MONITORING REPORT
VERSION 02 25/07/2012

Savita Oil Technologies Limited

Project Title	Bundled Wind Power generation project by Savita Oil Technologies Ltd., India
Version	02
Report ID	*Identification number of this document*
Date of Issue	25/07/2012
Project ID	CDM Reference Number: 5485
Monitoring Period	18/03/2010 to 31/12/2011 (first and last days inclusive)
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1 PROJECT DETAILS

1.1 Summary Description of Project

The project activity is the generation of electricity from wind power by installation of 3 nos. 1.25 MW Wind Turbine Generators (WTGs) of Suzlon make in Sadawaghapur forest site in Satara district of Maharashtra and 3 nos. 1.5 MW Wind Turbine Generators (WTGs) of Regen make at Thadichery & Koduvilarpatti site in Theni district of Tamil Nadu. The total installed capacity of the project is 8.25 MW. The purpose of the project is to produce power from clean source and to reduce the dependence on fossil fuels for energy requirements. Project proponent has signed a power purchase agreement (PPA) with "Maharashtra State Electricity Distribution Company Limited" (MSEDCL) for the WTGs in Maharashtra and "Tamil Nadu Electricity Board" (TNEB) for the WTGs in Tamil Nadu to export the electricity to local grid. The project displaces electricity from the grid (North East West North East (NEWNE) grid in Maharashtra and South grid in Tamil Nadu). This helps in significant reduction of GHG emissions as the Grid is mostly dependent on fossil fuel generated electricity.

The details of the WTG and their commissioning details are as follows:

State	Location No.	Model/Type	Capacity (MW)	Date of Commissioning
Maharashtra	S – 40	S-66	1.25	30/03/2010
	S – 63	S-66	1.25	30/03/2010
	S – 64	S-66	1.25	30/03/2010
Tamil Nadu	T45	Vensys 77	1.5	18/03/2010
	T46	Vensys 77	1.5	18/03/2010
	T75	Vensys 77	1.5	29/03/2010

Technology Employed

The project activity is a greenfield project for generation of electrical energy using wind which is a renewable source of energy. Thus, this project displaces electricity from the grid, which is essentially fossil-fuel based.

In wind energy generation, kinetic energy of the wind is converted into mechanical energy and subsequently into electrical energy. Wind turbines capture the wind's energy with three blades, which are mounted on a rotor, to generate electricity. The turbines sit high atop towers, taking advantage of the stronger and less turbulent wind. As the wind blows through the blades of the windmill, a pocket of low-pressure air forms on the downwind side of the blade. The low-pressure air pocket then pulls the blade towards it, causing the rotor to spin. The rotor turns the shaft that further spins the connected generator. The spinning of this generator produces the required

electricity. Since power is generated from wind energy, no emissions are attributed to the project emissions and emissions due to fossil-fuel dominated grid power has been displaced due to the project activity.

The salient features of the technology utilized are:

Parameter	Maharashtra - Suzlon	Tamil Nadu - Regen
Rated Power	1250 kW	1,500 kW
Rotor diameter	66 m	76.84 m
Swept area	3421 m^2	4634 m^2
No. of blades	3	3
Cut in wind speed	3.0 m/s	3.0 m/s
Cut out wind Speed	22 m/s	22 m/s
Rotor Speed	20.30 rpm	Variable, 9-17.3 rpm
Hub Height	74.5 m	85 m
Insulation	Class H	Class F
Generator Type	Asynchronous generator	Synchronous, Variable speed

1.2 Sectoral Scope and Project Type

As per the UNFCCC CDM Guidelines, the project activity belongs to:

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

1.3 Project Proponent

The project proponent details are:

Mr. Chandrakant L. Kale

President – Renewable Energy

Savita Oil Technologies Limited

66/67 Nariman Bhavan,

Nariman Point, Mumbai- 400 016

Maharashtra, India

Tel No.: +91 22 2288 3061, Email: clkale@savita.com

1.4 Other Entities Involved in the Project

There are no other entities involved in the Project.

1.5 Project Start Date

As per the VCS Standard, Version 3, dated 8th March 2011, the start date of the project activity is defined as the "the date on which the project began reducing or removing GHG emissions". For this project activity, the start date of the project activity was 18/03/2010, which is the date of commissioning of the first WTG.

1.6 Project Crediting Period

The crediting period of the project activity is from 18/03/2010 to 31/12/2011 (first and last days included).

