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
Version	02
Report ID	927
Date of Issue	15-October-2020
Project ID	927
Monitoring Period	01-October-2016 to 30-March-2019 (including both the start and end dates)
Prepared By	Barun Kumar DGM- Operations- Climate Change EKI Energy Services Limited

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CONTENTS

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

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 a Greenfield project activity; it utilizes wind energy for generating electricity which otherwise would have been generated through alternate fuels (most likely - fossil fuel) based power plants (baseline scenario) thus, contributing to reduction in specific emissions (emissions of pollutant) including GHG emissions.

The project activity includes 10 Wind Turbine Generators (WTGs) of total generating capacity of 13.75 MW (5 nos. of Suzlon make S 82 WTGs each having installed capacity of 1500 kW & 5 nos. of Suzlon make S 64 WTGs each having generating capacity of 1250 kW). The WTGs are located in Davangere district of Karnataka state of India.

The electricity generated is monitored using electrical meters which provide a measure of the actual electrical energy that would have been sourced from a fossil-fuel based power plants in the absence of the project activity. Hence, the fossil-fuel power based grid is the baseline for the project activity

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

The net anthropogenic GHG emission reduction for the monitoring period from 01-October-2016 to 30-March-2019 is 65,271 tCO_2e as the result of supplying net electricity 70412.398 MWh to grid.

1.2 Sectoral Scope and Project Type

Sectoral Scope: 1 Energy industries (renewable / nonrenewable sources)

Type I: Renewable Energy Projects

Category D: 'Grid connected renewable electricity generation' (Version 15, EB 50, valid from 30th October, 2009

1.3 Project Proponent

Organization name	Sargam Retails Private Limited (SRPL)

Contact person	Mr. Prafulla Premchand Khinvasara
Title	CEO- Renewable Power Projects
Address	Malpani House, Indira Gandhi Marg, Sangamner, Maharashtra, India, PIN-422605
Telephone	+91 2425 225011
Email	prafulla@malpani.com

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Barun Sharma
Title	DGM
Address	Office No 201, Plot No 48, Scheme 78, Vijay Nagar Part- II, Indore 452010, India
Telephone	9015615247
Email	barun@enkingint.org

1.5 Project Start Date

The first project activity was commissioned and electricity generation started on 31-March-2009 at yaraganahal village, Davanagere District in the state of Karnataka in India. Hence the project start date is 31-March-2009.

1.6 Project Crediting Period

Crediting Period Start date: 31-March-2009

Crediting Period End date: 30-March-2019

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

1.7 Project Location

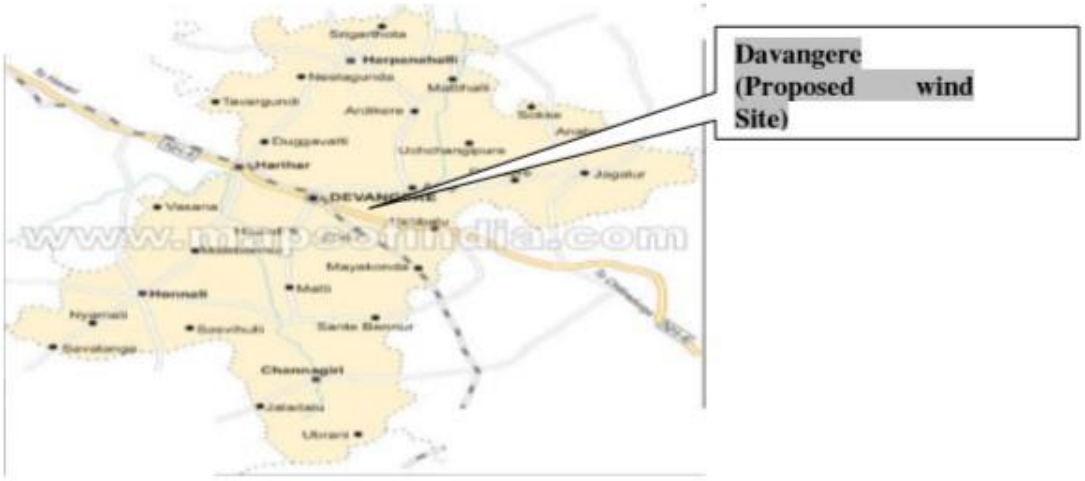
The project activity is located at Davangere in the state of Karnataka. Davangere:

