# WIND POWER PROJECT IN RAJASTHAN

Document Prepared by EKI Energy Services Limited

| | |
|---|---|
| **Project Title** | Wind power project in Rajasthan |
| **Version** | 02 |
| **Report ID** | 01 |
| **Date of Issue** | 17-August-2021 |
| **Project ID** | 1195 |
| **Monitoring Period** | 01-April-2020 to 31-May-2021 (inclusive of both the days) |
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## CONTENTS

# 1 PROJECT DETAILS

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

Mytrah Energy (India) Limited (MEIL) (formerly Caparo Energy (India) Limited) is continuously developing the wind power assets in India. MEIL has set up 42 MW wind power project in Jaisalmer District in the state of Rajasthan. The project activity comprises of 20 Wind Energy Generators (WEGs) with a capacity of 2.1 MW each.

The Project activity is a zero-emissions wind based power generation project connected to NEWNE regional grid of India (Now INDIAN grid). The project helps to reduce the supply demand gap in the state and also generates power using zero emissions wind-based power generation which helps to reduce GHG emissions and specific pollutants like SOx, NOx, and SPM associated with the conventional thermal power generation facilities. The project activity conserves fossil fuel like coal, which can be used in other industrial applications. In the project site, there are other wind projects owned by other customers connected to the same substation. There is an apportioning procedure which is approved by the state nodal agency for apportioning the electricity to each and every customer. The WEG commissioning details has been mentioned under Section 1.7.
The total VCUs generated achieved during this monitoring period is 60,570 $tCO_2e$.

## 1.2 Sectoral Scope and Project Type

The project activity falls under
**Sectoral Scope:** 01 - Energy industries (renewable / non-renewable sources)
**Project Type** **:** I - Renewable Energy Projects
**Title** **:** Consolidated baseline methodology for grid-connected electricity generation from renewable sources
**Reference** **:** Approved consolidated baseline and monitoring methodology ACM0002, Version 12.3.0[2]
This project is not a grouped project activity.

## 1.3 Project Proponent

| | |
|---|---|
| Organization name | **Mytrah Energy (India) Limited** |
| Contact person | Mr. Ravinder Kumar Rana |
| Title | Assistant Manager |
| Address | 1st Floor, 8001, 8th Floor, Q-City, Nanakramguda, Gachibowli Hyderabad 500032, Telangana, INDIA |

| | |
|---|---|
| Telephone | +91 9655967129 |
| Email | ravinderrana@mytrah.com |

## 1.4 Other Entities Involved in the Project

| | |
|---|---|
| Organization name | **EKI Energy Services Limited** |
| Role in the Project | Project Consultant |
| Contact person | Anjali Rao |
| Title | Project Manager |
| Address | Office No. 201, EnKing Embassy, Plot No. 48, Scheme No. 78, Part II, Vijay Nagar INDORE – 452010, India. |
| Telephone | 9109120940 |
| Email | anjali@enkingint.org |

## 1.5 Project Start Date

The project start date for this project is said to be 19-June-2011. This is because the first WEG was commissioned as on the said date.

## 1.6 Project Crediting Period

The project is registered under Clean Development Mechanism (CDM) of UNFCCC with 10 years crediting period (Reference No: 8591) on 13th Dec 2012.[1] Crediting period of the project under CDM starts on 31st December 2012 and ends on 30th December 2022.

The project has begun generating GHG emission reductions from 19th June 2011. Hence, crediting period for VCS begins on 19th June 2011 and ends on 18th June 2021 considering 10 years fixed crediting period.

The project proponent is also not claiming GHG emission reductions under two schemes for the same period.

