

**MONITORING REPORT FORM (F-CDM-MR)**
Version 02.0**MONITORING REPORT**

Title of the project activity	8.75 MW Bundle Wind Power Project in Maharashtra
Reference number of the project activity	1145
Version number of the monitoring report	1
Completion date of the monitoring report	02/11/2012
Registration date of the project activity	29/07/2007
Monitoring period number and duration of this monitoring period	Monitoring period no.: 02 Duration: 2 Years (01/04/2010 – 31/03/2012)
Project participant(s)	M/s Shahi Export Pvt. Ltd.
Host Party(ies)	India
Sectoral scope(s) and applied methodology(ies)	01; AMS-I.D.
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	34,126 t CO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	23,413 t CO ₂ e

SECTION A. Description of project activity**A.1. Purpose and general description of project activity**

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Purpose of project activity

This is the second Monitoring Report of project titled ‘8.75 MW Bundle Wind Power Project in Maharashtra’ by M/s Shahi Exports Pvt. Ltd. The document reports the Emission Reduction (ERs) generated by this CDM project, for producing renewable energy, covering the monitoring period from 01/04/2010 – 31/03/2012.

The implemented project activity, sells electricity to the regional grid, avoiding the dispatch of same amount of energy produced by fossil fuelled thermal plants to the grid. By that, the project avoids CO₂ emissions, and contributes to the regional sustainable development.

General description of project activity

In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy.

Wind has considerable amount of kinetic energy when blowing at high speeds. This kinetic energy when it passes through the blades of the wind turbines it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. Technology of Wind Turbine generator used in the project activity is developed by M/s Suzlon Energy Limited. The project activity installs 7 nos. (S-66) Suzlon make WEG of 1.25 MW capacity.

The project operation has been monitored in accordance with the requirements of the applicable Monitoring Methodology as described in its:

- Project Design Document Version: 03 (CDM-SSC-PDD)
- Guideline For Completing The Monitoring Report Form, EB 66, Annex 20, Version 02.0

Relevant dates for the project activity

The different units of the project were commissioned on the dates as given below and are running successfully since then.

Table -1: Commissioning Date

SITE	COMMISSIONING DATE
Dhule	
K 257 (1.25MW)	06/03/2006
K 259 (1.25MW)	06/03/2006
K 260 (1.25MW)	06/03/2006
Nandurbar	
K 391 (1.25MW)	26/03/2006
K 392 (1.25MW)	27/03/2006
K 393 (1.25MW)	26/03/2006
K 394 (1.25MW)	27/03/2006

Total emission reductions achieved in this monitoring period

The electricity generation from the project activity will contribute to GHG reductions achieved at 23,413 t CO₂ e over the Monitoring Period 01/04/2010 – 31/03/2012.

A.2. Location of project activity

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The proposed project is a bundled project activity which involves the establishment of 8.75 MW Wind Power Project. Project will enable generation of electricity by state-of-art seven 1.25 MW Wind Turbine Generators (WEGs) (One of the latest available technologies in the country developed by M/s Suzlon Energy Limited), in the State of Maharashtra. Project participant is M/s Shahi Exports Pvt. Ltd (hereafter SEPL or project participant).

The bundled project activity consists of 2 bundles:

- Bundle I: At Dhule (3 Nos. x 1.25 MW)
- Bundle II: At Nandurbar (4 Nos. x 1.25 MW)

The sum of the output capacity of project activities within the bundle does not exceed the maximum output capacity limit for its type (i.e. Renewable energy project activity with a capacity < 15 MW), hence this particular project activity qualifies as a Small Scale as per CDM Guidelines.

