



## THEPARAK WIND IN THAILAND



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|                   |                                                                                                                                                                                                                                                                                                                 |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Title     | THEPARAK WIND IN THAILAND                                                                                                                                                                                                                                                                                       |
| Version           | 03                                                                                                                                                                                                                                                                                                              |
| Report ID         | T1MR-02                                                                                                                                                                                                                                                                                                         |
| Date of Issue     | 03-March-2021                                                                                                                                                                                                                                                                                                   |
| Project ID        | VCS 2002                                                                                                                                                                                                                                                                                                        |
| Monitoring Period | 01-November-2019 to 31-December-2020                                                                                                                                                                                                                                                                            |
| Prepared By       | Kosher Climate India (P) Limited                                                                                                                                                                                                                                                                                |
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# 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<sub>2</sub>) only. Thus the project activity leads to an emission reduction of 156,167 tCO<sub>2</sub> per year or 1,561,670 tCO<sub>2</sub> for the chosen crediting period of 10 years.

The current monitoring period chosen is from 01-November-2019 to 31-December-2020 (inclusive of first & last date) and the GHG emission reductions calculated are 175,036 tCO<sub>2</sub>

## 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 grouped project

### 1.3 Project Proponent

|                   |                                                                                                                           |
|-------------------|---------------------------------------------------------------------------------------------------------------------------|
| Organization name | Theparak Wind Co., Ltd                                                                                                    |
| Contact person    | Kelly Dallas                                                                                                              |
| Title             | Director                                                                                                                  |
| Address           | 25 <sup>th</sup> Floor, Capital Tower, All Seasons Place, 87/1, Wireless road, Lumpini, Patumwan, Bangkok 10330, Thailand |
| Telephone         | +66(0) 2106 8000                                                                                                          |
| Email             | <a href="mailto:kelly@windenergyholding.com">kelly@windenergyholding.com</a>                                              |

### 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             | #109, 2 <sup>nd</sup> Floor, 27 <sup>th</sup> Main, HSR Layout, Bangalore- 560102 |
| Telephone           | +91-99453 43475                                                                   |
| Email               | <a href="mailto:vamsi@kosherclimate.com">vamsi@kosherclimate.com</a>              |

### 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

1<sup>st</sup> Crediting period: 27-November-2018 to 26-November-2028.

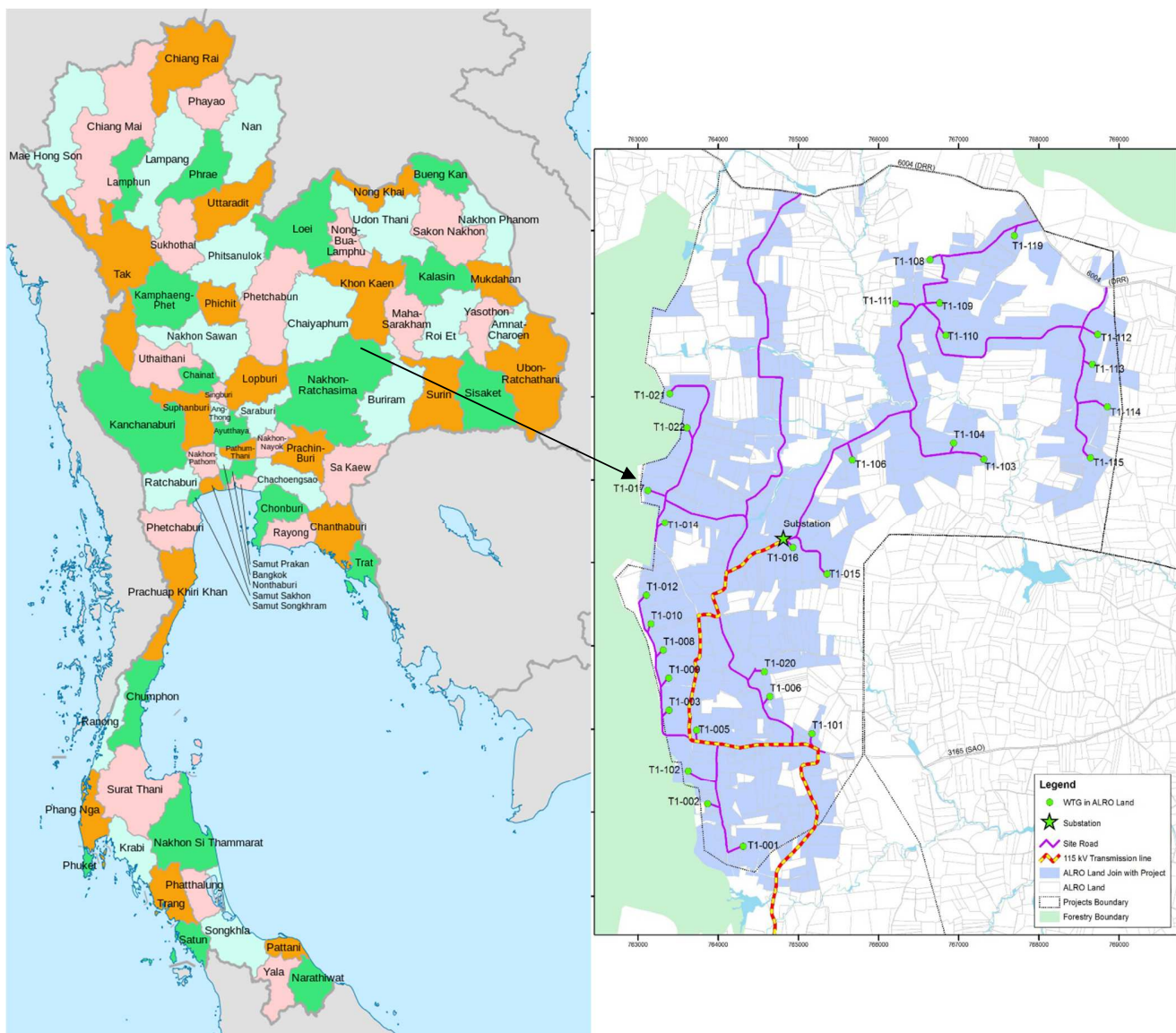
Length of 1<sup>st</sup> Crediting period: 10 years