## 1.7 Project Location

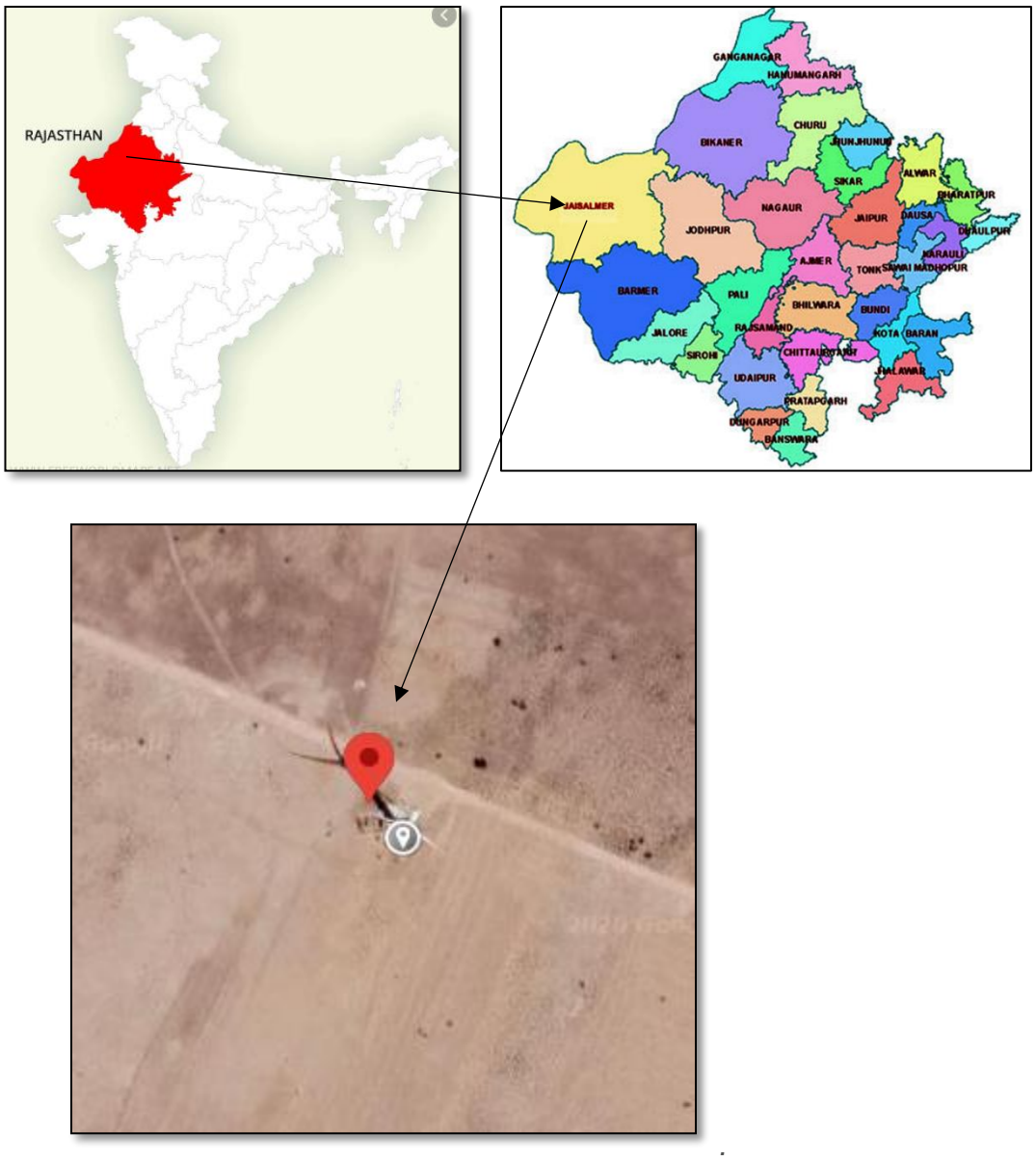
The wind power project is located in Tejwa – Mokal village, Jaisalmer District, Rajasthan State, India. The geo- coordinates of the project location is as follows.

The location of WEGs is as given below

[1] http://cdm.unfccc.int/Projects/DB/DNV-CUK1354785555.66/view

The geographical location of the project site with commissioning dates are as shown below:

| Sr. No. | WTG ID | WTG Co-ordinate | | Date of Commissioning |
|---|---|---|---|---|
| | | Latitude | Longitude | |
| 1 | MK014 | 27.1631 | 70.6809 | 04-Aug-2011 |
| 2 | MK015 | 27.1612 | 70.6858 | 19-Jul-2011 |
| 3 | MK016 | 27.1594 | 70.6907 | 19-Jul-2011 |
| 4 | MK017 | 27.1576 | 70.6956 | 19-Jul-2011 |
| 5 | MK021 | 27.1466 | 70.7251 | 30-Sep-2011 |
| 6 | MK039 | 27.1697 | 70.6926 | 12-Jul-2011 |
| 7 | MK040 | 27.1715 | 70.6877 | 12-Jul-2011 |
| 8 | MK042 | 27.1752 | 70.6779 | 19-Jul-2011 |
| 9 | MK043 | 27.1771 | 70.673 | 04-Aug-2011 |
| 10 | MK066 | 27.1837 | 70.6848 | 12-Jul-2011 |
| 11 | MK067 | 27.1812 | 70.6891 | 30-Jun-2011 |
| 12 | MK068 | 27.1804 | 70.6949 | 30-Jun-2011 |
| 13 | MK069 | 27.1782 | 70.6995 | 30-Jun-2011 |
| 14 | MK092 | 27.1887 | 70.7016 | 19-Jun-2011 |
| 15 | MK093 | 27.1905 | 70.6966 | 25-Jun-2011 |
| 16 | MK094 | 27.1924 | 70.6917 | 30-Jun-2011 |
| 17 | MK161 | 27.2195 | 70.6917 | 25-Jun-2011 |
| 18 | MK163 | 27.2237 | 70.6833 | 25-Jun-2011 |
| 19 | MK164 | 27.2255 | 70.6784 | 19-Jun-2011 |
| 20 | MK165 | 27.2274 | 70.6735 | 19-Jun-2011 |




## 1.8 Title and Reference of Methodology

Title: Consolidated baseline methodology for grid-connected electricity generation from renewable sources.
Methodology applied is ACM 0002, version 12.3.0[2].