Location of each Project is shown in the following table

Table -2: Location of each Project

Unique Identification of Project Activity		
	Bundle I	Bundle II
Site	Amkhel (3 Nos. x 1.25 MW)	Gangapur (4 Nos. x 1.25 MW)
Taluka	Sakri	Nandurbar
District	Dhule	Nandurbar
R.S. No.	100, 119, 164	125, 8, 64, 8
Unique Identification Number	K 257, K259, K 260	K391, K393, K392, K394

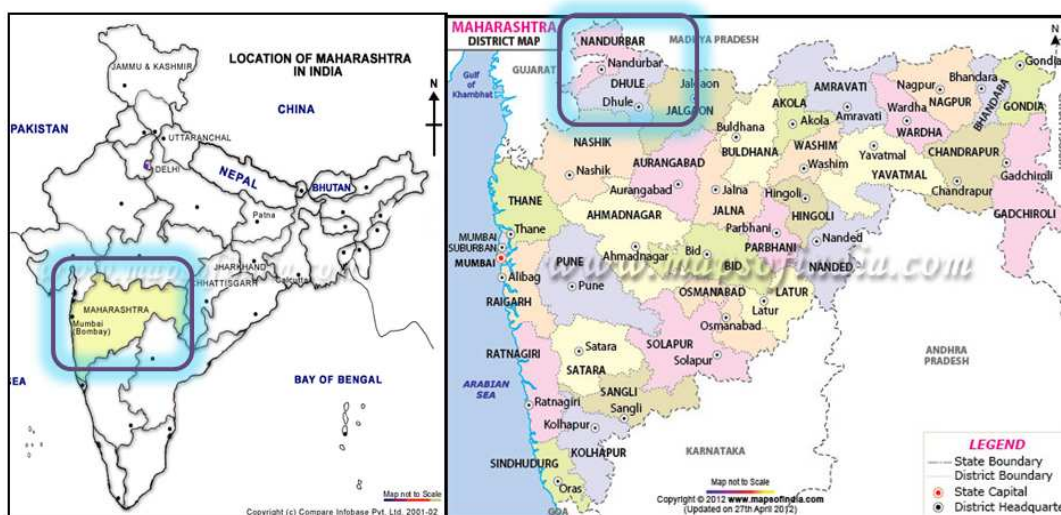


Figure 1: Location of Wind Turbines



Geo Co-ordinates			
Bundle I	K 257	N 21° 09' 58.4"	E 74° 14' 35.9"
	K 259	N 21° 10' 00.4"	E 74° 13' 59.8"
	K 260	N 21° 10' 25.3"	E 74° 13' 40.8"
Bundle II	K 391	N 21° 16' 20.3"	E 74° 17' 53.1"
	K 392	N 21° 16' 00.6"	E 74° 16' 35.5"
	K 393	N 21° 16' 18.5"	E 74° 16' 12.7"
	K 394	N 21° 15' 57.9"	E 74° 16' 18.2"

A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	Private entity - M/s Shahi Exports Pvt. Ltd.	No

A.4. Reference of applied methodology

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As defined under Appendix B of the simplified modalities and procedures for small-scale CDM project activities, the project activity falls under following project types and categories:

- Type : I – Renewable Energy Projects
- Project Category : I.D. – Grid connected renewable electricity generation - Version 10

A.5. Crediting period of project activity

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Crediting Period: 29/07/2007 to 28/07/2017

Total Crediting Period: 10 Years (Fixed)

SECTION B. Implementation of project activity**B.1. Description of implemented registered project activity**

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- Starting date of the operation of the project activity:
Three WEG's of (1.25 MW X 3 No.) in Bundle I at Dhule are commissioned on 06/03/2006. In Bundle II (1.25 MW X 4 No.) at Nandurbar 2 WEGs i.e. K 391 & K 393 were commissioned on 26/03/2006 while other 2 WEGs i.e. K 392 & K 394 were commissioned on 27/03/2006. Since date of commissioning to till date, the three WEGs of Bundle I is connected to Walve sub-station, where as 4 WEGs of Bundle II are presently connected to Gangapur substation¹. All the WEGs of the project activity are in continuous operation since the commissioning of the project.
- Information regarding actual operation of project activity during the monitoring period:
During the said monitoring period, no special events, for example overhaul times, downtimes of equipment, exchange of equipment, etc. were encountered.
- Events / Situations that occurred during the monitoring period impacting the applicability of methodology

¹ Four WEGs of sub bundle II were connected to Jamde substation from date of commissioning to 09/05/2009 and subsequently was shifted to Gangapur substation for purpose of load sharing.