Latitude & Longitude: 14º 27’13.39’’N, 75º 55’08.15’’E

Location Details of M/s Sargam Retails

Capacity	Location No.	R.S. No.	Village	Taluka	District
1.5 MW	K-543	111	Yaraganal	Honnali	Davangere
1.5 MW	K-544	111	Yaraganal	Honnali	Davangere
1.5 MW	K-549	28	Kudurekonda	Honnali	Davangere
1.5 MW	K-550	28	Kudurekonda	Honnali	Davangere
1.5 MW	K-551	28	Kudurekonda	Honnali	Davangere
1.25 MW	K-538	111	Yaraganal	Honnali	Davangere
1.25 MW	K-539	111	Yaraganal	Honnali	Davangere
1.25 MW	K-540	111	Yaraganal	Honnali	Davangere
1.25 MW	K-541	111	Yaraganal	Honnali	Davangere
1.25 MW	K-542	111	Yaraganal	Honnali	Davangere

WEG	Capacity (MW)	Taluka	District	Latitude	Longitude
K-543	1.5 MW	Honnali	Davangere	14°09'17.4"	75°30'11.9"
K-544	1.5 MW	Honnali	Davangere	14°09'10.4"	75°30'17.6"
K-549	1.5 MW	Honnali	Davangere	14°09'03.2"	75°30'23.1"
K-550	1.5 MW	Honnali	Davangere	14°08'57.2"	75°30'29.9"
K-551	1.5 MW	Honnali	Davangere	14°08'51.2"	75°30'36.7"
K-538	1.25 MW	Honnali	Davangere	14°08'45.3'	75°30'43.7"
K-539	1.25 MW	Honnali	Davangere	14°08'39.5'	75°30'50.9"
K-540	1.25 MW	Honnali	Davangere	14°08'13.3"	75°31'32.4"
K-541	1.25 MW	Honnali	Davangere	14°08'07.4'	75°31'38.8"
K-542	1.25 MW	Honnali	Davangere	14°07'59.5"	75°31'44.1"



1.8 Title and Reference of Methodology

Methodology title: Grid connected renewable electricity generation[1]

Reference: AMS-I.D. Version 15.0 (EB 50, Annex 29)

The methodological tool that is also used here:

Tool to calculate the emission factor for an electricity system[2], Version 02 (EB 50, Annex 14)

[1] https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

[2] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf

1.9 Participation under other GHG Programs

The project activity has also been registration with UNFCCC under Clean Development Mechanism (CDM) program, Registration reference number is 3700[3]. The project proponent has provided undertaking that it will not claim any GHG credits for UNFCC CDM during the current monitoring period.

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 and UNFCCC (Registration ID 3700[4]). The project proponent (PP) 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. PP has also submitted undertaking for not availing other forms of environmental credit including REC[5] benefits for the same crediting period under consideration

1.11 Sustainable Development

The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GOI) under the Ministry of Environment, Forest and Climate Change (MoEFCC)[6], has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project activity contributes to sustainable development using the following ways –

Social Well-being

The proposed 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 labor 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

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

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

[5] https://www.recregistryindia.nic.in/index.php/general/publics/registered_regens

[6] Since May 2014, the name of DNA changed to Ministry of Environment, Forest and Climate Change (MoEFCC)

& 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 utilizes 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, Forest and Climate Change (MoEFCC), Government of India notification dated September 14, 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, FOREST AND CLIMATE CHANGE) states that any project developer in India needs to file an application to the Ministry of Environment, Forest and Climate Change (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. Wind parks are not included in this list and thus an EIA is not required. As per documents published by CPCB (Central Pollution Control Board) dated 07-03-2016, The newly introduced White category of industries pertains to those industrial sectors which are practically non-polluting such as Biscuit trays etc. from rolled PVC sheet (using automatic vacuum forming machines), Cotton and woolen hosiers making (Dry process only without any dying/washing operation), Electric lamp (bulb) and CFL manufacturing by assembling only, Scientific and mathematical instrument manufacturing, Solar power generation through photovoltaic cell, wind power and mini hydel power (less than 25 MW). The project activity has no significant impact on the environment & there are no socio-economic impacts to the community.

