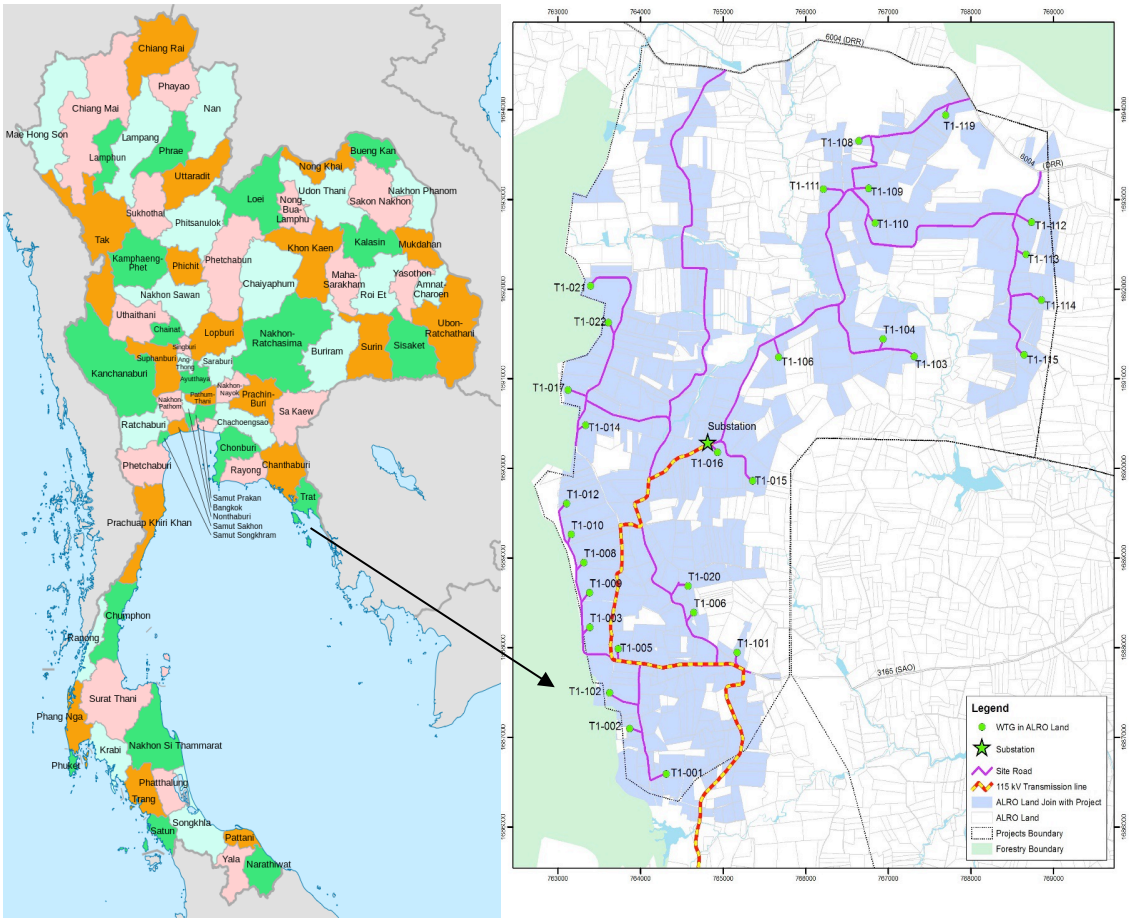
The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times

## 1.7 Project Location

The project activity is located in Nakhon Ratchasima province of Thailand. The geo-coordinates of the project location are as follows:

| S.No | WTG ID | Latitude (°N) | Longitude (°E) | Sub-District | District |
|---|---|---|---|---|---|
| 1 | T1-001 | 15.242054 | 101.460692 | Nongwang | Thepharak |
| 2 | T1-002 | 15.246658 | 101.456607 | Nongwang | Thepharak |
| 3 | T1-003 | 15.256905 | 101.452232 | Nongwang | Thepharak |
| 4 | T1-005 | 15.254707 | 101.455412 | Nongwang | Thepharak |
| 5 | T1-006 | 15.258259 | 101.463981 | Nongwang | Thepharak |
| 6 | T1-008 | 15.263423 | 101.451656 | Nongwang | Thepharak |
| 7 | T1-009 | 15.260403 | 101.452248 | Nongwang | Thepharak |
| 8 | T1-010 | 15.266278 | 101.450251 | Nongwang | Thepharak |
| 9 | T1-012 | 15.269408 | 101.449759 | Nongwang | Thepharak |

