



100 MW BUNDLED WIND POWER PROJECT IN ANANTAPURAM, ANDHRA PRADESH



Document Prepared by Infinite Solutions

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Prepared By	Infinite Solutions
Contact	214-215 Milinda Manor, Opp. Next Treasure Island, 2 RNT Marg, Indore - 452001. Landline No.: 0731-4050174 Email: jimmy@infisolutions.org Website: www.infisolutions.org

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity consists of a bundle of 50 Wind Electric Generators (WEG) of Gamesa Wind Turbines Private Limited make in Anantapuram District, Andhra Pradesh. 40 machines of 2 MW capacity have been set up by Guttaseema Wind Energy Company Private Limited (GWECPL) and the other 10 machines of 2 MW have been setup by Vayuputra Energy Private Limited (VEPL). The Project is owned by Guttaseema Wind Energy Company Private Ltd. and Vaayuputra Energy Private Ltd. which is part of Greenko Group. The project activity generates power by using the kinetic energy of wind, thus resulting in zero emissions during electricity production. The generated electricity from the implemented WEGs will be supplied to the Southern Power Distribution Company of AP Limited. Both companies have entered Power Purchase Agreement (PPA) with State utility i.e., Southern Power Distribution Company of AP Limited for a period of 20 years from the date of implementation of project.

Project Name	No. of WTGs	Capacity	Location
Guttaseema Wind Energy Company Private Ltd.	40	80 MW	Andhra Pradesh
Vayuputra Energy Private Ltd.	10	20 MW	Andhra Pradesh

The Project Activity Commissioned dates: -

Project Name	No. of WTGs	Capacity	Commissioning dates	Location
Guttaseema Wind Energy Company Private Ltd.	10	20 MW	22/03/2018 to 07/02/2019	Andhra Pradesh
Vayuputra Energy Private Ltd.	10	20 MW	22/03/2018	Andhra Pradesh
Total	20	40 MW		

**Only part of 40 MW has been commissioned.*

The current status of the remaining 60 MW (30WTGs) of the project activity to be commissioned by: -

Project proponent	No. of WTGs	Capacity	Yet to be Commissioned WTGs- Current status
Guttaseema Wind Energy Company Private Ltd.	10	20 MW	The 20 MW (10WTGs) of the project activity has already been installed on the project site and is ready for commissioning but due to COVID 19 pandemic it was a delayed. So now within 2-3 months it will be commissioned.

Guttaseema Wind Energy Company Private Ltd.	20	40 MW	The 40 MW (20 WTGs) of the project activity are under the construction phase. Due to COVID 19 pandemic, it was also delayed. So now within a year it will be commissioned.
Total	30	60 MW	

As a result, for the project capacity 100 MW, GHG emission reductions by project is estimated to be approximately 192,849 tCO₂e per year and total GHG emission reductions of 1,928,490 tCO₂e for the crediting period, thereon displacing 205,860 MWh/year amount of electricity from the grid. However as only 40 MW power is commissioned yet, hence GHG emission reductions by already commissioned project is estimated to be approximately 77,139 tCO₂e per year and total GHG emission reductions of 771,390 tCO₂e for the crediting period, thereon displacing 82,344 MWh/year amount of electricity from the grid.

GHG emission reduction by the Project in this monitoring period. The monitoring period is from 04/10/2019 to 31/12/2020. The total GHG emission reductions or removals generated in this monitoring period are 52,076 tCO₂e.

1.2 Sectoral Scope and Project Type

The bundled project will generate renewable electricity from WEGs. The generated electricity will be exported to the grid. Therefore, in accordance with Appendix B2 of the simplified modalities and procedures for small scale CDM project activities the applicable methodology is ACM0002. Grid connected renewable electricity generation. The relevant type and category are shown below:

The project activity falls under the following Sectoral scope and Project Type:

Sectoral Scope : 01 - Energy industries (renewable / non-renewable sources)

Project Type : I - Renewable Energy Projects

Project Category : Grid-connected electricity generation from renewable sources
ACM0002- Version 19.0¹

The project is not a grouped project activity.