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 take care by the PP

2.3 AFOLU-Specific Safeguards

Not applicable to this as this is not an AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project results in replacing anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 26,475 tCO_2e per year, thereon displacing 28560 MWh/year amount of electricity from the grid.

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	1,500 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	1,250 kW
Rotor diameter	64 m
Swept area	3,217 m^2
No. of blades	3
Cut in wind speed	3.5 m/s
Cut out wind Speed	25 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

No methodology deviation is applied during the monitoring period.

3.2.2 Project Description Deviations

Deviation 1

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.

Apart from change in crediting period, there is no deviation has taken place in project description during the monitoring period.

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.

3.3 Grouped Projects

The project is not a grouped project thus this is not applicable.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{OM, y}$
Data unit	tCO_2/MWh
Description	Operating Margin grid emission factor
Source of data	CEA website Version: 04 (Valid from 1st September 2008)
Value applied	1.000
Justification of choice of data or description of measurement methods and procedures applied	This value is calculated based on CEA database and as per tool to calculate emission factor for an electricity system.
Purpose of Data	Calculation of baseline emissions
Comments	Data will be kept for crediting period + 2 Years.

Data / Parameter	$EF_{BM,y}$
Data unit	tCO_2/MWh
Description	Build Margin grid emission factor
Source of data	CEA website Version :04 (Valid from 1st September 2008)
Value applied	0.710
Justification of choice of data or description of measurement methods and procedures applied	This value is calculated based on CEA database and as per tool to calculate emission factor for an electricity system.
Purpose of Data	Calculation of baseline emissions
Comments	Data will be kept for crediting period + 2 Years.

Data / Parameter	EF_{y}
Data unit	tCO_2/MWh
Description	Combined Margin grid emission factor
Source of data	CEA website Version :04 (Valid from 1st September 2008)
Value applied	0.927
Justification of choice of data or description	This value is calculated based on CEA database and as per tool to calculate emission factor for an electricity system.

of measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emissions
Comments	Data will be kept for crediting period + 2 Years.

4.2 Data and Parameters Monitored

Data/Parameter	$EG_{Net\ Exported}$[7]
Data unit	MWh
Description	Net Electricity supplied to grid by the project activity
Source of data	Credit report Sheets. (As per KPTCL/ BESCOM Form B[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. $EG_{Net\ Exported}$ = Net electricity supplied to the grid by the set 1 (5* 1.25 MW) WTGs { $EG_{Net\ Exported}$ for set 1 WTGs} + Net electricity supplied to the grid by the set 2 (5* 1.5 MW) WTGs { $EG_{Net\ Exported}$ for set 2 WTGs} Net Electricity generated is in kWh. However for the calculation purpose Net electricity generated is converted in MWh. The Net electricity supplied to the grid is calculated as the 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: ($EG_{Net\ Exported}$ (calculated separately for both sets of WTGs of PP) = $EG_{Exported}$- EG_{Import}- $EG_{Transmission\ Losses}$).
Frequency of monitoring/recording	Hourly monitoring and Monthly recording

[7] The symbols $EG_{Net\ Exported}$ and EG_y belongs to the same parameter that is Net Electricity supplied to grid by the project activity.

