

MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

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MONITORING REPORT
Version number: 1 Date: 13/06/2011

125 MW Wind Power Project in Karnataka, India
UNFCCC Ref. No.: 0315
Monitoring period number: 4
Monitoring period (first and last days included) 01/04/2009 – 31/03/2011

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

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Purpose of the project activity and the measures taken to reduce greenhouse gas emissions:

The purpose of the project activity is to mitigate greenhouse gas emissions by generating electricity from wind power. Electricity generation in conventional grid-connected power plants, which consists of primarily thermal power plants, is displaced by the project activity, thereby reducing greenhouse gas emissions.

Brief description of the installed technology and equipments:

The project activity comprises of 107 wind turbine generators (WTGs) with total installed capacity of 125.15 MW. The project activity generates renewable power and exports it to the southern regional grid via the nearest receiving station of KPTCL. The project equipment also includes the metering, switch gear and other protection equipment. Electricity generation from the WTGs is monitored via 18 metering points (each metering point comprising of one main meter and one check meter). The WTGs are identified by their location numbers, and metering points by meter IDs. Details on each of the 18 metering points are given in Annex 2 – Energy Meter Specifications.

Relevant dates for the project activity:

Table 1: Relevant dates for the project activity

S.No.	Activity	Date
1	Start date of crediting period for the project activity	22/03/2004
2	Commissioning dates of WTGs	Please refer Table 3 “Commissioning dates of WTGs” under section B.1 “Implementation status of the project activity”
3	Registration of project activity under CDM	29/09/2006
4	First Monitoring Period	22/03/2004 to 31/03/2006
5	Second Monitoring Period	01/04/2006 to 31/03/2007
6	Third Monitoring Period	01/04/2007 to 31/03/2009
7.	Fourth Monitoring Period	01/04/2009 to 31/03/2011

Total emission reductions achieved in this monitoring period:

The total emission reductions achieved during the monitoring period, i.e. from 01 April, 2009 to 31 March, 2011 amounts to **4,84,426 tCO₂e**. The monitoring data spreadsheet containing data for all the energy meter readings and supporting Joint Meter Reading (JMR) statements issued by KPTCL have been submitted to the DOE for verification.

A.2. Project Participants

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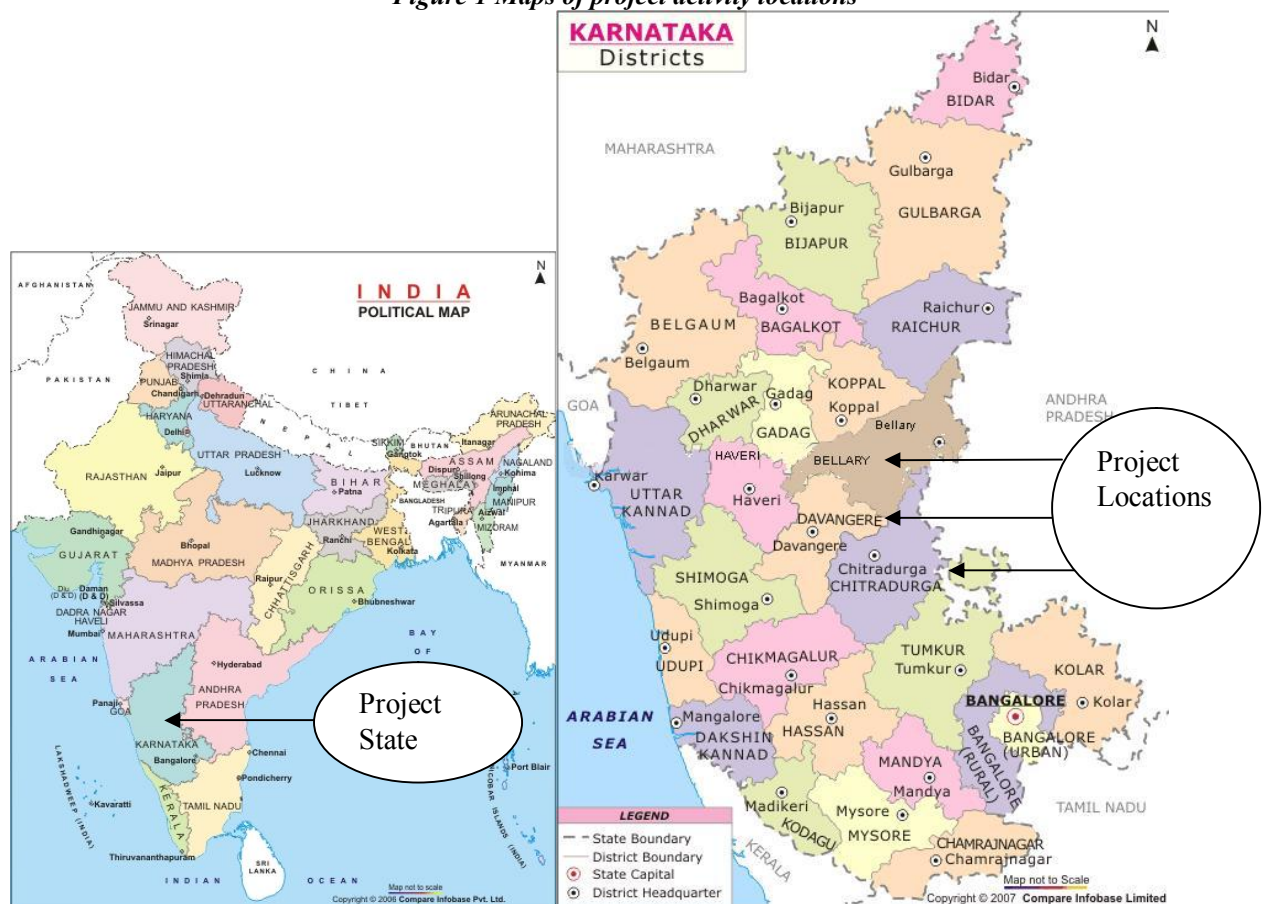
Host Parties	India Authorized Participants: MSPL Limited
Other Parties Involved	Spain , involved directly Authorized Participants: Kingdom of Spain Sweden , involved directly Authorized Participants: Government of Sweden - Swedish Energy Agency

A.3. Location of the project activity:

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The project WTGs are located in the districts of Bellary, Chitradurga and Davanagere in the state of Karnataka, India. The project activity locations are marked in the maps below.

Figure 1 Maps of project activity locations



The GPS coordinates of the WTG locations are within the range of latitude 14°11' 25'' to 14° 55' 44.1'' north, and longitude 75° 57' 36.5 to 76° 25' 19.6'' east.

A.4. Technical description of the project

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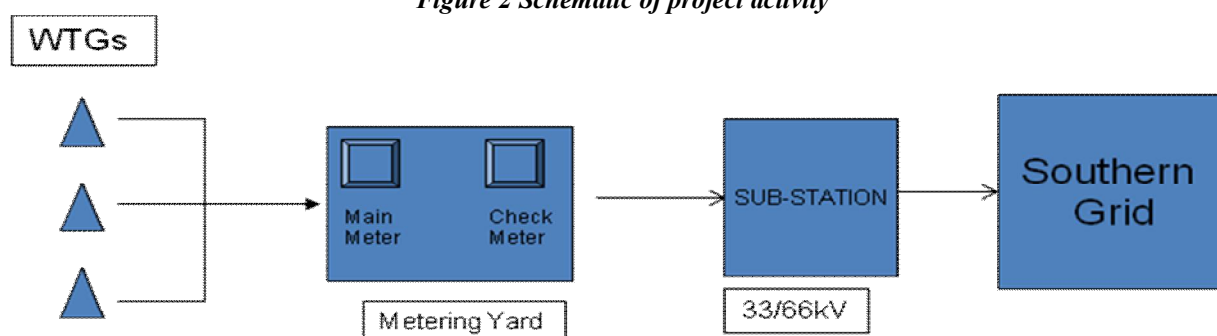
The project activity involves the implementation of a 125.15 MW capacity wind power installation in the state of Karnataka. The project activity displaces power generation in grid-connected plants (largely from fossil fuel based sources). Renewable energy is exported to the southern regional grid (India). The project activity consists of 107 WTGs owned by MSPL, RMMPL, and PVS & Brothers as listed below.

Table 2: Technical details of WTGs

Phase ¹	Company	Number of WTGs	Capacity (kW per WTG)	Total Capacity (kW)	Make	Meter Ids
I	MSPL	7	750	5,250	NEG Micon	GRHP-01, GRHP-08, GRHP-09, GRHP-05, GRHP-06, GRHP-14, JMT-01
		17	950	16,150	NEG Micon	
		5	1,250	6,250	Suzlon	
II	MSPL	41	1,250	51,250	Suzlon	MRB-03-K131,MRB-03-K140, JJK-08, JJK-05, JMT-03, JMT-05
II	RMMPL	31	1,250	38,750	Suzlon	JJK-07, JJK-06,MRB-03-K147,MRB-03-K161
II	PVS	6	1,250	7,500	Suzlon	MRB-03-K141
	Total	107	-	1,25,150	-	-

The project activity exports power to the southern regional grid of India through sub-stations where the generated power is stepped up from 33kV to 66KV. This is illustrated in the schematic below:

Figure 2 Schematic of project activity



A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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The baseline and monitoring methodology applied to the project activity is: ACM0002 ver. 4 - Consolidated methodology for grid-connected electricity generation from renewable sources

Reference:

https://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_YRBRBUU2ON10D2S9SE0RFK0VIR2TNL

A.6. Registration date of the project activity:

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The project activity was registered with UNFCCC on 29/09/2006.

¹ Phase I includes WEGs commissioned in 2004. Phase II includes WEGs commissioned in 2005.

