13.75 MW WIND POWER PROJECT IN DAVANGERE, KARNATAKA, INDIA

Document Prepared by EKI Energy Services Limited

Project Title	13.75 MW wind power project in Davangere, Karnataka, India
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Monitoring Period	31-March-2019 to 30-June-2021
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity is an initiative by Sargam Retails Private Limited (SRPL), towards clean electricity generation using wind energy resources in the state of Karnataka. SRPL is engaged in Trading and Marketing Packaged Tea & Tobacco.

The project activity leads to the installation of 10 Wind Turbine Generators (WTGs) of total generating capacity of 13.75 MW (5 nos of Suzlon make S 82 WTGs each having generating capacity of 1500 kW &5 nos of Suzlon make S 64 WTGs each having generating capacity of 1250 kW). There locations is in Davangere district of Karnataka state of India.

The start date of operation of the project is 31-March-2009, which is earliest date of commissioning of the wind mill of the project activity and 29-May-2009 which is the last data of the commissioning of the project activity.

The commissioning details of the project activity are summarized below:

WTG ID	Capacity and Number of WTGs	Date of Commissioning
K-543, K-544, K-549, K-550, K-551	1.5 MW x 05 No.s	31-March-2009
K-538, K-539, K-541, K-542	1.25 MW x 04 No.s	31-March-2009
K-540	1.25 MW x 01 No.	29-May-2009

The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources, to utilize the generated output for supply to Karnataka Power Transmission Company Limited (KPTCL) and to contribute to climate change mitigation efforts. This renewable energy produced will partially contribute to the electricity provided by the KPTCL.

The project is utilizing wind energy for generating electricity which otherwise would have been generated through alternate fuels (most likely - fossil fuel) based power plants thus, contributing to reduction in specific emissions (emissions of pollutant) including GHG emissions. Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. SRPL will be developing this project keeping in consideration the funding available under the Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change. The project activity is also responsible for sustainable economic growth and conservation of environment through use of wind as a renewable source. The Project activity would generate 13.75 MW of electricity with efficient utilization of the available wind energy through adoption of the latest, efficient and modern technology. The generated electricity will displace equivalent electricity (generated from fossil sources) that may have been supplied to KPTCL.

The total GHG emission reductions in the current monitoring period is 62,808 t CO_2e (for the period of 31-March-2019 to 30-June-2021).

1.2 Sectoral Scope and Project Type

Project Type: Renewable energy project
Sectoral Scope 1: Energy industries (renewable - / non-renewable sources)

This project is not grouped project because there is no addition other project activity.

This is a non-AFLOU type of project.

1.3 Project Proponent

Organization name	Sargam Retails Pvt. Limited
Contact person	Mr. Prafulla Premchand Khinvasara
Title	Head- Wind Power Projects
Address	Malpani House, Indira Gandhi Marg, Sangamner, Maharashtra – 422605, India
Telephone	+91- 9021032214
Email	prafulla@malpani.com

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Carbon credit advisory
Contact person	Manish Dabkara
Title	CEO & MD
Address	Office No 201, Plot No 48, Scheme 78, Vijay Nagar Part- II, Indore 452010, India
Telephone	+91 - 9910771187
Email	registry@enkingint.org, moonis@enkingint.org

1.5 Project Start Date

The start date of the project activity is 31-March-2009 which is the date of commissioning of the first wind turbine installed under the project activity.

1.6 Project Crediting Period

The crediting period of the project activity is for 10 years (Renewable for maximum 2 times).

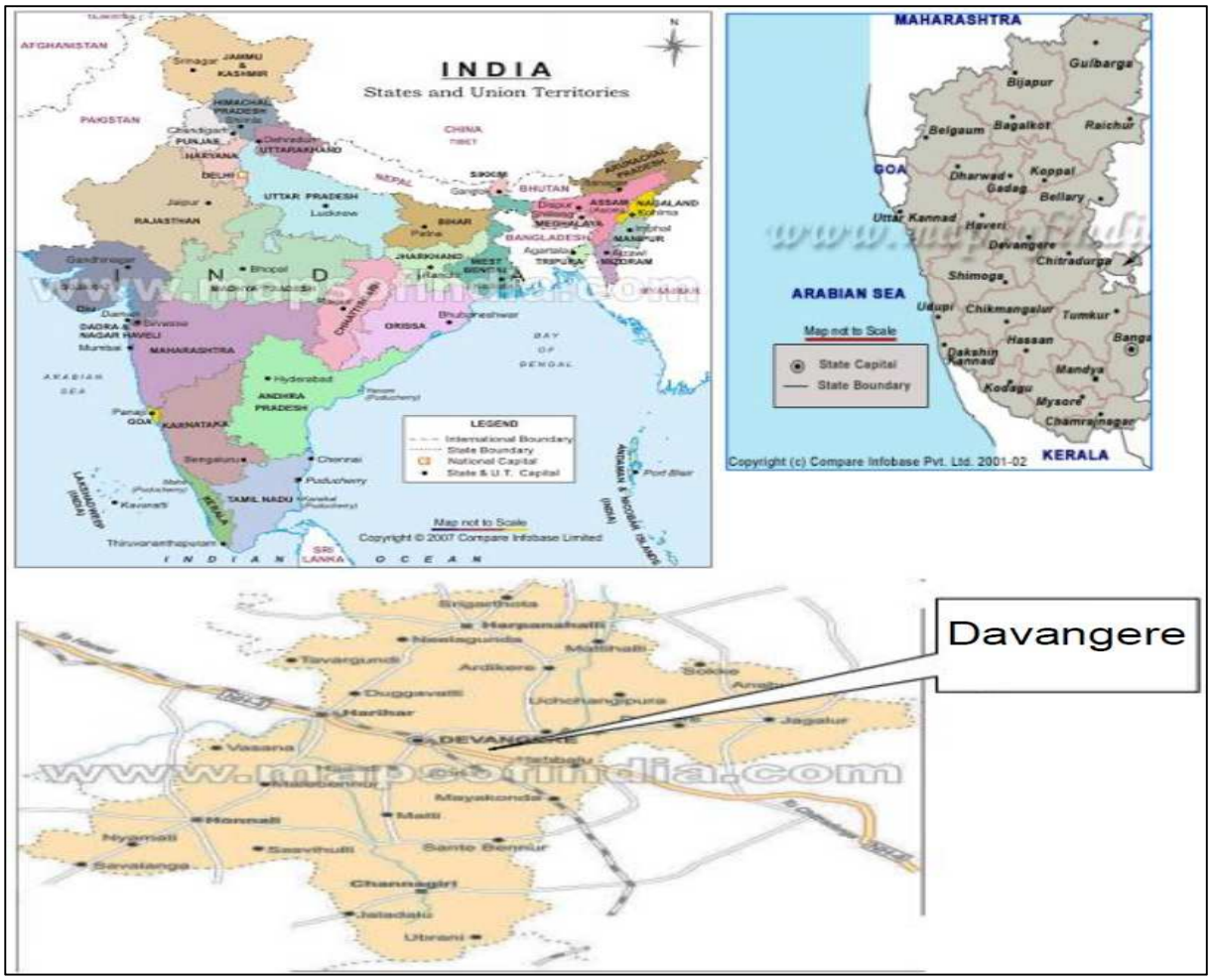
The length of the second crediting period is 31-March-2019 to 30-March-2029 (both dates inclusive).