¹ <http://cdm.unfccc.int/methodologies/DB/5725LCHYPYM4I1V8OD9SFYVAMFFWNP>

1.3 Project Proponent

Organization name	Guttaseema Wind Energy Company Private Ltd.
Contact person	Murali Krishnam Raju M
Title	AGM - Commercial
Address	PLOT NO. #1131/A, ROAD NO. 36, JUBILEE HILLS, HYDERABAD – 500033, TELANGANA, INDIA.
Telephone	+91 40 40300100
Email	muraliraju.m@greenkogroup.com

Organization name	Vayuputra Energy Private Ltd
Contact person	Murali Krishnam Raju M
Title	AGM - Commercial
Address	PLOT NO. #1131/A, ROAD NO. 36, JUBILEE HILLS, HYDERABAD – 500033, TELANGANA, INDIA.
Telephone	+91 40 40300100
Email	muraliraju.m@greenkogroup.com

1.4 Other Entities Involved in the Project

Organization name	Infinite Solutions
Role in the Project	Project Consultant
Contact person	Mr. Jimmy Sah
Title	Head – Sustainability
Address	214-215 Milinda Manor, Opp. Next Treasure Island, 2 RNT Marg, Indore – 452001, India
Telephone	+91-9644130430
Email	jimmy@infisolutions.org

1.5 Project Start Date

Project Start Date: 22/03/2018;

The project start date is the date on which first WTG of the project was commissioned

1.6 Project Crediting Period

Crediting Period Start date : 22/03/2018

Crediting Period End date : 21/03/2028

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

1.7 Project Location

Guttaseema Wind Energy Company Private Ltd. and Vayuputra Energy Private Ltd. have established wind mills in multiple villages in Anantapuram District, Andhra Pradesh and the details of physical location of each sub project in the bundled project activity are furnished below. The Geo-Coordinates of the WTGs already commissioned.

Guttaseema Wind Energy Company Private Limited					Commissioning Date
Sl. No.	WTG Loc. No.	Latitude	Longitude	Villages	
1	WTG-G01	N14°27'37.5"	E77°12'8.7"	Rudrampalli, Borampalli, Elagalavanka and Basavapuram villagesof Anatapuram District in Andhra Pradesh	07/02/2019
2	WTG-G02	N14°27'54.9"	E77°12'10.7"		07/02/2019
3	WTG-G03	N14°28'4.8"	E77°12'9.3"		07/02/2019
4	WTG-G06	N14°28'13.2"	E77°12'52.8"		07/02/2019
5	WTG-G08	N14°28'41.10"	E77°13'17.60"		22/03/2018
6	WTG-G09	N14°28'15.6"	E77°12'52.50"		07/02/2019
7.	WTG-G10	N14°29'20.5"	E77°13'11.4"		22/03/2018
8	WTG-G11	N14°29'43.00"	E77°14'33.80"		22/03/2018
9	WTG-G12	N14°29'24.20"	E77°14'31.10"		22/03/2018
10.	WTG-G23	N14°29'32.10"	E77°15'28.50"		22/03/2018

Vayuputra Energy Private Limited					Commissioning Date
Sl. No.	WTG Loc. No.	Latitude	Longitude	Villages	
1.	WTG-V01	N14°28'3.10"	E77°14'53.00"	Rudrampalli, Borampalli, Elagalavanka and Basavapuram villagesof Anatapuram District in Andhra Pradesh	22/03/2018
2.	WTG-V02	N14°27'48.00"	E77°14'50.20"		22/03/2018
3.	WTG-V03	N14°27'37.80"	E77°14'51.90"		22/03/2018
4.	WTG-V04	N14°27'15.10"	E77°14'29.00"		22/03/2018
5.	WTG-V05	N14°26'57.10"	E77°14'5.60"		22/03/2018
6.	WTG-V06	N14°27'41.0"	E77°13'42.50"		22/03/2018
7.	WTG-V07	N14°28'5.6"	E77°14'4.9"		22/03/2018
8.	WTG-V08	N14°28'17.1"	E77°13'40.6"		22/03/2018
9.	WTG-V09	N14°27'47.2"	E77°12'59.2"		22/03/2018
10.	WTG-V10	N14°27'3.5"	E77°12'30.1"		22/03/2018