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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Choice of crediting period: Fixed (10 years)
 Start date of crediting period: 22/03/2004
 Crediting period: 22/03/2004 to 21/03/2014

A.8. Name of responsible person(s)/entity(ies):

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Mr. Manoj K Agrawal
 Vice President – (Commercial & CSR)
 MSPL Limited
 Abheraj Baldota Road, Baldota Enclave
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 Fax: +91-8394-232333, 232444
 E-mail id: manoj@mspllimited.com

SECTION B. Implementation of the project activity**B.1. Implementation status of the project activity**

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Commissioning dates of the WTGs are tabulated below:

Table 3: Commissioning dates of WTGs

Meter ID	No. of WTGs	Capacity per WTG (kW)	Total capacity (MW)	Commissioning date	WTG Location Nos.
GRHP-05	4	950	3.8	31/03/2004	MSPL22 to MSPL25
GRHP-06	3	950	2.85	31/03/2004	MSPL26 to MSPL28
GRHP-08	2	750	1.5	16/04/2004	MSPL-15, MSPL-16
	3	950	2.85	08/09/2004	MSPL-11, MSPL-12A, MSPL-12B
	1	950	0.95	24/12/2004	MSPL-14
GRHP-09	2	750	1.5	08/09/2004	MSPL-17, MSPL-18
	3	750	2.25	16/04/2004	MSPL-19, MSPL-20, MSPL-21
GRHP-14	1	950	0.95	08/09/2004	MSPL-29
	1	950	0.95	19/05/2004	MSPL-30
GRHP-01	4	950	3.8	18/03/2004	MSPL-7, MSPL-8, MSPL-9, MSPL-10
JJK-05	13	1,250	16.25	31/03/2005	K-188 to K-200
JJK-06	6	1,250	7.5	31/03/2005	K-168 to K-172, K180
	3	1,250	3.75	31/05/2005	K-174, K-175 & K-177
	5	1,250	6.25	30/04/2005	K-167, K-173, K-176, K-178, K-179
JJK-07	2	1,250	2.5	31/03/2005	K-181, K-183
	1	1,250	1.25	31/05/2005	K-182

Meter ID	No. of WTGs	Capacity per WTG (kW)	Total capacity (MW)	Commissioning date	WTG Location Nos.
JJK-08	1	1,250	1.25	30/04/2005	K-184
	2	1,250	2.5	31/03/2005	K-185, K-186
	1	1,250	1.25	31/05/2005	K-187
JMT-01	3	1,250	3.75	31/03/2004	K-23, K-24, K-25
	2	1,250	2.5	10/04/2004	K-26, K27
JMT-03	3	1,250	3.75	22/03/2005	K-33 to K-35
JMT-05	1	1,250	1.25	22/03/2005	K-28
MRB-03-K131	7	1,250	8.75	21/03/2005	K-123 to K-125, K-127 to K-130
	4	1,250	5	28/03/2005	K-121, K-122, K-126 & K-131
MRB-03-K140	1	1,250	1.25	31/12/2005	K-132
	8	1,250	10	21/03/2005	K-133 to K-140
MRB-03-K141	6	1,250	7.5	28/03/2005	K-141 to K-146
MRB-03-K147	6	1,250	7.5	28/03/2005	K-147 to K-150, K-153, K-154
	2	1,250	2.5	13/06/2005	K-155, K-156
MRB-03-K161	6	1,250	7.5	26/03/2005	K-161 to K-166
TOTAL	107		125.15		

Information regarding actual operation of project activity during the monitoring period:

The average plant load factor for the WTGs achieved during the monitoring period was 24.80%. Please refer to section E.6 “Remarks on difference from estimated value in the PDD” for further details. Details on meter replacements during the monitoring period are given in Annexure 2 “Energy meter specifications”.

Events / situations that occurred during the monitoring period:

There were no events / situations during the monitoring period which would have any impact on the applicability of the methodology.

B.2. Revision of the monitoring plan

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The monitoring plan has been revised and the revision was approved by UNFCCC on 24 December, 2010. The revised monitoring plan can be found on the project’s webpage:

<https://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view>

B.3. Request for deviation applied to this monitoring period

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There was no request for deviation applied to this monitoring period.

B.4. Notification or request of approval of changes

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There was no request of approval of changes.

SECTION C. Description of the monitoring system

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Description of monitoring plan:

This project activity uses wind as a source for power generation and does not involve the combustion of fossil fuels. Therefore, there are no project emissions and emission reductions are equivalent to baseline emissions. Quantification of baseline emissions is dependent on monitoring of the electricity supplied to the grid by the project activity. Electricity supplied to the grid is calculated from the parameters gross electricity export from the project activity, electricity import by the project activity and transmission losses.

The gross electricity export from the project activity and electricity import by the project activity are monitored at 18 metering points, each consisting of a main and check energy meter. These 18 set of main and check energy meters owned by the project proponents. However, the calibration / replacement and maintenance of these energy meters is completely under the purview of KPTCL officials.

Each of the 18 metering points is connected to a receiving substation where voltage is stepped up from 33 KV to 66 KV. Details on each of the four substations, including a list of connected metering IDs (including those not part of the project activity), are give in Annex 3– Substation details. Connections between individual/groups of WTGs to respective metering points, and connections between metering points to substations are illustrated in the figures below:

Figure 3 Schematic of WTGS connected to Suzlon 33/66 kV Substation at Sogi

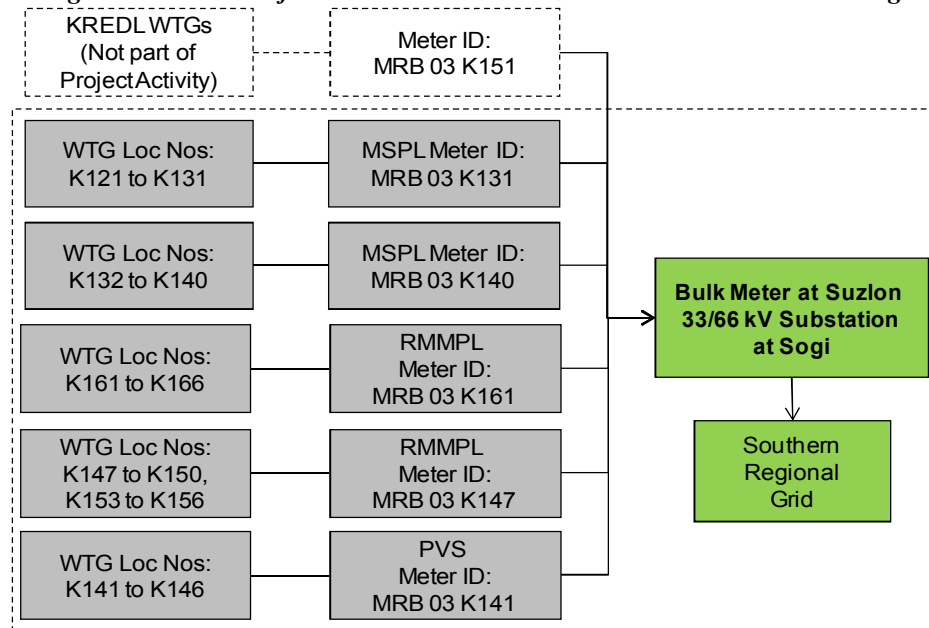


Figure 4 Schematic of WTGs connected to Suzlon 33/66 kV Substation at Chitradurga

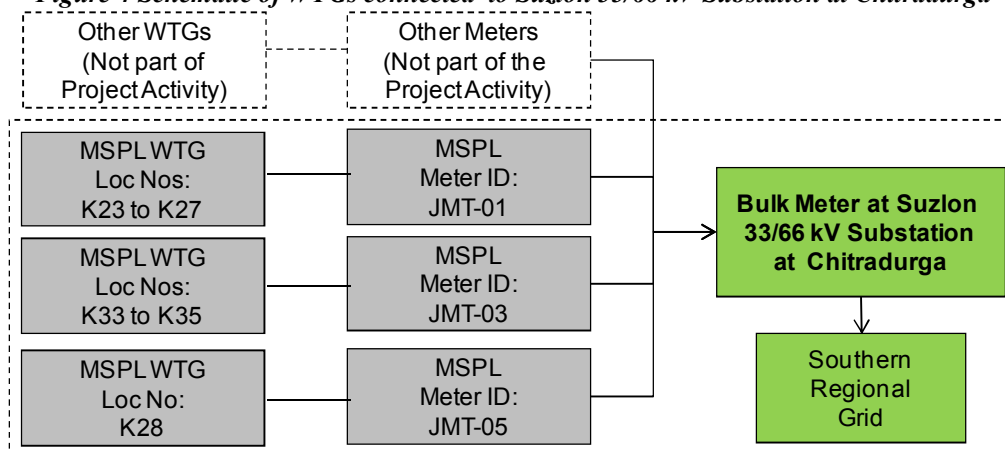


Figure 5 Schematic of WTGs connected to NEG Micon 66/33KV Substation at Chitradurga

