

MONITORING REPORT FOR “WIND POWER PROJECT AT ANTHIYUR, TAMIL NADU”

Document Prepared By “Windage Power Company (P) LTD”

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Table of Contents

1	Project Details	3
1.1	Summary Description of the Implementation Status of the Project	3
1.2	Sectoral Scope and Project Type.....	4
1.3	Project Proponent	4
1.4	Other Entities Involved in the Project	4
1.5	Project Start Date	4
1.6	Project Crediting Period	4
1.7	Project Location	4
1.8	Title and Reference of Methodology	6
1.9	Other Programs.....	6
1.10	Sustainable Development	6
2	Implementation Status.....	7
2.1	Implementation Status of the Project Activity.....	7
2.2	Deviations.....	7
2.2.1	Methodology Deviations	7
2.2.2	Project Description Deviations	7
2.3	Grouped Project	7
2.4	Safeguards	7
2.4.1	No Net Harm	7
2.4.2	Local Stakeholder Consultation	7
3	Data and Parameters	8
3.1	Data and Parameters Available at Validation	8
3.2	Data and Parameters Monitored	8
3.3	Monitoring Plan	10
4	Quantification of GHG Emission Reductions and Removals	15
4.1	Baseline Emissions	15
4.2	Project Emissions.....	16
4.3	Leakage.....	16
4.4	Net GHG Emission Reductions and Removals.....	16
	APPENDIX I: < Power exported and power imported by WTGs >	17

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity is a 14.85 MW wind farm consisting of 9 Vestas (India) Pvt. Ltd. WTGs of NM82/1650 kW capacity each. The project activity is implemented in the Anthiyur Village of Udumalpet and Pollachi Talukas of Coimbatore District in state of Tamil Nadu. The project activity involves implementation of WTGs as a voluntary measure to strengthen the regional grid of India through wind power generation potential available to India. The generated electricity shall be fed into the Tamil Nadu Electricity Board (TNEB). The electricity generation from the project activity is free of GHG emissions since wind energy (a zero emission source) is harnessed for electricity generation. However, in the baseline scenario, in the absence of the project activity the electricity would have been generated from the power stations operating in the grid. The commissioning date of each of the WTGs along with their H.T. Service Number is provided below;

Location Name	S.F. Nos	HT. Service Number	Date of commissioning
NSL 1	38&39/3	751	31.03.2005
NSL 2	150/3A2,150/3B,158/1	752	31.03.2005
NSL 3	104/1&109/1	754	31.03.2005
NSL 4	56/1C,47/8&56/1B	788	29.04.2005
NSL 5	431/3	753	31.03.2005
NSL 6	95/2,95/3&95/4	808	17.05.2005
NSL 7	17&18	728	30.03.2005
NSL 8	2/1	755	31.03.2005
NSL 9	254/A1,255/2B,255/2C	690	26.03.2005

The total emission reductions achieved in this monitoring period from 01-April- 2016 to 31-October-2017 are 64,026 tCO₂.

1.2 Sectoral Scope and Project Type

Sectoral scope : 01, Energy Industries (renewable- /non-renewable sources)
 Project Type : I, Renewable energy projects

The project is not a grouped (but a bundle of 9 WTGs) project activity.

1.3 Project Proponent

Organization name	Windage Power Company (P) LTD
Contact person	Mr. A. Rajnikant
Title	DGM – Power Division
Address	#8-2-684/2/A, NSL ICON, Road No. 12, Banjara Hills, Town / City: Hyderabad, Andhra Pradesh, PIN: 500034, India.
Telephone	+91 40 3051 4444
Email	rajnikant.a@nslpower.com

1.4 Other Entities Involved in the Project

NA

1.5 Project Start Date

26 March 2005 (Date on which the project began reducing or removing GHG emissions i.e. the commissioning date of the project)

1.6 Project Crediting Period

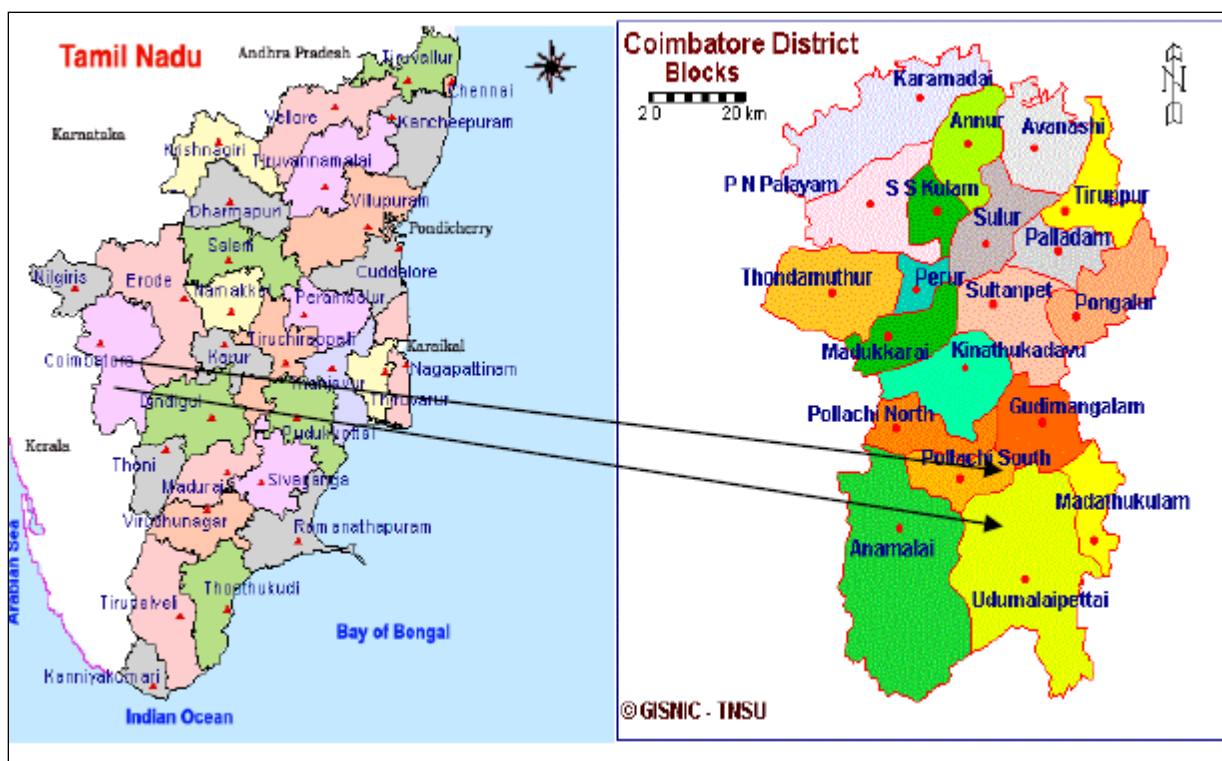
The proposed crediting period under VCS is as follows:

Duration of the current crediting period : 10 years.
 Start date of the current crediting period : 01 April 2016
 End date of the current crediting period : 31 March 2026.

This is the second renewal crediting period for the project activity.

1.7 Project Location

The 14.85 MW wind farm is located near Anthiyur Village of Udumalpet and Pollachi Talukas of Coimbatore District in Tamil Nadu. This wind farm is located 60 Km south – east of Coimbatore, Tamil Nadu. The altitude of wind farm is 380 m.



Location of Project:

S. No	Location Name	S.F. Nos	Village Name	Taluk Name	Co-ordinates			HT. Service Number
					North	East	Altitude in meters	
1	NSL1	38&39/3	Koolanayakan Patti	Pollachi	10°36'49.6"	77°09'15.3"	385	751
2	NSL2	150/3A2,150/3B,158/1	Gomangalam Puthoor	Pollachi	10°37'21.4"	77°09'30.0"	380	752
3	NSL3	104/1&109/1	Gomangalam Puthoor	Pollachi	10°36'48.2"	77°09'51.0"	386	754
4	NSL4	56/1C,47/8&56/1B	Gomangalam Puthoor	Pollachi	10°37'01.2"	77°09'45.6"	383	788
5	NSL5	431/3	Gomangalam	Pollachi	10°37'15.5"	77°09'52.9"	379	753
6	NSL6	95/2,95/3&95/4	Gomangalam Puthoor	Pollachi	10°36'39.6"	77°10'07.7"	385	808
7	NSL7	17&18	Venasa Patti	Udumal pet	10°37'11.7"	77°11'25.2"	383	728

8	NSL8	.2/1	Venasa Patti	Udumal pet	10°37' 27.5"	77°11' 21.0"	379	755
9	NSL9	254/A1, 255/2B, 255/2C	Pannai Kinaru	Udumal pet	10°38' 33.8"	77°11' 02.9"	364	690

1.8 Title and Reference of Methodology

Title: Grid connected Renewable Electricity Generation

Reference: AMS I.D., Version 18.0

1.9 Other Programs

Project has not been applied under any other GHG or any related programs. Also, the project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates, during this monitoring period. PP has also submitted the declaration confirming the same to the verifying DOE.

1.10 Sustainable Development

Project's contribution to sustainable development:

The project primarily assists the region as a whole in stimulating and accelerating the commercialization of grid connected renewable energy technologies.

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

Social well-being: Enhancing local employment in the rural area around the project. Capacity building and empowerment of vulnerable sections of the rural community dwelling in the project area.

Economical well-being: During the construction and operation phases, the project activity would generate small business opportunities for local stakeholders such as bankers, suppliers, manufacturers and contractors.

Environmental well-being: This project activity contributes to sustainable development through generation of eco-friendly power resulting in the increase of the share of renewable energy power generation in the regional and national grid. It would aid in strengthening India's rural electrification coverage. Wind power projects also aid in reducing GHG emissions and other pollutants (SOx, NOx, PM etc).

Technological well-being: The project activity helps in increasing the share of renewable energy power generation in the regional and national grid. The project activity also, encourages clean, renewable and efficient technologies.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The implementation status of the project activity(s), includes the following information:

- The project activity has been in operation since its date of commissioning. There is no any event of break down or non-operational phase during the monitoring period.
- There are no any other changes related to the project proponent or project observed. Project is implemented and operational as per the VCS Project description submitted.

2.2 Deviations

2.2.1 Methodology Deviations Not Applicable

2.2.2 Project Description Deviations

Project deviation taken during the current monitoring period:

During the current monitoring period, energy meters installed at HTSC No-751, 752, 754, 788, 753, 808, 728, 755, 690 was replaced with new meters with accuracy class of 0.2s on 08/05/2017, respectively. Details of replacement of energy meter are provided in Section 3.3 of MR. The calibration and maintenance of energy meters is beyond the control of project participant and is sole responsibility of state utility. Replacement of existing energy meter has been considered as project deviation in line with the guidance provided under section 3.6.1 of VCS standard v.3.7. However, it does not impact the existing applicability conditions of the methodology, additionality or the appropriateness of the baseline scenario

2.3 Grouped Project

Not Applicable (as the project is not a grouped project)

2.4 Safeguards

2.4.1 No Net Harm

Being a wind power generation project no negative environmental and socio-economic impacts have happened due to the project activity. Wind power project is green power generation which replaces equivalent amount of electricity from the fossil fuel dominated grid. Hence, there is no net harm from the project activity.

2.4.2 Local Stakeholder Consultation

The Project is already registered with VCS and registered VCS Project Description; sections 5.3 & 5.4 provide the reference for the Local Stakeholder Consultation Process as in-line with VCS requirement.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data/ Parameter	$EF_{Grid,CM,y}$
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ Emission Factor
Source of data	Central Electricity Authority:CO ₂ Emission Database CEA CO ₂ Baseline database Version 11, April 2016
Value applied	0.9777
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{Grid,CM,y} = W_{OM} * OM + W_{BM} * BM$ The following default values should be used for w_{OM} and w_{BM}: For Wind power generation project activities: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ for the selected crediting period Data compiled in CEA CO₂ CDM database is in line with the requirements of "Tool to calculate the emission factor for an electricity system".
Purpose of the data	Calculation of baseline emissions
Comments	The Combined Margin would be calculated ex ante and fixed during the crediting period.

3.2 Data and Parameters Monitored

For the project activity, the following parameters are being monitored on continuous basis:

Data / Parameter	$EG_{Gross,y}$
Data unit	kWh
Description	Gross Electricity export to the grid by the project during the year y
Source of data	From the certified joint meter readings
Description of measurement methods and procedures to be applied	Gross electricity generated by each WTG is recorded with the aid of energy meter for that WTG. The procedures for metering and meter reading will be as per the provisions of the power purchase agreement.
Frequency of monitoring/recording	The parameter will be monitored continuously and recorded at least monthly.

Value monitored	65,837,748
Monitoring equipment	Energy Meter
QA/QC procedures to be applied	QA/QC procedures will be as implemented by TNEB – state government utility. The meters used are calibrated as per once in a year to ensure accuracy of data.
Purpose of the data	Used to calculate baseline emissions
Calculation method	Same as mentioned under the description of measurement methods
Comments	All records relating to the project are kept in a secure and retrievable manner for at least two years after the end of the project crediting period.

Data / Parameter	EG _{net,y}
Data unit	MWh/year
Description	Net electricity supplied to the grid
Source of data	Monthly joint Energy Meter Reading Reports of 9 energy meters covering 9 numbers of WTG
Description of measurement methods and procedures to be applied	Continuous measurement and monthly recording. The monitoring of 'net Electricity supplied to the grid' would be as per the details provided in Power Purchase Agreement signed between the TNEB and project owner. The HTSC No. for the individual or group of turbines represents the unique identification of the joint meter. The net electricity supplied to the grid is calculated by the summation of the net electricity export figures of individual WTGs.
Frequency of monitoring/recording	The parameter will be monitored continuously and recorded at least monthly.
Value monitored	65,487
Monitoring equipment	Energy Meter
QA/QC procedures to be applied	Every month these meter readings will be recorded by TNEB representative and plant personnel. The meters at the substation will be two-way meters and will be in the custody of TNEB. The quantity of net electricity supplied will be cross-verified from the invoice raised on TNEB by the project proponent
Purpose of the data	Used to calculate baseline emissions
Calculation method	Same as mentioned under the description of measurement methods

Comments	All records relating to the project are kept in a secure and retrievable manner for at least two years after the end of the project crediting period.
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Data / Parameter	EG _{import,y}
Data unit	kWh
Description	Electricity imported from the grid by the project during the year y
Source of data	From the certified joint meter readings
Description of measurement methods and procedures to be applied	Calculated as measurement from the energy meters available at the generation points.
Frequency of monitoring/recording	The parameter will be monitored continuously and recorded at least monthly.
Value monitored	351,050
Monitoring equipment	Energy Meter
QA/QC procedures to be applied	The electricity imported by the individual WTG is recorded. The electricity imported is adjusted against the gross export by the project activity to the grid. To be cross-checked with monthly invoices or receipts of payments.
Purpose of the data	Used to calculate baseline emissions
Calculation method	Same as mentioned under the description of measurement methods
Comments	All records relating to the project are kept in a secure and retrievable manner for at least two years after the end of the project crediting period.

3.3 Monitoring Plan

Purpose of monitoring

The purpose of monitoring is to measure the gross electricity exported, net electricity supplied to the grid and the electricity imported from the project activity to verify the emission reductions.

Types of data and information to be reported, including units of measurement

The approved monitoring methodology (AMS-1.D version 18) requires monitoring of the gross electricity exported, net electricity supplied to the grid and the electricity imported from the project activity.

Origin of the data

The source of the data on monitoring parameters is certified joint meter readings.

Metering Equipment

Metering system-Energy Meter for each WTG for metering the exported electricity to the grid and imported electricity from grid system

Data Monitoring:

The data is monitored at the main meter of each WTG.

1. Equipment:

The main meter is an Energy Meter of accuracy class 0.2s. The meters will have capability of recording half-hourly and monthly readings.

2. Meter readings:

The monthly meter readings at the project site and receiving station are taken simultaneously by the site personnel and electricity board personnel every month. A document indicating number of kilo-watt-hours indicated by meter will be prepared and signed by officials of the electricity board and operating Office.

a) Accuracy:

All meters installed at the project site are of 0.2s accuracy class. Each meter is jointly inspected and sealed in the presence of both the parties. The accuracy of monitoring parameter is ensured by adhering to the calibration and testing procedure as described in the QA/QC procedures described for each parameter in Section 3.3 below. The project will adhere to all the mandatory regulatory and statutory requirements at the state as well as national level. The data will be archived for a period of 2 years after the end of the crediting period in the hard copy format.

b) Testing:

All meters are tested for accuracy every year in accordance with the electricity standards. The consumption by equipment's / electricity exported to the grid registered by main meters hold good for purpose of billing as long as errors in main meters are within the permissible limits.

Energy Meter Calibration Details (Please also refer at the ER sheet):

Location Name	Month	Energy Meter - S.No	Make	Accuracy Class	Type	Date of Calibration / Date of replacement*	Delay in meter Calibration in this monitoring period
	HTSC. No						
NSL-1	751	TN902583	Secure	0.2s	E3M025	06-04-2014	01/04/2016 to 08/05/2017
		4321904	Genus	0.2s	03D-183 (DLMS)	08-05-2017	
NSL-2	752	TN902589	Secure	0.2s	E3M025	06-04-2014	01/04/2016 to 08/05/2017
		4321911	Genus	0.2s	03D-183 (DLMS)	08-05-2017	
NSL-3	754	TN902584	Secure	0.2s	E3M025	06-04-2014	01/04/2016 to 08/05/2017
		4321912	Genus	0.2s	03D-183 (DLMS)	08-05-2017	
NSL-4	788	HT2110233	Wallaby	0.2s	MK6E	06-04-2014	01/04/2016 to 08/05/2017
		4321910	Genus	0.2s	03D-183 (DLMS)	08-05-2017	
NSL-5	753	15198077	L&T	0.2s	ER200P	25-11-2015	01/04/2016 to 08/05/2017
		4321907	Genus	0.2s	03D-183 (DLMS)	08-05-2017	
NSL-6	808	HT2110232	Wallaby	0.2s	MK6E	06-04-2014	01/04/2016 to 08/05/2017
		4321909	Genus	0.2s	03D-183 (DLMS)	08-05-2017	
NSL-7	728	TN902590	Secure	0.2s	E3M025	06-04-2014	01/04/2016 to 08/05/2017
		4321903	Genus	0.2s	03D-183 (DLMS)	08-05-2017	
NSL-8	755	TN902591	Secure	0.2s	E3M025	06-04-2014	01/04/2016 to 08/05/2017
		4321905	Genus	0.2s	03D-183 (DLMS)	08-05-2017	
NSL-9	690	TN902592	Secure	0.2s	E3M025	06-04-2014	01/04/2016 to 08/05/2017
		4322619	Genus	0.2s	03D-183 (DLMS)	08-05-2017	

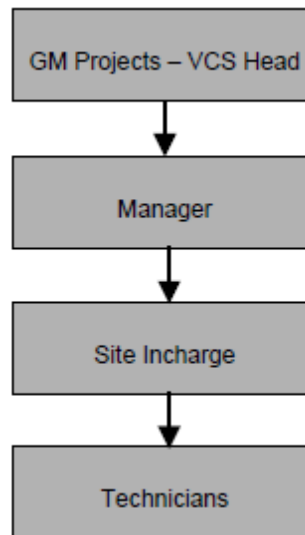
* The date of replacement of the old meters with new meters is to be considered as date of recent meter calibration as the newly installed meters are the calibrated meters and hence their accuracy is valid across the monitoring period from the date of installation.

3. Billing:

A daily generation report is prepared by site personnel. As discussed the meters are capable of storing readings, which is submitted to the state electricity board along with the cumulative meter reading for the wind farm. This is maintained by the state authorities. These readings are used to determine line losses as well as power exported to the grid.

Monitoring roles and responsibilities

The operational and management structure implemented by Windage Power Company (P) LTD (previously known as NSL) is as follows:



The General Manager (GM) manager is the head of the VCS team and would be responsible for coordinating with the manager and ensures that the monitoring is carried out in a transparent and accurate manner. The manager coordinates with the site in charge and the technicians and takes care of all the day to day activities of the plant and is responsible for testing the equipment, billing and archiving the data. The site in charge and the technicians are responsible for recording the operation and downtime hours of the project activity.

The monitoring team is also responsible for the following:

- Overall maintenance of the WTGs
- Calculation of actual creditable emission reduction in the most transparent and relevant manner
- For claims and settlement of electricity payment from the state utility every month
- Renewal of contracts with OEMs, insurance etc
- Periodical meter checking, calibration etc
- Meet the training needs of the personnel other than from the O&M contract at site
- Extracting, checking and Maintenance of data both manual and electronic form and preservation for the entire crediting period
- The authority and responsibility of project overall project coordination in relation to the VCS validation would be with the project proponent.

Procedures for internal audit and Management review:

An internal audit of the project activity would be done on an annual basis by a special audit team. The audit team would comprise competitive persons who would be appointed by the General Manager in charge.

The audit team after the audit would submit their observations to the Manager for his review and necessary action. The Manager would instruct the VCS team to take the required corrective action if any, suggested by the audit team.

Procedures for corrective actions for better future monitoring and reporting:

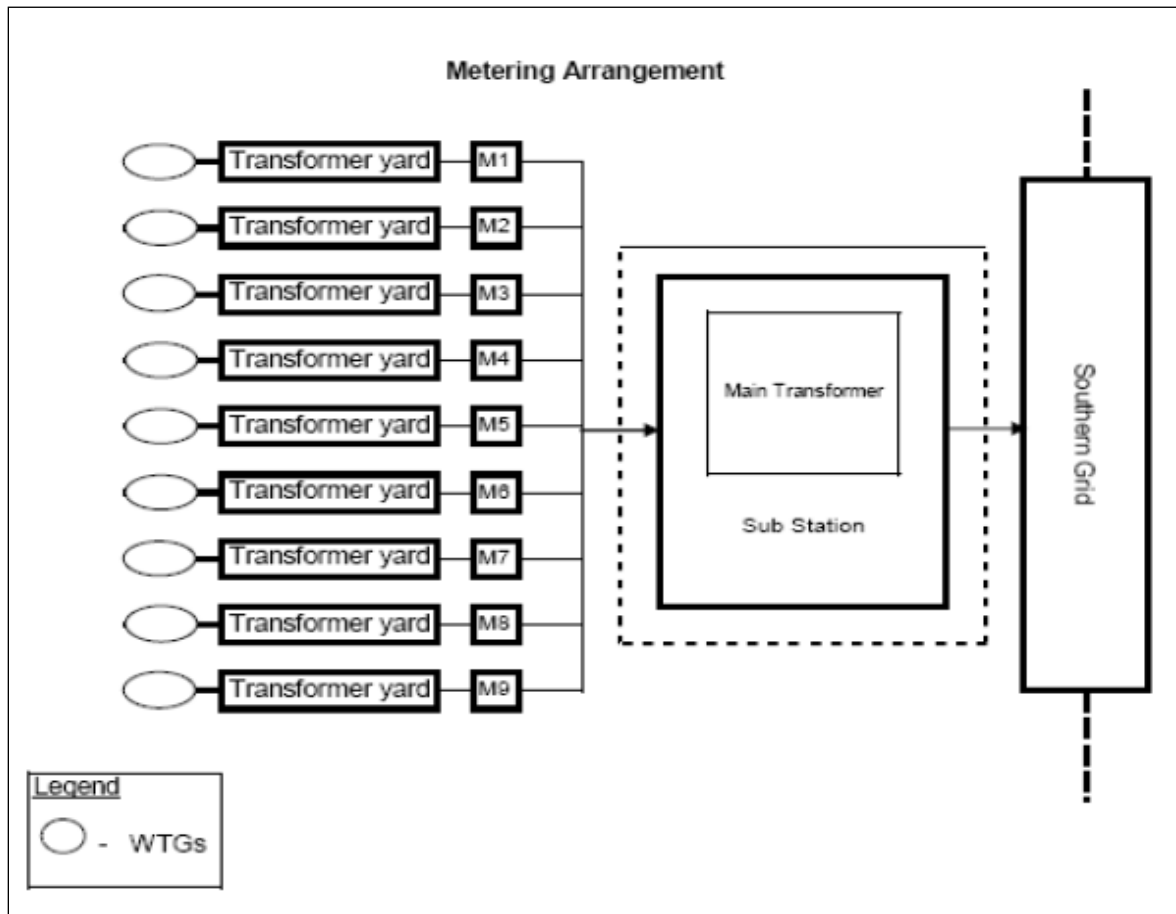
Errors or deviations will be identified during the annual internal audits. The VCS team Head (i.e., General Manager in charge) would take up these matters during the annual VCS team meetings (that normally would happen a few days after internal audit reports are prepared and submitted). The root cause of these errors would be discussed and appropriate action would be taken for better future monitoring and reporting. The corrective actions may include:

- Training of monitoring personnel where ever required
- Replacement or repair of equipment's

Procedures for maintenance of monitoring equipment's:

- The Site Engineer would conduct a physical inspection of all the energy meters once a month
- Any maintenance requirements would be immediately attended
- The energy meters will undergo a preventive maintenance one a year
- The responsibility of maintenance will be with the Site Engineer
- Maintenance history card would be maintained for all energy meters

The schematic diagram of the project activity is as given below:



4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants connected to the Southern Grid that are displaced by the project activity. The Baseline Emissions would be calculated using the formula

$$BE_y = EG_{BL,y} \times EF_{CO_2}$$

Where,

BE_y is Baseline Emissions in year y (tCO₂e/y)

$EG_{BL,y}$ is Energy Baseline in year y , kWh

EF_{CO_2} is CO₂ Emission Factor in year y ; t CO₂ / kWh

Baseline Emissions = 65,487MWh x 0.9777 tCO₂/MWh = 64,026 tonnes of CO₂

4.2 Project Emissions

As per methodology, for wind power projects PEy = 0 tonnes of CO₂

4.3 Leakage

As per the methodology, no leakage is considered from the project activity.

4.4 Net GHG Emission Reductions and Removals

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)
Year 2016 (1 st Apr to 31 st Dec 2016)	29,697	0	0	29,697
Year 2017 (1 st Jan to 31 st Oct 2017)	34,329	0	0	34,329
Total	64,026	0	0	64,026

The comparison of actual ER with estimated ERs as per registered PD has been included under the ER sheet and also provided justification based on facts and information.

APPENDIX I: < POWER EXPORTED AND POWER IMPORTED BY WTGS >

Month	EG Gross, y (Gross Electricity export to the grid by the project during the year y.) (kWh)	EG import, y (Electricity imported from the grid by the project during the year y) (kWh)	EG net, y (Net electricity supplied to the grid)(MWh)	Baseline Emission Factor (tCO2/MWh)	Baseline emissions (tCO2)	Project emissions (tCO2)	Leakage emissions (tCO2)	Emission Reductions (tCO2)
April.16	2,04,830	8,198	196.63	0.9777	192	0	0	192
May.16	18,32,947	23,286	1,809.66	0.9777	1,769	0	0	1,769
Jun.16	40,18,846	11,122	4,007.72	0.9777	3,918	0	0	3,918
Jul.16	13,32,629	501	1,332.13	0.9777	1,302	0	0	1,302
Aug.16	61,09,916	3,707	6,106.21	0.9777	5,970	0	0	5,970
Sep.16	77,29,510	1,924	7,727.59	0.9777	7,555	0	0	7,555
Oct.16	65,51,970	1,122	6,550.85	0.9777	6,405	0	0	6,405
Nov.16	24,88,633	25,571	2,463.06	0.9777	2,408	0	0	2,408
Dec.16	2,32,494	51,743	180.75	0.9777	177	0	0	177
Sub Total	305,01,774	1,27,176	30,375	0.9777	29,697	-	-	29,697
Jan.17	5,09,239	39,419	469.82	0.9777	459	0	0	459
Feb.17	3,87,603	35,954	351.65	0.9777	344	0	0	344
Mar.17	11,35,584	26,411	1,109.17	0.9777	1,084	0	0	1,084
Apr.17	13,27,560	35,351	1,292.21	0.9777	1,263	0	0	1,263
May.17	31,62,083	17,896	3,144.19	0.9777	3,074	0	0	3,074
Jun.17	55,19,980	7,740	5,512.24	0.9777	5,389	0	0	5,389
Jul.17	64,64,360	1,100	6,463.26	0.9777	6,319	0	0	6,319
Aug.17	74,70,060	2,000	7,468.06	0.9777	7,302	0	0	7,302
Sep.17	47,48,760	14,660	4,734.10	0.9777	4,629	0	0	4,629
Oct.17	34,90,120	14,080	3,476.04	0.9777	3,399	0	0	3,399
Nov.17	11,20,624	29,265	1,091.36	0.9777	1,067	0	0	1,067
Sub Total	353,35,974	2,23,875	35,112	0.9777	34,329	-	-	34,329
Grand Total	658,37,748	3,51,050	65,487		64,026	-	-	64,026

Please note that the last month of this VCS monitoring period shows as "Nov 2017" which actually accounts only the data ending as on 31st Oct 2017. This is because, as per prevailing practice in Tamil Nadu the reading period accounted in JMR is not consistent with the start and end dates of the month. Please refer to the ER calculation sheet for detailed calculation.