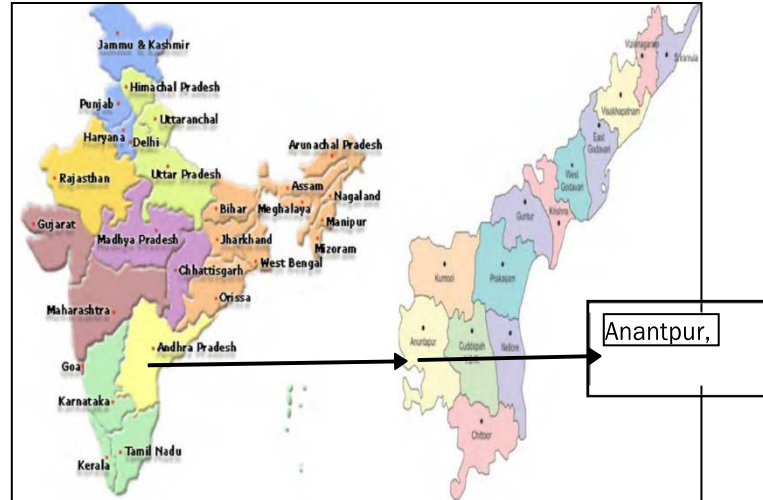


Figure 1 Project Location

The Geo-Coordinates of the WTGs yet to be commissioned: -

Guttaseema Wind Energy Company Private Limited				
Sl. No.	WTG Loc. No.	Latitude	Longitude	Villages
1	WTG-G05	14° 28' 30.72" N	77° 11' 56.544" E	Rudrampalli, Borampalli, Elagalavanka and Basavapuram villages of Anantapur District in Andhra Pradesh
2	WTG-G04	14° 28' 17.4" N	77° 12' 4.068" E	
3	WTG-G07	14° 28' 26.94" N	77° 13' 23.26" E	
4	WTG-G13	14° 30' 24.336" N	77° 13' 44.68" E	
5	WTG-G14	14° 29' 59.208" N	77° 13' 50.77" E	
6	WTG-G15	14° 29' 7.08" N	77° 14' 28.716" E	
7	WTG-G16	14° 28' 55.884" N	77° 14' 24.504" E	
8	WTG-G17	14° 28' 45.192" N	77° 14' 28.5" E	
9	WTG-G18	14° 28' 37.416" N	77° 14' 16.51" E	
10	WTG-G19	14° 27' 27.252" N	77° 14' 3.588" E	
11	WTG-G20	14° 29' 0.06" N	77° 15' 16.16" E	
12	WTG-G21	14° 28' 48.072" N	77° 15' 29.016" E	
13	WTG-G22	14° 29' 14.388" N	77° 15' 34.164" E	
14	WTG-G24	14° 29' 49.344" N	77° 15' 37.152" E	
15	WTG-G25	14° 31' 31.332" N	77° 15' 20.736" E	
16	WTG-G26	14° 28' 59.988" N	77° 16' 12.504" E	
17	WTG-G27	14° 29' 13.596" N	77° 16' 15.78" E	
18	WTG-G28	14° 29' 21.336" N	77° 16' 44.076" E	
19	WTG-G29	14° 29' 29.724" N	77° 16' 49.476" E	
20	WTG-G30	14° 29' 37.824" N	77° 16' 43.752" E	
21	WTG-G31	14° 29' 55.896" N	77° 16' 12.36" E	
22	WTG-G32	14° 30' 5.832" N	77° 16' 9.948" E	
23	WTG-G33	14° 30' 17.064" N	77° 15' 59.364" E	
24	WTG-G34	14° 30' 35.496" N	77° 16' 3.324" E	
25	WTG-G35	14° 30' 42.3" N	77° 15' 45.864" E	

26	WTG-G36	14° 31' 41.772" N	77° 15' 40.392" E	
27	WTG-G37	14° 31' 55.164" N	77° 15' 44.568" E	
28	WTG-G38	14° 32' 6" N	77° 15' 33.192" E	
29	WTG-G39	14° 32' 8.196" N	77° 14' 18.708" E	
30	WTG-G40	14° 32' 19.68" N	77° 14' 19.032" E	

1.8 Title and Reference of Methodology

Title: Grid-connected electricity generation from renewable sources

Reference: ACM0002: Version 19.0

Type I: Energy industries (renewable / non-renewable sources)

Tools referred with above methodology and applicable for project activity are:

- Tool to calculate the emission factor for an electricity system - Version 07.0 (EB 100, Annex 04)
- Methodological Tool- Tool for the demonstration and assessment of additionally - Version 07.0.0 (EB 70, Annex 08).

1.9 Participation under other GHG Programs

The Project has not participated in any other GHG programs.

1.10 Other Forms of Credit

Emissions Trading Programs and other Binding Limits

Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

Other Forms of Environmental Credits

The Project has no intend to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

1.11 Sustainable Development

Contribution to sustainable development:

Ministry of Environment and Forests, Govt. of India has stipulated the social wellbeing, economic wellbeing, environmental wellbeing and technological wellbeing as the four indicators for sustainable development for Clean Development Mechanism (CDM) projects.

- **Social well-being:** The project activity generates clean power, without emitting any GHGs during its operations. Hence, it leads to a cleaner environment, reducing the adverse impacts of GHG emissions on the people. It reduces a part of the electricity deficit being faced in the region and improves infrastructural development in the areas around the project activities.
- **Environmental well-being:** Wind being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the project activity also helps in avoiding significant amount of GHG emissions.
- **Economic well-being:** The project activities contribute to an investment of nearly INR 658.80 million which would increase the economic activity of the local area. The generated electricity is fed into the Grid through the local grid which would improve the grid frequency and availability of electricity to the local consumers. This will provide new opportunities for the industries to set up in the area thereby improving local employment and leading to overall development.
- **Technological well-being:** The project activities employ the best available technology and it lead to the promotion of wind technology into the region, demonstrating the success of wind based renewable energy generation, which is fed into the nearest sub-station (part of the Indian Grid), thus increasing energy availability and improving quality of power under the service area of the substation.
- **Further Information**

There are no information or incidents that will have bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission.

2 SAFEGUARDS

2.1 No Net Harm

There were no harm-identified from the project and hence no mitigations measures are applicable.

2.2 Local Stakeholder Consultation

The project has already been registered under VCS mechanism; hence it is not applicable.

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by the project proponent towards reducing emissions.

For ongoing communication, the PP has also placed a grievance register onsite where in the stakeholder can put down his/her complaint, and the same if found genuine will be addressed immediately.

However, there is no negative feedback has been reported within this monitoring period.

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

Guttaseema Wind Energy Company Private Ltd. (80 MW) and Vayuputra Energy Private Limited (20 MW) is located at Rudrampalli, Borampalli, Elagalavanka and Basavapuram villages of Anaparthi District in Andhra Pradesh. Generation of Electricity is by using Wind energy.

The total capacity of the proposed project activity is 100 MW. The proposed project activity comprises of total 50 WTGs, which comprises of 2 MW capacity each.