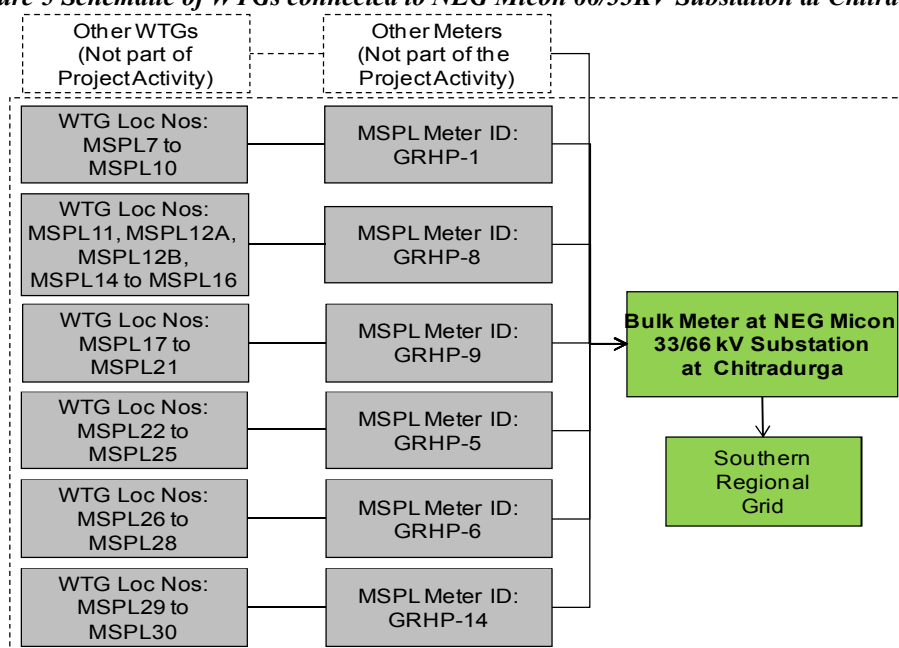
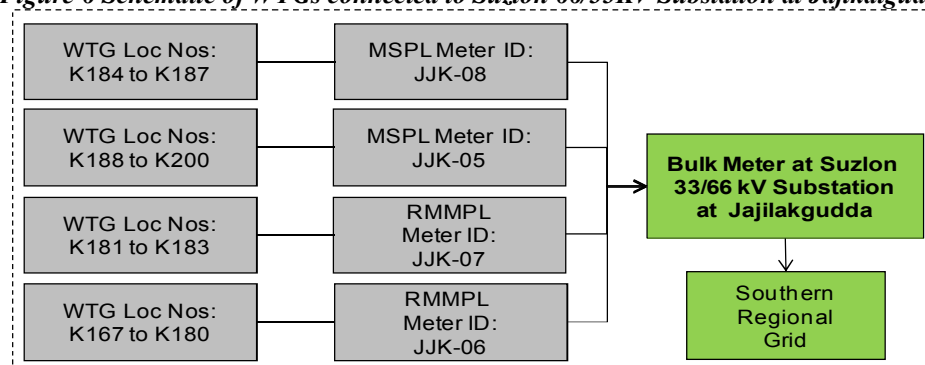


Figure 6 Schematic of WTGs connected to Suzlon 66/33KV Substation at Jajilakgudda

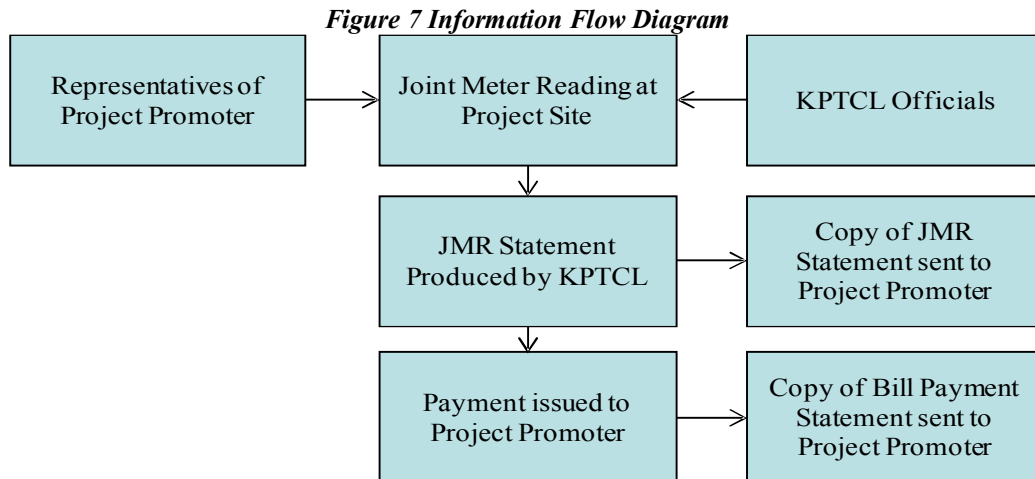


Data collection procedures:

The monthly Joint Meter Reading (JMR) Statements issued by KPTCL, report the electricity export and import from respective metering points and also the losses from transmission of electricity to respective substations. The values reported in JMR Statements can be cross-checked with those reported in Bill Payment Statements (also referred to as Pro Forma Invoices). The electricity supplied to grid by the

project activity is computed as: electricity exported less 115% of the electricity imported less transmission losses.

Joint meter readings at the metering points are taken by KPTCL officials and representatives of the project promoters (operation & maintenance contractors). JMR Statements are generated for each of the metering points by KPTCL and copies are sent to the respective project promoters. Against the JMR Statements, the Bill Payment Statements are generated by BESCOM and copies are sent to respective project promoters. Payments against sale of electricity are released by BESCOM to project promoters as per the Bill Payment Statements. This procedure is illustrated in the following diagram:



Quality Control and Quality Assurance procedures:

The monitoring equipment for the project activity comprises of 18 sets of main meters and corresponding check meters. These are electronic trivector energy meters of 0.2% accuracy class. The energy meters are sealed to ensure there is no tampering of the equipment. Annual calibration and periodical inspection of the energy meters is carried out by KPTCL officials.

The energy meter calibration details are given in ‘Annexure 5: Energy meter calibration details’. The calibration reports indicate that all the Energy meters were working within the permissible limit of error of 0.2% during the monitoring period. However, adjustments have been made to emission reduction calculations to account for delays in calibration as explained below in the section on “Data adjustment”.

There were instances where the check meter or the main meter malfunctioned (due to error in display, etc.) during the monitoring period. Wherever the main meters readings could not be considered due to the malfunction, the check meter readings were used for billing and for calculation of emission reductions. These instances have been marked in the monitoring data spreadsheet submitted to the DOE. Main meters for JJK-06, GRHP-05, and GRHP-09 and the check meter for JMT-03 were replaced during the monitoring period. The relevant details of the energy meter replacements are given in ‘Annexure 2: Energy meter specifications’.

Data adjustments:

As per the monitoring plan, the energy meters have to be calibrated annually. Due to a delay in calibration for 14 energy meters, as a conservative measure, emission reductions have been adjusted to account for this delay. The details of the delays in calibration are tabulated below:

Table 4: Details of delay in meter calibration

Meter ID	Schedule date of calibration	Actual Calibration date	Delay in calibration	Period
RR NO. MRB-03-K-131	14 July, 2009	29 September,2009	3 months (July 2009 - September 2009)	1 st April 2009-31 st March 2010
RR NO. MRB-03-K-140	14 July, 2009	29 September,2009	3 months (July 2009 - September 2009)	
RR NO. MRB-03-K141	14 July, 2009	29 September,2009	3 months (July 2009 - September 2009)	
RR NO MRB-03-K147	14 July, 2009	29 September,2009	3 months (July 2009 - September 2009)	
RR NO MRB-03-K-161	14 July, 2009	29 September,2009	3 months (July 2009 - September 2009)	
RR NO JJK-05	17 June, 2009	8 February,2010	9 months (June 2009 - February 2010)	
RR NO JMT-05	3 June, 2010	28 December,2010	7 months (June 2010 - December 2010)	
RR NO. GRHP-09	02 July, 2009	29 July,2009	1 month (July 2009)	
RR NO JMT-03	14 October, 2010	19 November,2010	2 months (October 2010 - November 2010)	1 st April 2010-31 st March 2011
RR NO. GRHP-01	15 May,2010	19 July,2010	3 months (May 2010 - July 2010)	
RR NO. GRHP-08	16 May, 2010	24 July, 2010	3 months (May 2010 - July 2010)	
RR NO. GRHP-05	15 May,2010	19 July,2010	3 months (May 2010 - July 2010)	
RR NO. GRHP-14	16 May,2010	24 July,2010	3 months (May 2010 - July 2010)	
RR NO JMT-01	20 May,2010	27 July, 2010	3 months (May 2010 - July 2010)	

Procedures for data adjustments given in EB 52 Annex 60: “Guidelines for Assessing Compliance with the Calibration Frequency Requirements” have been adopted. In accordance with paragraph 4a of the guidelines, the emission reductions have been adjusted considering the maximum permissible error of the energy meters. The delayed calibration test reports for all the energy meters indicate that the meters were working within the permissible error of 0.2%. Therefore, the maximum permissible error of the energy meters, 0.2% has been applied to the measured values for the months where calibration was delayed. The measured values for the project activity are Gross electricity export from the project activity ($E_{EXP,y}$) and Electricity import by the project activity ($E_{IMP,y}$). The values of gross electricity export have been decreased by 0.2% and the values of electricity import have been increased by 0.2%. These adjusted values have been used to calculate the emission reductions.

Calculation of transmission losses:

Apart from the export and import of electricity which is measured by the energy meters, the calculation of electricity supplied to grid includes a deduction of transmission losses. Transmission losses refer to the energy loss incurred between the metering point for the WTGs and the respective receiving station where voltage is stepped up to 66KV and exported to the grid. The calculation of transmission losses is carried out by KPTCL considering the export readings of the bulk meter at the receiving substation as well as the export readings of each metering point connected to the respective receiving substation. These electricity export values are measured on an hourly basis and are recorded on a monthly basis. The transmission losses have been calculated from these monthly recordings of electricity export values and the transmission loss calculation sheets are submitted by KPTCL every month along with the JMRs.

Although bulk meters are installed at sub-stations, they are fully under the purview and ownership of KPTCL. Similarly there are several other WTGs and respective metering points which are connected to the sub-station but under the ownership of different project promoters. Since MSPL does not have any

ownership or control over these meters (bulk meter and meters of other WTGs connected to substation), they are not covered under the monitoring plan.

For calculation of transmission losses, the following equation from the PPA is applied:

$$\text{Transmission losses} = X_1 \times Z\%$$

Where,

X1 is the reading of the energy meter installed at the Project Site

Z is the percentage transmission line loss incurred in the transmission line between the project and receiving station and is determined as:

$$Z = \left\{ \frac{(X_1 + X_2 + X_3 + X_4 + \dots) - Y}{(X_1 + X_2 + X_3 + X_4 + \dots)} \right\} \times 100$$

Where,

Y is the reading of the bulk energy meter installed on the 66 KV side of the receiving station.

X2, X3, X4, etc. are the readings of the energy meters installed at the various other individual wind power projects connected to the receiving station.