"Tool to calculate the emission factor for an electricity system" version 2.2.1.

[2] https://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L

## 1.9 Participation under other GHG Programs

Participation under Other GHG Programs: The PP has participated under CDM mechanism of UNFCCC. The UN reference id 8591[1] of program with this project activity. The PP would not consider the credit from any other mechanism for the current monitoring period which is 01-April-2020 to 31-May-2021. The undertaking is provided to confirm that there is no any double accounting for current monitoring period.

## 1.10 Other Forms of Credit

Include the following information, as applicable:

Emission Trading Programs and Other Binding Limits: The PP has not applied this project in any Emission Trading Programs and other Binding Limits.

Other Forms of Environmental Credit: The PP has not applied this project in any other form of environmental credits or for REC benefits. PP not participating for REC benefits can be verified from this link- https://www.recregistryindia.nic.in/index.php/publics/accredited_regens

## 1.11 Sustainable Development

**Contribution to sustainable development:**

Ministry of Environment and Forests, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project contributes to sustainable development using the following ways.

- **Social well-being:** 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 business with improved power generation.
- **Economic well-being:** 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 also helps to reduce the demand supply gap in the state. The project activity creates local employment generation which helps economic well-being of local people.
- **Technological well-being:** The successful operation of project activity is leading to promotion of renewable based power generation and would encourage other entrepreneurs to participate in similar projects
- **Environmental well-being:** The project activity being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the project activity also helps in avoiding significant amount of GHG emissions.

# 2 SAFEGUARDS

## 2.1 No Net Harm

The project activity does not involve any major construction activity. It primarily requires the installation of wind turbine generators.

The report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013. This report clearly mentioned that wind power project activity operations do not result in direct air pollution, noise pollution. Please refer below web link for the same[3].

Thus there are no any significant impacts due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity

## 2.2 Local Stakeholder Consultation

As a part of continual improvement process, feedback from the associated stakeholders is vital, therefore a dedicated Visitor register cum grievance register has been placed at the project site which is accessible to stakeholders to provide their feedback on the project. It is appropriate publicly accessible location at which local stakeholders can provide their feedback on the project. This location is also conducive to continuous and regular checks for stakeholder comments. For the global stakeholders, the suggestion and the grievance can be submitted to mail@mytrah.com

Stakeholder meetings were organized during project activity registration in order to identify the major challenges around the area, stakeholders were invited well in advance through printed invitation, calls, meeting and a notice was placed around the local common areas.

Various CSR activities around site are carried out with proper stakeholder requirements meeting. The stakeholders are also requested to share their experiences and grievances on continuous basis. Registers is used to records the grievances and feedback. During the current monitoring period, positive feedbacks had been received regarding site operation. No any negative comments/ grievances received during the current monitoring period, therefore, no any mitigation measures were required. In case of grievances, the nature of probable resolution is discussed with the plant head office and implemented by the site incharge.

## 2.3 AFOLU-Specific Safeguards

This Section is not applicable here as the project activity is not an AFOLU project activity.

# 3 IMPLEMENTATION STATUS

[3] https://smartnet.niua.org/sites/default/files/resources/report-on-developmental-impacts-of-RE.pdf

## 3.1 Implementation Status of the Project Activity

The project activity comprises of 20 Wind Turbine Generators (WTG's) with a capacity of 2.1 MW each. The project activity is using S-88- 2.1 MW WTG manufactured by Suzlon Energy Ltd. The technology of electricity generation from renewable wind resource is environment friendly as it does not use any fossil fuel. The power (electricity) thus produced by the project activity would be transmitted to the state electricity grid, thereby displacing equivalent amount of power in the grid which is dominated by emission intensive thermal power plants.

S88_2.1 MW wind turbines utilize well-proven DFIG technology that has been deployed in more than 5000 units around the world. The technical lifetime of the wind turbine is 20 years. Key inclusions in this design are:

- DFIG convertor featuring variable speed
- Larger swept area with rotor diameters; 95 and 97 meters
- 80-meter, 90-meter and 100-meter hub heights

