

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

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 1 (01/03/2012)
75MW wind power project in Maharashtra by Essel Mining Industries Limited
Reference No. : UNFCCC 1115
Monitoring Period No. 3 : 02/01/2011 to 02/01/2012

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

The project activity includes planning, installing and operating of a 75MW wind power project which has been set up in three stages at Dhule and Nandurbar districts of Maharashtra, India. The project activity involves generation of clean electrical energy by harnessing the kinetic energy of wind.

In the absence of the project activity, an equivalent amount of electricity would have been generated from the power plants connected to the grid, majority of whom are based on fossil fuels. The entire power generated is being exported to the state grid maintained by Maharashtra State Electricity Board (MSEB) grid which is a part of the Western Regional Grid.

The commissioning details are given below:

| Stages | Capacity | Commissioning dates |
|-----------|----------|--|
| Stage I | 15MW | <ul style="list-style-type: none"> ▪ 6 WTGs on 25th March 05 ▪ 6 WTGs on 31st March 05 |
| Stage II | 30MW | <ul style="list-style-type: none"> ▪ 8 WTGs on 20th September 05 ▪ 15 WTGs on 29th September 05 ▪ 1 WTG on 30th September 05 |
| Stage III | 30MW | <ul style="list-style-type: none"> ▪ 4 WTGs on 9th December 05 ▪ 7 WTGs on 5th January 06 ▪ 13 WTGs on 7th February 06 |

Table for detailed description of the turbine

| Serial No | Location No | Generator No | Date of Commissioning |
|----------------|-------------|--------------|-----------------------|
| Stage I | | | |
| 1 | K14 | 478673 | 25-Mar-05 |
| 2 | K17 | 479432 | 31-Mar-05 |
| 3 | K21 | 479433 | 31-Mar-05 |
| 4 | K24 | 479247 | 31-Mar-05 |
| 5 | K33 | 479249 | 31-Mar-05 |
| 6 | K34 | 478680 | 25-Mar-05 |
| 7 | K35 | 479157 | 25-Mar-05 |

| | | | |
|------------------|------|----------|-----------|
| 8 | K36 | 478702 | 25-Mar-05 |
| 9 | K37 | 478861 | 25-Mar-05 |
| 10 | K38 | 478862 | 25-Mar-05 |
| 11 | K39 | 479158 | 31-Mar-05 |
| 12 | K40 | 478930 | 31-Mar-05 |
| Stage II | | | |
| 13 | K219 | 64016841 | 29-Sep-05 |
| 14 | K220 | 64017874 | 29-Sep-05 |
| 15 | K221 | 64018485 | 29-Sep-05 |
| 16 | K222 | 64015302 | 29-Sep-05 |
| 17 | K216 | 64020221 | 29-Sep-05 |
| 18 | K168 | 64019647 | 29-Sep-05 |
| 19 | K227 | 64015942 | 29-Sep-05 |
| 20 | K167 | 5134897 | 20-Sep-05 |
| 21 | K209 | 5136457 | 20-Sep-05 |
| 22 | K212 | 5136465 | 20-Sep-05 |
| 23 | K215 | 64011924 | 20-Sep-05 |
| 24 | K201 | 64015940 | 29-Sep-05 |
| 25 | K203 | 64019648 | 29-Sep-05 |
| 26 | K204 | 64018482 | 29-Sep-05 |
| 27 | K205 | 470663 | 29-Sep-05 |
| 28 | K218 | 64017529 | 30-Sep-05 |
| 29 | K206 | 5136502 | 29-Sep-05 |
| 30 | K46 | 5136502 | 20-Sep-05 |
| 31 | K48 | 64017874 | 29-Sep-05 |
| 32 | K50 | 64015302 | 29-Sep-05 |
| 33 | K112 | 5136461 | 20-Sep-05 |
| 34 | K176 | 64017129 | 29-Sep-05 |
| 35 | K107 | 64014828 | 20-Sep-05 |
| 36 | K79 | 480645 | 20-Sep-05 |
| Stage III | | | |
| 37 | K356 | 64021776 | 9-Dec-05 |
| 38 | K362 | 64021435 | 9-Dec-05 |
| 39 | K364 | 64021773 | 9-Dec-05 |
| 40 | K365 | 64021434 | 9-Dec-05 |
| 41 | K352 | 64021431 | 5-Jan-06 |
| 42 | K353 | 64022374 | 5-Jan-06 |
| 43 | K354 | 64021775 | 5-Jan-06 |
| 44 | K360 | 64021432 | 5-Jan-06 |
| 45 | K363 | 64022375 | 5-Jan-06 |
| 46 | K366 | 64021774 | 5-Jan-06 |
| 47 | K368 | 64022239 | 5-Jan-06 |
| 48 | K355 | 64026133 | 7-Feb-06 |
| 49 | K370 | 64027704 | 7-Feb-06 |
| 50 | K371 | 64022243 | 7-Feb-06 |
| 51 | K372 | 64022244 | 7-Feb-06 |

| | | | |
|----|------|----------|----------|
| 52 | K374 | 64022377 | 7-Feb-06 |
| 53 | K377 | 64026127 | 7-Feb-06 |
| 54 | K378 | 64022241 | 7-Feb-06 |
| 55 | K379 | 64026703 | 7-Feb-06 |
| 56 | K381 | 64020225 | 7-Feb-06 |
| 57 | K382 | 64026704 | 7-Feb-06 |
| 58 | K385 | 64025701 | 7-Feb-06 |
| 59 | K386 | 64026128 | 7-Feb-06 |
| 60 | K388 | 64021777 | 7-Feb-06 |

The total Emission reduction achieved in this Monitoring Period is 96856 tCO₂e

A.2. Project Participants

| Name of Party involved ((host) indicates a host Party) | Private and/or public entity(ies) project participants (as applicable) | Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|--|
| Government of India, Ministry of Environment & Forests. (Host) | Essel Mining Industries Limited (EMIL) (Private) | No |
| Spain | Kingdom of Spain | No |
| Sweden | Swedish Energy Agency | No |

A.3. Location of the project activity:

The project is located in the Dhule and Nandurbar districts of Maharashtra, India.