There were no such events or situations that occurred during the monitoring period, which would have any impact on the applicability of the methodology.

B.2. Post registration changes**B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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Revision of the monitoring plan was approved by CDM-EB on 29/03/2011 during 1st Verification.

B.2.2. Corrections

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None

B.2.3. Permanent changes from registered monitoring plan or applied methodology

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None

B.2.4. Changes to project design of registered project activity

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None

B.2.5. Changes to start date of crediting period

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None

B.2.6. Types of changes specific to afforestation or reforestation project activity

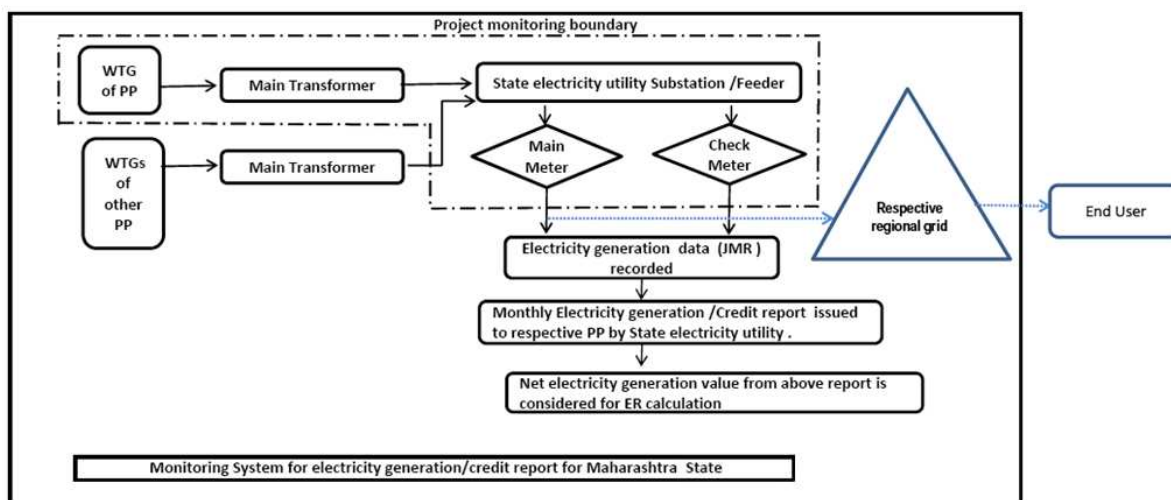
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Not Applicable

SECTION C. Description of monitoring system

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Line Diagram showing all relevant Monitoring Points:-





Metering System at the site: The project activity WEG's are connected to individual feeder connected to different sub-station². There is Main & Check meter of accuracy class 0.2s connected to individual feeder at both the sub-station. Gross electricity exported & imported are measured & recorded by the each main meter & check meter at substation. Based on this reading for the Net Electricity value is calculated as Gross Electricity export – Gross Electricity Import. The Net Electricity Exported by the projects activity to the Grid would be the sum total of the Net Electricity Exported calculated at both the substation.

The meter readings at the Metering Point are undertaken jointly by the representatives of the MSEDCL and the representative of Project Proponent i.e. SISL in every month.

The metering equipment (Consisting of the Main Meter and the Check Meter) is duly approved, tested and sealed by MSEDCL and is in complete control of MSEDCL only. The meter readings are jointly certified by representatives of the MSEDCL and SISL. However, it is the reading of the Main Meter that is considered for billing & emission reduction purpose. In case of error/failure in the Main Meter, the Check Meter reading is taken and the Main Meter is immediately calibrated /replaced by MSEDCL.

After the Main Meter readings are checked and cleared by MSEDCL authorities, Credit Report are prepared & issued to the customer. These electricity supplied values provided in Credit Report by MSEDCL is used for calculating the emission reductions from the Project activity.