| | | | | | |
|---|---|---|---|---|---|
| 10 | T1-014 | 15.277282 | 101.452011 | Bueng Prue | Thepharak |
| 11 | T1-015 | 15.271481 | 101.47077 | Nongwang | Thepharak |
| 12 | T1-016 | 15.27439 | 101.466817 | Nongwang | Thepharak |
| 13 | T1-017 | 15.280839 | 101.450052 | Bueng Prue | Thepharak |
| 14 | T1-020 | 15.26096 | 101.463356 | Nongwang | Thepharak |
| 15 | T1-021 | 15.29131 | 101.452738 | Bueng Prue | Thepharak |
| 16 | T1-022 | 15.287584 | 101.454698 | Bueng Prue | Thepharak |
| 17 | T1-101 | 15.254172 | 101.468782 | Nongwang | Thepharak |
| 18 | T1-102 | 15.250278 | 101.454386 | Nongwang | Thepharak |
| 19 | T1-103 | 15.283807 | 101.489087 | Bueng Prue | Thepharak |
| 20 | T1-104 | 15.285599 | 101.485604 | Bueng Prue | Thepharak |
| 21 | T1-106 | 15.283887 | 101.473835 | Bueng Prue | Thepharak |
| 22 | T1-108 | 15.305588 | 101.483107 | Bueng Prue | Thepharak |
| 23 | T1-109 | 15.3008 | 101.484177 | Bueng Prue | Thepharak |
| 24 | T1-110 | 15.297277 | 101.484846 | Bueng Prue | Thepharak |
| 25 | T1-111 | 15.300758 | 101.479076 | Bueng Prue | Thepharak |
| 26 | T1-112 | 15.297185 | 101.502467 | Samnaktakhro | Thepharak |
| 27 | T1-113 | 15.293929 | 101.501811 | Bueng Prue | Thepharak |
| 28 | T1-114 | 15.289313 | 101.50348 | Samnaktakhro | Thepharak |
| 29 | T1-115 | 15.283835 | 101.50148 | Samnaktakhro | Thepharak |
| 30 | T1-119 | 15.308079 | 101.492939 | Bueng Prue | Thepharak |



## 1.8 Title and Reference of Methodology

The methodology applied for the project is Approved Large Scale Consolidated Methodology: ACM0002 "Grid-connected electricity generation from renewable sources" (Version 19.0, EB100)[1]

ACM0002 draws upon the following tools which have been used in the PD:

- Methodological Tool: Tool to calculate the emission factor for an electricity system - Version 7.0, EB 100, Annex 6[2].

- Methodological Tool: Tool for the demonstration and assessment of additionality - Version 07.0.0, EB 70 Annex 8[3].

## 1.9 Participation under other GHG Programs

The project is not registered under any other GHG programs.

## 1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

The GHG emission reductions from the project activity are not included in any emissions trading program or any other mechanism that includes GHG allowance trading

The project has not sought or received another form of GHG-related environmental credit, including any form of renewable energy certificates, during this monitoring period

The project also does not affect emissions associated with a good or service that is included in the Supply Chain (Scope 3) Emissions

## 1.11 Sustainable Development Contributions

The project supplies clean electricity from the wind power plant to the Thailand National Grid hence displacing the electricity generated from grid connected fossil fuel power plants and

[1] http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD

[2] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf/history_view

[3] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

thereby avoiding the equivalent Carbon dioxide which is a green house gas. In the absence of the project activity, there won't be any avoidance of carbon dioxide.

During the construction and operation and maintenance of the wind power plant, it created many direct and indirect new job opportunities mostly to the local people in the project region. In the absence of the project activity, there would be no new jobs created in the project area.