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     | 101.470777     | 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)<sup>1</sup>

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

<sup>1</sup> <http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD>

- Methodological Tool: Tool to calculate the emission factor for an electricity system - Version 7.0, EB 100, Annex 6<sup>2</sup>.
- Methodological Tool: Tool for the demonstration and assessment of additionality - Version 07.0.0, EB 70 Annex 8<sup>3</sup>.

## 1.9 Participation under other GHG Programs

The project is not registered under any other GHG programs.

## 1.10 Other Forms of Credit

The GHG emission reductions from the project activity are 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 renewable energy certificates, during this monitoring period

## 1.11 Sustainable Development

**Social wellbeing:** The project helps in generating employment opportunities during the construction and operation phases. The project activity leads to development in infrastructure in the region like development of roads and also may promote locals business with improved power generation.

**Economic wellbeing:** The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits. The project activity will also help to reduce the demand supply gap in Thailand.

**Environmental Wellbeing:** The project activity will generate power using zero emissions wind based power generation which helps to reduce GHG emissions and specific pollutants like SO<sub>x</sub>, NO<sub>x</sub>, and SPM associated with the conventional thermal power generation facilities.

**Technological wellbeing:** The successful operation of project activity would lead to promotion of wind based power generation and would encourage other entrepreneurs to participate in similar projects

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<sup>2</sup> [http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf/history\\_view](http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf/history_view)

<sup>3</sup> <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

## 2 SAFEGUARDS

### 2.1 No Net Harm

The project is a wind power generation project. There were no harm identified 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 2<sup>nd</sup> 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<sub>2</sub> 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 [kelly@windenergyholding.com](mailto:kelly@windenergyholding.com).

No grievances received during the monitoring period.

### 2.3 AFOLU-Specific Safeguards

Not Applicable

## 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

#### 2.3.1 Methodology Deviations

There is no methodology deviations applied during this monitoring period.

#### 2.3.2 Project Description Deviations

There is no project description deviations applied during this monitoring period or in previous monitoring reports.

### 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 <sub>OM,y</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Data unit                                                                                    | tCO <sub>2</sub> /MWh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Description                                                                                  | Operating margin CO <sub>2</sub> 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 | <p>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".</p> <p>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'</p> <p>Weighted average</p> $= \frac{\sum_{i=1 \text{ to } n} (\text{Net generation in operating margin in year } i * \text{Simple operating margin in year } i)}{\sum_{i=1 \text{ to } n} (\text{Net generation in operating margin of year } i)}$ |
| 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 <sub>BM,y</sub>                                                                                                                                                                                                                                                                 |
| Data unit                                                                                    | tCO <sub>2</sub> /MWh                                                                                                                                                                                                                                                              |
| Description                                                                                  | Build margin CO <sub>2</sub> 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 | <p>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".</p> |
| 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 <sub>2</sub> /MWh                                                                                                                                                                                               |
| Description                                                                                  | Combined margin CO <sub>2</sub> 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 data has been considered in accordance to the Tool to calculate emission factor of an electricity system. The tool guides to take 75% weightage of $EF_{grid,OMsimple}$ , & 25% weightage of $EF_{grid,BM,y}$ . |
| 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                                                | $EG_{facility,y}$ <sup>4</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Data unit                                                       | MWh/year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Description                                                     | Quantity of net electricity supplied by the project activity to the grid in the year y                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Source of data                                                  | Monthly Energy meter reading                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Description of measurement methods and procedures to be applied | <p>Data Type: Measured &amp; Calculated.<br/> Monitoring equipment: Energy meters of accuracy class 0.2s<br/> Archiving Policy: Paper &amp; Electronic.<br/> Location of Energy Meter: EGAT Substation</p> <p>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, two back up meters also installed.</p> <p>The Net electricity supplied to the grid by each wind project is estimated as below<br/> Net electricity = Export – Import</p> |