[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

Value monitored	70412.40[9]
Monitoring equipment	Not applicable as this parameter is calculated
QA/QC procedures to be applied	Net electricity supplied to the grid as mentioned in Form B will be cross- checked with the invoices[10] 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 the data	Calculation of baseline emissions
Calculation method	$EG_{Net\ Exported} = EG_{Exported} - EG_{Import} - EG_{Transmission\ Losses}$
Comments	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Data Parameter	$EG_{Exported}$
Data unit	MWh
Description	Electricity exported by 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] Conservative value between the values of net electricity export as per FORM-Bs and invoices

[10] 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

<table>
<tr><td></td><td>The meters are calibrated once in five year as per CEA notification and deviation requested. Please refer section 3.2.2 of MR for deviation. Calibration details of the meters are provided in APPENDIX 1</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Continuous monitoring and Monthly recording</td></tr>
<tr><td>Value monitored</td><td>71792.53</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, K-539, K-540, K-541, K-542</td><td>08001351</td><td>08001352</td></tr>
<tr><td>5 x 1.5 MW</td><td>K-543, K-544, K-549, K-550, K-551</td><td>08001358</td><td>08001371</td></tr>
</table>
Calibration details of meters are provided in APPENDIX 1</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>The meters used for the monitoring of this parameter are calibrated once in five year as per CEA notification and deviation requested. Please refer section 3.2.2 of MR for deviation. Calibration details of the meters are provided in APPENDIX 1.</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Calculation method</td><td>Not applicable as this is a measured parameter</td></tr>
</table>

Comments	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.

Data Parameter	$EG_{Imported}$
Data unit	MWh
Description	Electricity imported by the project activity from grid
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 The meters used for the monitoring of this parameter are calibrated once in five year as per CEA notification and deviation requested. Please refer section 3.2.2 of MR for deviation. Calibration details of the meters are provided in APPENDIX 1.
Frequency of monitoring/recording	Continuous monitoring and Monthly recording
Value monitored	262.73
Monitoring equipment	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:

WTGs	WTG Location No.	Main Meter Sl.No.	Check Meter Sl. No.

	5 x 1.25 MW	K-538, K-539, K-540, K-541, K-542	08001351	08001352
	5 x 1.5 MW	K-543, K-544, K-549, K-550, K-551	08001358	08001371
	Calibration details of meters are provided in APPENDIX 1			
QA/QC procedures to be applied	The meters used for the monitoring of this parameter are calibrated once in five year as per CEA notification and deviation requested. Please refer section 3.2.2 of MR for deviation. Calibration details of the meters are provided in APPENDIX 1.			
Purpose of the data	Calculation of baseline emissions			
Calculation method	Not applicable as this is a measured parameter			
Comments	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.			

Data Parameter	$EG_{Transmission\ Losses}$
Data unit	MWh
Description	Electricity Losses in Transmission
Source of data	Credit report Sheets. (KPTCL/ BESCOM Form B)
Description of measurement methods and procedures to be applied	This is a calculated parameter, based on the measurement results of the meters installed at 33 kV metering point and 220 kV sub-station. Type: Bi-directional Tri-vector meters (main and check meter at 33 kV metering point and 220 kV sub-station (SS)) will be used for monitoring of electricity. Accuracy Class: 0.2s Serial Number: Meters at 33 kV metering point: Frequency: Continuously measured & monthly recording

<table>
<tr><td></td><td>Archiving Policy: Paper & Electronic

The meters used for the monitoring of this parameter are calibrated once in five year as per CEA notification and deviation requested. Please refer section 3.2.2 of MR for deviation. Calibration details of the meters are provided in APPENDIX 1.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Continuous monitoring and Monthly recording</td></tr>
<tr><td>Value monitored</td><td>1080.38</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, K-539, K-540, K-541, K-542</td><td>08001351</td><td>08001352</td></tr>
<tr><td>5 x 1.5 MW</td><td>K-543, K-544, K-549, K-550, K-551</td><td>08001358</td><td>08001371</td></tr>
</table>
Calibration details of meters are provided in APPENDIX 1

Meters at 220 kV substation
<table>
<tr><td>Meters at Line-1</td><td>Meters at Line-2</td></tr>
<tr><td>Main meter 08001856</td><td>Main meter 08001868</td></tr>
<tr><td>Check Meter 08001858</td><td>Check Meter 08001891</td></tr>
</table>
Calibration details of meters are provided in APPENDIX 1</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>Not applicable</td></tr>
</table>

Purpose of the data	Calculation of baseline emissions
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	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.