The technical specification of the WTG is as follows:

| MODEL | S88- 2.1MW |
|---|---|
| **Operating Data** | |
| Rated power | 2.1MW |
| Cut-in wind speed | 4 m/s |
| Rated wind speed | 14 m/s |
| Cut-out wind speed | 25 m/s |
| 50 years gust wind speed | 59.5 m/s |
| Hub height | 79 m (Foundation top equal to ground level) |
| Wind Class | IEC – IIA |
| Rotational Speed | 15 to 17.6 rpm |
| **Rotor** | |
| Pitch system | Pitch regulated, electrical |
| Diameter | 88 m |
| Swept area | 6082 $m^2$ |
| Blade material type | Epoxy bounded fibre glass |
| **Generator** | |
| Type | Asynchronous slip ring type induction generator |
| Rated power | 2100 kW |
| Rated voltage | 690/600 V |
| Frequency | 50/60 Hz |
| Protection | IP 54, IP23 for slip ring unit |
| Cooling system | Air cooled |
| Insulation | Class H |
| Slip control | Unique Flexi-Slip providing slip up to 16.67% |
| **Braking System** | |
| Aerodynamic brake | 3 independent systems with blade pitching mechanism |
| Mechanical brake | Hydraulic fail-safe disc brake system |
| **Gearbox** | |
| Type | 3 stages (One planetary & Two helical) |

| | |
|---|---|
| Ratio | 1:98.8 / 1:118.1 |
| Nominal load | 2200 kW |
| **Yaw System** | |
| Type | Driven by 3 electrical driven planetary drives |
| Bearings | Polyamide slide |
| **Certifications** | |
| Design standards | GL 2003 |
| Quality | ISO 9001:2000, ISO 9001:2008, ISO 14001:2004 & OHSASA 18001:2007 |
| **Tower** | |
| Type | Tubular Steel Tower (4 sections) |
| Corrosion protection | Epoxy/PU coated |

No events or situations happened during the reported monitoring period that can alter the applicability of the applied methodology.

The commissioning dates respective to the WTG sites are mentioned in section 1.7

## 3.2 Deviations

### 3.2.1 Methodology Deviations

There is no request for deviation applied during this monitoring period.

### 3.2.2 Project Description Deviations

**Deviation 1-**

The below deviation is requested for correction in formula for calculation of Net electricity exported by the project proponent.

As per the registered PDD:

Net electricity exported by the project proponent is calculated as mentioned below:

$EG_{PJ,y}$= (Export-Import) X (1+Transmission Loss)

The above formula was not followed currently and in actual, transmission losses are calculated separately for export and import and below formulas are considered for export and import values of project activity WTGs

$$Export = \left(\frac{E_{Exp,feeder,i}}{E_{Gen,feeder,i}} X\, E_{WTG,i}\right) - \left(\left(\left(\sum E_{Exp,feeder,i}\right) - E_{Exp,sub-station}\right) \div \sum E_{Gen,feeder,i}\right) \times E_{WTG,i}$$

$$Import = \left(\frac{E_{Imp,feeder,i}}{E_{Gen,feeder,i}} X\, E_{WTG,i}\right) - \left(\left(\left(\sum E_{Imp,feeder,i}\right) - E_{Imp,sub-station}\right) \div \sum E_{Gen,feeder,i}\right) \times E_{WTG,i}$$

The use of above apportioning formula and calculation of export and import values for project activity WTGs is under control of state electricity board and PP do not have any control on it.

The actual monitoring practice/formula has been updated now and PP is getting share certificate/break up certificate which gives the direct values of Net electricity exported by the project proponent. The net electricity can be verified from the invoices provided by the PP.

Thus deviation in requested to correct project description information.

**Deviation 2-**

The crediting period mentioned in VCS PD section 1.6 is as "The project has begun generating GHG emission reductions from 19th June 2011. Hence crediting period for VCS begins on 19th June 2011 and ends on 30th December 2012, since the crediting period under CDM starts on 31st December 2012. The project proponent will also not claim GHG emission reductions under VCS and CDM scheme for same period during the period of 31st December 2012 to 30th December 2022"

Also section 1.7 of VCS PD mentioned 10 years fixed crediting period. Thus there is inconsistency in VCS crediting period mentioned in VCS PD. Hence deviation is requested to confirm that VCS crediting period will be 19th June 2011 to 18th June 2021 i.e 10 years fixed crediting period. Also end date of VCS crediting period is within end date of CDM crediting period which is in line with VCS Standard Version 4.1.

The previous verification (VCS MR and Verification Report) confirmed the VCS crediting period as 19th June 2011 to 18th June 2021.

Thus deviation in requested to correct VCS Crediting period information.

## 3.3 Grouped Projects

This project activity is not a grouped project activity.

# 4 DATA AND PARAMETERS

## 4.1 Data and Parameters Available at Validation

| Data / Parameter | $EF_{grid,OMsimple,y}$ |
|---|---|
| Data unit | $tCO_2/MWh$ |
| Description | Operating margin $CO_2$ emission factor of NEWNE grid |
| Source of data | Central Electricity Authority:$CO_2$ Emission Database CEA $CO_2$ Baseline database Version 07[4] |
| Value applied | 0.9842 |
| Justification of choice of data or description of measurement methods and procedures applied | The operating margin emission factor data has been deduced from $CO_2$ database.<br>CEA $CO_2$ Baseline database Version 07 |
| Purpose of Data | Calculation of baseline emissions |