As a part of regional development efforts associated with the project, during the crucial times COVID-19 outbreak, where the people around the project region are lacking the minimum need of essentials Tropical Wind Co., Ltd has funded and supported the free Covid-19 screening check points and distributed the Covid-19 Fabric facemasks, Sanitizers, Food and Drinking water to the local community in the Bung Pure and wang Yai Thong divisions of Thepark District, Nakhon Ratchasima Province. This is funded from the revenue generated from the operation of the project activity. In the absence of project activity, there would be no revenue generated from the project and hence the activity would have not occurred in the absence of the project activity.

**Table 1: Sustainable Development Contributions**

| Row number | SDG Target | SDG Indicator | Net Impact on SDG Indicator | Current Project Contributions | Contributions Over Project Lifetime |
|---|---|---|---|---|---|
| 1) | 3.b | 3.b.1 Proportion of the population with access to affordable medicines and vaccines on a sustainable basis | Implemented activities to Increase | No health camp conducted during the monitoring period. | About 60 elders benefited from the free health camp contributed from this project since commissioning. |
| 02 | 3.d | 3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks. | Implemented activities to increase | PP has donated on below project<br>Support Thepharak District Office Wet Trash Donation Project. 25% of the amount is funded from this project revenue. Hence, effectively 20 people benefited from project contribution. | About 1990 people benefitted from health camps, medical essential distribution and viral fever prevention and awareness programmes since commissioning of this project |
| 3) | 4.3 | 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex | Implemented activities to increase | PP has conducted following activity during the current monitoring period.<br>• Support Donation Fund for hiring teacher for Ban Mai Jaroen Phol School (50% contribution is provided from this project- About 50 students benefitted from this project | Total 490 school children are benefitted from this activity since commissioning. |

| | | | | | |
|---|---|---|---|---|---|
| 4) | 4.a | 4.a.1 Proportion of schools offering basic services, by type of service | Implemented activities to increase | PP has provided funds to the schools in project area to improve the following infrastructure facilities to provide basic services to schools.<br><br>Support Donation Fund for multipurpose building Ban Nong Waeng School (50% contribution from this project – About 50 students benefitted from this) | Total 81 students benefitted from this project since commissioning of the project. |
| 5) | 7.2 | 7.2.1 Renewable energy share in the total final energy consumption | Implemented activities to increase | About 218,881 MWh renewable electricity has supplied to Thailand National grid during the reported period that helps to increase the renewable energy share in the energy mix. Refer section 4.2 below for the monitoring details. | Since commissioning, about 1,158,249 MWh renewable electricity has supplied to Thailand National grid till this monitoring that helps to increase the renewable energy share in the energy mix. |
| 6) | 8.5 | 8.5.2 Unemployment rate, by sex, age and persons with disabilities | Implemented activities to increase | No new employment has been created during the current monitoring period. | The project has created about 8 permanent jobs since commissioning. |

| | | | | | |
|---|---|---|---|---|---|
| 7) | 13.0 | 13.0 Tonnes of greenhouse gas emissions avoided or removed | Implemented activities to increase | By supplying 218,881 MWh clean electricity to national grid, the project avoided release of 124,587 $tCO_2e$ in to the atmosphere during the reporting period and contributed to the sustainable development goal 13. Refer Section 5 below for the Emission Reduction calculation. | Prevented the release of 659,273 $tCO_2e$ into the atmosphere since its commissioning. |
| 8) | 15.3 | 15.3.1 Proportion of land that is degraded over total land area | Implemented activities to decrease | No incremental activities were conducted during this monitoring period. | Around 9 hectares of degraded land is environmentally restored by planting tree samplings since commissioning till this monitoring period. |

# 2 SAFEGUARDS

## 2.1 No Net Harm

The project is a wind power generation project. There was no potential impact identified f from the project and hence no mitigations measures are applicable.

## 2.2 Local Stakeholder Consultation

The stakeholder consultation meeting took place at the site office on 2nd September 2019. Invitation notices were put up in the local government offices at least a week in advance of the consultations. In the introductory speech, the representatives of developer welcomed the gathering and informed the stakeholders about the project activity; project's associated benefits with respect to $CO_2$ emission reductions and explained the purpose of conducting the stakeholder meeting in order to gather the views and comments of the local stakeholders on the project activity. Subsequent to the introductory speech, comments were received from the stakeholders.