Data Parameter	$EG_{Controller}$
Data unit	MWh
Description	Electricity generated at Controller (MCS)[11]
Source of data	Daily Power Generation Report
Description of measurement methods and procedures to be applied	Monitored through inbuilt control panel meters of the WTGs. The data is continuously measured at each WTG by inbuilt control panel meter and recorded at CMS. Data Type: Measured Frequency: Continuously measured and daily recording Achieving Policy: Electronic

[11] This parameter shall only be used when it is required to apportion the electricity in a particular month. This is required as billing cycle and crediting period years or monitoring period may not match

Frequency of monitoring/recording	Continuous monitoring and Daily recording
Value monitored	72772436[12]
Monitoring equipment	Monitored through inbuilt control panel meters of the WTGs. The data is continuously measured at each WTG by inbuilt control panel meter and recorded at CMS.
QA/QC procedures to be applied	Not applicable
Purpose of the data	Calculation of baseline emissions
Calculation method	Not applicable
Comments	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 15.0, - Grid connected renewable electricity generation. This approved monitoring methodology requires monitoring of the following:

- ✓ Electricity generation from the project activity; and
- ✓ Computation of Emission Factor from published CEA database.

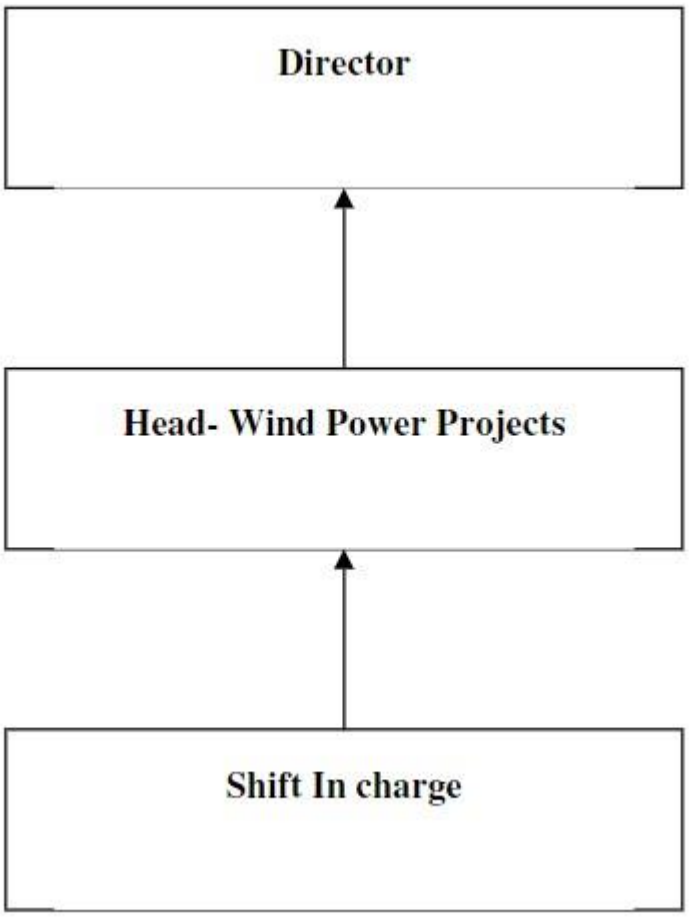
The monitoring methodology that will be incorporated for project-monitoring plan consist of metering the electricity generated by the individual WTG,s. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to grid by the project activity multiplied by emission factor for regional grid, would form the baseline for the project activity.

Since the baseline methodology is based on ex ante determination of the Emission factor, the monitoring of baseline emission factor is not required. The sole parameter for monitoring is the electricity supplied to the grid.

[12] This is the total daily generation reading for 2 set of WTGS for the entire monitoring period i.e. 01-October-2016 to 30-March-2019

The Project is operated and managed by M/s Suzlon Energy Limited and/ or its Associate Companies. The operational and management structure implemented by the project participant will implement in order to monitor emission reductions and any leakage effects generated by the project activity.