Total number of years: 1.79 years i.e. 654 days

1.7 Project Location

1. Village : Sadawaghapur

   Taluka : Patan

   District: Satara

   State : Maharashtra

   Country: India

The co-ordinates are:

WTG	Latitude (N)	Longitude (E)
S – 40	17°24'00"	73°56'18"
S – 63	17°25'16.8"	73°55'33.6"
S – 64	17°25'22.8"	73°55'40.2"

2. Village : Thadichery & Koduvilarpatti

   Taluka: Theni

   District: Theni

   State : Tamil Nadu

Country: India

The co-ordinates are:

WTG	Latitude (N)	Longitude (E)
T45	9°56'38.06"	77°27'54.78"
T46	9°56'44.20"	77°27'37.70"
T75	9°56'42.78"	77°29'39"

1.8 Title and Reference of Methodology

The name of the approved baseline methodology, as per the UNFCCC CDM guidelines, applied to the project activity is: "Grid connected renewable electricity generation", AMS.I.D, Version 16, EB 54.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The Project has been completed as planned and described in the registered CDM PDD.

The purpose of the project is to generate electricity by wind energy which is clean form of energy. After the project activity has been commissioned, project proponent has not made any changes in the project boundary.

State	Location No.	Meter No.	Accuracy	Substation	Feeder Name/No.	Date of Commissioning
Maharashtra	S – 40	04961755	0.2	Sadawaghapur	Feeder 03	30/03/2010
	S – 63	04961761		Sadawaghapur	Feeder 04	30/03/2010
	S – 64			Sadawaghapur	Feeder 04	30/03/2010
Tamil Nadu	T45	TNB 04537	0.5	Theni	-	18/03/2010
	T46	TNB 04534		Theni		18/03/2010
	T75	TNB 04517		Theni		29/03/2010

Meter Details for the Sub-station at Sadawaghapur, Maharashtra

Feeder	Meter	Meter Number
03	Main meter	04961755
	Check meter	04939180
04	Main meter	04961761
	Check meter	04961757

Monitoring at Maharashtra

The Project is operated and managed by Suzlon in Maharashtra. All the WTGs are connected & captured in a digital system located at that site only. The daily generation reports are made available to SOTL by the O&M service providers. SOTL has the overall responsibility for collating the monitored data received from all the three locations.

A particular feeder may comprise of WTGs belonging to owners other than SOTL but belonging to the same O&M service provider. At the MSEDCL sub-station, the total export & import to this feeder is monitored using the main meter & the check meter, which are electronic trivector meters. The total export at this meter is generally arrived at by multiplying the monthly meter reading to the multiplying factor of the meter concerned. The monthly meter reading is arrived at as the difference between the current meter reading and the previous meter reading. The period between these two readings is usually a period of 30 days which may vary. In a similar fashion, total import at this meter is also calculated. Hence, net electricity export is calculated as the difference between total export and total import at the meter. Additionally, MSEDCL receives daily export & import figures for each WTG from the O&M service provider with the help of which it calculates the electricity export by each WTG at the WTG controller. The WTG controller is located within the WTG assembly itself. It then arrives at the export value of each WTG by apportioning the reading of the main/check meter in the same ratio at which each of the WTG had exported electricity. The formula applied on each WTG of a particular feeder is as follows:

Export of WTG to Grid

= (% generation of individual WTG connected to feeder) x (Net Electricity Export @ MSEDCL meter for the feeder)

where, % generation of individual WTG connected to feeder

= (Controller reading @ Individual WTG)/(Sum of Controller reading of all WTGs connected on feeder)

Net Electricity Export @ MSEDCL meter for the feeder is obtained from the electricity export and electricity import readings recorded by the bi-directional energy meters located at the sub-station. At the time of commissioning of the WTGs, the Sadawaghapur substation was under construction

and hence the WTGs were connected to the Atit substation. However, after the completion of the construction, the WTGs were shifted from Atit substation to the Sadawaghapur substation[1].

The electricity export reports are generated by MSEDCL on credit notes and sent to SOTL through the O&M service provider on a monthly basis. Thus, to further elaborate, it may be said, that every month, SOTL receives credit notes from MSEDCL for all its WTGs from the O&M service provider. Some of the information mentioned in the credit notes is as follows:

1. Current meter reading of total export of the concerned feeder
2. Previous meter reading of total export of the concerned feeder
3. Current meter reading of total import of the concerned feeder
4. Previous meter reading of total import of the concerned feeder
5. Multiplying factor of meter
6. % generation of individual WTG connected to meter

Upon receipt of these reports, SOTL generates invoices on sale of electricity and sends to MSEDCL. Thereafter MSEDCL makes payments against the invoices.

Monitoring at Tamil Nadu

The Project is operated and managed by M/s Regen Powertech Pvt. Ltd. (RPPL) in Tamil Nadu. RPPL has provided panel meter on each WTG panel where the daily generation is monitored by the O&M service provider. Daily meter reading on panel is taken by site-in-charge or personnel from O&M contractor. Meter reading is noted electronically.