No negative feedback was received from any of the stakeholders. All of them supported the initiative and appreciated the project proponent for carrying out such an activity in the region. Hence no comments warranting action from the project proponent were received

**On-going communication with local stakeholders**

PP has a mechanism to receive feedbacks/grievances from local stakeholder continuously. PP has kept the grievance register/forms at the site office which is easily accessible to local public. Stakeholders can write their feedback or grievances in the register/forms. The site in-charge will take necessary action on the grievances. If any grievances are not resolved, the stakeholders can escalate the issue to the top management by writing email to napat@windenergyholding.com.

No grievances received during the monitoring period.

## 2.3 AFOLU-Specific Safeguards

The project activity is the construction and generation of electricity from greenfield wind plant. This does not fall under AFOLU projects, hence this section is not applicable to this project activity.

# 3 IMPLEMENTATION STATUS

## 3.1 Implementation Status of the Project Activity

All the WTGs of the project activity were commissioned on 27-November-2018. Since commissioning, all the WTGs are operational continuously without any major outages.

During the monitoring period, there is no major events occurred that may impact the GHG emission reductions or removals and monitoring

No other changes to the project such as change in project proponent or other entity happened during the monitoring period.

## 3.2 Deviations

### 3.2.1 Methodology Deviations

There is no methodology deviations applied during the monitoring period.

### 3.2.2 Project Description Deviations

There is no project description deviations applied during the monitoring period

## 3.3 Grouped Projects

The project is not a grouped project

# 4 DATA AND PARAMETERS

## 4.1 Data and Parameters Available at Validation

| Data / Parameter | $EF_{OM, y}$ |
|---|---|
| Data unit | $tCO_2e/MWh$ |
| Description | Operating margin $CO_2$ emission factor of Thailand National Grid |
| Source of data | Report 'Thailand Grid Emission Factor for GHG Reduction Project/Activity' dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation) |
| Value applied | 0. 5719 |

| | |
|---|---|
| Justification of choice of data or description of measurement methods and procedures applied | Calculated in Report 'Thailand Grid Emission Factor for GHG Reduction Project/Activity' dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation) in line with "Tool to calculate the emission factor for an electricity system". The value used is calculated ex-ante as generation based weighted average of last three years of the operating margin provided in the Thailand Grid Emission Factor for GHG Reduction Project/Activity' Weighted average = ∑ i=1 to n (Net generation in operating margin in year i * Simple operating margin in year i)/∑ i= 1 to n (Net generation in operating margin of year i) |
| Purpose of Data | Calculation of Baseline Emission |
| Comments | The operating margin emission factor is a 3-year generation-weighted average (2014, 2015 , 2016). The operating Margin is calculated ex ante and fixed during the crediting period |

| | |
|---|---|
| Data / Parameter | $EF_{BM,y}$ |
| Data unit | $tCO_2e/MWh$ |
| Description | Build margin $CO_2$ emission factor of Thailand National grid |
| Source of data | Report 'Thailand Grid Emission Factor for GHG Reduction Project/Activity' dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation) |
| Value applied | 0.5609 |
| Justification of choice of data or description of measurement methods and procedures applied | Calculated in Report 'Thailand Grid Emission Factor for GHG Reduction Project/Activity' dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation) in line with "Tool to calculate the emission factor for an electricity system". |
| Purpose of Data | Calculation of Baseline Emission |
| 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 | $EF_{grid,CM,y}$ |
| Data unit | $tCO_2e/MWh$ |
| Description | Combined margin $CO_2$ emission factor of Thailand National grid |
| Source of data | Report 'Thailand Grid Emission Factor for GHG Reduction Project/Activity' dated 28/09/2017 Published by Thailand Greenhouse Gas Management Organisation (Public Organisation) |
| Value applied | 0.5692 |
| Justification of choice of data or description of measurement methods and procedures applied | 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 EFgrid,OMsimple, & 25% weightage of EFgrid,BM,y. |
| Purpose of Data | Calculation of Baseline Emission |
| Comments | The combined margin would be calculated ex-ante and fixed for the entire crediting period |