Dhule is one of the good wind potential areas of the state. Wind farm site is about four hours drive from Diamond city – Surat (Gujarat), the nearest city from the site. The nearest railway station is Nandurbar (50 km) and Challisgaon (50 km). Nearest airports are Aurangabad/ Baroda (250 km).

The following are the GPS co-ordinates :

| Sr no | Location No | Latitude (N) | Longitude (E) |
|--------------|--------------------|---------------------|----------------------|
| 1 | K—14 | 21° 10' | 74° 19' |
| 2 | K—17 | 21° 10' | 74° 19' |
| 3 | K—21 | 21° 11' | 74° 19' |
| 4 | K—24 | 21° 11' | 74° 19' |
| 5 | K—33 | 21° 11' | 74° 20' |
| 6 | K—34 | 21° 11' | 74° 20' |
| 7 | K—35 | 21° 11' | 74° 20' |
| 8 | K—36 | 21° 11' | 74° 20' |
| 9 | K—37 | 21° 11' | 74° 20' |
| 10 | K—38 | 21° 11' | 74° 20' |
| 11 | K—39 | 21° 11' | 74° 20' |
| 12 | K—40 | 21° 11' | 74° 20' |

| | | | |
|----|-------|---------|-----------|
| 13 | K—46 | 21° 12' | 74° 19' |
| 14 | K—48 | 21° 11' | 74° 20' |
| 15 | K—50 | 21° 11' | 74° 19' |
| 16 | K—79 | 21° 12' | 74° 21' |
| 17 | K-107 | 21° 13' | ' 74° 19' |
| 18 | K-112 | 21° 13' | ' 74° 20' |
| 19 | K-167 | 21° 13' | ' 74° 17' |
| 20 | K-168 | 21° 13' | ' 74° 17' |
| 21 | K-176 | 21° 13' | ' 74° 17' |
| 22 | K-201 | 21° 11' | 74° 16' |
| 23 | K-203 | 21° 11' | 74° 16' |
| 24 | K-204 | 21° 12' | 74° 15' |
| 25 | K-205 | 21° 12' | 74° 16' |
| 26 | K-206 | 21° 12' | 74° 15' |
| 27 | K-209 | 21° 12' | 74° 15' |
| 28 | K-212 | 21° 12' | 74° 15' |
| 29 | K-215 | 21° 12' | 74° 16' |
| 30 | K-216 | 21° 12' | 74° 15' |
| 31 | K-218 | 21° 12' | 74° 16' |
| 32 | K-219 | 21° 13' | 74° 15' |
| 33 | K-220 | 21° 13' | 74° 15' |
| 34 | K-221 | 21° 13' | 74° 15' |
| 35 | K-222 | 21° 13' | 74° 15' |
| 36 | K-227 | 21° 13' | 74° 16' |
| 37 | K-352 | 21° 14' | 74° 20' |
| 38 | K-353 | 21° 14' | 74° 20' |
| 39 | K-354 | 21° 14' | 74° 21' |
| 40 | K-355 | 21° 14' | 74° 21' |
| 41 | K-356 | 21° 14' | 74° 20' |
| 42 | K-360 | 21° 14' | 74° 21' |
| 43 | K-362 | 21° 14' | 74° 20' |
| 44 | K-363 | 21° 14' | 74° 21' |
| 45 | K-364 | 21° 14' | 74° 21' |
| 46 | K-365 | 21° 14' | 74° 20' |
| 47 | K-366 | 21° 14' | 74° 21' |
| 48 | K-368 | 21° 15' | 74° 21' |
| 49 | K-370 | 21° 14' | 74° 20' |
| 50 | K-371 | 21° 15' | 74° 20' |
| 51 | K-372 | 21° 15' | 74° 21' |
| 52 | K-374 | 21° 15' | 74° 20' |
| 53 | K-377 | 21° 15' | 74° 20' |
| 54 | K-378 | 21° 15' | 74° 21' |
| 55 | K-379 | 21° 15' | 74° 20' |
| 56 | K-381 | 21° 15' | 74° 21' |
| 57 | K-382 | 21° 15' | 74° 20' |
| 58 | K-385 | 21° 15' | 74° 21' |
| 59 | K-386 | 21° 16' | 74° 21' |
| 60 | K-388 | 21° 16' | 74° 21' |

A.4. Technical description of the project

Each wind turbo-generator essentially consists of - rotor system, gear box, coupling, generator, yaw system, brake system, control system and power evacuation system.