Total electricity exported is the most important parameter required for the financial reporting and sustainability of the project and monitored with due care by both the parties (project proponent and KPTCL). For emission reductions project proponents proposes the following structure.



Roles and responsibilities:

Director: In the project management structure Director is responsible for the project management. He is responsible to plan and allocate the annual budget for operation,

estimation of the likely operating cost, electricity dispatch, organizing third party contractors, revenue collection from BESCOM etc.

The Director will check the monthly electricity generated and annual emission reduction calculations. He is responsible for any leakage of emissions in the project boundary.

Operation and maintenance of wind generators will be done by Suzlon Infrastructure Services Limited and they will be responsible to Director.

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 crosscheck the log book regularly and report to Director for any abnormality.

Shift In-charge: Shift in charge is responsible for recording the electricity meter reading in the KPTCL meter.

Record Handling: OEM contractors are collecting daily report with all the related parameters. All the records is given to Director on every month. The Director has final responsibility for record keeping.

The O&M personnel are qualified engineers and are trained at the WTG manufacturing facility of Suzlon Energy Limited at Daman & Pondicherry 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.

1. **Metering:** The Delivered Energy shall be metered by the Parties at the high voltage side of the step up transformer installed at the Receiving Station. The electricity generated by the Project shall be metered by the Parties at the high voltage side of the step up transformer installed at the Project Site. The WTGs of a single customer (SRPL in this case) at a particular site are connected to a Vacuum Circuit Breaker metering yard (VCB) which in turn connects to a feeder that ultimately leads to the shared main KPTCL meter at the substation maintained by Suzlon Power Infrastructure Limited . Data monitoring takes place at the VCB metering yard and WEG (through SCADA system). The electricity metered at the KPTCL meter is proportionally divided among the customers connected to the meter on the basis of the prorata readings taken at the VCB end. The emission reduction calculations are done on the basis of the KPTCL Main meter reading.

   For example 5 x 1.5 MW WTGs of Sargam Retails Pvt. Ltd. has 1 main meter and 1 check meter at location K 543. This meter will show the power generation of 5 WTGs. These two meters are calibrated by EB authorities in state of Karnataka. Every month the reading for these 5 no.s of WTGs will be taken from this meter.

   Now what 1 WTG has generated KPTCL has to do nothing, but if WTG owner want to know what 1 WTG has generated than one has to do following thing:

i) Each WTG has microprocessor based system, which records all parameter viz Generated Energy, Consumed Energy, Reactive power etc.

ii) Collect these reading from each WTG.

iii) Take readings of main meter at metering point that is location K543.(For SRPL 5 x 1.5 Mw, WTG,s).

For example: Let say each WTG shows 100 units in microprocessor, for 5 WTGs, 500 units.

Main meter at metering point shows 475 units.

In this case the difference i.e. 25 units will be divided to each WTG proportionately , that means 1 WTG has generated 95 units., but this is internal calculation, KPTCL is not concerned with this. Only in case of failure of metering point i.e. K543 (i.e. both meter main & check meter fails), the metering point in Main Substation i.e Kudurekonda substation will be referred.

Similar arrangement is for 5 x 1.25 MW WTG, having metering point at location K539.

2. **Metering Equipment:** Metering equipment shall be electronic trivector meters of accuracy class 0.2% required for the Project (both main and check meters).Dedicated core of both CT's and PT's of required accuracy shall be made available by the Company to Corporation. The metering equipment shall be maintained in accordance with electricity standards.Such equipment shall have the capability of recording a months reading.
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 on the first day of the following 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 (export and import) and all associated instruments, transformers installed at the Project shall be of 0.2% 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 meter 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. The consumption registered by the main meters alone will hold good 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 upto the date and time of such test shall be as per 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 quarterly 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 energy supplied for billing purposes for the period from the last month's meter reading upto 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

6. **Records:** O&M Contractor Suzlon will maintain an accurate and up-to-date operating log at the wind farm site with records of:

a. Hourly logs of real and reactive power generation, frequency, and transformer tap position, bus voltage(s), Main meter and back up meter readings and any other data mutually agreed.