However, Tamil Nadu Electricity Board (TNEB) have installed TNEB owned electronic tri-vector meters (Main meters) at each WTG transformer yard where the export and import of electrical energy is metered and the readings are taken by TNEB officials in presence of site-in-charge once in a month. The net energy generated from the specific WTG is calculated as a difference between electricity export and import values of the recording meter. These export/import values are obtained by multiplying the export/import readings of the recording meter with the multiplying factor of the recording meter. Monthly TNEB statement of net generation is provided to Savita Oil Technologies Limited (SOTL) on the basis of which invoices are raised.

The project owner uses the electricity generation statements sent by respective state electricity board for respective the WTGs at different locations. The cumulative power supplied to grids is tabulated and multiplied by respective Grid Emission Factor to calculate number of CERs.

The summary of the shut down times during the current monitoring period for the project activity is as below:

Sadawaghapur Site, Maharashtra

[1] The supporting document has been provided to the DOE for verification.

WTG	Date	Breakdown time (hrs:min:sec)	Remarks
S – 40	06/04/2010	17:06:00	Project work
S – 40	23/07/2010	24:00:00	Grid down from EB
S – 63	23/07/2010	24:00:00	Grid down from EB
S – 64	23/07/2010	24:00:00	Grid down from EB
S – 40	24/07/2010	24:00:00	Grid down from EB
S – 63	24/07/2010	24:00:00	Grid down from EB
S – 64	24/07/2010	24:00:00	Grid down from EB
S – 64	19/09/2010	23:42:00	Pitch_Freq Conv, Pitch 3_Err Stop

Theni Site, Tamil Nadu

WTG	Date	Breakdown time (hrs:min:sec)	Remarks
T 45	22/04/2010	24:00:00	External grid failure
T 46	22/04/2010	24:00:00	External grid failure
T 46	01/05/2011	23:50:00	External grid shutdown taken by Theni Sub-station for load shedding; Error wind anemometer
T 75	15/06/2011	24:00:00	Error converter grid monitoring; External grid shutdown taken by Theni Sub-station for load shedding
T 45	12/07/2011	24:00:00	Transformer Fault rectification work

2.2 Deviations from the Monitoring Plan

The project activity has been implemented as described in the registered CDM PDD and there have been no deviations in the monitoring plan.

2.3 Grouped Project

This is not a Grouped Project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	$EF_{NEWNE,CM,y}$

Data unit:	tCO_2/MWh
Description:	Combined Margin Grid emission factor for NEWNE grid
Source of data:	CEA website Version :05 (Valid from 1st November 2009)
Value applied:	0.9224
Purpose of the data:	As required by the methodology AMS-I.D data from the official source need to be used for the calculation of emission factor and emission reduction. To meet this requirement here, emission factor is calculated using $EF_{Grid,OM}$ and $EF_{Grid,BM}$. Following formula is used in calculation $EF_{NEWNE,CM,y} = 0.75 \times EF_{NEWNE,OM,y} + 0.25 \times EF_{NEWNE,BM,y}$
Any comment:	Data will be kept for crediting period + 2 Years.

Data Unit / Parameter:	$EF_{South,CM,y}$
Data unit:	tCO_2/MWh
Description:	Combined Margin Grid emission factor for South Grid
Source of data:	CEA website Version :05 (Valid from 1st November 2009)
Value applied:	0.9445
Purpose of the data:	As required by the methodology AMS-I.D data from the official source need to be used for the calculation of emission factor and emission reduction. To meet this requirement here, emission factor is calculated using $EF_{Grid,OM}$ and $EF_{Grid,BM}$. Following formula is used in calculation $EF_{South,CM,y} = 0.75 \times EF_{South,OM,y} + 0.25 \times EF_{South,BM,y}$
Any comment:	Data will be kept for crediting period + 2 Years.

Data Unit / Parameter:	$EF_{NEWNE,OM,y}$
Data unit:	tCO_2/MWh
Description:	Weighted average of 3 years (2006-07, 2007-08, 2008-09) CO_2 Operating Margin emission factor of the NEWNE grid
Source of data:	CEA website Version :05 (Valid from 1st November 2009)
Value applied:	1.0049
Purpose of the data:	As required by the applied methodology AMS-I.D data from the

	official source need to be used for the calculation of emission factor and emission reduction. To meet this requirement here, emission factor is calculated by taking generation based weighted average OM of last three years from officially published by Central Electricity Authority, Government of India.
Any comment:	Data will be kept for crediting period + 2 Years.

Data Unit / Parameter:	$EF_{South,OM,y}$
Data unit:	tCO_2/MWh
Description:	Weighted average of 3 years (2006-07, 2007-08, 2008-09) CO_2 Operating Margin emission factor of the South grid
Source of data:	CEA website Version :05 (Valid from 1st November 2009)
Value applied:	0.9868
Purpose of the data:	As required by the applied methodology AMS-I.D data from the official source need to be used for the calculation of emission factor and emission reduction. To meet this requirement here, emission factor is calculated by taking generation based weighted average OM of last three years from officially published by Central Electricity Authority, Government of India.
Any comment:	Data will be kept for crediting period + 2 Years.