As an example, the computation of transmission losses at MRB-03 for January, 2011 is given below. Figure 1 “Schematic of WTGS connected to Suzlon 66/33KV Substation at Sogi” under section A.4 “Technical description of the project activity” gives a schematic of the Suzlon 66/33KV receiving station at Sogi and may be referred for greater clarity.

Table 5: January 2011 Bulk Meter Readings at Suzlon 66/33 KV Receiving Station at Sogi

Parameter	Main Meter Data
Main meter export details (kWh)	Y = 8393700

Table 6: January 2011 Readings at Individual Metering Points connected to Suzlon 66/33KV Receiving Station at Sogi

Owner of Connected WTGs	Meter ID	Main Meter Electricity Export Data
KREDL	MRB 03 K151	X1= 433980
MSPL Ltd	MRB 03 K131	X2 = 1988250
MSPL Ltd	MRB 03 K140	X3 = 2108025
P. Venganna Shetty and Brothers	MRB 03 K141	X4 = 1113300
Ramgad Minerals and Mining Pvt. Ltd.	MRB 03 K147	X5 = 1407000
Ramgad Minerals and Mining Pvt. Ltd.	MRB 03 K161	X6 = 730800
P. Venganna Shetty and Brothers	MRB 03 K827	X7 = 160560
Ramgad Minerals and Mining Pvt. Ltd.	MRB 03 K826	X8 = 411840
Ramgad Minerals and Mining Pvt. Ltd.	MRB 03 K832	X9 = 187110
Total X = X1 + X2 + X3 + X4 + X5 + X6+ X7 + X8 + X9		X = 8540865

The percentage transmission losses are computed as:

$$Z = ((X - Y) / X) \times 100$$

$$X = \text{Total export from metering points connected to substation} = 85,40,865$$

$$Y = \text{Export from bulk meter at substation} = 83,93,700$$

Therefore:

$$Z = 1.7230690\%$$

For MRB-03 K140 the transmission losses for the month of January, 2011 are given as:

$$\text{Transmission losses} = X3 \times Z = 2108025 \times 1.7230690\% = 36,322.7 \text{ kWh}$$

Emergency Preparedness:

The operation and maintenance team is responsible for maintaining the physical and functional integrity of the project equipment. At every WEG location Tower/control room, the transformer yard has all necessary fire fighting equipments like fire buckets with sand and fire extinguishers. Fire extinguishers have been placed at each Monitoring stations/control room permanently. No emergency situations were reported during the monitoring period.

Management Roles & Responsibilities:

The Wind Division of MSPL reports to the Business Head of the Wind Division who reports directly to the Board of MSPL Limited. The Management and Corporate Staff of the MSPL Wind Division are responsible for coordinating with Site Personnel as well as the O&M contractors and the power off-takers (KPTCL & BESCOM). Site personnel are located at individual sites and are responsible for collection and transfer of monitored data from respective sites to the corporate office. The CDM team has the following overall functions:

- Collection of monitoring data for power generation by the project activity
- Maintenance of records and backup of relevant data for verification
- Coordination with KPTCL for maintenance and calibration of monitoring equipment
- Coordination with O&M contractors to ensure continuous functioning of WTGs

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	EF_y
Data unit:	tCO₂/MWh
Description:	CO ₂ emission factor of the grid
Source of data used:	KPTCL/CEA
Value(s) :	0.9071
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used to calculate the baseline emissions, as follows: BE _y = EF _y x EG _y Where, BE _y = Baseline emissions due to displacement of electricity during the year y EG _y = Electricity supplied to the grid by the project activity
Additional comment:	This parameter is calculated once at the beginning of the crediting period (i.e. fixed ex-ante).

Data / Parameter:	EF_{OM,y}
Data unit:	tCO₂/MWh
Description:	CO ₂ operating margin emission factor of the grid
Source of data used:	KPTCL/CEA
Value(s) :	1.18519
Indicate what the data are used for (Baseline/ Project/ Leakage emission)	The data is used to calculate the CO ₂ emission factor of the grid which is in turn used to calculate the baseline emissions.

calculations)	
Additional comment:	This parameter is calculated once at the beginning of the crediting period (i.e. fixed ex-ante).

Data / Parameter:	EF_{BM,y}
Data unit:	tCO₂/MWh
Description:	CO ₂ build margin emission factor of the grid
Source of data used:	KPTCL/CEA
Value(s) :	0.629
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used to calculate the CO ₂ emission factor of the grid which is in turn used to calculate the baseline emissions.
Additional comment:	This parameter is calculated once at the beginning of the crediting period (i.e. fixed ex-ante).

Data / Parameter:	F_{i,j,y}
Data unit:	Tons
Description:	Amount of fossil fuel i, consumed by each power source/plant in year y
Source of data used:	KPTCL/CEA
Value(s) :	Refer annexure 6 “Ex-ante Values”
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used to calculate the CO ₂ operating margin emission factor of the grid which is in turn used to calculate the baseline emissions.
Additional comment:	This parameter is calculated once at the beginning of the crediting period (i.e. fixed ex-ante).

Data / Parameter:	COEF_{i,j,y}
Data unit:	tCO₂/ton of fuel
Description:	CO ₂ emission factor of each fuel type i
Source of data used:	IPCC/local
Value(s) :	Refer annexure 6 “Ex-ante Values”
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used to calculate the CO ₂ operating margin emission factor of the grid which is in turn used to calculate the baseline emissions.
Additional comment:	This parameter is calculated once at the beginning of the crediting period (i.e. fixed ex-ante).

Data / Parameter:	GEN_{j,y}
Data unit:	MWh/annum
Description:	Electricity delivered to the grid by power source j in year y
Source of data used:	KPTCL/CEA
Value(s) :	Refer annexure 6 “Ex-ante Values”
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used to calculate the CO ₂ operating margin emission factor of the grid which is in turn used to calculate the baseline emissions.

calculations)	
Additional comment:	This parameter is calculated once at the beginning of the crediting period (i.e. fixed ex-ante).

D.2. Data and parameters monitored									
Data / Parameter:	EG _y								
Data unit:	MWh								
Description:	Electricity supplied to the grid by the project activity								
Measured /Calculated /Default:	Calculated								
Source of data:	KPTCL and BESCOM records								
Value(s) of monitored parameter:	<table><tr><th>1st April 2009 – 31st March 2010</th><th>1st April 2010 – 31st March 2011</th><th>Total</th></tr><tr><td>279,160.277</td><td>254,878.606</td><td>534,038.883</td></tr></table>			1 st April 2009 – 31 st March 2010	1 st April 2010 – 31 st March 2011	Total	279,160.277	254,878.606	534,038.883
1 st April 2009 – 31 st March 2010	1 st April 2010 – 31 st March 2011	Total							
279,160.277	254,878.606	534,038.883							
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used to calculate the baseline emissions.								
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The parameter is a calculated figure.								
Measuring/ Reading/ Recording frequency:	Monthly recording								
Calculation method (if applicable):	The electricity supplied to the grid by the project activity is calculated as follows: $EG_y = E_{EXP,y} - E_{TL,y} - 115\% * E_{IMP,y}$ Where, $E_{EXP,y}$ = Gross electricity export from the project activity $E_{TL,y}$ = Transmission losses $E_{IMP,y}$ = Electricity import by the project activity								
QA/QC procedures applied:	There are no QA/QC procedures to be followed as the data parameter is a calculated figure.								

Data / Parameter:	E _{EXP,y}		
Data unit:	MWh		
Description:	Gross electricity export from the project activity		
Measured /Calculated /Default:	Measured		
Source of data:	KPTCL and BESCOM records		
Value(s) of monitored parameter:			
	1 st April 2009 – 31 st March 2010	1 st April 2010 – 31 st March 2011	Total
	284,268.188	259,407.760	543,675.948
Indicate what the data are	The data is used to calculate the baseline emissions.		

used for (Baseline/ Project/ Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Details are provided in Annexure 2: Energy meter specification
Measuring/ Reading/ Recording frequency:	Hourly measurement and monthly recording
Calculation method (if applicable):	NA
QA/QC procedures applied:	The values of gross electricity export from the project activity in JMR statements are compared with values in proforma invoices.

Data / Parameter:	E_{IMP,y}		
Data unit:	MWh		
Description:	Electricity import by the project activity		
Measured /Calculated /Default:	Measured		
Source of data:	KPTCL and BESCOM records		
Value(s) of monitored parameter:	1st April 2009 – 31st March 2010	1st April 2010 – 31st March 2011	Total
	571.142	553.280	1,124.421
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used to calculate the baseline emissions.		
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Details are provided in Annexure 2: Energy meter specification		
Measuring/ Reading/ Recording frequency:	Hourly measurement and monthly recording		
Calculation method (if applicable):	NA		
QA/QC procedures applied:	The values of electricity import from the project activity in JMR statements are compared with values in proforma invoices.		

Data / Parameter:	E_{TL,y}
Data unit:	MWh
Description:	Transmission losses
Measured /Calculated /Default:	Measured
Source of data:	KPTCL and BESCOM records

Value(s) of monitored parameter:	1 st April 2009 – 31 st March 2010	1 st April 2010 – 31 st March 2011	Total
	4,451.098	3,892.882	8,343.980
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used to calculate the baseline emissions.		
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Details are provided in Annexure 2: Energy meter specification		
Measuring/ Reading/ Recording frequency:	Hourly measurement and monthly recording		
Calculation method (if applicable):	This parameter is calculated based on the measured values of electricity export from the bulk meter at the substation and export from individual meters connected to the substation. These electricity export values are measured on an hourly basis and are recorded on a monthly basis. The transmission losses have been calculated from these monthly recordings of electricity export and the transmission loss calculation sheets are submitted by KPTCL every month along with the JMRs. Details on calculation of transmission losses are provided under “Calculation of transmission losses” under section C. “Description of the monitoring system”.		
QA/QC procedures applied:	The values of transmission losses in JMR statements are compared with values in proforma invoices.		