[4] https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver7.pdf

| | |
|---|---|
| Comments | The operating margin emission factor is a 3-year generation-weighted average (2008-11).<br>Data calculated to be 0.9842. The operating Margin is calculated ex ante and fixed during the crediting period. |

| | |
|---|---|
| Data / Parameter | $EF_{grid,BM,y}$ |
| Data unit | $tCO_2/MWh$ |
| Description | Build margin $CO_2$ emission factor of NEWNE grid |
| Source of data | Central Electricity Authority:$CO_2$ Emission Database CEA $CO_2$ Baseline database Version 07[5] |
| Value applied | 0.8588 |
| Justification of choice of data or description of measurement methods and procedures applied | The operating margin emission factor data has been deduced from $CO_2$ database.<br>CEA $CO_2$ Baseline database Version 07 |
| Purpose of Data | Calculation of baseline emissions |
| Comments | The build Margin would be calculated ex-ante and fixed during the crediting period. For ex-ante calculation the most recent data available has been used and the build margin thus calculated is 0.8588 |

| | |
|---|---|
| Data / Parameter | $EF_{grid,CM,y}$ |
| Data unit | $tCO_2/MWh$ |
| Description | Combined margin $CO_2$ emission factor of NEWNE grid |
| Source of data | Central Electricity Authority:$CO_2$ Emission Database CEA $CO_2$ Baseline database Version 07[6] |
| Value applied | 0.9529 |
| Justification of choice of data or description of measurement methods and procedures applied | Calculated as per the procedures in "Tool to calculate the emission factor for an electricity system" based on CEA data. |
| Purpose of Data | Calculation of baseline emissions |
| Comments | The combined margin would be calculated ex-ante and fixed for the entire crediting period and the combined margin thus |

[5] https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver7.pdf

[6] https://cea.nic.in/wp-content/uploads/baseline/2020/07/user_guide_ver7.pdf

| | |
|---|---|
| | calculated is 0.9529. |

## 4.2 Data and Parameters Monitored

| | |
|---|---|
| Data / Parameter | $EG_{PJ,y}$ |
| Data unit | MWh |
| Description | Quantity of net electricity exported to the grid during the year y. |
| Source of data | Certificate for share of electricity generated by Wind Farm. |
| Description of measurement methods and procedures to be applied | Net electricity supplied is calculated on the basis of the difference between calculated values of "export" and calculated value "import" on the JVVNL energy meter at the common evacuation point and the percentage transmission loss as prescribed in the PPA for metering at 220 kV.<br><br>All the data items monitored under the monitoring plan is archived for entire crediting period or till the last issuance of VER/CERs for this project activity whichever occurs later.<br><br>Calibration Frequency: All Energy meters are tested for accuracy at least once in a year. The accuracy class of the energy meter is 0.2s |
| Frequency of monitoring/recording | Measuring frequency: Continuous<br>Reading frequency: Daily<br><br>Recording frequency: Monthly |
| Value monitored | 63,565.06 MWh |
| Monitoring equipment | Energy meters of 0.2s accuracy class. Refer to appendix 1 for further details. |
| QA/QC procedures to be applied | Net electricity supplied to the grid by the project activity is cross checked with invoices submitted to JVVNL. |
| Purpose of the data | Calculation of baseline emissions |
| Calculation method | Net electricity supplied to the grid by the project activity is cross checked with invoices submitted to JVVNL. |
| Comments | The data will be archived for two years after the end of the last crediting period or till the last issuance of CERs for the project activity, whichever is later. |

| | |
|---|---|
| Data / Parameter | $E_{,WEG,I,Y}$ |
| Data unit | MWh |

| | |
|---|---|
| Description | Quantity of Electricity generated by the individual WEGs of the PP in year y. |
| Source of data | WEG controller meter reading |
| Description of measurement methods and procedures to be applied | Electricity generated by the WEG is continuously monitored by the controller meter installed within the WEG. These reading are recorded online by the technology supplier.<br><br>Calibration Frequency: The WEG controller meter does not require calibration as per the specification provided by the technology supplier. |
| Frequency of monitoring/recording | Continuous measuring |
| Value monitored | 65,871.45 MWh (summation of generation from all 20 WEGs) |
| Monitoring equipment | Microprocessor based controller meter |
| QA/QC procedures to be applied | The quantity of electricity generated by the individual WEG is cross-checked with the online tracking system provided by the technology supplier. |
| Purpose of the data | Calculation of baseline emissions |
| Calculation method | Not Applicable |
| Comments | - |

## 4.3 Monitoring Plan

The electricity exported to the grid through the project activity and the electricity imported from the JVVNL grid is monitored. The electricity export and import is through a common evacuation system having common metering equipments. Suzlon Energy Limited has been identified as the common agency responsible for joint metering.