## 4.2 Data and Parameters Monitored

| | |
|---|---|
| Data / Parameter | $EG_{facility,y}$ |
| Data unit | MWh/year |
| Description | Quantity of net electricity supplied by the project activity to the gridin the year y |
| Source of data | Monthly Energy meter reading & invoice raised by EGAT |
| Description of measurement methods and procedures to be applied | Data Type: Measured & Calculated.<br>Monitoring equipment: Energy meters of accuracy class 0.2s<br>Archiving Policy: Paper & Electronic.<br>Location of Energy Meter: EGAT Substation<br>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, one back up meter is also installed. |

<table>
<tr><td></td><td>The Net electricity supplied to the grid by each wind project is estimated as below<br>Net electricity = Export – Import</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Measurement: Continuous<br>Recording: Monthly</td></tr>
<tr><td>Value monitored</td><td>2,18,881 MWh</td></tr>
<tr><td>Monitoring equipment</td><td>Energy meters:
<table>
<tr><td>Meter Number</td><td>Main:51515191<br>Backup:51515192</td></tr>
<tr><td>Accuracy</td><td>0.2s</td></tr>
<tr><td>Location</td><td>Si Khiu 3 Substation (EGAT)</td></tr>
<tr><td>Calibration Frequency</td><td>1 year</td></tr>
</table></td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The export reading has been crosschecked with the Invoice raised by<br>the developer to EGAT<br>The meter(s) shall be calibrated and maintained by the EGAT as per their own schedule, and this frequency of meter calibration is not within the control of the Project Proponent.<br>The calibration details are given below:
<table>
<tr><th>Details</th><th>Calibration date</th><th>Calibration due date</th></tr>
<tr><td rowspan="3">Main Meter<br>Mt.No:51515191</td><td>15/03/2020</td><td>14/03/2021</td></tr>
<tr><td>22/03/2021</td><td>21/03/2022</td></tr>
<tr><td>21/02/2022</td><td>20/02/2023</td></tr>
<tr><td rowspan="3">Backup Meter<br>Mt.No:51515192</td><td>15/03/2020</td><td>14/03/2021</td></tr>
<tr><td>22/03/2021</td><td>21/03/2022</td></tr>
<tr><td>21/02/2022</td><td>20/02/2023</td></tr>
</table>
As per the above calibration date, the calibration is not valid for the period 21/02/2023 to 31/05/2023. Hence, Feb 2023 to May</td></tr>
</table>

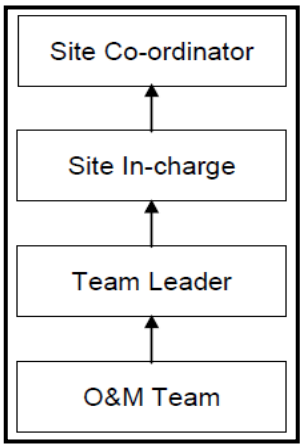
| | |
|---|---|
| | 2023 export & import reading are adjusted with maximum possible error as described below:<br>Adjusted Export = Recorded Export* (1-0.2%)<br>Adjusted Import = Recorded Import *(1+0.2%) |
| **Purpose of the data** | Calculation of baseline emission |
| **Calculation method** | - |
| **Comments** | The data would be archived electronically and maintained for the entire crediting period plus two years. |

## 4.3 Monitoring Plan

The wind project has entered into agreement with the WTG Suppliers for the operation and maintenance of WTGs. 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.

**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 as 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 JMR 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 training for operating and maintaining the plant will be provided to the O&M team whenever there would be necessity or any technological up gradation.

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. In rare occurrences of the meters at the substation are destroyed due to man-made or natural disasters, the lowest of the previous 3-month energy meter reading shall be considered.

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 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 VCUs 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 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 (ie, >1%) 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. Hence, the data collected is of high accuracy and authorised by EGAT.

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.

Sampling approaches:

No sampling approach is used as all the monitoring parameter is monitored 100%.

# 5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

## 5.1 Baseline Emissions

As per description earlier under this document:

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

$EF_{grid,CM,y}$ is 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" ($tCO_2e/MWh$) (i.e, 0.569 2 $tCO_2e/MWh$).

and;

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

Net Electricity (EG facility, y) month wise data:

| Sl. No | Month | Export (kWh) | Adjusted Export (kWh) | Import (kWh) | Adjusted Import (kWh) | Net Energy(Export-Import) (kWh) |
|---|---|---|---|---|---|---|
| **1** | Aug-22 | 2,10,65,010 | 2,10,65,010 | 37,200 | 37,200 | 2,10,27,810 |
| **2** | Sep-22 | 1,14,59,590 | 1,14,59,590 | 98,400 | 98,400 | 1,13,61,190 |
| **3** | Oct-22 | 2,62,49,620 | 2,62,49,620 | 18,000 | 18,000 | 2,62,31,620 |
| **4** | Nov-22 | 1,60,95,840 | 1,60,95,840 | 49,200 | 49,200 | 1,60,46,640 |
| **5** | Dec-22 | 3,89,79,293 | 3,89,79,293 | 6,000 | 6,000 | 3,89,73,293 |
| **6** | Jan-23 | 3,15,21,595 | 3,15,21,595 | 13,200 | 13,200 | 3,15,08,395 |
| **7** | Feb-23 | 2,14,35,30 | 2,13,92,43 1 | 45,600 | 45,691 | 2,13,46,74 0 |
| **8** | Mar-23 | 2,20,36,225 | 2,19,92,153 | 31,200 | 31,262 | 2,19,60,890 |
| **9** | Apr-23 | 1,69,78,437 | 1,69,44,480 | 33,600 | 33,667 | 1,69,10,813 |
| **10** | May-23 | 1,35,81,390 | 1,35,54,227 | 40,800 | 40,882 | 1,35,13,346 |
| | **Total** | **21,94,02,30 2** | **21,92,54,239** | **3,73,200** | **3,73,502** | **21,88,80,73 7** |

*0.2% error applied for calibration delay.

| Vintage | Net Electricity $EG_{PJ,y}$ (MWh) | Grid Emission Factor $EF_{grid,CM,y}$ $tCO_2e/MWh$ | Baseline Emission $EG_{PJ,y}$ x $EF_{grid,CM,y}$ |
|---|---|---|---|
| **2022** | 1,13,641 | 0.5692 | 64,684 |
| **2023** | 1,05,240 | 0.5692 | 59,903 |
| **Total** | **2,18,881** | **0.5692** | **1,24,587** |

## 5.2 Project Emissions

The project activity involves in harnessing wind power. So, the emissions from the project are zero.

## 5.3 Leakage

No leakage emissions have been considered and hence the leakage emission is zero.

## 5.4 Net GHG Emission Reductions and Removals

As per the applied methodology, emission reductions are calculated as follows:

ER y = BE y -PE y -LEy

Where,

ER y = Emission Reduction in $tCO_2$ e/year

BE y = Baseline emission in $tCO_2$ /year

PE y = Project emissions in $tCO_2$ e/year

LE y = Project Leakage emission in $tCO_2$ e/year

| Year | Baseline emissions or removals ($tCO_2e$) | Project emissions or removals ($tCO_2e$) | Leakage emissions ($tCO_2e$) | Net GHG emission reductions or removals ($tCO_2e$) |
|---|---|---|---|---|
| 2022 | 64,684 | 0 | 0 | 64,684 |
| 2023 | 59,9 02 | 0 | 0 | 59,9 02 |
| Total | **1,24, 586** | **0** | **0** | **1,24, 587** |

| Ex-ante emissions reductions/removals | Achieved emissions reductions/removals | Percent difference | Justification for the difference |
|---|---|---|---|
| 1.30,068 tCO2e | 1,24,587 $tCO_2e$ | - 4.21% | Since actual emission reduction of all the projects are less than estimated emission reduction, no further justification is required |

# APPENDIX I: COMPARISON OF ACTUAL ER WITH ESTIMATED ER

| Description | Value | Unit |
|---|---|---|
| Start date of Monitoring period | 01-Aug-22 | |
| End date of Monitoring period | 31-May-23 | |
| Total days in the Monitoring period | 304 | days |
| Estimated emission Reduction As per PDD | 156,167 | $tCO_2e$ |
| Estimated ERs for this monitoring period | 1.30,068 | $tCO_2e$ |
| Actual Emission Reduction | 1,24,587 | $tCO_2e$ |
| Difference in Emission reduction | -4.21 | % |

# APPENDIX II: SDG CONTRIBUTIONS

**Thepharak District Office Wet Trash Donation Project**

**Donation Fund hiring at teacher Ban Mai Jaroen Phol School**

Donation for multipurpose building at NW school