Project current status during this monitoring period: -

Project proponent	WTGS - Commissioned	Commissioning Dates
Guttaseema Wind Energy Company Private Ltd. (80 MW)	10 WTGs (20 MW) out of 40 WTGs (80 MW) are commissioned.	22/03/2018, 07/02/2019

Vayuputra Energy Private Limited (20 MW)	10 WTGs (2 MW each) are commissioned	22/03/2018, 23/03/2018
Total	20 WTGs (40 MW)	

In this monitoring period only 40 MW has considered the generation for calculating under emission reduction under VCS mechanism. **Hence, 60 MW (30 WTGs) capacity are yet to be commissioned.**

The project activity comprises of 21 WEGs of G97-2 MW and 29 WEGs of G114-2 MW WEGs supplied by Gamesa Wind Turbines Private Limited.

The salient Features of Gamesa G97 are as follows.

Parameter	Specifications
	Gamesa- G97 - 2.0MW
Power	
Installed electrical output	2,000 kW
Cut-in wind speed	3 m/s
Rated wind speed	11 m/s
Cut-out wind speed	25 m/s
Regulation	Pitch
Rotor	
Diameter	97.0 m
Rotor swept area	7,390.0 m ²
Number of blades:	3
Tip speed:	90 m/s
Generator	
Type	Double Fed Asyn
Speed, max	1,904.0 U/min
Operating voltage	690 V
Frequency	50 Hz / 60 Hz

The salient Features of Gamesa G114 2.0MW WTG are as follows: -

Parameter	Specifications
	Gamesa- G114 CS 2.0MW
Power	

Installed electrical output	2,000 kW
Cut-in wind speed	2.5 m/s
Rated wind speed	10 m/s
Cut-out wind speed	25 m/s
Regulation	Pitch
Rotor	
Diameter	114.0 m
Rotor swept area	10,207.0 m ²
Number of blades:	3
Tip speed:	96 m/s
Generator	
Type	Double Fed Asyn
Speed, max	1,280.0 U/min
Operating voltage	690 V
Frequency	50 Hz / 60 Hz

The start date of the current monitoring period i.e., 04/10/2019 but we have a zero-generation value in the October-2019 month as per October- 2019 JMRs & Invoices for Guttaseema Wind Energy Company Private Limited & Vayuputra Energy Private Limited. So, we had taken the generation value for emission reduction calculation during this monitoring period from November-2019 to December-2020.

The project proponent would like to clarify that on 15/09/2019 the state government had disconnected the pooling substation (where the project WTGs are connected) from the grid, considering the substation as temporary connection point to the grid.

In the above matter, the project developers has approached the High Court of Andhra Pradesh to set aside the Government of Andhra Pradesh's and DISCOMs relevant orders. With regards to abrupt disconnection of wind power, the Hon'ble High Court of Andhra Pradesh, passed the order directing the respondents to restore the last uncontested position and directing the APTRANSCO to immediately reconnect the applicants wind power project to the state grid at the approved

temporary connection point (Substation) and allow the petitioners to continue to supply power to APSPDCL as before.

Following the order issued by the High Court, the Govt official had re-connected the substation to the grid on 06/11/2019 as indicated in the JMRs issued by the state utility. Thus, the generation in the month of October 2019 is zero.

3.2 Deviations

2.3.1 Methodology Deviations

No methodology deviation is applied during the monitoring period.

2.3.2 Project Description Deviations

No deviation has taken place in project description during the monitoring period.

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	$EF_{grid, OM, y}$
Data unit	tCO ₂ /MWh
Description	Operating margin CO ₂ emission factor for the project electricity system in year y
Source of data	Calculated from CEA database, Version 14, December 2018 ²
Value applied	0.9610 (Indian Grid)
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 07.0.0” as 3-year generation weighted average using data for the years 2015-16, 2016-17 & 2017-18. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 14.0, published by the Central Electricity Authority, Ministry of Power, and Government of India.
Purpose of Data	For the calculation of the Baseline Emission

² http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver10.pdf

Comments	This parameter is fixed ex-ante for the entire crediting period.
Data / Parameter	$EF_{grid, BM, y}$
Data unit	tCO ₂ /MWh
Description	Build margin CO ₂ emission factor for the project electricity system in year y
Source of data	Calculated from CEA database, Version 14, December 2018
Value applied	0.8644 (Indian Grid)
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 07.0.0” as 3-year generation weighted average using data for the year 2017-18. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 14.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	Calculation of baseline emissions
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid, CM, y}$
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor for the project electricity system in year y
Source of data	Calculated from CEA database, Version 14, December 2018
Value applied	0.9368 (Indian Grid)
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid, CM, y} = EF_{grid, OM, y} * WOM + EF_{grid, BM, y} * WBM$ Where: $EF_{grid, BM, y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh) $EF_{grid, OM, y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh) WOM = Weighting of operating margin emissions factor (%) = 75% WBM = Weighting of build margin emissions factor (%) = 25%
Purpose of Data	Calculation of baseline emissions
Comments	The above value is fixed and it is same for the entire crediting period

4.2 Data and Parameters Monitored

Data / Parameter	EG_{PJ}
Data unit	MWh
Description	Electricity supplied to Grid
Source of data	Certificate for share of electricity generated by the wind farm

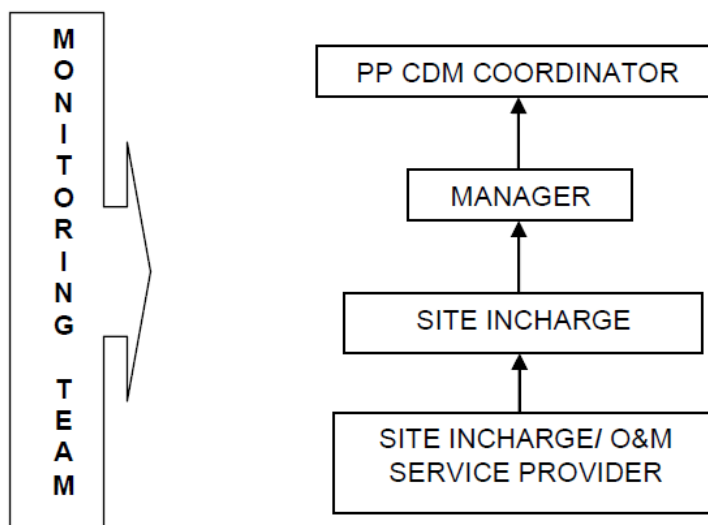
Description of measurement methods and procedures to be applied	Net electricity generated will be calculated at the main meter connected to the Grid Substation. The procedures for metering will be as per the provisions of the power purchase agreement. The WEGs of a single customer (individual PPS) at a particular site are connected to a feeder that ultimately leads to the main meter at the substation maintained by O&M team. Data monitoring takes place at the metering yard and Main meter at the substation. The electricity metered at the main meter is proportionally divided among the customers connected to the meter on the basis of the readings taken at the individual WTGs. The emission reduction calculations are done on the basis of the Main meter reading (net electricity exported to the grid) after deducting imports from the grid as mentioned in the share certificate issued on monthly basis. The electricity measurements at main meter are continuous and recorded on monthly basis.
Frequency of monitoring/recording	Continuous measurement and at least monthly recording
Value monitored	55,592 MWh
Monitoring equipment	Electricity Meters of 0.2s Class
QA/QC procedures to be applied	Calibration of all the meters will be undertaken at required intervals and faulty meters will be duly replaced immediately based on CEA guidelines which specifies calibration once in 5 years. The data will be cross checked with sales receipts.
Purpose of the data	Calculation of Baseline emissions
Calculation method	N/A
Comments	The data will be archived electronically for two years after the end of the last crediting period or the last issuance of VERs for this project activity, whichever occurs later

4.3 Monitoring Plan

The project proponents at the power station have a procedure to ensure proper monitoring of the VCS project activity. The project activity has installed monitoring and control equipment that measure, record, report, monitor and control various key parameters.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participant. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipments for this project activity.