The Rotor system consists of 3 rotor blades, each of 69m diameters (blade length – 33.5) having swept area of 3740m², mounted on a spherical cast iron hub capable of rotating at a speed of 13.5 to 20.3rpm. There are three independent electrical pitching mechanisms where the pitch angle (-2o to 88o) of each blade is accurately adjustable by AC motors. The three stage gear box – one stage planetary and other two helical, has a gear ratio 1:74.9 and capable of operating at 98% efficiency. The planetary part takes up the slow rotor speed/movement and distributes the high torque to the subsequent planetary gears and the Helical shape helps in noise dampening.

Suzlon's S70 model machines uses a synchronous pole switchable generator (6/4 poles) at rated output of 1250 kW and can provide harmonic-free power supply to grid.

The yaw system ensures that the turbine is positioned correctly in the wind at all times, thereby resulting in the optimal power production and minimum stress on the turbine drive train. The brake system consists of two independent braking systems. The primary system is the aerodynamic tip-brakes and the secondary system is the mechanical disk brake system which is located on the high speed shaft of the gearbox. During emergency brakes both the aerodynamic and mechanical brake systems are activated simultaneously thus ensuring more safety in the operations of the WTGs.

Power generated from the WTGs is fed to the respective sub-station of the WTG. This sub-station is placed near the WTG. Power is transmitted through step-up transformers 690 Volts / 33 KV, 1500 KVA. The sub-station is equipped with all electrical controls like – CT / PT / VCB etc.

The diagram of the project activity is presented in section C below.

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

Title: Consolidated baseline methodology for grid connected electricity generation from renewable sources

Reference: Approved consolidated baseline methodology ACM0002/ Version 06

Sectoral Scope: 01

Tools: Tool to calculate the emission factor for an electricity system version 1

| |
|--|
| A.6. Registration date of the project activity: |
|--|

01/02/2008

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

The crediting period is from 01/02/2008 to 31/01/2018 (10 years)

Starting Date: 01/02/2008

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

M/s Essel Mining Industries Limited (EMIL).

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

The commissioning details are given below:

| Stages | Capacity | Commissioning dates |
|-----------|----------|--|
| Stage I | 15MW | <ul style="list-style-type: none">6 WTGs on 25th March 056 WTGs on 31st March 05 |
| Stage II | 30MW | <ul style="list-style-type: none">8 WTGs on 20th September 0515 WTGs on 29th September 051 WTG on 30th September 05 |
| Stage III | 30MW | <ul style="list-style-type: none">4 WTGs on 9th December 057 WTGs on 5th January 0613 WTGs on 7th February 06 |

Details of the Wind Turbine Generators:

| Serial No | Location No | Generator No | Date of Commissioning |
|-----------------|-------------|--------------|-----------------------|
| Stage I | | | |
| 1 | K14 | 478673 | 25-Mar-05 |
| 2 | K17 | 479432 | 31-Mar-05 |
| 3 | K21 | 479433 | 31-Mar-05 |
| 4 | K24 | 479247 | 31-Mar-05 |
| 5 | K33 | 479249 | 31-Mar-05 |
| 6 | K34 | 478680 | 25-Mar-05 |
| 7 | K35 | 479157 | 25-Mar-05 |
| 8 | K36 | 478702 | 25-Mar-05 |
| 9 | K37 | 478861 | 25-Mar-05 |
| 10 | K38 | 478862 | 25-Mar-05 |
| 11 | K39 | 479158 | 31-Mar-05 |
| 12 | K40 | 478930 | 31-Mar-05 |
| Stage II | | | |
| 13 | K219 | 64016841 | 29-Sep-05 |
| 14 | K220 | 64017874 | 29-Sep-05 |
| 15 | K221 | 64018485 | 29-Sep-05 |
| 16 | K222 | 64015302 | 29-Sep-05 |
| 17 | K216 | 64020221 | 29-Sep-05 |
| 18 | K168 | 64019647 | 29-Sep-05 |

| | | | |
|------------------|------|----------|-----------|
| 19 | K227 | 64015942 | 29-Sep-05 |
| 20 | K167 | 5134897 | 20-Sep-05 |
| 21 | K209 | 5136457 | 20-Sep-05 |
| 22 | K212 | 5136465 | 20-Sep-05 |
| 23 | K215 | 64011924 | 20-Sep-05 |
| 24 | K201 | 64015940 | 29-Sep-05 |
| 25 | K203 | 64019648 | 29-Sep-05 |
| 26 | K204 | 64018482 | 29-Sep-05 |
| 27 | K205 | 470663 | 29-Sep-05 |
| 28 | K218 | 64017529 | 30-Sep-05 |
| 29 | K206 | 5136502 | 29-Sep-05 |
| 30 | K46 | 5136502 | 20-Sep-05 |
| 31 | K48 | 64017874 | 29-Sep-05 |
| 32 | K50 | 64015302 | 29-Sep-05 |
| 33 | K112 | 5136461 | 20-Sep-05 |
| 34 | K176 | 64017129 | 29-Sep-05 |
| 35 | K107 | 64014828 | 20-Sep-05 |
| 36 | K79 | 480645 | 20-Sep-05 |
| Stage III | | | |
| 37 | K356 | 64021776 | 9-Dec-05 |
| 38 | K362 | 64021435 | 9-Dec-05 |
| 39 | K364 | 64021773 | 9-Dec-05 |
| 40 | K365 | 64021434 | 9-Dec-05 |
| 41 | K352 | 64021431 | 5-Jan-06 |
| 42 | K353 | 64022374 | 5-Jan-06 |
| 43 | K354 | 64021775 | 5-Jan-06 |
| 44 | K360 | 64021432 | 5-Jan-06 |
| 45 | K363 | 64022375 | 5-Jan-06 |
| 46 | K366 | 64021774 | 5-Jan-06 |
| 47 | K368 | 64022239 | 5-Jan-06 |
| 48 | K355 | 64026133 | 7-Feb-06 |
| 49 | K370 | 64027704 | 7-Feb-06 |
| 50 | K371 | 64022243 | 7-Feb-06 |
| 51 | K372 | 64022244 | 7-Feb-06 |
| 52 | K374 | 64022377 | 7-Feb-06 |
| 53 | K377 | 64026127 | 7-Feb-06 |
| 54 | K378 | 64022241 | 7-Feb-06 |
| 55 | K379 | 64026703 | 7-Feb-06 |
| 56 | K381 | 64020225 | 7-Feb-06 |
| 57 | K382 | 64026704 | 7-Feb-06 |
| 58 | K385 | 64025701 | 7-Feb-06 |
| 59 | K386 | 64026128 | 7-Feb-06 |
| 60 | K388 | 64021777 | 7-Feb-06 |

The project activity was in operation continuously with regular maintenance and inspection. There were no replacements or exchange of any major equipment during the monitoring period which may impact

the applicability of the methodology or the revised monitoring plan. Below is the calibration details of energy meters.

Table for detailed description of energy meters Table B.1. a :

| Serial No | Main Meter No | Check Meter No | Feeder No | Accuracy Class | Frequency of calibration/testing ¹ | Sub Station | Dates of Calibration/Testing | | Change of meter | Date of Change of Meter | New Meter No |
|-----------|---------------|----------------|------------|----------------|---|-------------|------------------------------|------------|-----------------|-------------------------|--------------|
| 1 | 4890617 | 4890556 | Sakri I | 0.2 | Annually | Sakri | 20/08/2010 | 17/09/2011 | No | - | - |
| 2 | 4890618 | 4890561 | Sakri II | 0.2 | Annually | Sakri | | | No | - | - |
| 3 | 4725791 | 4763795 | Jamde 9 | 0.2 | Annually | Jamde | | | No | - | - |
| 4 | 4738077 | 4738074 | Jamde 7 | 0.2 | Annually | Jamde | | | No | - | - |
| 5 | 4862465 | 4725796 | Jamde 3 | 0.2 | Annually | Jamde | | | No | - | - |
| 6 | 4890567 | 4725804 | Jamde 2 | 0.2 | Annually | Jamde | | | Yes | - | - |
| 7 | 4725806 | 4725809 | Jamde 12 | 0.2 | Annually | Jamde | | | No | - | - |
| 8 | 4725799 | 4725805 | Jamde 11 | 0.2 | Annually | Jamde | | | No | - | - |
| 9 | 4890562 | 4863441 | Jamde 10 | 0.2 | Annually | Jamde | | | No | - | - |
| 10 | 4738079 | 4738067 | Jamde 8 | 0.2 | Annually | Jamde | | | No | - | - |
| 11 | 4725784 | 4738059 | Jamde 15 | 0.2 | Annually | Jamde | | | No | - | - |
| 12 | 4725778 | 4725803 | Jamde 6 | 0.2 | Annually | Jamde | | | No | - | - |
| 13 | 4890564 | 4738078 | Jamde 16 | 0.2 | Annually | Jamde | | | Yes | 01.10.2011 | 4890557 |
| 4 | 4725806 | 4725809 | Jamde 12 | 0.2 | Annually | Jamde | | | Yes | 01.10.2011 | 4890559 |
| 15 | 4961777 | 4863440 | Valve VII | 0.2 | Annually | Valve | | | | - | - |
| 16 | 4961750 | 4961751 | Gangapur 6 | 0.2 | Annually | Gangapur | | | | - | - |

B.2. Revision of the monitoring plan

The monitoring plan of the registered PDD had been revised which was approved by UNFCCC on 09/05/2010.

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

Not Applicable

B.4. Notification or request of approval of changes

Not Applicable

SECTION C. Description of the monitoring system

¹ Calibration frequency of 1 year has been mentioned in the Power Purchase Agreement signed between MSEDCL and project proponent

As per the applied monitoring methodology to the project, the project participants need to monitor the following parameters on continuous basis to monitor the net electricity EG_y supplied from the project activity:

$EG_{GENTOTAL,i}$ = Total Electricity exported to MSEB (MSEDCL) facility by all WTGs (WTGs of project proponent as well as of other promoters) connected to the feeder i (kWh)

$EG_{AUXTOTAL,i}$ = Total Electricity imported by all WTGs (WTGs of project proponent as well as of other promoters) connected to the feeder i from MSEB (MSEDCL) (kWh)

$EG_{CONTROLLER,,i,j}$ = Electricity generation at the controller of individual WTG, j, of the project proponent connected to feeder i (kWh)

$EG_{CONTROLLERTOTAL,i}$ = Total electricity generation at the controller of all WTGs (WTGs of project proponent as well as of other promoters) connected to the feeder i (kWh)

$EG_{GEN,y,i}$ = Total electricity generation by the WTGs of the project proponent connected to the feeder, i (apportioned) (kWh).

$EG_{AUX,y,i}$ = Auxiliary consumption by the WTGs of the project proponent connected to the feeder, i (apportioned) (kWh).

$EG_{GEN,y}$ = Total electricity generation by all the wind turbines of project proponent (kWh)

$EG_{AUX,y}$ = Auxiliary consumption by all the wind turbines of the project proponent (kWh)

Now,

$$EG_{GEN,y,i} = (\sum EG_{CONTROLLER,i,j} / EG_{CONTROLLERTOTAL,i}) * EG_{GENTOTAL,i}$$

$$EG_{AUX,y,i} = (\sum EG_{CONTROLLER,i,j} / EG_{CONTROLLERTOTAL,i}) * EG_{AUXTOTAL,i}$$

Then,

$$EG_{GEN,y} = \sum EG_{GEN,y,i}$$

$$EG_{AUX,y} = \sum EG_{AUX,y,i}$$

Where,

i - represents the feeders

j - represents the WTGs of the project proponent.

The net electricity supply is calculated as

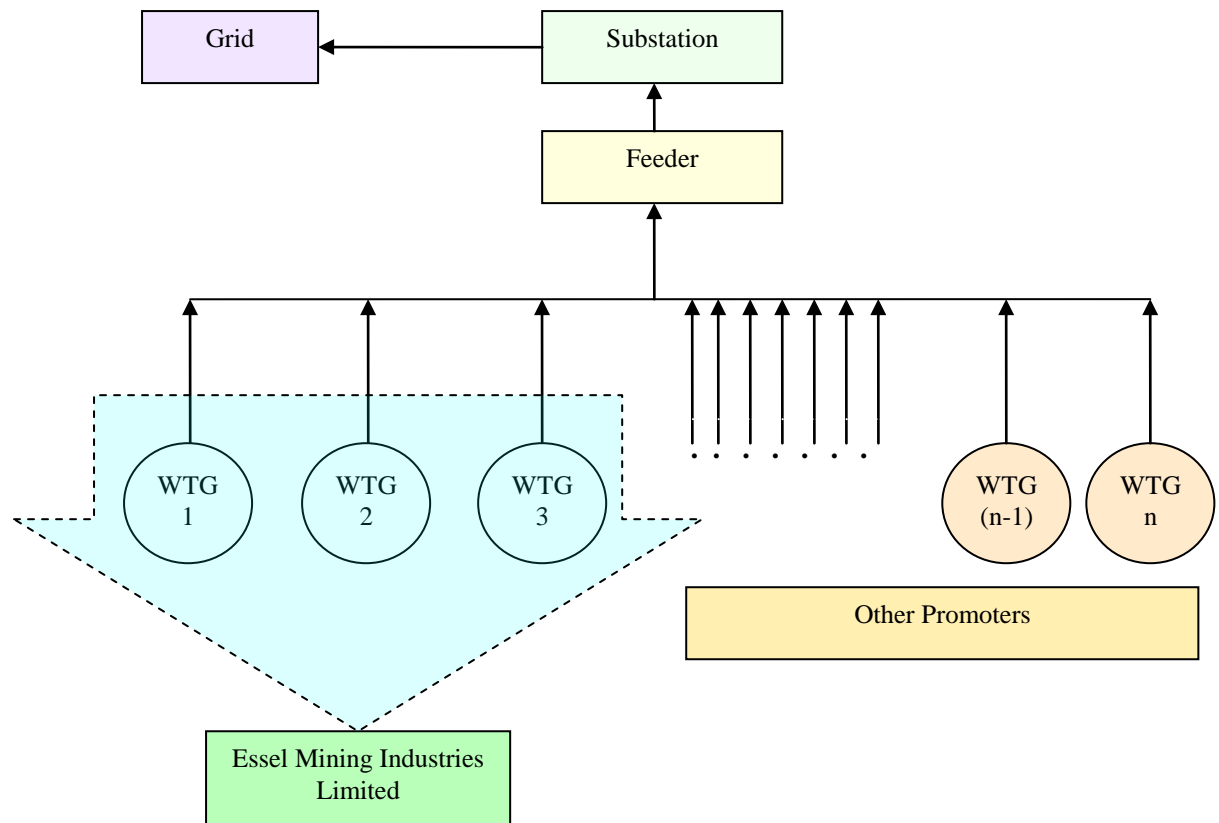
$$EG_y = EG_{GEN,y} - E_{AUX,y}$$

The monitoring of $EG_{GEN,y}$ and $EG_{AUX,y}$ would be as per the details provided in the Article 11 of the Power Purchase Agreement signed between the MSEB and EMIL.

As per Article 11, section 11.05 of PPA, “Wherever more than one Power Producer(s) are delivering energy produced by them using common evacuation system and through the common Metering equipment, then they shall identify a common agency responsible for joint meter reading with MSEB. The Joint Meter Reading taken at the common evacuation system shall be supported by meter readings of individual power producers using such common evacuation system. Based on this breakup, limited to energy delivered, the power generated from individual power plant shall be certified by MSEB”.

The apportioning of electricity generated by the entire wind farm is entirely under the jurisdiction of the electricity board. The project proponent has no role in computing and furnishing the apportioned electricity generated for themselves or any other promoter. The above calculation for deriving the apportioned electricity generated by the project proponent has been included only to bring clarity to the apportioning and overall monitoring procedure followed by the project proponent for the project activity.

Diagrammatic Representation:



Analytical representation:

EG_{GEN,y}

Let us assume there are 'n' WTGs,

The *power generated from individual power plant (meter readings of individual power producers hereafter referred to as controller generation of each WTG)* be X_i .

Therefore,

Controller generation for WTG 1 = X_1

Controller generation for WTG 2 = X_2

Controller generation for WTG n = X_n

Now, $X_1 + X_2 + X_3 + \dots + X_n = X$ (say)

Let the energy delivered (*Joint Meter Reading taken at the common evacuation system*) be Y then as per article 11 of the PPA,

Y_i , electricity generation of each WTG at (S/s feeder) is equal to the ratio of respective controller generation at that WTG and total controller generation of all WTGs connected to the feeder (*common evacuation system*) multiplied by the total net generation (S/s feeder) Therefore,

$$Y_i = (X_i/X) * Y$$

The operation and maintenance of the wind farm has been outsourced to Suzlon. All the WTGs at the site are monitored from the Central Monitoring Station (CMS) at the wind farm, where electricity generation from each WTG is continuously monitored. The CMS at the wind farm reports to the main CMS at Pune, where the daily generation report is prepared and sent to EMIL by the respective CRM (Customer Relationship Management) manager.

The electricity generation reports on joint meter reading are generated by MSEDCL and sent to EMIL through Suzlon (O&M service provider) on monthly basis. Upon receipt of reports, EMIL generates invoices on sale of electricity and sends to MSEDCL via Suzlon. Thereafter, MSEDCL makes payments against the invoices within 3 months directly to EMIL.

QA/QC procedures:

Essel Mining & Industries Ltd has established, documented and implemented Integrated Management Systems. The company maintains and continually improves the effectiveness of QMS, EMS and OHSMS in accordance with the requirements of ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007. The company has developed “Documentation structure” and it comprises of:

- Level1- Manual
- Level 2- Process approach and Procedures
- Level 3- Specifications, Process Flow Diagrams, Aspect and Hazard Register, Legal Register, Emergency Plan, Work Instructions and Management Programmes
- Level 4- Formats, Registers, Tags, Labels, Files and Records

Integrated Managemnet Systems Manual describes the organization structure with responsibilities; and measures for documentation, implementation & control of the system. Integrated Management Procedures provide information and instructions for achieving and maintaining functional controls, meeting the requirements of International Standard ISO9001: 2000,ISO 14001:2004 & OHSAS 18001:2007 and the organization’s IMS Policy. Head of the departments (HODs) effectively implement these procedures into practice, involving all personnel concerned.

Roles and Responsibilities:

The entire operation and maintenance of the project activity has been outsourced to Suzlon, which is also the equipment supplier. The monitoring of export and import of electricity would be as per the

details provided in the Article 11 of the Power Purchase Agreement signed between the MSEB and EMIL, which clearly identifies the following:


Metering and recording process of power generation and consumption data

Calibration of metering instruments

Validation of data

Recording and approving authority

EMIL has outsourced the operations and monitoring the performances of the WTGs to Suzlon Infrastructure Services Limited who sends daily and monthly performance records to EMIL. All the WTGs at the site are connected to a Central Monitoring Station of Suzlon being operated from Pune wherein data are directly captured through digital system. The captured data are then directly uploaded to the CRM (customer relationship management) system. From CRM the daily generation reports are directly sent to EMIL on a daily basis. A CRM manager deputed by Suzlon, is responsible for the monitoring of the WTGs. EMIL has daily communication CRM manager. The electricity generation reports on joint meter reading are generated by MSEDCL and send to EMIL through Suzlon (O&M service provider) on monthly basis.



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: | EFOM,y |
| Data Unit | tCO2/MWh |
| Description | Operating Margin emission factor for western regional grid |
| Source of Data to be used | Computed from data sourced from Website of Central Electricity Authority of India |
| Value applied | 0.99tCO2/MWh |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Calculated as per ACM0002 with 3years vintage (2002-2003, 2003-2004, 2004- 2005) data obtained from CEA database on CO2 baseline for Indian Power Sector. Computed once during PDD finalization (ex-ante). |
| Any comment: | Records to be archived for 12years from the start of the crediting period either on paper or in electronic media. |

| | |
|---|--|
| Data/Parameter: | EFBM,y |
| Data Unit | tCO2/MWh |
| Description | Build Margin emission factor for western regional grid |
| Source of Data to be used | Computed from data sourced from Website of Central Electricity Authority of India |
| Value applied | 0.78tCO2/MWh |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Calculated as per ACM0002 with vintage (2004-2005) data obtained from CEA database on CO2 baseline for Indian Power Sector. Computed once during PDD finalization (ex-ante). |
| Any comment: | Records to be archived for 12years from the start of the crediting period either on paper or in electronic media. |

| | |
|---|---|
| Data/Parameter: | EFy |
| Data Unit | tCO2/MWh |
| Description | Combine Margin CO2 emission factor for western regional grid |
| Source of Data to be used | Estimated figure based on 75% of OM and 25% of BM values calculated using data obtained from CEA database on CO2 baseline emission factor for Indian Power Sector. |
| Value applied | 0.940tCO2/MWh |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Calculated as per ACM0002 with 3years vintage data and option of ex ante calculation based on “75% of OM and 25% of BM values approach”. Computed once during PDD finalization. (ex-ante) |
| Any comment: | Records to be archived for 12years from the start of the crediting period either on paper or in electronic media. |