1.7 Project Location

The project activity is located at Davengere in the state of Karnataka.

Geographical Location Details of the project site of M/s Sargam Retails

Capacity (MW)	Location No.	R.S. No.	Village	Taluka	District	Latitude (N)	Longitude (E)
1.5	K-543	111	Yaraganal	Honnali	Davangere	14°09'17.4"	75°30'11.9"
1.5	K-544	111	Yaraganal	Honnali	Davangere	14°09'10.4"	75°30'17.6"
1.5	K-549	28	Kudurekonda	Honnali	Davangere	14°09'03.2"	75°30'23.1"
1.5	K-550	28	Kudurekonda	Honnali	Davangere	14°08'57.2"	75°30'29.9"
1.5	K-551	28	Kudurekonda	Honnali	Davangere	14°08'51.2"	75°30'36.7"
1.25	W K-538	111	Yaraganal	Honnali	Davangere	14°08'45.3'	75°30'43.7"
1.25	W K-539	111	Yaraganal	Honnali	Davangere	14°08'39.5"	75°30'50.9"
1.25	W K-540	111	Yaraganal	Honnali	Davangere	14°08'13.3"	75°31'32.4"
1.25	W K-541	111	Yaraganal	Honnali	Davangere	14°08'07.4"	75°31'38.8"
1.25	W K-542	111	Yaraganal	Honnali	Davangere	14°07'59.5"	75°31'44.1"



1.8 Title and Reference of Methodology

Title: "Grid Connected Renewable Electricity Generation" Version 18.0[1]
Reference: AMS I. D.: Small-scale Consolidated Methodology

The methodology AMS I.D. refers to the latest approved versions of the following tools:
Tool to calculate the emission factor for an electricity system, Version 07.0 (EB 100, Annex 04)[2]
Tool for the demonstration and assessment of additionality, Version 7.0[3]

1.9 Participation under other GHG Programs

Project has been registered with UNFCCC under Clean Development Mechanism program, Registration reference number is 3700.

The Web-link for the same has been mentioned below:

https://cdm.unfccc.int/Projects/DB/SGS-UKL1273659698.37/view

[1] https://cdm.unfccc.int/UserManagement/FileStorage/2P7FS6ZQAR84LG3NMKYUH50WI9ODBC
[2] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf
[3] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

1.10 Other Forms of Credit

India is Non-annex1 country and there is no compliance with an emission trading program or to meet binding limits on GHG emissions for this project activity. The project is registered under CDM with registration ID 3700. Project Proponent has submitted undertaking that they will not claim same GHG emission reductions of the project from CDM and VCS. PP would not use net GHG emission reductions by the projects for compliance with emission trading program to meet binding limits on GHG emissions.

1.11 Sustainable Development

The following criteria have been considered for demonstrating sustainable development.

- Social well being
- Economic well being
- Environmental well being
- Technological well being

The project activity contributes to the sustainable development in the following way:

Social well being

The project activity will lead to alleviation of poverty by establishing direct and indirect employment benefits. Such benefits will, for example, be accrued out during maintenance operations of the project activity or as generation of permanent labour in the form of security services. The infrastructure in and around the project area will also improve due to project activities. This includes development of road network and improvement of electricity quality, frequency and availability.

Economic Prosperity

The project activity leads to an investment of about INR 786 million to a developing region which otherwise would not have happened in the absence of project activity. The generated electricity is fed into the Southern Regional Grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers & sub-urban habitants). This attracts new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development. The project activity also leads to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

Environmental Well-being

The project will utilize wind energy for generating electricity which otherwise would have been generated through alternate fuels (most likely - fossil fuel) based power plants, contributing to reduction in specific emissions (emissions of pollutant) including GHG emissions. Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. Thus the project causes no negative impact on the surrounding environment contributing to environmental well-being.

Technological Up-gradation

The project activity involves the installation of state-of–art technology. The wind turbine generators used for the project activity are of the latest technology. This project will therefore motivate other proponents in the surrounding area to put up high-efficiency techniques.

Thus, it is ensured that the project activity meets all the criteria for Sustainable development.

2 SAFEGUARDS

2.1 No Net Harm

According to Indian regulation, the implementation of the wind park does not require an environmental impact assessment. The Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India notification dated 14-September-2006 regarding the requirement of Environment Impact Assessment (EIA) studies as per the Environment Protection Rule, 1986 (Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) Ministry of Environment, Forests and Climate Change, Government of India) states that any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) Wind parks are not included in this list and thus an EIA is not required.
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

Project Proponent had conducted local stakeholder consultation extensively during registration of the project through identification of stakeholders, invitation of stakeholders for meeting, explanation on the project and resolving comments/suggestions/ grievances of the stakeholders.

The process of local stakeholder consultation is continuous. During the current monitoring period, the project proponent has kept grievance register in plant site office and sought comments/grievances/suggestions from local stakeholders including local community, government agencies and NGOs. Besides, the PP has also kept provision for submitting comments/grievances/suggestions from local stakeholders through direct mail. However, no major comments/grievances/suggestions have been received from the aforementioned stakeholders during the current monitoring period and all such minor suggestions have been taken care by the PP.