Project activity shares the same metering equipment (s) at each sub-station with other wind energy generator that doesn't belong to this project activity. An apportioning approach is taken by the Maharashtra State Electricity Distribution Company Limited (MSEDCL) to calculate the share of Net Electricity Exported to the grid by the Individual Investors. The detailed procedure is explained below viz:

- a. The MSEDCL & SISL personnel jointly take the Main Meter reading at MSEDCL sub-station (to which the project activity as well as non-project activities Wind Electric Generators is connected) in every month.
- b. These readings are forwarded to the MSEDCL O & M Circle Office at Dhule.
- c. The MSEDCL O & M Circle Office at Dhule, based on this reading mentioned above, issues a feeder-wise Break up Energy Report of the electricity received at each sub-station to SISL³.
- d. After receipt of the feeder-wise Break up Energy Report, the SISL of the Wind WEG provide a generation bifurcation of individual WEG (based on the electricity generation readings at the controller end) as per the PPA.

² The Feeder & sub-station to which Main Meter & Check Meter of project activity are currently connected may be shifted to other substation in the future for load sharing. Load sharing activity is under complete control of MSEDCL.

³ Feeder wise Break up Energy Reports contains generation readings of all project proponents whose WEG's are connected to the feeder at sub-station. As this report contains confidential information of other PP's WEG's generation, hence it remains with SISL only.

- e. After receipt of the individual bifurcation of energy generated for each Wind Electric Generator from SISL, the Net Electricity Exported to the grid by the individual investor's WEG is calculated by the MSEDCL, using an apportioning method, based on which the Credit Report is prepared and issued by MSEDCL O & M Circle Office, Dhule for each WEG. The Credit Report contains the Net Electricity Exported by the individual WEG to the grid. This Credit Report is used for the calculations of emission reductions from the project activity.

The Formula used by the MSEDCL for the apportioning is:

I) Net Export of WEG @ EB (Electricity Board)

= (Controller Generation @ Individual WEG) x (Total Net Generation @EB) [S/S feeder]

Total Controller Generation of WEGs for each feeder

Above steps for apportioning of electricity amongst the individual investors are controlled and conducted by the MSEDCL and the Project Proponent has no role in the entire procedure of apportioning.

Procedures for Data Uncertainty:

The accuracy class of Main and Check Meters is 0.2s. The Main & Check Meter are tested annually by the MSEDCL authority. The meters shall be deemed to be working satisfactorily if the errors are within Specifications of the meters i.e. $\pm 0.2s$. The generation registered by the Main Meter alone will be used for the purpose of billing and emission reduction as long as the error in the Main Meter is within the permissible limits i.e. $\pm 0.2s$. The procedures or steps followed in case of uncertainties are listed below:

1. The main and check meter readings are measured and recorded every month by MSEDCL & representative of Project Proponent (SISL). MSEDCL authority will compare the readings of the main & check meter. In case of differences in the readings of main meter and check meter exceeds by $\pm 0.2\%$, MSEDCL authority does testing of the Check meter & Main meter, the meter with error will be identified, then MSEDCL goes for calibration for the meter showing error. If the error is with main meter, then for that particular month check meter reading will be used for preparing the feeder wise Break up energy report & Monthly Credit Report.
2. If during the joint monthly meter reading the error is found in check meter, the main meter reading will only be used in Break up energy report preparation and check meter will be corrected for the identified error. The generation registered by the main meters alone will be used for the purpose of credit report preparation by MSEDCL as long as the error in the main meter is within the permissible limits.
3. In case of any error identified during annual testing, correction will be applied by the project proponent and CER value will be corrected to achieve conservativeness. Based on testing record of main & check meter, the highest error - either of main or check meter - will be applied to all the readings available in credit report issued by MSEDCL since the date of last testing. This will give conservative estimate of CER.



During the current monitoring period there has been no instance of data uncertainty due to defects or errors in any of the meters of the project activity.

Accuracy testing of meters / Calibration

The frequency of accuracy testing of meters of the project activity is stated to be annual as per the approved revised monitoring plan.