<sup>4</sup> Since the project activity is the installation of a Greenfield power plant, then:  $EG_{PJ,y} = EG_{facility,y}$

| Frequency of monitoring/recording | Measurement: Continuous<br>Recording: Monthly                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------|----------------------|-------------------------------|------------|-----------------------------|-----------------------|------------|----------------------------------|------------|------------|------------|------------|
| Value monitored                   | <table><tr><th>Vintage</th><th>Net Generation (MWh)*</th></tr><tr><td>2019</td><td>61,019</td></tr><tr><td>2020</td><td>246,496</td></tr><tr><td>Total</td><td>307,515</td></tr></table> <p>*After applying 0.2% error for the calibration delay period</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Vintage              | Net Generation (MWh)*             | 2019                 | 61,019                        | 2020       | 246,496                     | Total                 | 307,515    |                                  |            |            |            |            |
| Vintage                           | Net Generation (MWh)*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| 2019                              | 61,019                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| 2020                              | 246,496                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| Total                             | 307,515                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| Monitoring equipment              | 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>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Meter Number         | Main:51515191<br>Backup: 51515192 | Accuracy             | 0.2s                          | Location   | Si Khiu 3 Substation (EGAT) | Calibration Frequency | 1 year     |                                  |            |            |            |            |
| Meter Number                      | Main:51515191<br>Backup: 51515192                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| Accuracy                          | 0.2s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| Location                          | Si Khiu 3 Substation (EGAT)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| Calibration Frequency             | 1 year                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| QA/QC procedures to be applied    | <p>The export reading has been crosschecked with the Invoice raised by the developer to EGAT</p> <p>The import reading shall be crosschecked with the invoice raised by EGAT to developer.</p> <p>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.</p> <p>The calibration details are given below:</p> <table><tr><th>Details</th><th>Calibration dates</th><th>Calibration due date</th></tr><tr><td rowspan="2">Main Meter<br/>Mt No: 51515191</td><td>22/02/2019</td><td>21/02/2020</td></tr><tr><td>16/03/2020</td><td>15/03/2021</td></tr><tr><td rowspan="2">Backup meter<br/>Mt. No: 51515192</td><td>22/02/2019</td><td>21/02/2020</td></tr><tr><td>16/03/2020</td><td>15/03/2021</td></tr></table> <p>As per the above calibration date, the calibration is not valid for the period 22/02/2020 to 15/03/2020. Hence, February 2020 &amp; March 2020 export &amp; import reading are adjusted with maximum possible error as described below:</p> <p>Adjusted Export = Recorded Export* (1-0.2%)</p> <p>Adjusted Import = Recorded Import *(1+0.2%)</p> | Details              | Calibration dates                 | Calibration due date | Main Meter<br>Mt No: 51515191 | 22/02/2019 | 21/02/2020                  | 16/03/2020            | 15/03/2021 | Backup meter<br>Mt. No: 51515192 | 22/02/2019 | 21/02/2020 | 16/03/2020 | 15/03/2021 |
| Details                           | Calibration dates                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Calibration due date |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| Main Meter<br>Mt No: 51515191     | 22/02/2019                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 21/02/2020           |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
|                                   | 16/03/2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 15/03/2021           |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| Backup meter<br>Mt. No: 51515192  | 22/02/2019                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 21/02/2020           |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
|                                   | 16/03/2020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 15/03/2021           |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |
| 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                                   |                      |                               |            |                             |                       |            |                                  |            |            |            |            |

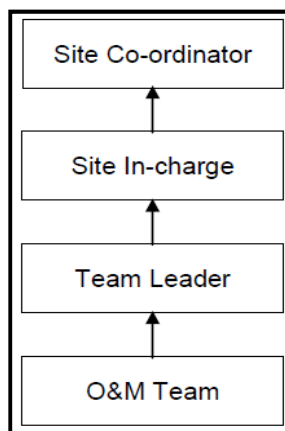
### 4.3 Monitoring Plan

All the three wind projects in the bundle have entered into agreement with the respective WTG Suppliers for the operation and maintenance of WTGs. And the solar project 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 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

**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 solar 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 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. Hence, the data collected is of high accuracy and authorised by EGAT.