D.2. Data and parameters monitoredProject Parameters used to determine the Emission Reductions:

| | |
|---|--|
| Data/Parameter: | EG_y |
| Data Unit | MWh/yr |
| Description | Net Electricity supplied to MSEB facility |
| Measures / calculated / default | Calculated |
| Source of Data to be used | Joint Meter Readings (JMRs) and Invoices available at project site and at EMIL Corporate Office |
| Value(s) of monitored parameter | 103129 (Details as per table D-3) |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline emission calculation |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | This is calculated parameter; hence no monitoring equipment is required. |
| Measuring/ Reading/ Recording frequency: | Monthly |
| Calculation method (if applicable): | As per Section C above and detail calculation is given in ER computation sheet. |
| QA/QC procedures to be applied: | Uncertainty level of data: Low; This data can be cross referred with the invoices raised to MSEB by EMIL and payment against the invoice. |

| | |
|---|--|
| Data/Parameter: | EGGENTOTAL,i |
| Data Unit | KWh |
| Description | Total Electricity exported to MSEB (MSEDCL) facility by all WTGs (WTGs of project proponent as well as of other promoters) connected to the feeder, i. |
| Measures / calculated / default | Measured |
| Source of Data to be used | Monthly Generation Report obtained from Suzlon Infrastructure Services Limited |
| Value(s) of monitored parameter | 298525218 (Details as per table D-3) |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline emission calculation |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | The measurement is done through the energy meters for each feeder at the grid sub-station. The meters are duly approved, tested and sealed by the electricity board. Monthly readings are taken jointly by the electricity board and the authorized representative of the project proponent. These readings are |

| | |
|--|--|
| | furnished by the electricity board in the master JMR ² . Details as per Table B.1.a above |
| Measuring/ Reading/ Recording frequency: | Monthly |
| Calculation method (if applicable): | Not applicable |
| QA/QC procedures to be applied: | Uncertainty level of data: Low; As per the power purchase agreement, the electricity board carries out the calibration and maintenance of meters. Calibration is done annually. |

| | |
|---|--|
| Data/Parameter: | EGAUXTOTAL,i |
| Data Unit | KWh |
| Description | Total Electricity imported from MSEB (MSEDCL) by all WTGs (WTGs of project proponent as well as of other promoters) connected to the feeder, i. |
| Measures / calculated / default | Measured |
| Source of Data to be used | Monthly Generation Report obtained from Suzlon Infrastructure Services Limited |
| Value(s) of monitored parameter | 1766329 (Details as per table D-3) |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline emission calculation |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | The measurement is done through the energy meters for each feeder at the grid sub-station. The meters are duly approved, tested and sealed by the electricity board. Monthly readings are taken jointly by the electricity board and the authorized representative of the project proponent. These readings are furnished by the electricity board in the master JMR ³ . Details as per Table B.1.a above |
| Measuring/ Reading/ Recording frequency: | Monthly |
| Calculation method (if applicable): | Not applicable |
| QA/QC procedures to be applied: | Uncertainty level of data: Low; As per the power purchase agreement, the electricity board carries out the and maintenance of meters. is done annually. |

| | |
|---------------------------------|---|
| Data/Parameter: | EGCONTROLLER,i,j |
| Data Unit | KWh |
| Description | Electricity generation at the controller of individual WTG, j, of the project proponent connected to feeder, i. |
| Measures / calculated / default | Measured |
| Source of Data to be used | Monthly Generation Report obtained from Suzlon Infrastructure |

² Master JMR is issued by MSEDCL to Suzlon Energy Limited for the entire windfarm, wherein, monthly energy generation details for all the promoters are mentioned. This report is not under the jurisdiction of the project proponent and available only at the plant site.

³ Master JMR is issued by MSEDCL to Suzlon Energy Limited for the entire windfarm, wherein, monthly energy generation details for all the promoters are mentioned. This report is not under the jurisdiction of the project proponent and available only at the plant site.

| | |
|---|--|
| | Services Limited |
| Value(s) of monitored parameter | 107127855 (Details as per table D-3) |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline emission calculation |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | The measurement is done through the controller at each WTG. Recording of the same is done at the Central Monitoring Station (CMS) in the windfarm. This data is provided to MSEDCL on a monthly basis for computation of electricity generation by individual promoters. All the WTGs in the windfarm are monitored from the CMS |
| Measuring/ Reading/ Recording frequency: | Monthly |
| Calculation method (if applicable): | Not applicable |
| QA/QC procedures to be applied: | Uncertainty level of data: Low; This data can be cross referred with the JMR issued by MSEDCL (MSEDCL) to EMIL. |

| | |
|---|--|
| Data/Parameter: | EG_{CONTROLLERTOTAL,i} |
| Data Unit | KWh |
| Description | Total of electricity generation at the controller of all WTGs (WTGs of project proponent as well as of other promoters) connected to the feeder, i). |
| Measures / calculated / default | Measured |
| Source of Data to be used | Monthly Generation Report obtained from Suzlon Infrastructure Services Limited |
| Value(s) of monitored parameter | 310345354 (Details as per table D-3) |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline emission calculation |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | The measurement is done through the controller at each WTG. Recording of the same is done at the Central Monitoring Station (CMS) in the windfarm. This data is provided to MSEDCL on a monthly basis for computation of electricity generation by individual promoters. All the WTGs in the windfarm are monitored from the CMS This data is the summation of electricity generation at the controller of all WTGs (WTGs of project proponent as well as of other promoters) connected to the feeder, i. |
| Measuring/ Reading/ Recording frequency: | Monthly |
| Calculation method (if applicable): | Not applicable |
| QA/QC procedures to be applied: | Uncertainty level of data: Low; This data can be verified with the master JMR for the entire windfarm issued by MSEDCL (MSEDCL) to Suzlon. |