During the current monitoring period, for **Bundle I**, following are the dates of accuracy testing:

- 1) 08/07/2009
- 2) 20/08/2010
- 3) 10/08/2011 to 24/08/2011

As seen above there is delayed calibration in the year 2010 & 2011. The PP has applied an error equivalent to the maximum permissible error of the meter i.e. 0.2% to the measured values from

- I. 09/07/2010 till the monthly credit report data of August 2010

Further, PP has applied an error equivalent to the maximum permissible error of the meter i.e. 0.2% to the monthly credit report data of July & August 2010. The maximum permissible error is applied since the results of the delayed testing of the meters indicate the errors to be within the maximum permissible error of the instrument.

Bundle II

The WEGs of Bundle II are connected to the Gangapur sub-station from the start of the current monitoring period. The accuracy testing of the meters connected to the feeder at Gangapur substation are as follows

- 1) 04/06/2009
- 2) 20/08/2010
- 3) 10/08/2011 to 24/08/2011

As seen above there is delayed calibration in the year 2010. The PP has applied an error equivalent to the maximum permissible error of the meter i.e. 0.2% to the measured values from

- I. 05/06/2010 till the monthly credit report data of August 2010

Further, PP has applied an error equivalent to the maximum permissible error of the meter i.e. 0.2% to the monthly credit report data of June, July & August 2010. The maximum permissible error is applied since the results of the delayed testing of the meters indicate the errors to be within the maximum permissible error of the instrument.

The project participant signed an operation and maintenance agreement with the supplier of the wind turbines i.e. Suzlon Infrastructure Services Limited here onwards SISL. The agreement is for a period of 10 years. The performance of the turbines, safety in operation and scheduled /breakdown maintenances is responsibility of SISL and are organized and monitored by them. So the authority and responsibility of project management lies with the O & M contractor i.e. SISL.

Management Services:

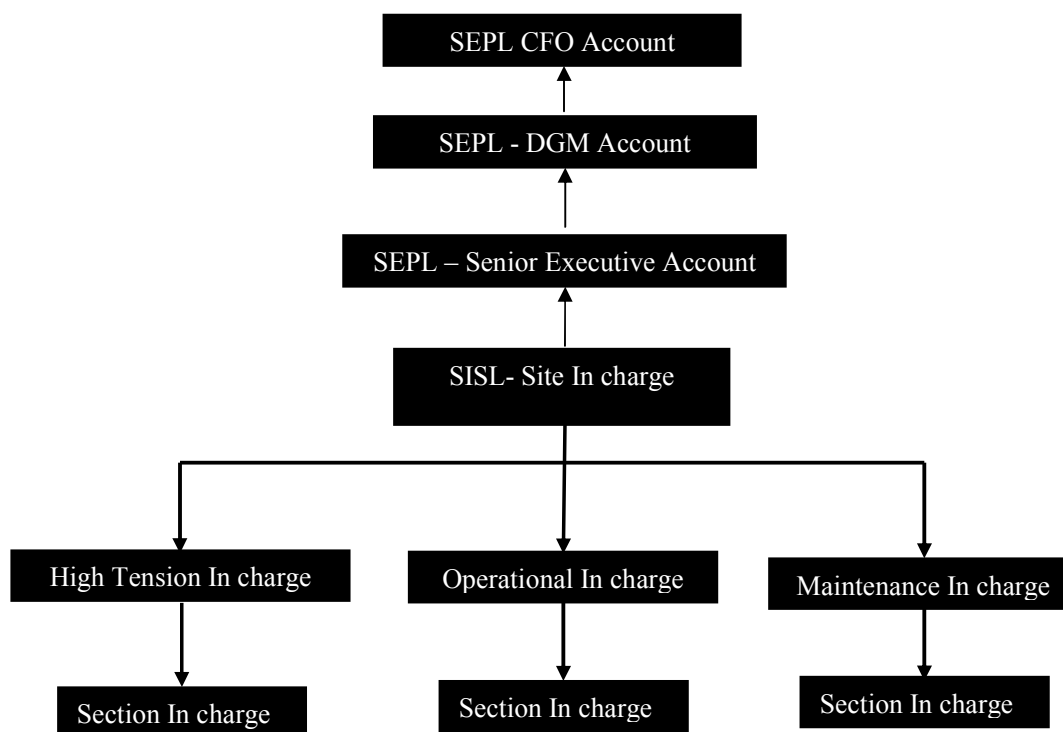
- a) Data logging in for power generation, grid availability, machine availability.
- b) Preparation and submission of monthly performance report in agreed format.
- c) Taking monthly meter reading jointly with utility of power generated at Wind Farm and supplied to grid from the meter/s maintained by utility for the purpose and co-ordinate to obtain necessary power credit report/ certificate.