As mentioned in deviation request, the correct formula used for export and import values of project activity WTGs are as below

$$Export = \left(\frac{E_{Exp.feeder.i}}{E_{Gen.feeder.i}} X\, E_{WTG.i}\right) - \left(\left(\left(\sum E_{Exp.feeder.i}\right) - E_{Exp.sub-station}\right) \div \sum E_{Gen.feeder.i}\right) \times E_{WTG.i}$$

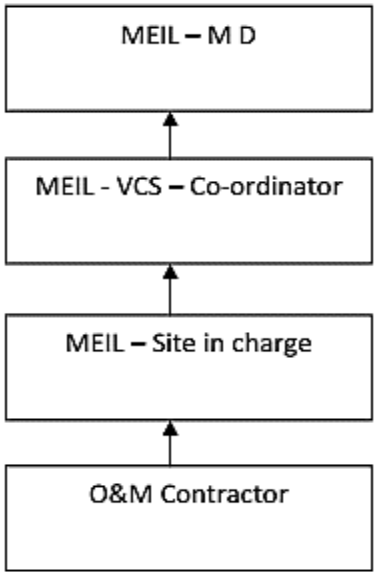
$$Import = \left(\frac{E_{Imp.feeder.i}}{E_{Gen.feeder.i}} X\, E_{WTG.i}\right) - \left(\left(\left(\sum E_{Imp.feeder.i}\right) - E_{Imp.sub-station}\right) \div \sum E_{Gen.feeder.i}\right) \times E_{WTG.i}$$

The use of above apportioning formula and calculation of export and import values for project activity WTGs is under control of state electricity board and PP do not have any control on it.

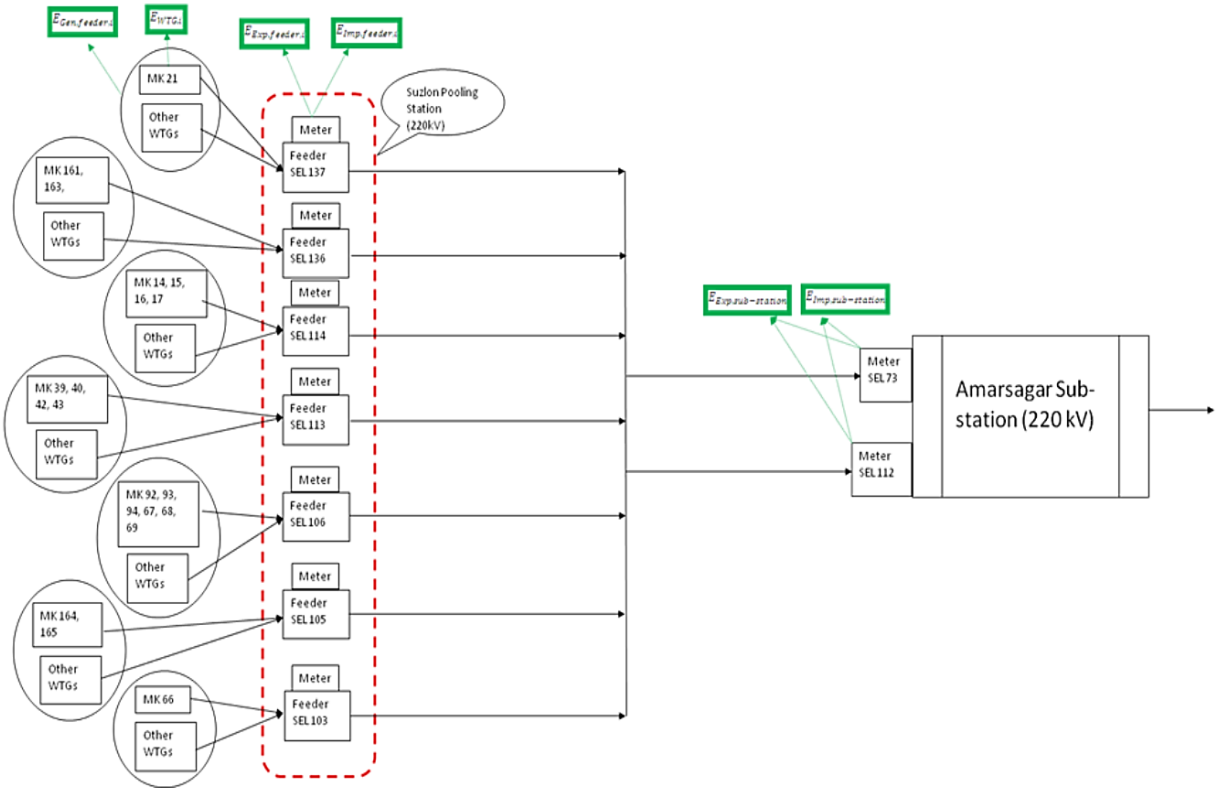
The transmission losses between suzlon pooling substation (feeder) and sub-station are accounted in above formula, hence separate consideration of transmission losses is not required.

The PP is getting share certificate/break up certificate which gives the direct values of Net electricity exported by the project proponent and same is considered for ER calculations.