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

The baseline emissions are calculated as the product of the electricity supplied to the grid by the project activity (EG_y) in MWhs and the Baseline Emission Factor (EF_y) of the Southern Regional grid of India in tCO_2/MWh . The baseline emission factor was fixed ex-ante as 907.1 tCO_2/MU or 0.9071 tCO_2/MWh . Therefore baseline emissions are calculated as:

$$BE_y = EG_y * EF_y = EG_y * 0.9071$$

Table 7: Summary of baseline emissions calculations

Item	Parameter	1 st April 2009 – 31 st March 2010	1 st April 2010 – 31 st March 2011	Total
A	Gross electricity export from project activity (MWh)	2,84,268.188	2,59,407.760	5,43,675.948
B	Electricity import from project activity (MWh)	571.142	553.280	1,124.421
C	Transmission losses (MWh)	4,451.098	3,892.882	8,343.980
D	Electricity supplied to the grid by the project activity, EG_y (MWh) $D = A - 115\% * B - C$	2,79,160.227	2,54,878.606	5,34,038.883

Item	Parameter	1 st April 2009 – 31 st March 2010	1 st April 2010 – 31 st March 2011	Total
E	Baseline Emission Factor, EF _y (tCO ₂ /MWh) <i>This was determined ex-ante as the combined margin grid emission factor.</i>	0.9071	0.9071	0.9071
F	Baseline emissions due to displacement of electricity during the year y, BE _y (tCO ₂) $F = D * E$	2,53,226	2,31,200	4,84,426

The month-wise electricity export, electricity import, and transmission loss data in kWh for each of the metering points in the project activity is given in Annex 1. The detailed monitoring data spreadsheet showing the energy meter readings and calculation of emission reductions has been submitted to the DOE for verification.

E.2. Project emissions calculation

>>

In accordance with the applied methodology and the registered PDD, there are no project emissions for the project activity.

Therefore, PE_y = 0 tCO₂e

E.3. Leakage calculation

>>

In accordance with the applied methodology and the registered PDD, there are no leakage emissions for the project activity.

Therefore, L_y = 0 tCO₂e

E.4. Emission reductions calculation / table

>>

The total , baseline emissions, project emissions, leakage emissions, and emission reductions for the monitoring period are as below:

Total baseline emissions	: 4,84,426 tCO ₂ e/MWh
Total project emissions	: 0 tCO ₂ e
Total leakage	: 0 tCO ₂ e
Total emission reductions	: 4,84,426 tCO ₂ e/MWh

The formula used for estimation of the total emission reductions due to the MSPL project activity during a given year y is:

$$ER_y = BE_y - PE_y - L_y$$

BE_y is the baseline emissions for the project activity (tCO₂e)

PE_y is the project emissions for the project activity (tCO₂e)

L_y is the leakage for the project activity (tCO₂e)

Since,

PE_y = 0 tCO₂e, and

L_y = 0 tCO₂e

$$ER_y = BE_y$$

The calculation of emission reductions is summarized below:

Table 8: Summary of baseline emission reduction calculations

Item	Parameter	1 st April 09 – 31 st March 10	1 st April 10 – 31 st March 11	Total
A	Baseline emissions due to displacement of electricity during the year y , BE_y (tCO ₂)	2,53,226	2,31,200	4,84,426
B	Project emissions during the year y , PE_y (tCO ₂)	0	0	0
C	Leakage emissions during the year y , L_y (tCO ₂)	0	0	0
D	Emission Reductions, ER_y (tCO ₂) $D = A - B - C$	2,53,226	2,31,200	4,84,426

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

>>

Emission reductions per year as per registered CDM-PDD (tCO ₂ e)	Actual emission reductions reported during the monitoring period (tCO ₂ e)
275,129	1 st April 2009-31 st March 2010: 253,226 1 st April 2010-31 st March 2011: 231,200

E.6. Remarks on difference from estimated value in the PDD

>>

As can be observed in the table, the actual emission reductions achieved during the current monitoring period are lower than that stated in the registered CDM-PDD. The difference in emission reductions can be attributed to the difference between the ex-ante estimation of PLF and the actual PLF for the monitoring period. The annual electricity export to KPTCL considered in the registered PDD is 303.3 Million Units. This corresponds to a PLF of 27.67%. The PLF achieved during the monitoring period is tabulated below. These values are calculated based on the gross electricity export from project activity for the relevant periods.

Table 9: PLF achieved during the monitoring period

For the Period	PLF
1 st April 2009 – 31 st March 2010	25.93%
1 st April 2010 – 31 st March 2011	23.66%
Entire Monitoring Period: 1 st April 2009– 31 st March 2011	24.80%

Wind is an intermittent source of energy, which may vary from season to season, and is a primary determining factor for PLF. Because of this intermittent nature of wind, the actual PLF attained by the project activity during the monitoring period is lower than the ex-ante estimation of the PLF.

ANNEXURE 1: MONITORING DATA

1.1. Gross Electricity Export from the project activity in kWh for the period: 1st April 2009 – 31st March 2010²

Sl. No	Electricity Board Meter ID	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	TOTAL
1	RR NO. MRB-03-K-131	1791900	2737350	3514500	6274750.4	3146020.4	2230455.1	2099625	2187075	2518725	1940400	1097250	1392600	30930650.85
2	RR NO. MRB-03-K-140	1895400	2829600	3865725	6427294.7	3440330.5	2326787.1	2259225	2433375	2544750	1920375	1070550	1443150	32456562.3
3	RR NO. MRB-03-K141	1147050	1807650	2436300	4205372.4	2149841.7	1410623.1	1316250	1240650	1449450	1009800	553500	809550	19536037.2
4	RR NO MRB-03-K147	1505400	2274600	3024000	5107764	2749689.6	1849693.2	1726200	1610400	1731600	1317000	751800	1117800	24765946.8
5	RR NO MRB-03-K-161	814050	1380600	1853100	3527680.5	1628885.7	1016762.4	902250	773100	869400	610200	441000	582300	14399328.6
6	RR NO JJK-06	2146200	3268650	4369050	8045100	4109700	2797200	2537850	2182950	2618700	1961400	1269450	1654800	36961050
7	RR NO JJK-07	600750	1016775	1250325	2139525	1309500	894375	733050	621450	743625	541350	359775	471375	10681875
8	RR NO JJK- 08	680400	1101300	1322700	2383800	1367100	956100	904800	780300	979500	725700	464700	591300	12257700
9	RR NO JJK-05	1758900	2710500	3862035.4	7460374.4	3808517.7	2509496	2394676	2244826.35	2780003.85	1888690.05	1182255.75	1484925	34085200.5
10	RR NO JMT-05	219060	384300	449370	649530	451890	384030	248490	172890	166680	110970	104670	161010	3502890
11	RR NO JMT-03	370800	717000	1186200	2221200	1262700	892200	659700	395400	457800	331500	231300	274200	9000000
12	RR NO. GRHP-01	429000	660000	912000	1755000	972000	717000	582000	495000	546000	408000	228000	297000	8001000
13	RR NO. GRHP-08	572850	993150	1200600	1864350	1182150	948600	681300	496800	551250	434700	286200	422550	9634500
14	RR NO. GRHP-09	407925	717300	937125	1558377	936450	697950	517725	367200	397125	306000	208125	282150	7333452
15	RR NO. GRHP-05	278700	501600	709800	1437300	745200	531300	456600	334800	412500	336300	227400	177900	6149400
16	RR NO. GRHP-06	249975	374175	566100	1095075	537075	399600	372375	326475	325125	301725	186525	200250	4934475
17	RR NO. GRHP-14	239400	430800	519840	845040	550200	430800	317400	258960	306960	235560	165720	203040	4503720
18	RR NO JMT-01	841950	1504350	1996650	3151350	2072250	1665450	1086750	706500	689400	456750	367200	595800	15134400
TOTAL		15949710	25409700	33975420	60148883	32419501	22658422	19796266	17628151.4	20088593.9	14836420.1	9195420.75	12161700	284268188.3

² Where cells are highlighted in blue, metered export values have been adjusted to account for delays in calibration. Export values have been decreased by 0.2% and import values have been increased by 0.2%.

1.2. Gross Electricity Export from the project activity in kWh for the period: 1st April 2010 – 31st March 2011³

Sl. No	Electricity Board Meter ID	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	TOTAL
1	RR NO. MRB-03-K-131	1369500	3341250	3648975	4292475	3329700	2385900	1662375	1638450	1970100	1988250	1612050	1297725	28536750
2	RR NO. MRB-03-K-140	1399950	3440475	3939975	4524525	3407400	2683125	1782675	1749600	2137725	2108025	1645650	1512000	30331125
3	RR NO. MRB-03-K141	817200	2141100	2470050	2868300	2105550	1611450	990450	882900	1156500	1113300	850500	856800	17864100
4	RR NO MRB-03-K147	1144200	2781000	3058200	3625800	2520000	2058000	1320600	1150800	1439400	1407000	1170000	1156200	22831200
5	RR NO MRB-03-K-161	612900	1637550	1949400	2376450	1736100	1177650	651600	567900	683550	730800	611100	651600	13386600
6	RR NO JJK-06	1645350	4051950	4431000	5352900	4064550	2851800	1830150	1609650	2024400	2122050	1802850	1831200	33617850
7	RR NO JJK-07	478350	1197450	1278450	1557450	1275300	909675	582750	470025	580275	600300	554850	515025	9999900
8	RR NO JJK- 08	551700	1296300	1314300	1661400	1371900	975300	620700	602400	712200	769800	703500	635400	11214900
9	RR NO JJK-05	1305525	3180450	3969225	4943250	3893175	2701725	1479075	1610700	2008500	2135250	1733550	1661400	30621825
10	RR NO JMT-05	145440	359010	461135.88	499758.48	473890.32	318591.54	241076.88	127080	134730	160290	159120	159300	3239432.1
11	RR NO JMT-03	224700	816600	1338900	1568400	1327800	915300	491614.8	262274.4	367500	405300	325200	288900	8332489.2
12	RR NO. GRHP-01	252000	592812	999996	1221552	996000	627000	414000	309000	363000	432000	372000	339000	6918360
13	RR NO. GRHP-08	362700	946702.8	1182929.4	1335174.3	1206900	846450	604800	346500	441450	479700	459000	432000	8644306.5
14	RR NO. GRHP-09	255825	681300	957375	1077750	949950	627300	380925	242775	297675	349200	309600	291375	6421050
15	RR NO. GRHP-05	168300	503590.8	803889	959876.4	795600	490200	274200	273300	321600	366900	317700	260400	5535556.2
16	RR NO. GRHP-06	140625	288900	565425	717525	574875	377325	211500	209025	247950	295425	252450	245700	4126725
17	RR NO. GRHP-14	159840	380477.52	517482.96	618799.92	561360	388560	249600	207240	238440	261120	233400	183360	3999680.4
18	RR NO JMT-01	537300	1569604.5	2099542.5	2309272.2	2126250	1466550	963450	452250	561600	592200	544500	563400	13785919.2
TOTAL		11571405	29206523	34986251	41510658	32716300	23411902	14751542	12711869.4	15686595	16316910	13657020	12880785	2259407759.6

³ Where cells are highlighted in blue, metered export values have been adjusted to account for delays in calibration. Export values have been decreased by 0.2% and import values have been increased by 0.2%.