Technical Services:

- a) Visual inspection of the WEG's and all parts thereof.
- b) Technical assistance including checking of various technical, safety and operational parameters of the equipment, trouble shooting and relevant technical services.

Although it is being anticipated that there would be no unintended emissions/leakages from this project, however, if any such condition arises, and leakage effect is found due to the project, such leakage will be accounted accordingly as mentioned in the chosen applied baseline methodology.

The organizational hierarchy of Project Proponent & SISL Project management is as follows –



**SECTION D. Data and parameters****D.1. Data and parameters fixed ex ante or at renewal of crediting period***(Copy this table for each piece of data and parameter.)*

Data/Parameter	CO₂ Emission Factor
Unit	t CO₂ / MWh
Description	Carbon emission factor
Source of data	Central Electricity Authority – Carbon Dioxide baseline Database version 3 published on 15/12/2007
Value(s) applied	0.92
Purpose of data	Baseline emission calculation. Combined margin including imports (average of operating and built margin) for the western grid of India.
Additional comment	This data is fixed ex-ante for the entire crediting period

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Copy this table for each piece of data and parameter.

Data/Parameter	EG _{y, export}			
Unit	MWh			
Description	Gross Electricity Exported by Project Activity to the grid as per Monthly Credit Report			
Measured/Calculated /Default	Measured			
Source of data	Monthly Credit Report by MSEDCL			
Value(s) of monitored parameter	25542			
Monitoring equipment	Type: Trivector Electronic meters Accuracy Class: 0.2s Calibration Frequency: Annual			
	Machine No.	Meter Serial No.	Date of last calibration	Validity
	K-257	Main meter: 4725793 Check meter: 4725788	20/08/2010	1 Year
	K-259			
	K-260			
	K-391	Main meter: 4961774 Check meter: 4961768	20/08/2010	1 Year
	K-392			
	K-393			
	K -394			
	Measuring/Reading/ Recording frequency	Gross Electricity Exported by all WEG's including project activity (connected to the individual feeder) are recorded every month from each Main Meter & Check Meter connected at the sub-station jointly by Project Proponents representative i.e. Suzlon Infrastructure Services Limited (here onwards SISL) & MSEDCL personnel.		
Calculation method (if applicable)	Not Applicable			
QA/QC procedures	The Main and Check Meters are tested annually for accuracy with a portable calibrated standard meter by the MSEDCL			
Purpose of data	Measurement of Electricity generation and export by project activity's WEG's to Grid. EG _{y, export} is used for calculation of baseline emission.			
Additional comment	The data is archived for the entire crediting period + 2 years or the date of last issuance whichever is later, in paper and electronic form.			



Data/Parameter	EG _{y, import}			
Unit	MWh			
Description	Gross Electricity Imported by Project Activity from the grid as per Monthly Credit Report			
Measured/Calculated /Default	Measured			
Source of data	Monthly Credit Report by MSEDCL			
Value(s) of monitored parameter	94			
Monitoring equipment	Type: Trivector Electronic meters Accuracy Class: 0.2s Calibration Frequency: Annual			
	Machine No.	Meter Serial No.	Date of last calibration	Validity
	K-257	Main meter: 4725793 Check meter: 4725788	20/08/2010	1 Year
	K-259			
	K-260			
	K-391	Main meter: 4961774 Check meter: 4961768	20/08/2010	1 Year
	K-392			
	K-393			
	K -394			
Measuring/Reading/ Recording frequency	Gross Electricity Imported by all WEG’s including project activity (connected to the individual feeder) are recorded every month from each Main Meter & Check Meter connected at the sub-station jointly by Project Proponents representative i.e. Suzlon Infrastructure Services Limited (here onwards SISL) & MSEDCL personnel.			
Calculation method (if applicable)	Not Applicable			
QA/QC procedures	The Main and Check Meters are tested annually for accuracy with a portable calibrated standard meter by the MSEDCL			
Purpose of data	Measurement of Net Electricity generation and imported by project activity’s WEG’s from the Grid. EG _{y, import} is used for calculation of baseline emission.			
Additional comment	The data is archived for the entire crediting period + 2 years or the date of last issuance whichever is later, in paper and electronic form.			