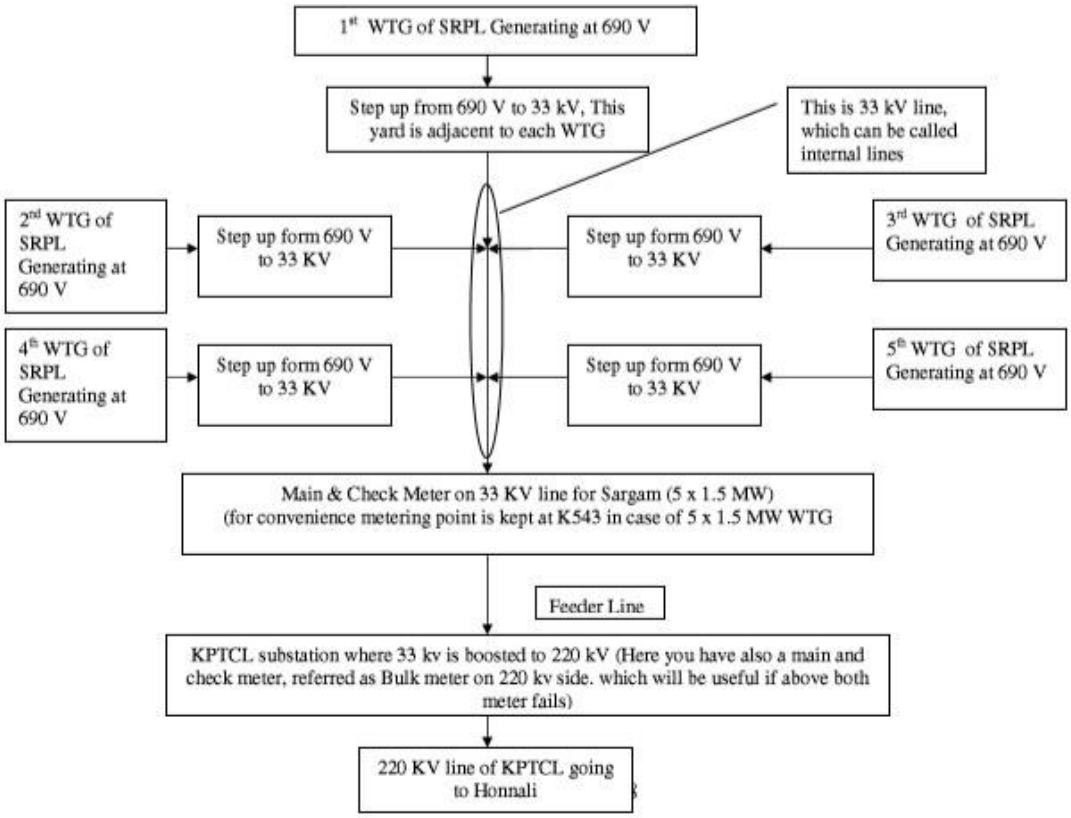
b. Any unusual conditions found during operation/inspections

c. Chart and printout of event loggers, if any, for system disturbances/outages

d. 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 energy supplied.

   M/s Suzlon Infrastructure Services Limited (SEL) will have a designated Site-In-Charge (O&M) on site who will be responsible for monitoring the emission reductions of the project activity. The electrical layout of the WTGs is as follows:



On the 1st of every month, the KPTCL designated official shall arrive at the site and record the readings of meters placed at the 33/220 kV Sub-Station and as well as at the individual customer metering point. Keeping in view, the total generation supplied to Grid from the sub-station, the electricity generation data for every particular customer will be computed on *Form B* as per the apportioning procedure mentioned below:

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

Internal audits & Performance review

The records are regularly audited and checked by the SRPL representatives during their site visit. The SRPL representative visit once in a year and audit the records. The SRPL representatives will crosscheck the emissions reductions claimed in 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. All corrective actions will be recorded in the log book. The person taking readings at site are adequately trained and go through training procedures regularly.