Monitored Results:

The details of the net electricity generated from the project activity for the monitoring period is as given in table below:

| |
|--|
| Table for details of Monitored Results – Table – D3 |
|--|

| Months | EG _{CONTROLLER,TOTAL,i} (kWh) | EGGEN,TOTAL,i (kWh) | EGAUX,TOTAL,i (kWh) | EGCONTROLLER,i,j (kWh) | Total Export (kWh) | Total Import (kWh) | EG _v , Net Export (kWh) | Net Export (Adjusted figure due to delay in calibration) (kWh) |
|--------------|--|---------------------|---------------------|------------------------|--------------------|--------------------|------------------------------------|--|
| Jan '11 | 6042195 | 5586476 | 255445 | 2036183 | 1892422 | 81779 | 1810643 | 1810643 |
| Feb '11 | 6277026 | 5896995 | 215144 | 2131866 | 2012934 | 68422 | 1944512 | 1944512 |
| Mar '11 | 17110576 | 16523620 | 182198 | 5617237 | 5426534 | 55958 | 5370576 | 5370576 |
| April '11 | 25661936 | 25887240 | 109896 | 9497221 | 9185400 | 39064 | 9146336 | 9146336 |
| May '11 | 61535242 | 60180773 | 6556 | 20917601 | 20498432 | 3062 | 20495370 | 20495370 |
| June '11 | 65444785 | 58449054 | 71180 | 22693752 | 22074456 | 22380 | 22052076 | 22052076 |
| July'11 | 51974349 | 50441130 | 61532 | 17717074 | 17189278 | 21724 | 17167554 | 17167554 |
| Aug'11 | 44074967 | 43859120 | 71338 | 15259951 | 14831989 | 24056 | 14807933 | 14749962 |
| Sept'11 | 20434455 | 21019690 | 98298 | 7280261 | 7027600 | 32378 | 6995222 | 6963086 |
| Oct '11 | 3287826 | 3015220 | 183220 | 1154273 | 1058639 | 63918 | 994721 | 994721 |
| Nov'11 | 4014635 | 3629640 | 245214 | 1314453 | 1185084 | 87303 | 1097781 | 1097781 |
| Dec'11 | 4487362 | 4036260 | 266308 | 1507983 | 1343264 | 96809 | 1246455 | 1246455 |
| Total | 310345354 | 298525218 | 1766329 | 107127855 | 103726032 | 596853 | 103129179 | 103039072 |

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

$$BE_y = EG_y \times EF_y$$

where,

BE_y = Baseline Emissions due to displacement of electricity during the year y (in tons of CO₂)

EG_y = Net units of electricity substituted in the grid during the year y (in MWh)

EF_y = Emission Factor of the grid (in tCO₂/ MWh) and

y is any year within the crediting period of the project activity

Carbon dioxide emission factor as per the baseline adopted, $EF_y = 0.940 \text{ tCO}_2/\text{MWh}$

Net Electricity supplied to MSEB facility, $EG_y = 103129179 \text{ kWh}$

Net Electricity supplied to MSEB facility adjusted due to delay in calibration of meters located at Jamde substation = **103039072 kWh**

Baseline emissions is

$$BE_y = EG_y \times EF_y = 96856 \text{ tCO}_2\text{e}$$

(Detailed calculation is given in ER computation sheet)

E.2. Project emissions calculation

Project Emissions, $PE_y = \text{NIL tCO}_2\text{e}$

E.3. Leakage calculation

Leakage Emissions, $L_y = \text{NIL tCO}_2\text{e}$

E.4. Emission reductions calculation / table

The emission reduction resulting from the project activity in the monitoring period under consideration is calculated based on the 'Net electricity export to grid during that period' and the 'CO₂ emission factor of the Western Regional Grid (computed ex-ante)'.

$$\text{Emission Reduction } ER_y = BE_y - PE_y - L_y$$

Where,

BE_y = Baseline emissions

PE_y = Project emissions; $PE_y = 0$ for project activity.

L_y = Emissions due to Leakage. $L_y = 0$ for project activity.

$$\begin{aligned} \text{Emission Reduction} &= 96856 - 0 \text{ tCO}_2\text{e} \\ &= 96856 \text{ tCO}_2\text{e} \end{aligned}$$

:

| |
|--|
| E.5. Comparison of actual emission reductions with estimates in the CDM-PDD |
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This section shall include a comparison of actual values of the emission reductions achieved during the monitoring period with the estimations in the registered CDM-PDD.

| Item | Values applied in ex-ante calculation of the registered CDM-PDD | Actual values reached during the monitoring period |
|--|---|--|
| Emission reductions (tCO ₂ e) | 118203 per annum | 96856 |

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

Actual emission reduction claimed is lower than the estimated value in the PDD.

Emission reduction depends upon the net electricity generation which in case of wind power plants depends on the PLF. The PLF for current monitoring period is lower than the PLF assumed while computing emission reduction during project registration. Therefore, the net electricity supplied by the project activity is lower than as per the registered PDD resulting in lower emission reductions than that in the registered PDD.

History of the document

| Version | Date | Nature of revision |
|--|--------------------------------|--------------------|
| 01 | EB 54, Annex 34 28 May 2010 | Initial adoption. |
| Decision Class: Regulatory Document Type: Guideline, Form Business Function: Issuance | | |