1.3. Electricity Import by the project activity in kWh for the Period: 1st April 2009 – 31st March 2010⁴

Sl. No	Electricity Board Meter ID	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	TOTAL
1	RR NO. MRB-03-K-131	8250	4950	825	826.65	2479.95	4959.9	4950	3300	2475	4125	14025	9900	61066.5
2	RR NO. MRB-03-K-140	6075	4050	675	0	2029.05	4734.45	4050	2025	2025	2700	8775	8100	45238.5
3	RR NO. MRB-03-K141	5400	3150	450	450.9	1352.7	2705.4	3600	1350	1350	2250	7650	5850	35559
4	RR NO MRB-03-K147	6000	4200	1200	0	1803.6	3607.2	4200	1800	1800	3000	8400	7800	43810.8
5	RR NO MRB-03-K-161	5400	3600	900	0	1803.6	3156.3	4500	2250	2250	3600	8100	6750	42309.9
6	RR NO JJK-06	10500	3150	2100	0	3150	5250	7350	3150	3150	5250	17850	11550	72450
7	RR NO JJK-07	2925	900	225	0	675	1350	1575	900	675	1125	3825	2475	16650
8	RR NO JJK- 08	3300	1200	300	0	1200	1500	2400	1200	600	1800	4800	3300	21600
9	RR NO JJK-05	8775	4875	976.95	0	3907.8	5861.7	6838.65	3907.8	1953.9	4884.75	17585.1	11700	71266.65
10	RR NO JMT-05	1530	990	540	90	630	720	1080	810	810	1440	1710	1710	12060
11	RR NO JMT-03	2700	1800	300	300	1200	1200	2100	1500	1800	2700	4500	3300	23400
12	RR NO. GRHP-01	3000	0	0	0	3000	0	3000	3000	0	3000	3000	3000	21000
13	RR NO. GRHP-08	1800	900	450	0	900	900	1350	1350	900	1350	2700	1800	14400
14	RR NO. GRHP-09	1350	675	225	225.45	900	675	1350	900	675	1350	1800	1350	11475.45
15	RR NO. GRHP-05	3000	1800	600	0	1800	1500	3000	2100	900	2400	4500	3000	24600
16	RR NO. GRHP-06	1350	675	225	225	675	675	1350	900	675	1125	2250	1350	11475
17	RR NO. GRHP-14	1200	480	240	120	480	360	960	0	480	1080	1320	960	7680
18	RR NO JMT-01	4050	2700	450	450	1350	1350	3600	2250	2700	4500	6750	4950	35100
TOTAL		76605	40095	10681.95	2688	29336.7	40504.95	57253.65	32692.8	25218.9	47679.75	119540.1	88845	571141.8

⁴ Where cells are highlighted in blue, metered export values have been adjusted to account for delays in calibration. Export values have been decreased by 0.2% and import values have been increased by 0.2%.

1.4. Electricity Import by the project activity in kWh for the Period: 1st April 2010 – 31st March 2011⁵

Sl. No	Electricity Board Meter ID	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	TOTAL
1	RR NO. MRB-03-K-131	12375	4950	1650	0	2475	4950	5775	4950	4950	4125	4950	9075	60225
2	RR NO. MRB-03-K-140	8775	4725	1350	0	1350	4050	4725	4050	3375	3375	3375	8100	47250
3	RR NO. MRB-03-K141	7200	3150	900	450	1350	2250	3600	2700	2700	2250	3150	5850	35550
4	RR NO MRB-03-K147	9000	4200	1200	0	1800	3600	3600	3600	3600	3000	4200	6600	44400
5	RR NO MRB-03-K-161	7650	3600	1350	0	2250	3150	4500	3600	3600	3150	4500	6300	43650
6	RR NO JJK-06	15750	6300	2100	1050	2100	5250	7350	6300	5250	5250	6300	11550	74550
7	RR NO JJK-07	3150	1575	450	0	450	1125	1575	1125	1350	1350	1575	2925	16650
8	RR NO JJK- 08	4500	2100	600	0	600	1800	1800	1800	1800	1500	2100	3900	22500
9	RR NO JJK-05	14625	5850	1950	0	1950	5850	6825	5850	4875	4875	6825	11700	71175
10	RR NO JMT-05	1890	1350	541.08	360.72	450.9	631.26	721.44	990	900	990	1080	1620	11525.4
11	RR NO JMT-03	4500	1500	600	0	600	1500	1803.6	1503	1500	1500	2100	3300	20406.6
12	RR NO. GRHP-01	3000	3006	0	0	0	0	3000	3000	0	3000	0	3000	18006
13	RR NO. GRHP-08	2250	901.8	901.8	0	0	1350	1350	1350	900	450	1350	1800	12603.6
14	RR NO. GRHP-09	1575	900	675	0	225	900	1125	1350	675	675	900	1350	10350
15	RR NO. GRHP-05	2700	1503	601.2	0	600	1200	1800	2100	1200	1200	1200	2400	16504.2
16	RR NO. GRHP-06	1800	900	450	0	450	1125	1125	1350	900	900	675	1350	11025
17	RR NO. GRHP-14	1200	480.96	240.48	120.24	120	600	600	600	840	600	720	1080	7201.68
18	RR NO JMT-01	6750	2254.5	901.8	450.9	450	2250	2700	2250	2250	2250	2700	4500	29707.2
TOTAL		108690	49246.26	16461.36	2431.86	17220.9	41581.26	53975.04	48468	40665	40440	47700	86400	553279.68

⁵ Where cells are highlighted in blue, metered export values have been adjusted to account for delays in calibration. Export values have been decreased by 0.2% and import values have been increased by 0.2%.

1.5. Transmission losses in kWh for the Period: 1st April 2009 – 31st March 2010

Sl. No	Electricity Board Meter ID	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	TOTAL
1	RR NO. MRB-03-K-131	35931.8	54411.3	67202.5	145086	59106.5	43105	42139	36763.6	41368	32779	21947	29635	609474.7
2	RR NO. MRB-03-K-140	38007.2	56245	73918.4	148613	64635.9	44966.7	45342	40903.7	41795	32441	21413	30710	638990.9
3	RR NO. MRB-03-K141	23001.03	35931.33	46585.68	97237	40390.57	27261.21	26417	20854.67	23805.07	17058.36	11071.02	17227	386839.94
4	RR NO MRB-03-K147	30186.8	45213.1	57823.4	118103	51660.3	35747	34645	27070	28440	22248	15038	23787	489961.6
5	RR NO MRB-03-K-161	16323.6	27442.7	35434	81568	30603	19649.6	18108	12995.4	14279	10308	8821	12391.1	287923.4
6	RR NO JJK-06	34451	66121	71344	159969	67853	43937	40904	28036	32516	25480	19108	24926	614645
7	RR NO JJK-07	9643	16943	20417	42542	21620	14048	11815	7981	9234	7033	5415	7101	173792
8	RR NO JJK- 08	10922	18351	21599	47399	22571	15018	14583	10021	12162	9428	6995	8907	197956
9	RR NO JJK-05	28234	45165	63191	148639	63006	39497	38673	28888	34588	24585	17831	22367	554664
10	RR NO JMT-05	1153.3	2061	2455.5	4648.2	2808.5	2212.4	1613	227.6	180.3	55	753.8	719.1	18887.7
11	RR NO JMT-03	1952.2	3846.2	6481.8	15895.6	7848	5140.1	4281.2	520.4	495.2	164.3	1666	1225	49516
12	RR NO. GRHP-01	2936	2379	4356	13366	6786	4294	7236	4423	6522	7016	4456	4745	68515
13	RR NO. GRHP-08	3920	3579	5734	14199	8253	5680	8471	4432	6585	7475	5594	6750	80672
14	RR NO. GRHP-09	2791	2585	4476	11892	6537	4180	6437	3281	4744	5261	4068	4507	60759
15	RR NO. GRHP-05	1907	1808	3390	10946	5202	3182	5677	2991	4927	5783	4444	2842	53099
16	RR NO. GRHP-06	1711	1349	2703	8340	3750	2393	4630	2917	3884	5188	3645	3199	43709
17	RR NO. GRHP-14	1638	1553	2483	6436	3841	2580	3946	2314	3667	4051	3239	3244	38992
18	RR NO JMT-01	4432.8	8069.8	10911	22552	12879.2	9594.8	7053	929.9	746	227	2644.3	2660.9	82700.7
TOTAL		249141.73	393053.43	500505.28	1097430.8	479350.97	322485.81	321970.2	235549.27	269937.57	216580.66	158149.12	206943.1	4451097.9