Apportioning Procedure:

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

Partial days generation of the Month at Controller (kWh): X

Total generation at Controller (kWh) for the same month: Y (kWh/month)

% Generation for partial days of generation (%): Z= (X/Y) *100

Generation as per BULK metering point KPTCL generation report for the month:

G (kWh/month) Partial days of generation as per KPTCL generation report: (G*Z/100)

Form B, which contains the generation data, is certified by the Site-in-Charge (O&M) for SEL and also by the Asst. Executive Engineer of KPTCL. The Form B is now forwarded to Executive Engineer of KPTCL and is certified thereof. Copies of this document are forwarded to the State Load Dispatch Center of Karnataka Power Transmission Company Limited (KPTCL), Asst. Electrical Engineer of KPTCL and the customer (in this case, Sargam Retails Pvt. Ltd. - SRPL). The monthly generation shall be derived from Form B and the same shall be used in monitoring report and 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

As per AMS-I.D (Version 15.0, EB 50) baseline emission is calculated as

$BE_y = EG_y * EF_y$

Where:

BE_y = Baseline Emissions due to displacement of electricity during the year y (tCO_2)

EG_y = Net units of electricity due to substituted in the grid during the year y (MWh)

EF_y = Emission Factor of the grid (in tCO_2/ MWh) and y is any year within the crediting period of the project activity.

$EG_{y} = EG_{Net\ Exported} = EG_{Exported} - EG_{Import} - EG_{Transmission\ Losses}$

Values for the above parameters are as follow:

EF_y = 0.927 tCO_2/MWh

EG_{Export} = 71792.53 MWh

EG_{Import} = 262.73 MWh

$EG_{Transmission\ losses}$ = 1080.38 MWh

$EG_{Net\ Exported}$ = 70412.40[13] MWh

EG_y, = $EG_{Net\ Exported}$ = 70412.40 MWh

$BE_y = EG_y * EF_y$

Year	Net Electricity supplied to grid(MWh)	Baseline Emission Factor(tCO_2/MWh)	Baseline Emissions(tCO_2)
2016	5268.876	0.927	4,884
2017	30769.691	0.927	28,523
2018	29906.567	0.927	27,723
2019	4467.264	0.927	4,141
Total	70412.398		65,271

Hence, baseline emissions during the monitoring period BE_y = 65,271 tCO_2e

5.2 Project Emissions

No project emissions are applicable to this small scale wind electric power project, since the electricity generation is based on wind resources, which does not involve in combustion or generation of emissions from fossil fuels. Hence, these emission sources are neglected.

PE_y = 0 tCO_2e

5.3 Leakage

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport). These emission sources are neglected

LE_y = 0 tCO_2e

5.4 Net GHG Emission Reductions and Removals

[13] Obtained by considering the conservative values(for every month in the monitoring period) of net electricity export by using formula EG_{Export} - EG_{Import} – $EG_{Transmission\ Losses}$ as per FORM-B and invoices

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)
2016	4,884	0	0	4,884
2017	28,523	0	0	28,523
2018	27,723	0	0	27,723
2019	4,141	0	0	4,141
Total	65,271	0	0	65,271

The actual VER is about 1.3% lower than the estimated VCUs. 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.

APPENDIX 1: METER CALIBARTION DETAILS

Main and Check Meter Details

WTGs	WTG Location No.	Main Meter Sl.No.	Check Meter Sl. No.
5 x 1.25 MW	K-538, K-539, K-540, K-541, K-542	08001351	08001352
5 x 1.5 MW	K-543, K-544, K-549, K-550, K-551	08001358	08001371

Calibration details of Main and Check Meters

Calibration date	Next calibration due on
27-April-2016	26-April-2021

Meters at 220 kV substation

Meters at Line-1	Meters at Line-2
Main meter 08001856	Main meter 08001868
Check Meter 08001858	Check Meter 08001891

Calibration details of Meters at 220 kV Substation

Calibration date	Next calibration due on
21-May-2016	20-May-2021

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.

Considering the calibration dates of meters at WTG yard as well at 220kV substation, there has been no delay in calibration.