Data/Parameter	EG _y
Unit	MWh
Description	Net Electricity Exported by project activity to the grid
Measured/Calculated /Default	Calculated
Source of data	Monthly Credit Report by MSEDCL
Value(s) of monitored parameter	25449
Monitoring equipment	EG _y is a calculated value
Measuring/Reading/Recording frequency	EG _y is a calculated value
Calculation method (if applicable)	Net Electricity exported by the project activity WEG's to the grid is a calculated value and the calculation is done as follows, $EG_y = (EG_{y, \text{ export}} - EG_{y, \text{ import}})$
QA/QC procedures	Net Electricity Exported by Project Activity to the grid mentioned in the Credit Report is cross checked with the invoice of Project Proponent which contains the reference to the period for which it is raised. Further payment made by the MSEDCL to Project Proponent (bank statement) is cross checked with the Invoice amount as it mentions the Net Electricity Export value. There is a difference between the Bank statement amount and Invoice amount due to Administrative charges levied by MSEDCL, in line with section 9.03 of the PPA signed between PP and MSEDCL.
Purpose of data	EG _y is the Net Electricity supplied by project activity to the grid. EG _y is used for calculation of baseline emission.
Additional comment	The data is archived for the entire crediting period + 2 years or the date of last issuance whichever is later, in paper and electronic form.

D.3. Implementation of sampling plan

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No sampling approach is applicable/ used in this monitoring period.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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The baseline emissions (BE_y) for the project activity as:

Baseline Emission = Net Electricity Exported to the grid x Emission Factor

For the current monitoring period,

Net Electricity Exported by project activity to the grid (MWh) = 25,449

Emission Factor = 0.920 t CO₂/MWh

Therefore; BE_y = 25,449 x 0.920 t CO₂/MWh
= 23,413 t CO₂ e

E.2. Calculation of project emissions or actual net GHG removals by sinks

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As per AMS-I.D. Version 10, Wind Energy Project i.e. renewable energy sources hence no emissions from project activity.

E.3. Calculation of leakage

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As per AMS-I.D. Version 10 If the energy generating equipment is transferred from another activity, leakage is to be considered. In this project no equipment transfer is involved and hence, no leakage is considered for this project.

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO ₂ e)
Total	23,413	0	0	23,413

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO₂e)	34,126 ⁴	23,413

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

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The estimated emission reductions of 17063 tCO₂ e / year as indicated in the registered CDM PDD has been calculated for a period of 365 days, whereas the actual value of 23,413 t CO₂ e reached during the current monitoring period is for 730 days. To make a comparison of the two values the emission reduction estimates in the registered CDM PDD are recalculated for a period of 730 days as follows

Annual emission reductions estimated in the registered CDM PDD = 17063 t CO₂ e

Emission reductions estimated in the registered CDM PDD apportioned for a period of 730 days = 17063 * (730/365)

= 34,126 tCO₂ e

Hence, as observed above the actual emission reduction achieved during the current monitoring period is lower than the estimated value in the registered CDM PDD. This decrease in emission reduction is mainly due to low wind availability in the region.

⁴ The estimated emission reduction (t CO₂ e) in Registered CDM-PDD is 17063 t CO₂/yr. As the Monitoring Period is of 730 days, the estimated generation as per Registered PDD for the entire monitoring period will be: 17063* 730/365 = 34,126 t CO₂ e



History of the document

Version	Date	Nature of revision
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance		