

REVISED MONITORING PLAN

15 MW grid-connected wind power project by MMTC in Karnataka

UNFCCC Registration No. 1797

Registration Date: 20th February 2009

PDD Version: 4

PDD Date: 31st October 2008

Methodology: AMS ID

Methodology Version: 11

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

According to AMS I D, for this project the parameters that needs to be monitored is the electricity generation and the baseline emission factor which is calculated ex post.

a) E_{Gy}

Data / Parameter:	E _{Gy}
Data unit:	MWh
Description:	Net Electricity supplied to the grid by the WEG project in year y (MWh).
Source of data to be used:	JMR Sheets/measurement records of the EPC (<u>Engineering, Procurement, and Construction</u>) contractor.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	30375 MWh
Description of measurement methods and procedures to be applied:	<ul style="list-style-type: none">- Calculated from the measured readings of electricity exported and imported by energy meters of accuracy class 0.2, both by the operator and the grid representative- In case other than the project WEGs jointly metered at MRS, the net electricity will be calculated based on apportioning- The data for export and import of electricity is measured hourly and recorded monthly- The net electricity that is delivered is calculated after deduction of transmission line losses¹- 100% of the data is monitored- The data will be archived electronically
QA/QC procedures to be applied:	The electricity meters record both export and import of electricity from the WEGs and the net electricity generated will be used for calculation of Emission reductions. The two meters (main and check) would be checked for accuracy and calibrated annually.
Any comment:	

b) E_{Gy(import)}

Data / Parameter:	E _{Gy(import)}
--------------------------	-------------------------

¹ The details of the calculation of the transmission line loss are given in Appendix I to Annex 4.

Data unit:	MWh
Description:	Electricity imported by the project in year y (MWh).
Source of data to be used:	JMR Sheets/measurement records of the EPC (<u>Engineering, Procurement, and Construction</u>) contractor.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Nil
Description of measurement methods and procedures to be applied:	<ul style="list-style-type: none"> - The electricity is measured with the help of electronic meters both by the operator and the grid representative. - Calculated from the measured readings, in case of WEGs with common meters - The data is measured hourly and recorded monthly - 100% of the data is monitored - The data will be archived electronically
QA/QC procedures to be applied:	The two meters (main and check) would be checked for accuracy and calibrated annually.
Any comment:	Used to calculate net electricity supplied to the grid by the project

c) $EG_{y(\text{export})}$

Data / Parameter:	$EG_{y(\text{export})}$
Data unit:	MWh
Description:	Electricity exported by the project in year y (MWh).
Source of data to be used:	JMR Sheets/measurement records of the EPC (<u>Engineering, Procurement, and Construction</u>) contractor.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Nil
Description of measurement methods and procedures to be applied:	<ul style="list-style-type: none"> - The electricity is measured with the help of electronic meters both by the operator and the grid representative. - Calculated from the measured readings, in case of WEGs with common meters - The data is measured hourly and recorded monthly - 100% of the data is monitored - The data will be archived electronically
QA/QC procedures to be applied:	The two meters (main and check) would be checked for accuracy and calibrated annually.
Any comment:	Used to calculate net electricity supplied to the grid by the project

d) EF_y

Data / Parameter:	EF _y
Data unit:	tCO ₂ /MWh
Description:	Emission factor of the existing generation mix for Southern Grid
Source of data to be used:	CEA : ‘The CO ₂ Baseline Database for the Indian Power Sector’ http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.7219 tCO ₂ /MWh
Description of measurement methods and procedures to be applied:	The methods for measuring EF _y can be found in the User Guide for The CO ₂ Baseline Database for the Indian Power Sector by CEA. The URL is as below: - http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf
QA/QC procedures to be applied:	The data for the EF _y would be calculated by the Central Electricity Authority of India every year. Thus, the data would reflect the updated existing generation mix for the southern grid and used ex-post.
Any comment:	Used to calculate emission reductions

B.7.2 Description of the monitoring plan:

>>

For the purpose of monitoring, the project participant has entered into an operation and maintenance agreement with the supplier of the machines Vestas RRB India Ltd. for a period of twenty years from the date of commissioning.

Training of engineers of MMTC at site and two engineers at works where assembly and testing of complete WEG are carried out has been done by the Vestas RRB India Ltd. (the Contractor); the training course is carried out at site.

RRB Vestas has a separate service department headed by Vice President supported by General Managers, Managers, and Assistant Managers and Supervisory Staff. Assistant Managers are posted at the project site along with requisite numbers of supervisory staff for carrying out operation and maintenance. The supervisory staff and maintenance are provided in adequate number for maintaining adequate strength at all the time. The operation and maintenance structure with respect to the implementation of the project has been given in Annex 4. The operators also record monthly energy output of each WEG and prepare reports on the performance of wind farm indicating turbine wise production.

The contractor shall draw the preventive maintenance schedules and attend to the breakdowns keeping in view that machine availability would be minimum 95%.