Data Unit / Parameter:	$EF_{NEWNE,BM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 Built Margin emission factor of the NEWNE grid
Source of data:	CEA website Version :05 (Valid from 1st November 2009)
Value applied:	0.6752
Purpose of the data:	As required by the methodology AMS-I.D data from the official source need to be used for the calculation of emission factor and emission reduction. To meet this requirement here, emission factor is estimated and officially published by Central Electricity Authority, Government of India.
Any comment:	Data will be kept for crediting period + 2 Years.

Data Unit / Parameter:	$EF_{South,BM,y}$

Data unit:	tCO_2/MWh
Description:	CO_2 Built Margin emission factor of the South grid
Source of data:	CEA website Version :05 (Valid from 1st November 2009)
Value applied:	0.8179
Purpose of the data:	As required by the methodology AMS-I.D data from the official source need to be used for the calculation of emission factor and emission reduction. To meet this requirement here, emission factor is estimated and officially published by Central Electricity Authority, Government of India.
Any comment:	Data will be kept for crediting period + 2 Years.

Data Unit / Parameter:	w_{OM}
Data unit:	Dimensionless
Description:	Weightage for Operating Margin
Source of data:	Tool to calculate the emission factor for an electricity system. (Version 02.2.1)
Value applied:	0.75
Purpose of the data:	As required by the Tool to calculate the emission factor for an electricity system. (Version 02.2.1)
Any comment:	Data will be kept for crediting period + 2 years

Data Unit / Parameter:	w_{BM}
Data unit:	Dimensionless
Description:	Weightage for Build Margin
Source of data:	Tool to calculate the emission factor for an electricity system. (Version 02.2.1)
Value applied:	0.25
Purpose of the data:	As per the Tool to calculate the emission factor for an electricity system. (Version 02.2.1)
Any comment:	Data will be kept for crediting period + 2 years

3.2 Data and Parameters Monitored

<table>
<tr><td>Data Unit / Parameter:</td><td>$EG_{y,Mah}$</td></tr>
<tr><td>Data unit:</td><td>MWh/year</td></tr>
<tr><td>Description:</td><td>Net electricity exported to grid</td></tr>
<tr><td>Source of data:</td><td>Electricity generation statements</td></tr>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>Monitoring: Monitored through the meter readings from bi-directional main meter (electronic tri-vector meter) capable of monitoring electricity export and electricity import. Meter shall be located at sub-station. Meter accuracy class 0.2.

Data type: Measured & Calculated

Archiving: Electronic

Recording Frequency: Continuous monitoring, hourly measurement and at least monthly recording

Responsibility: The site-in-charge shall be responsible for the regular recording of data.

Calibration Frequency: The meters shall be calibrated annually

Calibration details:
<table>
<tr><th>Location No.</th><th>Meter No.</th><th>Substation Feeder No.</th><th>Date of calibration</th></tr>
<tr><td>S – 40</td><td rowspan="3">04961759</td><td rowspan="3">Atit Feeder 01</td><td rowspan="3">30/12/2009</td></tr>
<tr><td>S – 63</td></tr>
<tr><td>S – 64</td></tr>
<tr><td rowspan="3">S – 40</td><td rowspan="3">04961755</td><td rowspan="3">Sadawaghapur Feeder 03</td><td>30/03/2010</td></tr>
<tr><td>08/09/2010</td></tr>
<tr><td>19/05/2011</td></tr>
<tr><td rowspan="2">S – 63</td><td rowspan="3">04961761</td><td rowspan="3">Sadawaghapur Feeder 04</td><td>15/03/2010</td></tr>
<tr><td rowspan="2">S – 64</td><td>08/09/2010</td></tr>
<tr><td>19/05/2011</td></tr>
</table></td></tr>
<tr><td>Frequency of monitoring/recording:</td><td>Continuous monitoring, hourly measurement and at least monthly recording</td></tr>
</table>

Value monitored:	12227.57
Monitoring equipment:	Electrical Energy Meters which are electronic tri-vector meters of accuracy class 0.2 (Main & Check meters)
QA/QC procedures to be applied:	Meter calibration shall be conducted annually in Maharashtra and internal audit system is in place as mentioned in Section B.7.2. Measurement results shall be cross checked with records for sold/purchased electricity (e.g., invoices/receipts)
Calculation method:	As described in section 2.1 of this document
Any comment:	**Data archived:** 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 Unit / Parameter:	$EG_{y,TN}$
Data unit:	MWh/year
Description:	Net electricity exported to grid
Source of data:	Electricity generation statements
Description of measurement methods and procedures to be applied:	Monitoring: Monitored through the meter readings from bi-directional main meter (electronic tri-vector meter) capable of monitoring electricity export and electricity import. Meter accuracy class 0.5 Data type: Measured & Calculated Archiving: Electronic Recording Frequency: Continuous monitoring, hourly measurement and at least monthly recording Responsibility: The site-in-charge shall be responsible for the regular recording of data. Calibration Frequency: The meters shall be calibrated once every three years. Calibration Details:
Frequency of monitoring/recording:	Continuous monitoring, hourly measurement and at least monthly recording