2.3 AFOLU-Specific Safeguards

Not applicable as the project activity is not an AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project has already been commissioned and monitoring equipments were installed in accordance with registered VCS Project Description (PD). The commissioning details of the project activity re given below:

WTG ID	Capacity and Number of WTGs	Date of Commissioning
K-543, K-544, K-549, K-550, K-551	1.5 MW x 05 No.s	31-March-2009
K-538, K-539, K-541, K-542	1.25 MW x 04 No.s	31-March-2009
K-540	1.25 MW x 01 No.	29-May-2009

For the project activity, SRPL has placed the purchase order to procure Wind Turbine Generators (WTGs) from M/S Suzlon Energy Limited (SEL) and it's associate companies for supply of 5 nos. S-82 1500 kW capacity and 5 nos. S 64 1250 kW capacity.

The salient features of the technology are:

S-82 1.5 MW 50Hz

Rated Power	1500 kW
Rotor diameter	82 m
Swept area	5,281 m^2
No. of blades	3
Cut in wind speed	4 m/s
Cut out wind speed	20 m/s
Rotor speed	20.3 rpm
Regulation	Pitch
Hub height	78.5 m
Generator Type	Asynchronous
Insulation	Class H

S-64 1.25 MW 50Hz:-

Rated Power	1250 kW
Rotor diameter	64 m
Swept area	3m217 m^2
No. of blades	3
Cut in wind speed	3.5 m/s
Cut out wind speed	20 m/s
Rotor speed	20.3 rpm
Regulation	Pitch
Hub height	74.5 m
Generator Type	Asynchronous
Insulation	Class 'H'

The WTGs of a single customer (SRPL in this case) at a particular site are connected to a 33 kV metering point (having the main and check meter) which in turn connects to a bulk meter (main and check meter) at the 220 kV substation maintained by Suzlon Power Infrastructure Limited.

There has been no major breakdown in the plant in the current monitoring period that can impact the GHG emission reductions of the project activity.

3.2 Deviations

3.2.1 Methodology Deviations

There is no any methodology deviation applicable for the project activity.

3.2.2 Project Description Deviations

Project Description Deviations in the previous monitoring period

In the previous monitoring period from 01-October-2016 to 30-March-2019, two Project Description Deviations were requested. These Project Description deviations are as following:

Deviation 1[4]

There is change in crediting period of the project activity from existing renewable crediting period to ten years fixed crediting period. This crediting period change does not affect the applicability of current methodology, additionality and baseline of the project activity.

The fixed crediting period of the project activity is now from 31-March-2009 to 30-March- 2019.

Deviation 2

As per registered VCS PD, the calibration frequency is once in a quarter and the same is mentioned in PPA. However, calibration of meters is not in control of PP and same is done by state electricity board. The state electricity board does not follow any fixed calibration frequency, hence deviation is requested for change in calibration frequency as once in five years. This calibration frequency is as per CEA notification

http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

The updated version available from the year 2019 also upholds the same frequency of testing of meters. This can be found at http://www.cea.nic.in/reports/regulation/CEA_metering_regulation_amendment_2019.pdf

The change in calibration frequency does not have any impact on ER calculations as during monthly reading state electricity board official and PP representative check the meter conditions. Also both parties accepts the reading and PP raise the invoice to state electricity board based on monthly JMR reading. Thus financial obligations are involved which ensures that meters are running accurately.

Project Description Deviations in the current monitoring period

[4] In the last monitoring period (from 01-October-2016 to 30-March-2019), under the Deviation 1, the 10-year fixed crediting period was incorrectly applied, and that the current 10-year, twice renewable crediting period is correct.

In the current monitoring period (31-March-2019 to 30-June-2021), change in the calibration frequency has been sought. As per the Section 5.2 of the registered VCS RCP PD, the calibration of energy meters (including both main meter and check meter) would be carried on an annual basis. However, according to the Power Purchase Agreement (PPA) with Bangalore Electricity Supply Company Limited (BESCOM) - to which electricity generated by the project activity is supplied, calibration should ideally be carried out on a quarterly basis. Therefore, to maintain the practice expected by BESCOM Standard, the PP has done the quarterly calibration. Wherever there has been a delay, an error factor has been applied.

The change in the calibration frequency in the current monitoring period (31-March-2019 to 30-June-2021) will not have any impact on the ER calculations. Both parties, the PP and the state electricity board - BESCOM accepts the meter reading and PP raise the invoice to BESCOM based on monthly JMR reading. Due to the financial obligations for the PP and the state electricity board - BESCOM, both parties ensure that the meters are running accurately.

3.3 Grouped Projects

This is not a grouped project. So, this section is not applicable.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{BM,y}$
Data unit	tCO_2/MWh
Description	Build Margin Emission Factor for Indian Grid
Source of data	Calculated from CEA database, Version 15[5]
Value applied	0.8811
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07".as per the latest data available for the most recent year 2018-19. The data is obtained from "CO_2 Baseline Database for Indian Power Sector" version 15, published by the Central Electricity Authority, Ministry of Power, and Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{OM,y}$
Data unit	tCO_2/MWh
Description	Operating Margin Emission Factor for Indian Grid

[5] https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_15.zip

Source of data	Calculated from CEA database, Version 15, Dec 2019[6]
Value applied	0.9622
Justification of choice of data or description of measurement methods and procedures applied	Calculated as the last 3 year (2016-17, 2017-18, 2018-19) generation-weighted average, sourced from Baseline CO_2 Emission Database, Version 15.0, published by Central Electricity Authority (CEA), Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{CM,y}$
Data unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 15, Dec 2019[7]
Value applied	0.9419
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: $EF_{grid,BM,y}$= Build margin CO_2 emission factor in year y (tCO_2/MWh) $EF_{grid,OM,y}$= Operating margin CO_2 emission factor in year y (tCO_2/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM}= Weighting of build margin emissions factor (%) = 25%
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{PJ,facility,y}$
Data unit	MWh
Description	Net electricity supplied to the grid by the project activity
Source of data	Credit report Sheets. (KPTCL/ BESCOM Form B2[8])/ Invoice (whichever is conservative).
Description of measurement methods and procedures to be applied	The net electricity supplied by the set of WTGs of the project activity is calculated by following formula: Net electricity supplied to the grid by the project activity i.e. $EG_{PJ,facility,y}$ = Net electricity supplied to the grid by the set 1 (5* 1.25 MW) WTGs { $EG_{PJ,facility,y}$ for set 1 WTGs} + Net electricity