Organizational Structure for monitoring: -



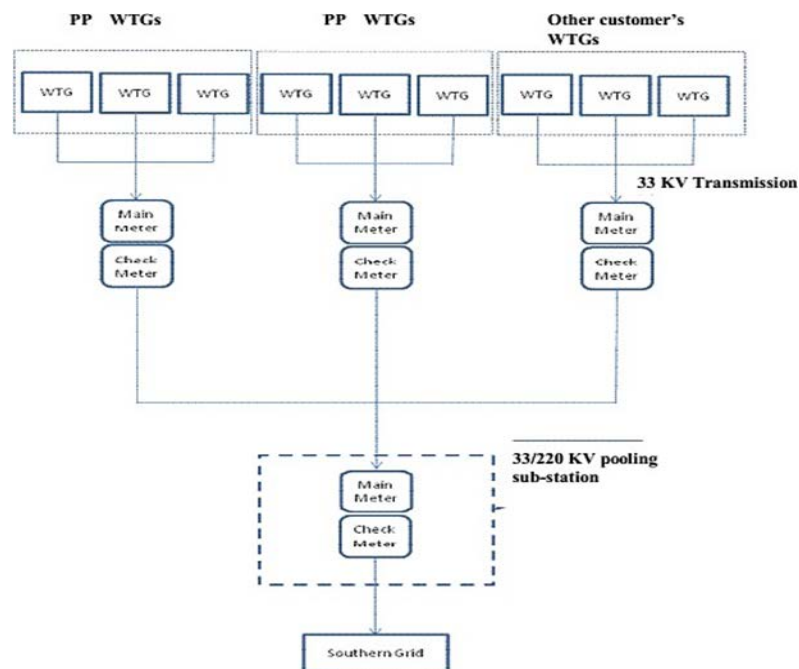
Organizational Structure for monitoring: -

Designation	Responsibilities
PP COORDINATOR	Overall project monitoring including collecting and aggregating JMRs/Invoices for all WTGs investors.
MANAGER	Holds complete control over monitoring aspects pertaining to the project.
SITE INCHARGE	- Recording - Verification - Storage of Data
SITE INCHARGE/ O&M SERVICE PROVIDER	- Operation and Maintenance - Storage of data - Data Recording

The methodology requires monitoring of the net electricity supplied from the project activity.

The proponent shall maintain complete and accurate records and all other data required for the purpose of proper administration and operation of the wind power project. The data will be kept for at least 2 years after the end of the crediting period.

1. **Purpose** - The purpose of monitoring the project is to assess the annual emission reductions in tonnes of CO₂ that the project activity has achieved.
2. **Data to be reported** - EG_{PJ,y} in MWh and periodical calibrations of monitoring equipment's.
3. **Monitoring times and periods** - The data will be monitored on a continuous basis but will be recorded on a monthly basis with the energy meters installed at the site.
4. **Data Accuracy** - Metering Arrangement of the Power Purchase Agreement (PPA) the metering arrangement including its installation, testing, maintenance and collection transportation and processing of data required for energy exchange shall be governed as per the notification/ directives issued/or to be issued by Central Electricity Regulatory Commission and as per relevant provisions contained in IEGC as amended from time to time. The Central Electricity Authority (CEA) notification regarding Installation and Operation of meters regulations, 2006, says that meters are required to be tested once in 5 years (refer clause 18 of the guideline). Thus, the meters recording the electricity exported will be calibrated at least once 5 years.



5. **Emission Reduction Calculation Approach** - The emission reductions are calculated as a product of the net electricity generated from the project activity and the combined margin

emission factor. The calculation approach is explained in detail under section 3 of this document.

6. **Approach to be followed in following cases:** In case monitoring period is between the billing cycle, pro rata calculation for the number of days in the monitoring period shall be estimated for emissions reduction calculation.

Personnel Training: -

The project personnel, including those involved in data recording, maintenance and direct data assessments will be provided with training on the application and usage of the manual.

Training and maintenance requirements: -

O&M operator would provide training to the on-site staffs on operation and maintenance of the metering system and adherence to the Monitoring Plan of the project activity. Training for operation of Wind projects and shall be provided by the respective O&M Operators.

For WTGs, Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the WTGs, it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure that technology providers' service staff is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established.

Apportioning: In case of mismatch of date between the start date of the billing cycle and the start date of monitoring period the data will be apportioned in line to the daily generation values for the said mismatch period.

QA/QC procedures: The energy meters at the feeders are maintained and owned by APSPDCL. Neither the project proponent nor the site personnel have any control over it. The records will be cross-checked with the records of sold electricity to APSPDCL. The meters are calibrated by APSPDCL at-least once in five years.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

As per the approved consolidated Methodology ACM0002 (Version 19)

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that existing grid-connected power plants and the addition of new grid-connected power plants would have generated all project electricity generation above baseline levels. The baseline emissions are to be calculated as follows:

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

Where:

BE_y = Baseline emissions in year y (tCO₂/yr)

$EG_{PJ,y}$ = 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/yr)

$EF_{grid, CM, y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (t CO₂/MWh)

Grid Emission Factor:

The GEF is fixed ex-ante in the PD as given below:

Parameter	Value (tCO ₂ /MWh)
OM	0.9610
BM	0.8644
CM	0.9368

Therefore,

$$BE_y = 55,592 \times 0.9368$$

$$= 52,076 \text{ tCO}_2\text{e (Round down value)}$$

5.2 Project Emissions

Not Applicable, since emissions from the project activity is zero as per ACM0002 methodology.
Hence, $PE_y = 0$.

5.3 Leakage

Not Applicable, since leakage emissions from the project activity is zero as per ACM0002 methodology. Hence, $LE_y = 0$.

5.4 Net GHG Emission Reductions and Removals

The Formula used to calculate the net emission reduction for the project activity

$$ER_y = BE_y - PE_y$$

Where,

ER_y = Emission Reduction in tCO₂/year

BE_y = Baseline emission in tCO₂/year

PE_y = Project emissions in tCO₂/year

LE_y = Leakage Emissions in tCO₂/year

For the project activity during the current monitoring period, as per section 5.1

$BE_y = 52,076$ tCO₂e

$PE_y = 0$ tCO₂e

:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
04/10/2019 to 31/12/2019	3,650	0	0	3,650
01/01/2020 to 31/12/2020	48,426	0	0	48,426
Total	52,076	0	0	52,076

The achieved GHG emission is 45.84% which is lower than the estimated value. This is due to the lower wind flow pattern at the site.

Parameters	tCO2e
Annual Estimated emission Reduction As per PDD (100 MW)	192,849
Annual Estimated emission Reduction As per PDD (40 MW)	77,139
Estimated emission reduction for this monitoring period (100 MW) - 455 Days	240,401
Estimated emission reduction for this monitoring period (40 MW) - 455 Days	96,160
Total Emission Reduction for this monitoring period	52,076
Difference in Emission reduction	45.84%(lesser)

APPENDIX 1: < METER CALIBRATION DETAILS >

Guttaseema Wind Energy Company Pvt. Ltd.					
Main Meter	Check Meter	Stand by Meter	Calibration Date	Due Date of calibration	Accuracy Class
18035458	18035460	18035461	26/02/2019	25/02/2024	0.2S

Vayuputra Energy Pvt. Ltd.					
Main Meter	Check Meter	Stand by Meter	Calibration Date	Due Date of	Accuracy Class

				calibration	
17250994	18035463	18035464	26/02/2019	25/02/2024	0.2S