Location No.	Meter No.	Substation	Date of calibration
T45	TNB 04537	Theni	27/03/2011
T46	TNB 04534		
T75	TNB 04517		

Value monitored:	19923.82
Monitoring equipment:	Electrical Energy Meters which are electronic tri-vector meters of accuracy class 0.5
QA/QC procedures to be applied:	Meter calibration shall be conducted once every three years in Tamil Nadu and internal audit system is in place as mentioned in Section B.7.2. Measurement results shall be cross checked with records for sold/purchased electricity (e.g., invoices/receipts)
Calculation method:	As described in section 2.1 of this document
Any comment:	**Data archived:** 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.

3.3 Description of the Monitoring Plan

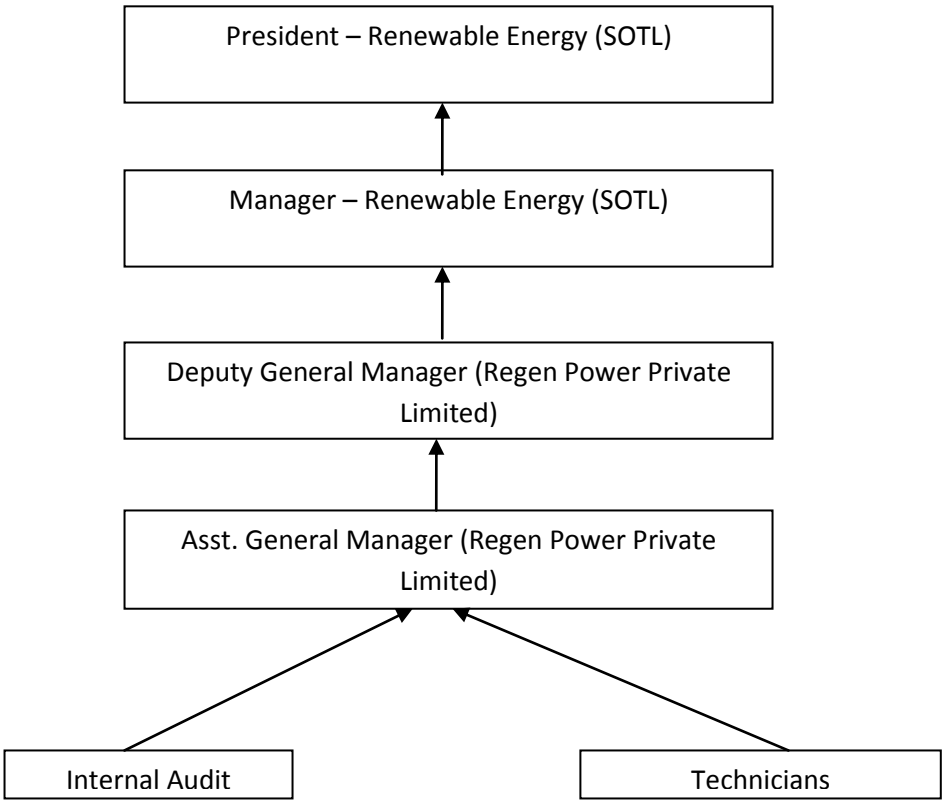
The project activity is in accordance with approved small scale methodology AMS I.D, and therefore, can use the monitoring methodology for type I.D of 'Appendix B of the simplified M&P for small-scale CDM project activities-Version 16, - Grid connected renewable electricity generation.

The monitoring methodology specified in the methodology requires that the project-monitoring plan to consist of metering the electricity generated by the renewable technology. 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 baseline, the monitoring of baseline emission factor is not required. The sole parameter for monitoring is the electricity exported to the grid.

Monitoring at Tamil Nadu

The Project is operated and managed by M/s Regen Powertech Pvt. Ltd. (RPPL) in Tamil Nadu. The operational and management structure implemented by RPPL is as follows:



RPPL has provided panel meter on each WTG panel where the daily generation is monitored by the O&M service provider. Daily meter reading on panel is be taken by site-in-charge or personnel from O&M contractor. Meter reading is noted electronically.