1.6. Transmission losses in kWh for the Period: 1st April 2010 – 31st March 2011

Sl. No	Electricity Board Meter ID	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	TOTAL
1	RR NO. MRB-03-K-131	26749	75589	76113.7	90443.4	66917	44132.3	28116.1	27975.5	31964	34259	28524.1	29357	560140.1
2	RR NO. MRB-03-K-140	27344	77834	82184	95332.7	68478.1	49630.1	30150.7	29873.3	34685	36324	29118.6	34204	595158.5
3	RR NO. MRB-03-K141	15962	48438	51523	60435.71	42315	29807.17	16751.67	15075	18764	19183	15048.98	19382	352685.53
4	RR NO MRB-03-K147	22349	62915	63791	76396.4	50644.1	38067	22335.6	19649.2	23354	24244	20702.3	26156	450603.6
5	RR NO MRB-03-K-161	11971	37046.1	40662.4	50072.3	34890.2	21783.1	11021	9696.5	11091	12592.2	10813	14740	266378.8
6	RR NO JJK-06	26131	70052	73431	90423	64936	44511	24486	20164	27057	25681	26226	26237	519335
7	RR NO JJK-07	7597	20702	21186	26309	20374	14198	7797	5888	7756	7265	8072	7379	154523
8	RR NO JJK- 08	8762	22411	21781	28065	21918	15222	8304	7546	9519	9316	10234	9104	172182
9	RR NO JJK-05	20734	54985	65778	83503	62198	42168	19789	20177	26844	25841	25218	23805	471040
10	RR NO JMT-05	879.4	1958.8	2509	2684.1	2208	569	155.4	442.2	388.2	168.4	385	883	13230.5
11	RR NO JMT-03	1359	4455.5	7270.2	8407	6174.2	1631.3	317	437	1039.3	426	786.4	1601	33903.9
12	RR NO. GRHP-01	4362	3423	8333	9039	5082	3474	2887	3482	2918	1111	1132	2850	48093
13	RR NO. GRHP-08	6277	5467	9857	9880	6158	4690	4217	3905	3549	1234	1397	3632	60263
14	RR NO. GRHP-09	4428	3927	7962	7959	4846	3476	2656	2736	2393	898	942	2450	44673
15	RR NO. GRHP-05	2913	2908	6699	7103	4059	2716	1912	3168	2585	944	967	2190	38164
16	RR NO. GRHP-06	2434	1665	4702	5299	2933	2091	1475	2356	1993	760	768	2066	28542
17	RR NO. GRHP-14	2767	2197	4312	4579	2864	2153	1740	2336	1917	672	710	1542	27789
18	RR NO JMT-01	3249	8581.1	11423.4	12402.8	9887	2613.8	619.7	751.3	1588.3	622.2	1317	3121.4	56177
TOTAL		196267.4	504554.5	559517.7	668333.41	476881.6	322932.77	184730.17	175658	209404.8	201540.8	182361.38	210699.4	3892881.9

ANNEXURE 2: ENERGY METER SPECIFICATIONS

S.No	Meter ID	Location	No. of WTGs	WTG Location Nos.	Connected Capacity (KW)	Connected to Substation	Main Meter No.	Check Meter No.	Accuracy class	Model / Make	Calibration agency (External / Internal)
1	RR NO. MRB-03-K-131	Sogi, Bellary	11	K121 to K131	13750	Suzlon 66/33 KV Substation at Sogi	4249306	4249312	±0.2%	L&T	External (Gulbarga Electricity Supply Company Limited (GESCOM))
2	RR NO. MRB-03-K-140	Sogi, Bellary	9	K132 to K140	11250	Suzlon 66/33 KV Substation at Sogi	4249330	4249308	±0.2%	L&T	External (Gulbarga Electricity Supply Company Limited (GESCOM))
3	RR NO. MRB-03-K141	Sogi, Bellary	6	K141 to K146	7500	Suzlon 66/33 KV Substation at Sogi	4249305	4249310	±0.2%	L&T	External (Gulbarga Electricity Supply Company Limited (GESCOM))
4	RR NO MRB-03-K147	Sogi, Bellary	8	K147 to K150 & K153 to K156	10000	Suzlon 66/33 KV Substation at Sogi	4249354	4249359	±0.2%	L&T	External (Gulbarga Electricity Supply Company Limited (GESCOM))
5	RR NO MRB-03-K-161	Sogi, Bellary	6	K161 to K166	7500	Suzlon 66/33 KV Substation at Sogi	4249295	4249296	±0.2%	L&T	External (Gulbarga Electricity Supply Company Limited (GESCOM))
6	RR NO JJK-06	Jajikalgudda, Davangere	14	K167 to K180	17500	Suzlon 66/33 KV Substation at Jajikalgudda	04249328 6604982 ⁶	04249329	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
7	RR NO JJK-07	Jajikalgudda, Davangere	3	K181 to K183	3750	Suzlon 66/33 KV Substation at Jajikalgudda	04249320	04249360	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
8	RR NO JJK- 08	Jajikalgudda, Davangere	4	K184 to K187	5000	Suzlon 66/33 KV Substation at Jajikalgudda	04249346	04249340	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
9	RR NO JJK-05	Jajikalgudda, Davangere	13	K188 to K200	16250	Suzlon 66/33 KV Substation at Jajikalgudda	04249322	04249323	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
10	RR NO JMT-05	Jogimatti, Chitradurga	1	K28	1250	Suzlon 66/33 KV Substation at Chitradurga	04249341	04249345	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))

⁶ For RR No. JJK-06, main meter no. 04249328 has been replaced with main meter no.6604982 on 12/05/2009. As per the letter from the Executive Engineer Electrical, BESCOM, dated 15/05/2009, the main meter was replaced due to a failure of display (PT circuit failure) of the main meter. For the months of April and May 2009, check meter readings have been considered for billing and for emission reduction calculations. The calibration of both the new main and check meters were carried out and the readings were found to be within the permissible limits of 0.2%.

S.No	Meter ID	Location	No. of WTGs	WTG Location Nos.	Connected Capacity (KW)	Connected to Substation	Main Meter No.	Check Meter No.	Accuracy class	Model / Make	Calibration agency (External / Internal)
11	RR NO JMT-03	Jogimatti, Chitradurga	3	K33 to K35	3750	Suzlon 66/33 KV Substation at Chitradurga	04249362	04249363 ⁷ 08001367	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
12	RR NO. GRHP-01	GR Halli, Chitradurga	4	MSPL7 to MSPL10	3800	NEG MICON 66/33 KV Substation at Chitradurga	02307542	02307543	±0.2%	ABB	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
13	RR NO. GRHP-08	GR Halli, Chitradurga	6	MSPL11, MSPL12A, MSPL12B, MSPL14 to MSPL16	5300	NEG MICON 66/33 KV Substation at Chitradurga	04186306	04186299	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
14	RR NO. GRHP-09	GR Halli, Chitradurga	5	MSPL17 to MSPL21	3750	NEG MICON 66/33 KV Substation at Chitradurga	04186287 09141515 ⁸	04186304	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
15	RR NO. GRHP-05	GR Halli, Chitradurga	4	MSPL22 to MSPL25	3800	NEG MICON 66/33 KV Substation at Chitradurga	04179552 09142205 ⁹	04179678	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
16	RR NO. GRHP-06	GR Halli, Chitradurga	3	MSPL26 to MSPL28	2850	NEG MICON 66/33 KV Substation at Chitradurga	04179664	04179679	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))
17	RR NO. GRHP-14	GR Halli, Chitradurga	2	MSPL29 to MSPL30	1900	NEG MICON 66/33 KV	04186311	04186289	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd

⁷ For RR No. JMT-03, check meter no. 04249363 was replaced with check meter no.08001367 on 14/10/2009. As per the letter from the Executive Engineer Electrical, BESCOM, dated 06/11/2009, the check meter was replaced because the display of the check meter was faulty. The calibration of both the main and new check meters were carried out and the readings were found to be within the permissible limits of 0.2%.

⁸ For RR No. GRHP-09, main meter no. 04186287 was replaced with main meter no.09141515 on 29/07/2009. As per the letter from BESCOM dated 14/05/2009, there was a variation found in the RTC of the meter. The calibration of both the main and new check meters were carried out and the readings were found to be within the permissible limits of 0.2%.

⁹ For RR No. GRHP-05, main meter no. 04179552 has been replaced with main meter no.09142205 on 12/11/2010. For the month of November 2010, check meter readings were considered for billing and for emission reduction calculations. The calibration of both the main and new check meters were carried out and the readings were found to be within the permissible limits of 0.2%.

S.No	Meter ID	Location	No. of WTGs	WTG Location Nos.	Connected Capacity (KW)	Connected to Substation	Main Meter No.	Check Meter No.	Accuracy class	Model / Make	Calibration agency (External / Internal)
						Substation at Chitradurga					(KPTCL))
18	RR NO JMT-01	Jogimatti, Chitradurga	5	K23 to K27	6250	Suzlon 66/33 KV Substation at Chitradurga	04179551	04179544	±0.2%	L&T	External (Karnataka Power Transmission Corporation Ltd (KPTCL))

ANNEXURE 3: SUBSTATION DETAILS

Suzlon 66/33 KV Receiving Station at Sogi			
Owner of WTGs	Meter ID	Connected WTGs	Part of Project Activity
KREDL	MRB 03 K151	KREDL WTGs	No
MSPL Ltd	MRB 03 K131	MSPL WTGs Loc. Nos K121-K131	Yes
MSPL Ltd	MRB 03 K140	MSPL WTGs Loc Nos K132-K140	Yes
P Vengana Shetty & Brothers	MRB 03 K141	PVS & Brothers WTGs Loc Nos K141-K146	Yes
Ramgad Minerals & Mines Pvt Ltd (RMMPL)	MRB 03 K147	RMMPL WTGs Loc Nos K147 to K150 & K153 to K156	Yes
Ramgad Minerals & Mines Pvt Ltd (RMMPL)	MRB 03 K161	RMMPL WTGs Loc Nos K161 to K166	Yes