[6] https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_15.zip
[7] https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_15.zip
[8] Form B consists of a set of documents which is issued by KPTCL/BESCOM which consists of data such as the import and export of electricity by group of WTGs of the project activity at a site at 33 kV metering point, export and import of electricity at the 33/220 kV KPTCL sub-station from all the WTGs (PP and non PP) connected to the substation, Transmission losses and its calculation (i.e. calculation of percentage line losses for a month) done by BESCOM.

	supplied to the grid by the set 2 (5* 1.5 MW) WTGs { $EG_{PJ,facility,y}$ for set 2 WTGs} Net Electricity supplied to the grid is in kWh. However for the calculation purpose Net electricity supplied is converted in MWh. The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid and the transmission losses obtained from credit reports provided by KPTCL/BESCOM as per below equation: ($EG_{PJ,facility,y}$ (calculated separately for both sets of WTGs of PP) = $EG_{Exported}$ - EG_{Import} - $EG_{Transmission\ Losses}$).
Frequency of monitoring/recording	Monthly
Value applied	66,684
Monitoring equipment	This is a calculated value
QA/QC procedures to be applied	Net electricity supplied to the grid as mentioned in Form B is cross-checked with the invoices[9] raised by the PP for the project activity. Whichever is the conservative value will be considered for emission reduction calculation during verification of the project activity.
Purpose of data	To Determine baseline emissions
Calculation method	$EG_{PJ,facility,y}$ (calculated separately for both sets of WTGs of PP) = $EG_{Exported}$ - EG_{Import} - $EG_{Transmission\ Losses}$.
Comments	The data will be kept for two years after the end of the crediting period or the last issuance of VERs for this project activity, whichever occurs later.

Data / Parameter	$EG_{exported}$[10]
Data unit	MWh
Description	Electricity exported by the WTGs of the project activity
Source of data	Credit report Sheets. (KPTCL/ BESCOM Form B)
Description of measurement methods and procedures to be applied	Monitoring: Bi-directional Trivector meters (main and check meter at 33 kV metering point) are used for monitoring of electricity exported by WTGs of the project activity. The meters are of 0.2s accuracy class. Electricity exported is in kWh. However for the calculation purpose electricity exported is converted in MWh. Data Type: Measured Frequency: Continuously measured & monthly recording Archiving Policy: Paper & Electronic

[9] The values of Export, import and transmission losses can be cross checked from the invoice. However as per the provision of the State utility an increase of 115% has to be applied on the import value for billing purpose. This results in a higher import value than that in the credit note thus resulting in a lesser value of the net electricity supplied to the grid in the invoice.

10 In case of apportioning of electricity for any month (When billing cycle and crediting period years or monitoring period not matches) as per the procedures provided under "Apportioning Procedure" of monitoring plan (B.7.3), EG Exported (i.e. Sum of G for each group of WTGs of the project activity) and G for any month are same only

<table>
<tr><td></td><td>The meters are calibrated once in a quarter as per PPA. Calibration details of the meters are provided in Appendix 1.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Measuring Frequency: Continuously measured & monthly recording</td></tr>
<tr><td>Value applied</td><td>68,762.72</td></tr>
<tr><td>Monitoring equipment</td><td>Type: Bi-directional Trivector meters (main and check meter at 33 kV metering point) are used for monitoring of electricity exported by WTGs of the project activity.

Accuracy Class: 0.2s

Serial Number:
<table>
<tr><th>WTGs</th><th>WTG Location No.</th><th>Main Meter Sl. No.</th><th>Check Meter Sl. No.</th></tr>
<tr><td>5 x 1.25 MW</td><td>K-538, K539, K-540, K-541, K542</td><td>08001351</td><td>08001352</td></tr>
<tr><td>5 x 1.5 MW</td><td>K-543, K544, K-549, K-550, K551</td><td>08001358</td><td>08001371</td></tr>
</table>
The meters are calibrated on a quarterly basis as per PPA. Calibration details of meters are provided in Appendix 1.</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The meters are calibrated once in a quarter as per PPA. There has been delay in calibration. Therefore error factor of 0.2% has been applied in export and import electricity values (as per the meter accuracy class 0.2s).</td></tr>
<tr><td>Purpose of data</td><td>Baseline emission calculation</td></tr>
<tr><td>Calculation method</td><td>Not Applicable as this is a measured parameter</td></tr>
<tr><td>Comments</td><td>The data will be kept for two years after the end of the crediting period or the last issuance of VERs for this project activity, whichever occurs later.</td></tr>
</table>

Data / Parameter	EG_{Import}
Data unit	MWh
Description	Electricity imported from the grid by the WTGs of the project activity.
Source of data	Credit report Sheets. (KPTCL/ BESCOM Form B)
Description of measurement methods and procedures to be applied	Monitoring: Bi-directional Trivector meters (main and check meter at 33 kV metering point) are used for monitoring of electricity exported by WTGs of the project activity. The meters are of 0.2s accuracy class. Electricity exported is in kWh. However for the calculation purpose electricity exported is converted in MWh. Data Type: Measured Frequency: Continuously measured & monthly recording Archiving Policy: Paper & Electronic

<table>
<tr><td></td><td>The meters are calibrated on a quarterly basis as per PPA. The calibration certificates detail are provided in the Appendix 1.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Measuring Frequency: Continuously measured & monthly recording</td></tr>
<tr><td>Value applied</td><td>230.49</td></tr>
<tr><td>Monitoring equipment</td><td>Type: Bi-directional Trivector meters (main and check meter at 33 kV metering point) are used for monitoring of electricity exported by WTGs of the project activity.