However, Tamil Nadu Electricity Board (TNEB) have installed TNEB owned electronic tri-vector meters (Main meters) at each WTG transformer yard where the export and import of electrical energy is metered and the readings are taken by TNEB officials in presence of site-in-charge once in a month. The net energy generated from the specific WTG is calculated as a difference between electricity export and import values of the recording meter. These export/import values are obtained by multiplying the export/import readings of the recording meter with the multiplying factor of the recording meter. Monthly TNEB statement of net generation is provided to SOTL on the basis of which invoices are raised.

Main meters are calibrated at least once in three years as per the CEA Metering Regulations 2006.

The performance of the machines is monitored through:

1. Electric meters: Daily generation is monitored on panel meter provided on the WTG panel
2. Main meter by TNEB for recording the actual generation.

Daily Report: Daily report is generated and sent to SOTL by O&M service provider. Report consists of number of units produced, generation hours, grid and machine availability hours, and details of downtime due to machine/grid.

Internal audits & Performance review

The records are regularly audited and checked by the senior officials from project proponent on an annual basis. The officials monitor the actual emission reduction. The personnel responsible for taking readings at site are adequately trained.

Emergency Preparedness

In the context of the project activity, the main meters are kept in sealed by TNEB and all maintenance is taken up by TNEB only. With reference to clause (4) of the Article 4 of the Energy Purchase agreement as provided below:

"(4) The State Transmission Utility/Distribution Licensee may provide Check Meters of the same specification as Main meters", the project proponents have not opted for check meters. Further, it may please be noted as per clause (8) and (9) of Article 4 of the Energy Purchase agreement:

"(8) Check meter readings shall be considered when Main Meters are found to be defective or stopped. Provided that, if difference between the readings of main and check meters vis-à-vis main meter reading exceeds twice the Percentage error applicable to the relevant class, both meters shall be tested and the one found defective shall be immediately replaced and reading of other will be considered.

(9) If during test or calibration, both the main meter and check meter are found to have errors beyond permissible limits, the bill shall be revised for the previous 3 (Three) months or the exact period if known and agreed upon by the parties, by applying correction as determined by the meter testing Wing of the STU/Distribution Licensee to the consumption registered by the meter with lesser error."

Hence, in case of failure of the main meter clause (9) of Article 4 of the Energy Purchase agreement will come into effect and the generation would be accordingly calculated and approved by the meter testing Wing of the State Transmission Utility/Distribution Licensee.

In continuation to the above clause, the correction would be taken in accordance with Clause (viii) of the Circular dated 06/01/1993 issued by the Chief Engineer, TNEB, which states:

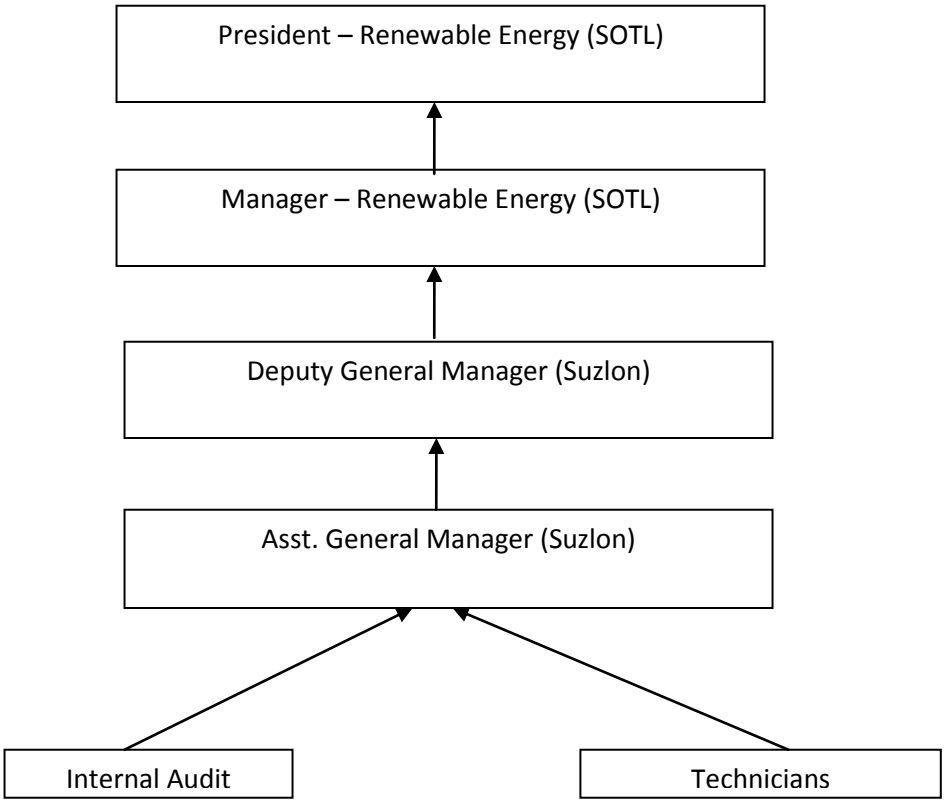
"During the defective period of the meters, the units generated can be computed based on the units recorded in the panel of the windmill and by comparison with the nearby windmill generator."