There are three metering points for the project activity. The first being at the Controller end, completely controlled and maintained by the RRB Vestas. The WEGs are then connected to the Main Receiving Stations (MRS) managed by HESCOM. All the WEGs for the project have been specifically identified at LCS to avoid any confusion regarding the generation by each WEG. The MRS is then connected to the Main meter at the Bulk meter station handled by HESCOM and KPTCL. In case, other than the project WEGs are jointly metered at the

Main meters (MRS), the electricity generated is apportioned on the basis of the readings at the MRS and individual generation of WEGs at the controller end. A check meter is also provided at the Main Receiving Station (MRS) as a backup for any fault in the Main meters. The meters both at Bulk meter station and MRS would be calibrated regularly and in case of faulty meters, corrective action would be taken immediately.

On the first day of every month, readings are taken from the Main meters (JMR) at the Main Receiving Station (MRS) on the basis of which invoices are raised to the HESCOM. The annual emission reductions would also be calculated on the basis of the same readings. A double check of the measurements can be done with the help of the sale receipts from the HESCOM. The data would be collected regularly by project proponent and archived in both electronic and paper for minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

The responsibility of registration of the project has been assigned to

The General Manager
MMTC

Core-1, “Scope Complex”, 7 Institutional Area, Lodhi Road, New Delhi – 110003, India

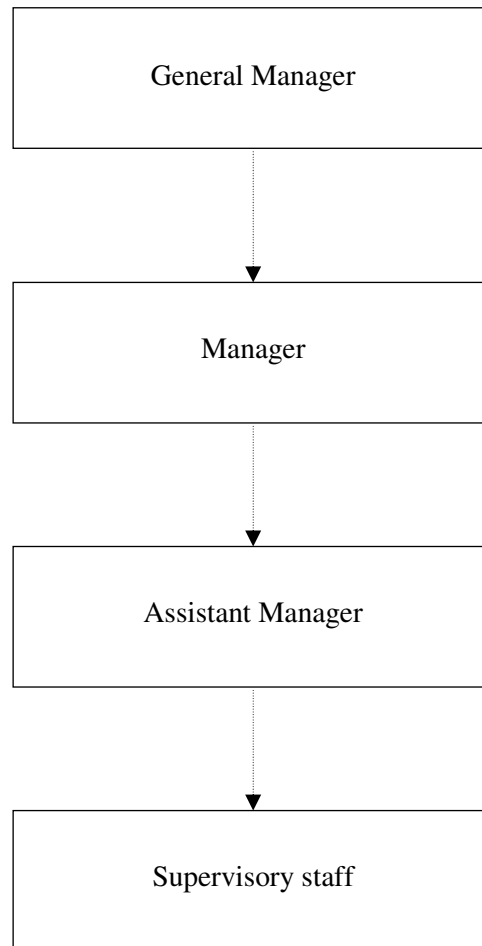
The General Manager has been assigned overall supervision of the project performance including the following:

- Performance review of WEG installations
- Arranging for annual verification of the installations for issuance of CERs.

Annex 4

Monitoring Information

Operation and Maintenance structure for wind energy project



Appendix I to Annex 4

Transmission loss calculation

The Electricity Energy Generated by the Wind Energy Generators (WEGs) flows from machines located at different locations at the project to the Energy Meters installed at Main Receiving Station (MRS), which are named as RR.No.62 (8 WEGs), RR.No.63 (8 WEGs), RR.No.64 (4 WEGs) and RR.No.75 (5 WEGs).

The Energy so produced by the WEGs after passing through Energy Meters at MRS, flows to the Bulk Meters installed near the project site. The Two Bulk Meters (also known as Energy Meters) installed records the Energy Generated received from the MRS. These Bulk Meters are named as RR.No.66 (connected to RR.Nos.64 & RR.Nos. 75 of MRS) and RR.No.67 (connected to RR.no.62 & RR.no.63 of MRS). These Bulk Meters are the delivery point of Energy Generated by the WEGs of MMTC at the Project to M/s.HESCOM (i.e. State Electricity Board). All the energy meters at MRS facility and Bulk Meters are controlled by HESCOM and KPTCL.

Net Energy Delivered: The Export energy recorded at all the 4 RRs of MMTC are named as X1,X2,X3,X4 and totalled to get the gross product, the export energy recorded at two bulk meters are named as 'Y' and totalled to get the gross product. The total of 'X' product is deducted in the total of 'Y' product to get the transmission loss (in units). The net product of transmission loss units is divided by totalled units of 'X' and multiplied by 100 gives the percentage of Line Transmission which is named as 'Z'. This can be mentioned in the formula as follows:

X1= MMTC RR No.62, X2=MMTC RR No.63, X3=MMTC RR No.64 & X4=MMTC RR No.75

Y= BULK METER Nos. RR No.66 & 67

i.e. $\frac{X1+X2+X3+X4 (-) Y}{X1+X2+X3+X4} \times 100 = 'Z'$

The Loss percentage so arrived is applied to calculate the transmission loss in units as follows in each RR:

DE (Delivered Energy) = X1(Export-gross) (-) (X1 x Z%) = which gives the energy in units as “Transmission Loss” which will be deducted in Export-gross.

i.e. Net Energy Delivered = Gross Export (-) Transmission loss