Accuracy Class: 0.2s

Serial Number:
<table>
<tr><td>WTGs</td><td>WTG Location No.</td><td>Main Meter Sl. No.</td><td>Check Meter Sl. No.</td></tr>
<tr><td>5 x 1.25 MW</td><td>K-538, K539, K-540, K-541, K542</td><td>08001351</td><td>08001352</td></tr>
<tr><td>5 x 1.5 MW</td><td>K-543, K544, K-549, K-550, K551</td><td>08001358</td><td>08001371</td></tr>
</table>
Calibration details of meters are provided in Appendix 1. The meters used for the monitoring of this parameter are calibrated on quarterly basis once. There has been delay in the calibration. Therefore error factor of 0.2% has been applied in export and import electricity values (as per the meter accuracy class 0.2s).</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The meters used for the monitoring of this parameter are calibrated on quarterly basis once. There has been delay in calibration. Therefore error factor of 0.2% has been applied in export and import electricity values (as per the meter accuracy class 0.2s).</td></tr>
<tr><td>Purpose of data</td><td>Baseline emission calculation</td></tr>
<tr><td>Calculation method</td><td>Not Applicable as this is measured parameter.</td></tr>
<tr><td>Comments</td><td>The data will be kept for two years after the end of the crediting period or the last issuance of VERs for this project activity, whichever occurs later.</td></tr>
</table>

<table>
<tr><td>Data / Parameter</td><td>$EG_{Transmission\ Losses}$</td></tr>
<tr><td>Data unit</td><td>MWh</td></tr>
<tr><td>Description</td><td>Electricity Losses in Transmission</td></tr>
<tr><td>Source of data</td><td>Credit report Sheets. (KPTCL/ BESCOM Form B)</td></tr>
<tr><td>Description of measurement methods and procedures to be applied</td><td>Monitoring: This is a calculated parameter, based on the measurement results of the meters installed at 33 kV metering point and 220 kV sub-station. Bi- directional Trivector meters (main and check meter at 33 kV metering point and 220 kV sub-station (SS)) will be used for monitoring of electricity. The meters will be of 0.2s accuracy class</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Monthly</td></tr>
</table>

Value applied	903.3
Monitoring equipment	Not Applicable
QA/QC procedures to be applied	-
Purpose of data	Baseline emission calculation
Calculation method	Calculation Procedure EG Transmission Losses Z= % of line losses X= Total exported electricity from all the metering points connected to the sub – station (as measured at 33 kV metering point of all the WTGs (PP + non PP) connected to the SS) hence X= X1+ X2+X3+.....Xn Y= Total exported electricity as measured at Sub – Station Bulk meter (i.e main and check meter at 220 kV SS). Z= [(X-Y)/X]*100 EG Transmission Losses = Z* $EG_{Exported}$ Electricity Loss in Transmission is in kWh. However for the calculation purpose electricity loss in transmission is converted in MWh.
Comments	This % transmission loss calculation as explained above is done by the state utility based on measured parameters and transparently provided in the FORM B. However, PP has no control over this calculation. Nonetheless, this calculation is transparently mentioned in the FORM B and can be verified any time during the verification. The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

4.3 Monitoring Plan

The project activity is in accordance with approved small scale methodology AMS-I.D, and therefore, can use the monitoring methodology for type I.D of 'Appendix B of the simplified M&P for small-scale CDM project activities-Version 18.0, - Grid connected renewable electricity generation.

This approved monitoring methodology requires monitoring of the following:

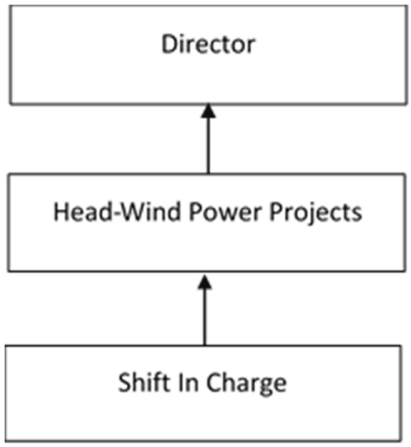
✓ Net Electricity supplied by the project activity to the grid

In order to monitor the mitigation of GHG due to the project activity, the Net electricity supplied by the project activity to the grid needs to be monitored. The net electricity supplied to grid by the project activity multiplied by grid emission factor for regional grid, would form the baseline for the project activity.

Since the emission factor (combined margin) of the grid is fixed for the crediting period, the monitoring of grid emission factor is not required. The sole parameter for monitoring is the net electricity supplied to the grid.

The Project is operated and managed by M/s Suzlon Energy Limited/ Its Group Companies/Contractor specifically appointed by Suzlon. The operational and management structure will be implemented by the project participant in order to monitor emission reductions by the project activity:

Net electricity supplied by the project activity is the most important parameter required for the financial reporting and sustainability of the project and monitored with due care by both the parties (O&M Contractor (PP's representative and representative of KPTCL). For emission reductions project proponents proposes the following structure.



Roles and responsibilities:

Director: In the project management structure Director is responsible for the overall project performance. The Director will review the monthly Net electricity supplied and annual emission reduction calculations. Operation and maintenance of WTGs of the project activity will be done by Suzlon Energy Limited/It's Group Companies/Contractor specifically appointed by Suzlon.

Head- Wind Power Projects: Head- Wind Power Projects is assisting to director for completing the task discussed above. He is responsible for the electricity generations at the individual wind turbine installations. He will report to Director for any abnormality.

Shift In-charge: Shift in charge is responsible for recording the electricity meter reading from the KPTCL meter. He will be the person of Suzlon Energy Limited/It's Group Companies/Contractor specifically appointed by Suzlon.

Record Handling: OEM contractors (i.e. Suzlon Energy Limited/It's Group Companies/Contractor specifically appointed by Suzlon) are responsible for daily records with all the related parameters. The relevant records are submitted to Head- Wind Power Projects on monthly basis. The Head-Wind Power project has final responsibility for record keeping. The O&M personnel are qualified engineers and are trained by Suzlon for operating and ensuring best performance of the WTGs. The general conditions set out for metering, recording, meter readings, meter inspections, Test & Checking and communication shall be as per the PPA (power purchase agreement)with KPTCL/BESCOM.

1. **Metering:** The Delivered Electricity shall be metered by the Parties at the high voltage side of the step up transformer installed at the Receiving Station (main and check meter at 220 kV substation). The electricity exported and imported by the WTGs of the Project activity shall be metered by the Parties at the high voltage side of the step up transformer installed at the Project Site (main and check meter at 33 kV metering point). The WTGs of a single customer (SRPL in this

case) at a particular site are connected to a 33 kV metering point (having the main and check meter) which in turn connects to a bulk meter (main and check meter) at the 220 kV substation maintained by Suzlon Power Infrastructure Limited. Data monitoring takes place at the 33 kV metering point, 220 kV sub-station and at the WTG inbuilt controller meter. The emission reduction calculations are done on the basis of net electricity supplied to the grid by the project activity as explained later in this section under heading "Procedure of monitoring of net electricity supplied to the grid by the project activity".

2. **Metering Equipment:** Metering equipment shall be electronic bi-directional trivector meters of accuracy class 0.2s required for the Project (both main and check meters at 33 kV metering point and 220 kV sub-station). The metering equipment shall be maintained in accordance with electricity standards. Such equipment shall have the capability of recording a month's reading and measure both import and export simultaneously.

3. **Meter Readings:** The monthly meter readings (both main and check meters) at the Project Site and the Receiving Station shall be taken simultaneously and jointly by the Parties every month. The recorded metering data shall be downloaded through meter recording Instrument by KPTCL officer as and when required.

4. **Inspection of Energy Meters**: All the main and check energy meters used for the monitoring under the project activity shall be of 0.2s accuracy class. Each meter shall be jointly inspected and sealed on behalf of the Parties and shall not be interfered with by either Party except in the presence of the other Party or its accredited representatives.

Data Adjustments and Uncertainties:

5. **Meter Test Checking:** All the main and check meters shall be tested for accuracy. as per requirement with reference to a portable standard meter which shall be of an accuracy class of 0.1%. The portable standard meters shall be owned by the Corporation at its own cost and expense and tested and certified at least once every year or as per requirement against an accepted laboratory standard meter in accordance with electricity standards. The meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2% accuracy class. As per the PPA Article 7 Sub-clause 7.5, the consumption registered by the main meters alone will hold well for the purpose of billing as long as the error in the main meter is within the permissible limits.

a. If during the tests, the main meter is found to be within the permissible limit of error and the corresponding check meter is beyond the permissible limits, then billing will be as per the main meter as usual. The check meter shall, however, be calibrated immediately.
b. If during the tests, the main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within permissible limits of error, then the billing for the month up to the date and time of such test shall be as per the check meter. There will be a revision in the bills for the period from the previous calibration test up to the current test based on the readings of the check meter. The main meter shall be calibrated immediately and billing for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.

c. If during the tests, both the main meters and the corresponding check meters are found to be beyond the permissible limits of error, both the meters shall be immediately calibrated and the correction applied to the reading registered by the main meter to arrive at the correct reading of electricity supplied for billing purposes for the period from the last month's meter reading up to the current test. Billing for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.

d. If during any of the monthly meter readings, the variation between the main meter and the check meter is more than that permissible for meters of 0.2% accuracy class, all the meters shall be re-tested and calibrated immediately.

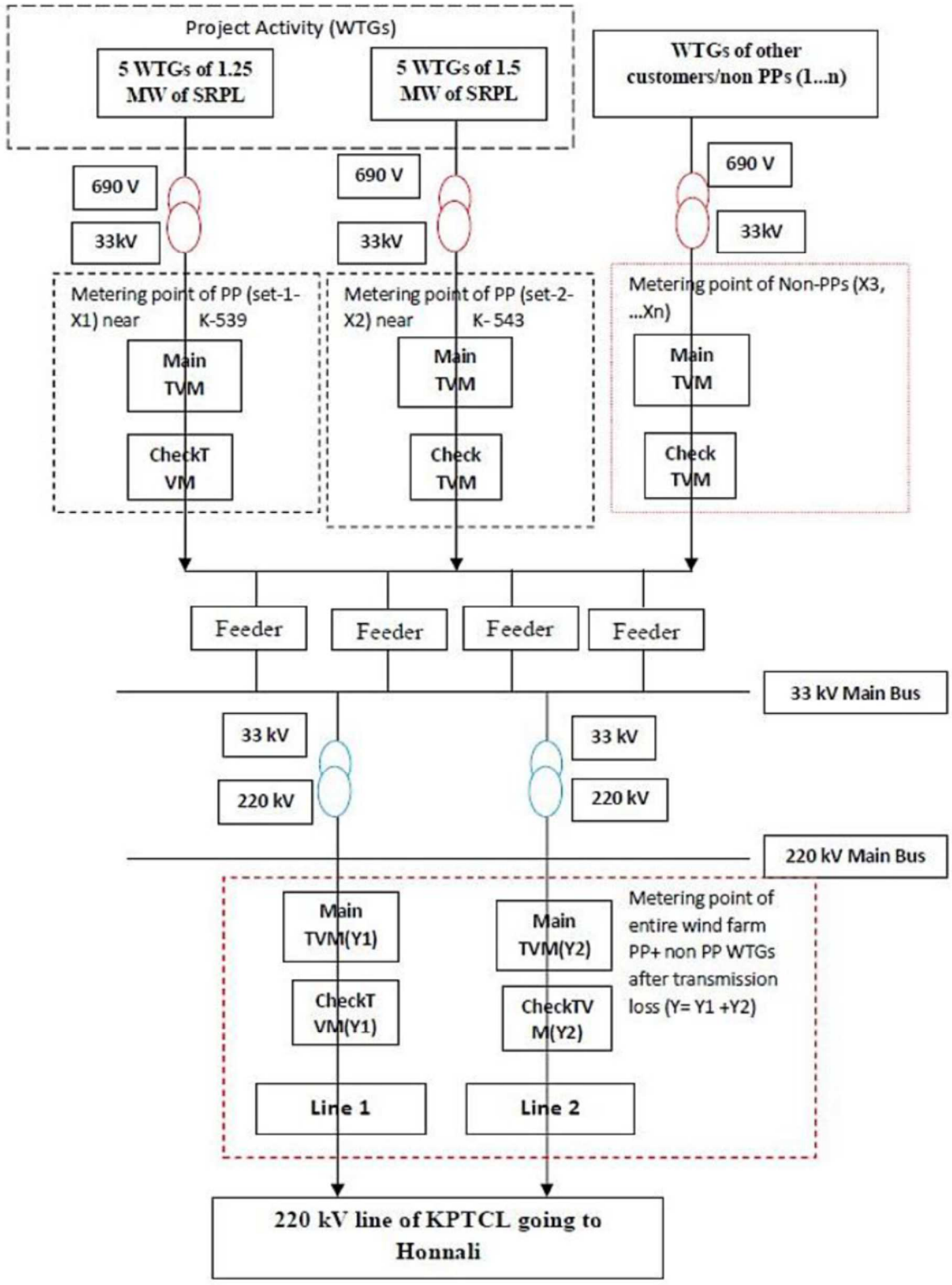
Description of calibration of WTG Controller:

The controller used for the WTG is SCS Controller is a micro-processor based intelligent controller which has been specially designed for control of wind turbines. It uses a Woodward Multi function Relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current/ voltage is converted into digital signal internally using A/D Converters at very high sampling rate. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed /stored. Woodward relay is having no display and needs special protocol to view energy readings as this relay is communicating digital signal through special communication protocol. Moreover, turbine can not run without this relay hence it cannot be removed for calibration, hence, it is not possible to calibrate16.Incase of any problem related to the panel meter, the WTG will automatically get shut down and the meter will be replaced by a new meter immediately.

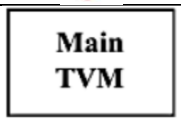
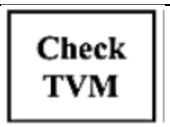
6. **Records:** Suzlon Energy Limited/It's Group Companies/Contractor specifically appointed by Suzlon will maintain an accurate operating record at the wind farm site of:
   a. Daily generation reading
   b. Any unusual conditions found during operation/inspections
   c. All the records will be preserved for 2 years beyond the crediting period.

7. The billing will be on monthly basis. The BESCOM will be billed by Sargam Retails pvt Ltd based on statement given by BESCOM at the end of each month for the net electricity supplied by the WTGs of the project activity.

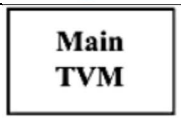
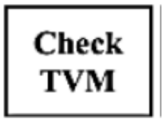
   Schematic Diagram of whole monitoring activity, including the physical meter locations and connections to the project activity has been provided below:



Legends at 33 kV side:

	Step-up transformer for Step up from 690 V to 33 kV
	Main Meter (Bi-directional Trivector Meter – TVM) at 33 kV side
	Check Meter (Bi-directional Trivector Meter – TVM) at 33 kV side

Legends at 220 kV side:

	Step-up transformer for Step up from 33 kV to 220 kV
	Main Meter (Bi-directional Trivector Meter – TVM) at 220 kV side on Line 1 and Line 2
	Check Meter (Bi-directional Trivector Meter – TVM) at 220 kV side on Line 1 and Line 2

The monitoring/calculation of net electricity supplied to the grid by the project activity is as per PPA, which is further explained below:

Electricity from each WTG of the project activity is generated at 690 V which is further step- up to 33 kV voltage level through a step up transformer installed at each WTG yard. There are a total 10 WTGs in the project activity which are in two sets (as far as monitoring of net electricity supplied is concerned) first set constitutes five WTGs of 1.25 MW (5 X 1.25 MW) and second set constitutes of five WTGs of 1. 5 MW (5 X 1.5 MW). Each set of 5 X 1.25 MW and 5 X 1.5 MW has one metering set at 33 kV. The 33 kV metering points monitors the generation of import and export for the individual WTG or a set of WTGs (PP + non-PP) connected to it. The feeders of 33 kV metering point are further connected to 220 kV step up transformer at substation; on the high voltage side of these step-up transformers, another set of bulk meters, both main and check, are installed. These bulk meters are not exclusive to project WTGs, but instead are also connected to WTGs belonging to other project developers.

In order to obtain the net electricity supplied by the WTGs, meter readings are taken at two sides that is one at the 33 kV side and the other at 220 kV side. The electricity export (without transmission losses) and import by the WTGs (individual or set of WTGs at the wind farm site) of the customers (PP and non PP) is measured by taking the main and check meter readings at 33 kV side. Further to this, the main and check meter readings (also known as Bulk meter readings) are taken at Line 1 and Line 2 of the 220 kV side.

Both these readings are used to compute the transmission loss % as below:

Total Export Meter readings @ 33 kV side for all customers – X (= X1+ X2+....XN)

Bulk meter readings @ 220 kV side (Total Export after transmission loss) for all customers – Y (=Y1+Y2)

Transmission Losses % (Z) = {(X – Y)/X}*100

This value of Z (%) is multiplied with the export meter reading of the set of WTGs of PP (i.e. set 1 and set2) obtained at 33 kV side to calculate the transmission losses incurred by the PP. The import of electricity as measured at 33kV metering point is not subjected to any treatment of transmission loss by the state utility during the FORM B preparation. The net electricity supplied by the set of WTGs of the project activity is calculated by following formula: Net electricity supplied to the grid by the project activity = Electricity export by the WTGs of the project activity (measured at 33 kV metering point for set 1 and set 2) - import from grid (measured at 33 kV metering point for set 1 and set 2) - (transmission loss % calculated by state utility * export as measured at33 kV metering point for set 1 and set 2).

The Electricity export by the WTGs of the project activity, import from grid and the transmission loss on export will be crosschecked with the invoice raised by the PP to the state utility. Based on this invoice state utility makes the payment to the PP. This is based on the PPA signed between the PP and state utility and this invoice is a commercial document, a credible and authentic document. The Net electricity supplied to the grid by the project activity, however differs in the invoice and JMR/Form B as explained below:

The value of net electricity supplied to the grid by the project activity in the invoice is lesser than that in the credit note/Form B provided by BESCOM. This difference in the value is due to a higher import value obtained after applying an increase of 115% on the import value of the credit note for billing purpose.

As per Article 5.5 of the PPA, "The Company shall be permitted to use 10% of the installed capacity for start-up, after inspection by the concerned officers of the BESCOM and 105% of such energy provided by the BESCOM for start-up purposes shall be deducted from the energy pumped into the grid by the company for determining the amount to be paid by the BESCOM to the company". However as per the KERC order18, the state utility has instructed all the WTG owners to raise an invoice after deducting 115%of the energy supplied by BESCOM to the PP. This results in higher value of import than that provided in the credit note.

Hence conservatively the lower value of net electricity supplied to the grid (between invoices/ JMR/Form B) will be used for emission reduction calculation.

SRPL (Head- Wind Power Projects & Director) will be keeping the daily / monthly data generated from all the WTGs provided by Suzlon and KPTCL.

Internal audits & Performance review:

The records are regularly reviewed and checked by the SRPL representatives based upon the daily power generation reports and credit report sheets (KPTCL/BESCOM Form B). The SRPL representatives shall do the internal audit on yearly basis and will crosscheck the emissions reductions estimated in the PDD with respect to actual emissions reduction. For any deviation from the actual emission reduction values and reported values corrective action will be suggested by SRPL representatives to calculate the conservative emission reduction.

Apportioning Procedure:

The following apportioning procedure will be followed, if the monitoring period date of the project activity falls in – between the billing cycles of KPTCL/BESCOM:

Partial days generation of the Month at Controller by the WTGs of the project activity (kWh): X Total generation at Controller (kWh) for the same month by the WTGs of the project activity: Y kWh % Generation for partial days of generation (%): Z= (X/Y) *100

Electricity export to the grid by the WTGs of the project activity as per credit report (KPTCL/BESCOM from B) for the month: G kWh

Electricity export to the grid by the WTGs of the project activity for the partial days: (G*Z/100).

Form B, which contains the electricity data, is certified by the Site-in-Charge (O&M contractor) of SEL and also by the Asst. Executive Engineer of KPTCL/BESCOM. The monthly Net Electricity supplied shall be derived from Form B and the same shall be used in monitoring report during verification. Head – Wind power projects of SRPL will be responsible for keeping the copies of Form B sent to SRPL from KPTCL.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The equation for Baseline Emissions calculation is as per the Equation (1) of the applied methodology – AMS I. D.: Small-scale Consolidated Methodology – "Grid Connected Renewable Electricity Generation" Version 18.0[11].

The equation is as below:

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

Where:

BE_y	= Baseline emissions in year y (t CO_2)
$EG_{PJ, facility, y}$	= Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{grid,CM,y}$	= Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

In the present monitoring period, the values obtained for each parameter are as following:

$EG_{PJ, facility, y}$ = 66,684 MWh

$EF_{grid,CM,y}$ = 0.9419

[11] https://cdm.unfccc.int/UserManagement/FileStorage/2P7FS6ZQAR84LG3NMKYUH50WI9ODBC

So,

BE_y = 66,684 MWh * 0.9419 tCO_2e/MWh

BE_y = 62,808 tCO_2e (Round down value)

Therefore, the baseline emission in the monitoring period from 31-March-2019 to 30-June-2021 is 62,808 tCO_2e.

5.2 Project Emissions

For most renewable energy power generation project activities, PE_y = 0 tCO_2e.

5.3 Leakage

No other leakage emissions are considered. LE_y = 0 tCO_2e.

5.4 Net GHG Emission Reductions and Removals

Emission reductions are calculated as follows:

$ER_y = BE_y – PE_y – LE_y$

Where

ER_y = Emission reductions in year y (t CO_2)
BE_y = Baseline emissions in year y (t CO_2)
PE_y = Project emissions in year y (t CO_2)
LE_y = Leakage emissions in year y (t CO_2)

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)
31-March-2019 to 31-December-2019	25,023	0	0	25,023
01-January-2020 to 31-December-2020	26,875	0	0	26,875
01-January-2021 to 30-June-2021	10,910	0	0	10,910
Total	**62,808**	**0**	**0**	**62,808**

Remarks on the increase in achieved emission reductions

During the present monitoring period, actual emission reductions achieved are 62,808 tCO2e whereas estimated emission reductions was 60,653 tCO2e.

The actual emission reduction achieved is 3.6 % higher than the estimated figure as per registered VCS PD. This is due to higher electricity generation compared to estimated generation in registered VCS PD (for the equivalent period) during the monitoring period which is due to natural phenomena and nature dependent. As per the Section 3.5 of RCP VCS PD[12] and Section B.5. of the registered CDM PDD[13] of the same project, the benchmark for sensitivity analysis is 12.25%. The 3.6% increase in emission reduction due to increase in electricity generation is still within the benchmark of 12.25%. Hence, the benchmark is not breached and the project activity is still additional.

[12] https://registry.verra.org/mymodule/ProjectDoc/Project_ViewFile.asp?FileID=56839&IDKEY=qq934lkmsad39asjdkfj90qlkalsdkngaf98ulkandDfdvDdfhf78380981

[13] https://cdm.unfccc.int/filestorage/H/F/3/HF3XRWIA1N6PTUG0C2VE5SO49MZDKL/2009.pdf?t=Q2Z8cjN1MGl1fDDGkU7TinqZYdD8rPAICQZ7

APPENDIX 1: METER CALIBRATION DETAILS

Main and Check Meter Details

WTG Location No.	Meter. No.	Meter Type	Calibration Dates	Validity of Calibration	Delay in Calibration[14]
K-538, K-539, K-540, K-541, K-542	08001351	Main Meter	19-February-2019, 21-August-2019, 16-March-2021 18-September-2021	18-May-2019, 20-November-2019, 15-June-2021 17-December-2021	19-May-2019 to 20-August-2019, 21-November-2019 to 15-March-2021, 16-June-2021 to 30-June-2021
	08001352	Check Meter	19-February-2019, 21-August-2019, 16-March-2021 18-September-2021	18-May-2019, 20-November-2019, 15-June-2021 17-December-2021	19-May-2019 to 20-August-2019, 21-November-2019 to 15-March-2021, 16-June-2021 to 30-June-2021
K-543, K-544, K-549, K-550, K-551	08001358	Main Meter	19-February-2019, 21-August-2019, 16-March-2021 18-September-2021	18-May-2019, 20-November-2019, 15-June-2021 17-December-2021	19-May-2019 to 20-August-2019, 21-November-2019 to 15-March-2021, 16-June-2021 to 30-June-2021
	08001371	Check Meter	19-February-2019, 21-August-2019, 16-March-2021 18-September-2021	18-May-2019, 20-November-2019, 15-June-2021 17-December-2021	19-May-2019 to 20-August-2019, 21-November-2019 to 15-March-2021, 16-June-2021 to 30-June-2021

[14] Error Factor 0.2% has been applied where delay in monitoring meter calibration happened.