The actual generation record (both at the panel meter and the TNEB main meter) for the period 18/03/2010 to 10/11/2010 suggests a difference of only 0.21% between the panel meter & the TNEB main meters. The deviation is lower than the error margin of the TNEB main meter (0.5% as already mentioned in Section B.7.1 above). Hence, in order to introduce conservativeness & uniformity, any generation recorded as per the Clause (viii) would be subjected to a discount of 0.5% during the crediting period. It may be please noted that such discounting is also in line with paragraph 4(a) of the "*Guidelines for assessing compliance with the calibration frequency requirements, Version 01, EB 52*."

The project promoters have contracted the technology supplier for providing O&M services for the power project. The service provider would be responsible for maintenance of the necessary spare parts and consumables for the maintenance of the WTGs such as anemometers, wind vanes and sensors, oil filters, batteries, auxiliary motors and pumps, WTG controllers, slip rings, limit switches and sensors, detergents & solvents etc. The service provider would also be responsible for supply of necessary main components of the WTG such as main gearboxes, blades, generators, towers, hubs, main shafts & bearings, ground and top controller and hydraulic systems. The service provider would also ensure that occupational health and safety procedures are adhered to during the operation & maintenance activities. Additionally, spare meters would also be kept available at the site for replacement in case of failure of any of the monitoring equipment.

Monitoring at Maharashtra

The Project is operated and managed by Suzlon in Maharashtra. The operational and management structure implemented by Suzlon is as follows:



All the WTGs are connected & captured in a digital system located at that site only. The daily generation reports are made available to SOTL by the O&M service providers. SOTL has the overall responsibility for collating the monitored data received from all the three locations. Any failure in the WTG, including in its monitoring system, will trigger the interlocking circuit which will stop generation of electricity immediately.

A particular feeder may comprise of WTGs belonging to owners other than SOTL but belonging to the same O&M service provider. At the MSEDCL sub-station, the total export & import to this feeder is monitored using the main meter & the check meter, which are electronic trivector meters. The total export at this meter is generally arrived at by multiplying the monthly meter reading to the multiplying factor of the meter concerned. The monthly meter reading is arrived at as the difference between the current meter reading and the previous meter reading. The period between these two readings is usually a period of 30 days which may vary. In a similar fashion, total import at this meter is also calculated. Hence, net electricity export is calculated as the difference between total export and total import at the meter. Additionally, MSEDCL receives daily export & import figures for each WTG from the O&M service provider with the help of which it calculates the electricity export by each WTG at the WTG controller. The WTG controller is located within the WTG assembly itself. It then arrives at the export value of each WTG by apportioning the reading of the main/check meter in the same ratio at which each of the WTG had exported electricity. The formula applied on each WTG of a particular feeder is as follows:

Export of WTG to Grid

= (% generation of individual WTG connected to feeder) x (Net Electricity Export @ MSEDCL meter for the feeder)

where, % generation of individual WTG connected to feeder

= (Controller reading @ Individual WTG)/(Sum of Controller reading of all WTGs connected on feeder)

Net Electricity Export @ MSEDCL meter for the feeder is obtained from the electricity export and electricity import readings recorded by the bi-directional energy meters located at the sub-station. After the commissioning of the WTGs, the substation was changed from Atit substation to the Sadawaghapur substation[2].

The electricity export reports are generated by MSEDCL on credit notes and sent to SOTL through the O&M service provider on a monthly basis. Thus, to further elaborate, it may be said, that every month, SOTL receives credit notes from MSEDCL for all its WTGs from the O&M service provider. Some of the information mentioned in the credit notes is as follows:

1. Current meter reading of total export of the concerned feeder
2. Previous meter reading of total export of the concerned feeder
3. Current meter reading of total import of the concerned feeder
4. Previous meter reading of total import of the concerned feeder
5. Multiplying factor of meter
6. % generation of individual WTG connected to meter

Upon receipt of these reports, SOTL generates invoices on sale of electricity and sends to MSEDCL. Thereafter MSEDCL makes payments against the invoices.

SOTL is overall responsible for storing and archiving data as well as the preparation of monitoring report and communicate with EB of UNFCCC for project performance, registration and verification of the CDM project activity.

Internal audits & Performance review

The records are regularly audited and checked by the senior officials from project proponent on an annual basis. The officials will monitor the actual emission reduction. The site in-charge will be responsible for taking readings at site.

Emergency Preparedness

Incase if monitoring meter failure errors, the grid officials would immediately replace the meter with a calibrated meter. There are two meters provided at each feeder: a Main Meter and a Check

[2] The supporting document has been provided to the DOE for verification.