The organizational structure of this VCS project activity is as follows:




The project proponent has entered into agreement with the WEG- Supplier – Suzlon Energy Limited for the operation and maintenance of WEGs. The WEG supplier has dedicated and technically well-equipped O&M team for day to day Operation and maintenance of each WEG. O&M contractor provides a monthly report, which includes wind data, generation data, major breakdown events and machine availability, which forms the basis for invoicing and emission reduction computation. Project Manager is responsible for recording of monthly Joint Meter Readings of export and import. Monthly power export and import data are to be sent regularly to CDM coordinator of MEIL. All data will be archived for a period two years after crediting period. The single line diagram for the project activity is as follows:




# 5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

## 5.1 Baseline Emissions

The baseline emissions are the product of electrical energy baseline $EG_{BL, y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor. Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors.

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

Where:

$BE_y$ : Baseline Emissions in year y; t $CO_2$

**$EG_{PJ,y}$** : Energy baseline in year y; MWh

$EF_{grid, CM, y}$ : Combined margin $CO_2$ emission factor for grid connected power generation in year y, $tCO_2/MWh$

As per registered CDM PDD, combined margin emission factor is 0.9529 $tCO_2$ /MWh. Hence the baseline emissions for the project activity for the current monitoring period are as follows.

$BE_y$ = 63,565.06* 0.9529 = 60,570 $tCO_2e$ (round down values).

## 5.2 Project Emissions

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

## 5.3 Leakage

The project activity is a Greenfield wind power project and there is no technology transfer with respect to this project activity. Hence the Leakage emissions for the project are zero.

## 5.4 Net GHG Emission Reductions and Removals

| Year | Baseline emissions or removals ($tCO_2e$) | Project emissions or removals ($tCO_2e$) | Leakage emissions ($tCO_2e$) | Net GHG emission reductions or removals ($tCO_2e$) |
|---|---|---|---|---|
| **2020** | 40,936 | 0 | 0 | 40,936 |
| **2021** | 19,634 | 0 | 0 | 19,634 |
| **Total** | **60,570** | **0** | **0** | **60,570** |

The actual GHG avoided during the current monitoring plan is 60,570 $tCO_2e$. The estimated GHG during current monitoring period is 82,489 $tCO_2e$. The actual VER is -26.57% lower than the estimated VER. This variation is majorly due to the variations in wind flow pattern, grid availability and other parameters which are not in the control of PP. The above variations is conservative.

# APPENDIX 1: CALIBRATION DETAILS

| Feeder number | Meter number | Meter make | Calibration date | Calibration due date |
|---|---|---|---|---|
| SEL-73 | 13195548 | L&T | 23-January-2020 | 23-January-2021 |
| | | | 13-January-2021 | 13-January-2022 |
| | 13195549 | L&T | 23-January-2020 | 23-January-2021 |
| | | | 13-January-2021 | 13-January-2022 |
| SEL-112 | RJB90206 | L&T | 23-January-2020 | 23-January-2021 |
| | | | 13-January-2021 | 13-January-2022 |
| | RJB90207 | L&T | 23-January-2020 | 23-January-2021 |
| | | | 13-January-2021 | 13-January-2022 |

Feeder meter details:-

| WEG | Feeder Number | Meter Number | Meter Make | Calibration Date | Next Calibration due date |
|---|---|---|---|---|---|
| MK 66 | Fed No. 10 | RJB 72831 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| | | RJB 72832 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| MK 164<br>MK 165 | Fed No. 11 | RJB 73524 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| | | RJB 73525 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| MK67<br>MK68<br>MK69<br>MK92<br>MK93<br>MK94 | Fed No. 12 | RJB 73521 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| | | RJB 73522 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| MK14<br>MK15<br>MK16<br>MK 17 | Fed No. 14 | RJB 73571 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| | | RJB 73572 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| MK39<br>MK40<br>MK42<br>MK43 | Fed No. 13 | RJB 73569 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| | | RJB 73570 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |

| | | | | | |
|---|---|---|---|---|---|
| MK 21 | Fed No. 17 | RJB 74434 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| | | RJB74435 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| MK 161<br>MK 163 | Fed No. 16 | RJB 74432 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |
| | | RJB 74433 | Secure Meters Limited | 10-May-2019 | 10-May-2020 |
| | | | | 02-June-2020 | 02-June-2021 |

Error factor has been applied during the months of May-2020 & June-2020 due to delay in calibration during the period of 10-May-2020 to 02-June-2020 as a conservative approach.

# APPENDIX II: BREAK-DOWN DETAILS

| Gen. Date | Site | Loc. No. | Breakdown Remark | Breakdown Hrs. |
|---|---|---|---|---|
| 07-April-2020 | Mokal | MK42 | Pitch EmergencyRun | 18.7 |
| 08- April-2020 | Mokal | MK164 | Elec SafetyChainStop | 24.0 |
| 13- April-2020 | Mokal | MK40 | Battery Charger2 Disconnected | 17.2 |
| 23- April-2020 | Mokal | MK66 | Elec FB GeneratorFan | 21.2 |
| 25-May-2020 | Mokal | MK14 | DFIG Inverter Fault Shutdown | 17.2 |
| 31- May-2020 | Mokal | MK164 | Pitch EmergencyRun | 21.0 |
| 04-June-2020 | Mokal | MK164 | Rep Pitch FreqConvPitch3 ErrStop | 19.6 |
| 08- June-2020 | Mokal | MK39 | DFIG Invrtr CANFail | 24.0 |
| 15- June-2020 | Mokal | MK164 | Damper FullLoad Osc Stop | 21.2 |
| 16- June-2020 | Mokal | MK14 | Rep Pitch EmergencyRun | 23.0 |
| 12-July-2020 | Mokal | MK68 | Rep Pitch FreqConvPitch1 ErrStop | 24.0 |
| 23-Aug-2020 | Mokal | MK66 | Rep Pitch FreqConvPitch1 ErrStop | 24.0 |
| 24- Aug-2020 | Mokal | MK92 | Rep Pitch FreqConvPitch1 ErrStop | 23.9 |
| 03-September-2020 | Mokal | MK164 | Elec FB GeneratorFan | 19.6 |
| 04- September-2020 | Mokal | MK164 | DFIG Inverter Fault Shutdown | 24.0 |
| 27- September-2020 | Mokal | MK39 | Pitch EmergencyRun | 21.2 |
| 28- September-2020 | Mokal | MK164 | Rep Pitch FreqConvPitch3 ErrStop | 23.0 |
| 29- September-2020 | Mokal | MK14 | DFIG Invrtr CANFail | 24.0 |
| 11-October-2020 | Mokal | MK68 | Pitch EmergencyRun | 24.0 |
| 31- October-2020 | Mokal | MK40 | Rep Pitch FreqConvPitch3 ErrStop | 24.0 |
| 01-November-2020 | Mokal | MK66 | DFIG Invrtr CANFail | 23.9 |
| 02- November-2020 | Mokal | MK14 | Damper FullLoad Osc Stop | 19.6 |
| 03- November-2020 | Mokal | MK164 | Rep Pitch EmergencyRun | 24.0 |
| 17- November-2020 | Mokal | MK68 | Pitch EmergencyRun | 18.7 |

| | | | | |
|---|---|---|---|---|
| 21- November-2020 | Mokal | MK66 | Elec SafetyChainStop | 24.0 |
| 25- November-2020 | Mokal | MK92 | Battery Charger2 Disconnected | 17.2 |
| 26- November-2020 | Mokal | MK14 | Elec FB GeneratorFan | 21.2 |
| 28- November-2020 | Mokal | MK164 | Rep Pitch FreqConvPitch1 ErrStop | 17.2 |
| 12-January-2021 | Mokal | MK68 | Rep Pitch FreqConvPitch1 ErrStop | 21.0 |
| 20-January-2021 | Mokal | MK14 | Elec FB GeneratorFan | 19.6 |
| 21-January-2021 | Mokal | MK68 | DFIG Inverter Fault Shutdown | 24.0 |
| 25-January-2021 | Mokal | MK40 | Pitch EmergencyRun | 18.7 |
| 16-February-2021 | Mokal | MK66 | Rep Pitch FreqConvPitch3 ErrStop | 24.0 |
| 17-Febraury-2021 | Mokal | MK14 | Damper FullLoad Osc Stop | 17.2 |
| 20- Febraury-2021 | Mokal | MK92 | Rep Pitch EmergencyRun | 21.2 |
| 28- Febraury-2021 | Mokal | MK164 | Pitch EmergencyRun | 19.6 |
| 20-March-2021 | Mokal | MK164 | Elec SafetyChainStop | 24.0 |
| 25- March-2021 | Mokal | MK39 | Battery Charger2 Disconnected | 18.7 |
| 26- March-2021 | Mokal | MK164 | Elec FB GeneratorFan | 16.5 |
| 27- March-2021 | Mokal | MK14 | Rep Pitch FreqConvPitch1 ErrStop | 17.2 |
| 05-April-2021 | Mokal | MK164 | Rep Pitch FreqConvPitch1 ErrStop | 24.0 |
| 06- April-2021 | Mokal | MK164 | Pitch EmergencyRun | 17.2 |
| 16- April-2021 | Mokal | MK39 | Rep Pitch FreqConvPitch3 ErrStop | 21.2 |
| 15-May-2021 | Mokal | MK164 | DFIG Invrtr CANFail | 18.0 |
| 28- May-2021 | Mokal | MK14 | Pitch EmergencyRun | 24.0 |
| 19- May-2021 | Mokal | MK68 | Rep Pitch FreqConvPitch3 ErrStop | 18.7 |
| 23-May-2021 | Mokal | MK68 | Rep Pitch FreqConvPitch3 ErrStop | 19.2 |