**Handling Non-conformities**

Not applicable as the energy meter recording is done by 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:

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

$EF_{grid,CM,y}$  is Combined margin CO<sub>2</sub> 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<sub>2</sub>/MWh) (i.e, 0.569<sub>2</sub> tCO<sub>2</sub>/MWh).

and;

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

Net Electricity ( $EG_{facility,y}$ ) month wise data:

| Month        | Import (kWh)       | Export (kWh)   | Net Export (kWh)   |
|--------------|--------------------|----------------|--------------------|
| Nov-19       | 28,748,300         | 6,720          | 28,741,580         |
| Dec-19       | 32,303,560         | 26,400         | 32,277,160         |
| Jan-20       | 17,883,090         | 42,000         | 17,841,090         |
| Feb-20*      | 23,157,003         | 27,655         | 23,129,348         |
| Mar-20*      | 16,038,421         | 27,655         | 16,010,766         |
| Apr-20       | 16,659,090         | 38,400         | 16,620,690         |
| May-20       | 16,685,630         | 22,800         | 16,662,830         |
| Jun-20       | 17,625,810         | 19,200         | 17,606,610         |
| Jul-20       | 15,979,720         | 40,800         | 15,938,920         |
| Aug-20       | 23,201,080         | 21,600         | 23,179,480         |
| Sep-20       | 9,255,410          | 55,200         | 9,200,210          |
| Oct-20       | 20,312,700         | 58,800         | 20,253,900         |
| Nov-20       | 34,527,040         | 20,400         | 34,506,640         |
| Dec-20       | 35,574,100         | 28,800         | 35,545,300         |
| <b>Total</b> | <b>307,950,954</b> | <b>436,430</b> | <b>307,514,524</b> |

\*0.2% error applied for calibration delay.

Calculations of baseline emissions:

| Vintage | Net Electricity -<br>$EG_{PJ,y}$ (MWh) | Grid Emission Factor-<br>$EF_{grid,CM,y}$ tCO <sub>2</sub> /MWh | Baseline Emissions (tCO <sub>2</sub> )<br>$EG_{PJ,y} \times EF_{grid,CM,y}$ |
|---------|----------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------|
| 2019    | 61,019                                 | 0.5692                                                          | 34,731                                                                      |
| 2020    | 246,496                                | 0.5692                                                          | 140,305                                                                     |
| Total   | <b>307,515</b>                         | <b>0.5692</b>                                                   | <b>175,036</b>                                                              |

## 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:

$$ER_y = BE_y - PE_y - LE_y$$

Where,

$ER_y$  = Emission Reduction in tCO<sub>2</sub>e/year

$BE_y$  = Baseline emission in tCO<sub>2</sub>/year

$PE_y$  = Project emissions in tCO<sub>2</sub>e/year

$LE_y$  = Project Leakage emission in tCO<sub>2</sub>e/year

| Year         | Baseline emissions or removals (tCO <sub>2</sub> e) | Project emissions or removals (tCO <sub>2</sub> e) | Leakage emissions (tCO <sub>2</sub> e) | Net GHG emission reductions or removals (tCO <sub>2</sub> e) |
|--------------|-----------------------------------------------------|----------------------------------------------------|----------------------------------------|--------------------------------------------------------------|
| 2019         | 34,731                                              | 0                                                  | 0                                      | 34,731                                                       |
| 2020         | 140,305                                             | 0                                                  | 0                                      | 140,305                                                      |
| <b>Total</b> | <b>175,036</b>                                      | <b>0</b>                                           | <b>0</b>                               | <b>175,036</b>                                               |

## APPENDIX I: COMPARISON OF ACTUAL ER WITH ESTIMATED ER

| Description                              | Value   | Unit                    |
|------------------------------------------|---------|-------------------------|
| Estimated emission Reduction as per PDD  | 156,167 | tCO <sub>2</sub> e/year |
| Total days in the Monitoring period      | 427     | days                    |
| Estimated ERs for this monitoring period | 182,694 | tCO <sub>2</sub> e      |
| Actual Emission Reduction                | 175,036 | tCO <sub>2</sub> e      |
| Difference in Emission reduction         | -4.19%  |                         |

The actual emission reduction is 4.19% is less than the estimated emission reduction. Hence no justification is required.