Meter. In case of failure of the meters, generation will be calculated based on the corresponding norms (Section 11.02 [c], [d] & [e]) as laid down in the Power Purchase Agreement:

"*[c] If during testing, both the Main and Check Meter are found within the permissible limit of error i.e. 0.5%, the energy consumption will be as per the Main Meter. If during test, any of the Main Meters is found to be within the permissible limits of error but the corresponding Check Meter is beyond the permissible limit; the energy consumption will be as per the Main Meter. The Check Meter shall be calibrated immediately.*

If during the tests, the Main Meter is found to be beyond the permissible limits of error, but the corresponding Check Meter is found to be within the permissible limits of error, then the energy consumption for the month to-date and time of such test shall be in accordance with Check Meter. The Main Meter shall be calibrated immediately and the energy for the period thereafter 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 0.5%, all the meters shall be re-tested and calibrated immediately by MSEDCL, at the Seller's[3] *cost.*

[e] The correction required as per the result of the testing will be applied to the generation and consumption of energy for the period from last meter reading to the time of such test checks. Energy for the periods thereafter shall be in accordance with the calibrated Main Meter."

The O&M service provider would be responsible for maintenance of the necessary spare parts and consumables for the maintenance of the WTGs such as anemometers, wind vanes and sensors, oil filters, batteries, auxiliary motors and pumps, WTG controllers, slip rings, limit switches and sensors, detergents & solvents etc. The service provider would also be responsible for supply of necessary main components of the WTG such as main gearboxes, blades, generators, towers, hubs, main shafts & bearings, ground and top controller and hydraulic systems. The service provider would also ensure that occupational health and safety procedures are adhered to during the operation & maintenance activities. Additionally, spare meters would also be kept available at the site for replacement in case of failure of any of the monitoring equipments.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The baseline emissions are to be calculated using the following formula

Baseline Emissions = $EG_{y,Mah} \times EF_{NEWNE,CM,y} + EG_{y,TN} \times EF_{South,CM,y}$

[3] "Seller" refers to the project proponent as per the Power Purchase Agreement

As per the CDM PDD, the baseline emissions factor which is 0.9224 tCO_2/MWh for Maharashtra (=$EF_{NEWNE,CM,y}$) and 0.9445 tCO_2/MWh for Tamil Nadu (=$EF_{South,CM,y}$).

The net export from the project activity is:

a) 12227.57 MWh for Maharashtra

b) 19923.82 MWh for Tamil Nadu

Hence BE_y = 0.9224 x 12227.57 + 0.9445 x 19923.82 = 11278 + 18818 = 30096 tCO_2

Vintage period	Tamil Nadu	Maharashtra	Overall
March 2010-Dec 2010	9290.121	4501	13791.12
Jan 2011-Dec 2011	9527.927	6777.77	16305.6
			30096.72

Thus the emission reduction achieved for the complete monitoring period is 30096.

4.2 Project Emissions

The project uses wind energy only for power generation which leads to zero net GHG on-site emissions. Hence there is no net emission within the project boundary.

Hence, PE_y= 0.

4.3 Leakage

The project proponents have identified no anthropogenic greenhouse gases by sources outside the project boundary that are significant, measurable and attributable to the project activity. Hence, no leakage is considered from the project activity.

LE_y = 0

4.4 Summary of GHG Emission Reductions and Removals

The emission reductions are calculated as per the equation:

$ER = BE_y – PE_y – LE_y$

ER – Emission Reduction (tCO_2/year)

BE_y - Baseline Emissions (tCO_2/year)

PE_y – Project Emissions (tCO_2/year)

LE_y - Leakage Emissions (tCO_2/year)

$ER = BE_y – PE_y – LE_y$

= 30,096 – 0 – 0

= 30,096 tCO_2e

The ex-ante estimated for the complete monitoring period is 27356 tCO_2 as against 30096 tCO_2 achieved during the monitoring period. The explanation is given below.

5 ADDITIONAL INFORMATION

The ex-ante estimated for the complete monitoring period is 27356 tCO_2 as against 30096 tCO_2 achieved during the monitoring period. The reason being that the wind is a variable factor and not in the hand of the project participant.

Moreover, as per Para 5(d) of Annex 67 EB48 the IRR analysis is not required for the parameter which is not under the control of PP. However, PP has still carried out the additionality test (increase in generation) to check the viability of the project.
In the state of Tamil-Nadu increase of generation does not affect the viability of the project as IRR is well within the range of sensitivity. However, in the state of Maharashtra the IRR slightly crosses the benchmark (i.e. 11.02% as against 11%) however, within the sensitivity range. The increase in generation is 6.5% higher than the estimated PLF. This is due to the fact that the project additionality is demonstrated based on 20 years during registration and it is not appropriate to conclude the project viability based on one year and 289 days data. Thus it can be concluded that the calculated ER is correct and accurate.