Suzlon 66/33 KV Receiving Station at Chitradurga			
Owner of WTGs	Meter ID	Connected WTGs	Part of Project Activity
G.N. Agarwal	KMK-01	G.N. Agarwal WTGs	No
Ferromar Shipping Pvt. Ltd	KMK-02	Ferromar Shipping Pvt. Ltd. WTGs	No
Rajesh Construction Co.	KMK-03	Rajesh Construction Co. WTGs	No
Vandana Ispat	KMK-04	Vandana Ispat WTGs	No
MSPL Ltd	JMT-01	MSPL Ltd WTGs Loc Nos K23 to K27	Yes
Navalakha Translines	JMT-02	Navalakha Translines WTGs	No
MSPL Ltd	JMT-03	MSPL Ltd WTGs Loc Nos K33 to K35	Yes
Kariganur Iron & Steel	JMT-04	Kariganur Iron & Steel WTGs	No
MSPL Ltd	JMT-05	MSPL Ltd WTGs Loc No K28	Yes
Amitronics	JMT-06	Amitronics WTGs	No
Mantri Developers	JMT-07	Mantri Developers WTGs	No
Abishek Exports	JMT-08	Abishek Exports WTGs	No
Jivraj Tea	JMT-09	Jivraj Tea WTGs	No
Sanjana Gryogenics	JMT-10	Sanjana Gryogenics WTGs	No

Suzlon 66/33 KV Receiving Station at Jajikalgudda			
Owner of WTGs	Meter ID	Connected WTGs	Part of Project Activity
MSPL Ltd	JJK-08	MSPL WTGs Loc No. K184 to K187	Yes
MSPL Ltd	JJK-05	MSPL WTGs Loc No. K188 to K200	Yes
Ramgad Minerals & Mines Pvt	JJK-07	RMMPL WTGs	Yes

Ltd (RMMPL)		Loc No. K181 to K183	
Ramgad Minerals & Mines Pvt Ltd (RMMPL)	JJK-06	RMMPL WTGs Loc No. K167 to K180	Yes

NEG Micon 66/33 KV Receiving Station at Chitradurga			
Owner of WTGs	Meter ID	Connected WTGs	Part of Project Activity
MSPL Ltd	GRHP-2	MSPL WTGs ¹⁰	No
MSPL Ltd	GRHP-3	MSPL WTGs ¹	No
MSPL Ltd	GRHP-1	MSPL WTGs Loc No. MSPL7 to MSPL10	Yes
MSPL Ltd	GRHP-8	MSPL WTGs Loc No. MSPL11, MSPL12A, MSPL12B, MSPL14 to MSPL16	Yes
MSPL Ltd	GRHP-9	MSPL WTGs Loc No. MSPL17 to MSPL21	Yes
MSPL Ltd	GRHP-5	MSPL WTGs Loc No. MSPL22 to MSPL25	Yes
MSPL Ltd	GRHP-6	MSPL WTGs Loc No. MSPL26 to MSPL28	Yes
MSPL Ltd	GRHP-14	MSPL WTGs Loc No. MSPL29 to MSPL30	Yes
Ramgad Minerals & Mines Pvt Ltd (RMMPL)	GRHP-4	RMMPL WTGs ¹	No
Ramgad Minerals & Mines Pvt Ltd (RMMPL)	GRHP-13	RMMPL WTGs ¹	No
Suresh Productions Pvt. Ltd.	GRHP-7	Suresh Productions WTGs	No
Sanghvi Movers Limited	GRHP-12	Sanghvi Movers Limited WTGs	No
Eswari Knitting Works	GRHP-10	Eswari Knitting Works WTGs	No
Eswari Garments	GRHP-11	Eswari Garments WTGs	No
Eswari Textiles	GRHP-15	Eswari Textiles WTGs	No

NEG Micon 66/33 KV Receiving Station at Chitradurga			
Owner of WTGs	Meter ID	Connected WTGs	Part of Project Activity
Victus Associat	GRHP-16	Victus Associat WTGs	No
Shanmuga Compacts	GRHP-18	Shanmuga Compacts WTGs	No
Bellary Iron Ores Pvt. Ltd. - Chikkappanahally	GRHP-17	Bellary Iron Ores WTGs	No
Jindal Aluminium Ltd.	KHLP-1	Jindal Aluminium WTGs	No
Indian Energy Pvt. Ltd.	KHLP-2	Indian Energy WTGs	No
Pallavi Green Power	KHCD-4	Pallavi Green Power WTGs	No

¹⁰ This set of WTGs are not part of the project activity but are included in a separate GHG emissions reduction project.

Savitha Chemicals Ltd - Kunchiganal	KHLP-3	Savitha Chemicals WTGs	No
Mansukmal Investments Pvt. Ltd	KHLP-4	Mansukmal Investments WTGs	No
Karignur Iron Steel Pvt. Ltd	KHLP-5	Karignur Iron Steel WTGs	No
Maris Power Supply Company – Kunchiganal	GRHP 20	Maris Power WTGs	No
Maris Power Supply Company - Madhikaripura	GRHP 21	Maris Power WTGs	No
Bellary Iron Ores Pvt. Ltd. - Gonur	GRHP 24	Bellary Iron Ores WTGs	No
Savitha Chemicals Ltd -Gonur	GRHP 23	Savitha Chemicals WTGs	No
S. Kumar - Gonur	GRHP 22	S. Kumar WTGs	No
Ballad & Company Ltd. – Gonur	GRHP 25	Ballad & Company WTGs	No
Elveety Industries Pvt. Ltd.	GRNHP 1	Elveety Industries WTGs	No
Indian Energy Pvt. Ltd.	GRHP 26	Indian Energy WTGs	No
Savitha Chemicals Ltd.	CKS 20	Savitha Chemicals WTGs	No
Lanco Infratech Ltd.	CKS 01	Savitha Chemicals WTGs	No
Prabath Agri Biotech Ltd.	CKS 02	Savitha Chemicals WTGs	No

ANNEXURE 4: FUNCTIONS OF GOVERNMENT BODIES

KPTCL

Karnataka Power Transmission Corporation Limited (KPTCL) is a registered company under the Companies Act, 1956 was incorporated on 28/7/1999 and is a company wholly owned by the Government of Karnataka. KPTCL was formed on 1/8/1999 by carving out the Transmission and Distribution functions of the erstwhile Karnataka Electricity Board.

The Power Purchase Agreements for the machines installed in phase I of the project activity are with signed with KPTCL. Joint Meter Readings are carried out by KPTCL officials and representatives of the project promoters. However, the payments against sale of electricity are issued by BESCOM.

UNBUNDLING OF KPTCL INTO ESCOMS

As per Government vide order No. 69 BSR 2001 Bangalore, dated 15/02/2002, four distribution companies were formed to take over the function of distribution of power previously performed by KPTCL. Following this order, KPTCL is vested with the responsibility of transmitting power all over the State and construction and maintenance of Stations and lines of 66KV and above. KPTCL purchases power from various power producers and sells it to the distribution companies.

The four newly formed independent distribution companies, which were registered on 30/04/2002, are Bangalore Electricity Supply Company (BESCOM), Mangalore Electricity Supply Company (MESCOM), Hubli Electricity Supply Company (HESCOM) and Gulbarga Electricity Supply Company (GESCOM). They have started functioning w.e.f. 01/06/2002. These companies are in charge of distribution of power within their jurisdiction.

The Power Purchase Agreements for the machines installed in phase II of the project activity are signed with BESCOM.

SPPCC

The State Power Procurement Co-ordination Centre (SPPCC) is a cell that operated under KPTCL. SPPCC was merged with the Power Company of Karnataka Limited (PCKL), a special purpose vehicle, on 1/09/07 as per Government Order No. EN 138 PPC 2006. SPPCC performed the function of verification and scrutinizing of bills (bill payment statements) for power producers. This function was subsequently transferred to the ESCOMs on September 2007.

ANNEXURE 5: ENERGY METER CALIBRATION DETAILS

[illegible]

ANNEXURE 6: EX-ANTE VALUES¹¹

Amount of fossil fuel i, consumed by each power source/plant ($F_{i,j,y}$)

Parameter	Year	Coal	Furnace oil	Diesel oil	LSHS (steam)	Gas	Naphtha	HSD (gas stations)	Natural Gas	Diesel	LSHS (diesel)	Lignite
$F_{i,j,y}$	Unit	Tons/year	Tons/year	Tons/year	Tons/year	m ³ /year	Tons/year	Tons/year	Million m ³ /year	Tons/year	Tons/year	Tons/year
	2001-02	53107000	115103.7	5821.65	7321.6	0.00	149197.41	4614.65	3230	648561.05	0	17318250
	2002-03	65997000	103163.46	7145.95	5361.84	0	322854.84	233853.7	3130	736047.3	0	17738000
	2003-04	52985000	50275.21	28076.35	4672.8	1932274000.0	478596.51	192933.85	2010	12667.55	569756.88	20755000

CO₂ emission factor of each fuel type i ($COEF_{i,j,y}$)

Parameter	Year	Coal	Furnace oil	Diesel oil	LSHS (steam)	Gas	Naphtha	HSD (gas stations)	Natural Gas	Diesel	LSHS (diesel)	Lignite
$COEF_{i,j,y}$	Unit	tCO ₂ /ton of fuel	tCO ₂ /ton of fuel	tCO ₂ /ton of fuel	tCO ₂ /ton of fuel	kgCO ₂ /m ³ of gas	tCO ₂ /ton of fuel	tCO ₂ /ton of fuel	tCO ₂ /million m ³ of gas	tCO ₂ /ton of fuel	tCO ₂ /ton of fuel	tCO ₂ /ton of fuel
	2001-02	1.91	3.19	3.16	3.18	NA	3.284	3.160	2120.024	3.16	3.18	1.09
	2002-03	1.64	3.26	3.00	3.20	NA	3.284	2.996	2120.024	3.00	3.20	1.12
	2003-04	1.51	3.15	3.13	3.13	0.47	3.284	3.127	2120.024	3.13	3.13	1.14

Electricity delivered to the grid by power source j in year y ($GEN_{j,y}$)

Parameter	Year	Coal & Lignite	Gas	Diesel
$GEN_{j,y}$	Unit	MWh	MWh	MWh
	2001-02	84031.63	10329.45	4135.12
	2002-03	92053.19	13950.10	4358.50
	2003-04	95898.00	16949.00	3225.00

¹¹ All values are taken from the registered PDD

History of the document

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