



## Monitoring report form (Version 03.2)

### Monitoring report

|  |   |
|--|---|
| <b>Title of the project activity</b>   | Wind Power Project of Hindustan Platinum in Maharashtra   |
| <b>Reference number of the project activity</b>  | 5425 <sup>1</sup>   |
| <b>Version number of the monitoring report</b>   | 01  |
| <b>Completion date of the monitoring report</b>  | 30/11/2013  |
| <b>Registration date of the project activity</b>   | 17/07/2012  |
| <b>Monitoring period number and duration of this monitoring period</b>   | Monitoring period number: 01<br>Monitoring period: 01/08/2012 to 29/10/2013<br>(First and Last date included)   |
| <b>Project participant(s)</b>  | M/s Hindustan Platinum Pvt. Ltd.  |
| <b>Host Party(ies)</b>   | India   |
| <b>Sectoral scope(s) and applied methodology(ies)</b>  | Sectoral Scope 1: Energy Industries (renewable - /non renewable sources)<br>Methodology: - AMS I.D – Grid connected renewable electricity generation – version 17 |
| <b>Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD</b>           | 7173 tCO <sub>2</sub>   |
| <b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period</b>                                      | 6875 tCO <sub>2</sub>   |
| <b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)</b>        | 2,421 tCO <sub>2</sub>  |
| <b>Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).</b> | 4,454 tCO <sub>2</sub>  |

<sup>1</sup> <http://cdm.unfccc.int/Projects/DB/SGS-UKL1321357848.74/view>

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

&gt;&gt;

Hindustan Platinum Pvt. Ltd. (HPPL) established in 1961. It is a manufacturer of precious metals products having industrial applications across a broad spectrum of industries. HPPL has decided to invest into renewable energy sector by setting up new Wind Turbine Generators (WTGs) in year 2008. Based on this decision HPPL (now onwards referred as Project Participant/ PP) has invested in setting up of 2 nos. of 1650 kW WTGs at Revangoan (Bhud) village of Khanapur Taluka of Sangli District in Maharashtra state in India. Details of the site are as below,

**Table - 1: Site Details**

| PP   | Capacity | Tower No. | Gat No. | Model No. | Commissioned On |
|------|----------|-----------|---------|-----------|-----------------|
| HPPL | 1650 kW  | R – 8     | 722     | V 82      | 31/03/2008      |
|      | 1650 kW  | R – 22    | 297     | V 82      | 31/03/2008      |

The technology used for the project activity is supplied by well established firm - Vestas Wind Technology India Private Limited, which is 100% subsidiary of VESTAS A/S Denmark. Both the WTGs used in the project activity are V 82 type WTGs with nominal power capacity 1650 kW. The main features of the WTG are given in Table - 2. Power generated is exported to North, East, West, North-East (NEWNE) grid of India.

**Purpose of the project activity:**

The main purpose of the project activity is to generate electrical energy through sustainable means - using wind power resources and to reduce the dependence on fossil fuels for energy requirements. The Project Proponent (PP) has signed a power purchase agreement (PPA) with “The Maharashtra State Electricity Distribution Company Limited” (MSEDCL) and exports the electricity to the local grid. The project displaces electricity from the NEWNE grid thereby helping in significant reduction of GHG emissions. Apart from generation of renewable electricity, the project has also been conceived for the following:

- To enhance the propagation of commercialization of wind turbines in the region.
- Contribute to the sustainable development of the region.
- To reduce the prevalent regulatory risks for this project through revenues from the CDM.

The electricity generated by these 2 WTGs is measured using a dedicated State Electricity Board's energy meters.

| Project Promoter | Capacity | Tower No. | Main meter | Back-up meter |
|------------------|----------|-----------|------------|---------------|
| HPPL             | 1650 kW  | R – 8     | 04880949   | 04880948      |
|                  | 1650 kW  | R – 22    | 04880946   | 04880945      |

**Brief description of the installed technology and equipments:**

The project activity consists of 2 WTGs of 1650 kW manufactured, supplied & maintained by **Vestas Wind Technology India Pvt. Ltd.**. The WTGs are installed in Maharashtra, India. The technology is a clean technology since there are no GHGs emissions associated with the electricity generation.

Generated electricity is transmitted through a transmission lines to the nearest substation. The turbines used are certified and manufactured according to International Standards. The technological key features are as follows:

**Table- 2: Salient Features of Vestas V 82/1650**

| Sr. No.                | Item                           | Description                           |
|------------------------|--------------------------------|---------------------------------------|
| 1.                     | Make                           | Vestas Wind technology India Pvt Ltd. |
| 2.                     | Model No.                      | V 82                                  |
| Operational Conditions |                                |                                       |
| 3.                     | Calculated Lifetime            | 20 years                              |
| 4.                     | Cut-in Wind Speed ( m/s )      | 3.5                                   |
| 5.                     | Cut-out Wind Speed ( m/s )     | 20 (10 min. average)                  |
| 6.                     | Maximum Rotational Speed       | 14.4 rpm                              |
| Main Specification     |                                |                                       |
| 7.                     | Rotor Diameter (m)             | 82                                    |
| 8.                     | No. of Blades                  | 3                                     |
| 9.                     | Power Control                  | Active Stall                          |
| 10.                    | Rotational Speed (Synchronous) | 14.4 rpm                              |
| 11.                    | Rotor Position                 | Upwind                                |
| 12.                    | Nominal Power                  | 1650 kW                               |
| 13.                    | Hub Height                     | 78 m                                  |
| Rotor                  |                                |                                       |
| 14.                    | Rotor Diameter                 | 82 m                                  |
| 15.                    | Tilt Angle                     | 5°                                    |
| 16.                    | Swept Area                     | 5281 m <sup>2</sup>                   |
| Blade                  |                                |                                       |
| 17.                    | Material                       | Carbon Fiber/Epoxy/Wood               |
| 18.                    | Blade Length                   | 40 m                                  |
| 19.                    | Blade Profile                  | FFA-W, NACA 63.4                      |
| 20.                    | Air Break                      | Full Break                            |
| Hub                    |                                |                                       |
| 21.                    | Type                           | Spherical                             |
| 22.                    | Material                       | EN-GJS-400-18U-LT                     |
| Main Shaft             |                                |                                       |
| 23.                    | Type                           | Forged shaft and flange               |
| 24.                    | Material                       | 34CrNiMo6                             |
| Main Bearing           |                                |                                       |
| 25.                    | Front Bearing                  | Spherical roller bearing              |
| Main Gearbox           |                                |                                       |
| 26.                    | Gear ratio                     | 1:70.2                                |
| 27.                    | Mechanical Power               | 1800 kW                               |
| Couplings              |                                |                                       |
| 28.                    | Gearbox/ Generator             | Flexible                              |
| Generator              |                                |                                       |
| 29.                    | Nominal Power                  | 1650 kW                               |
| 30.                    | Rotational speed (synchronous) | 1012 rpm at rated power               |
| 31.                    | Insulation Class               | F/B                                   |
| 32.                    | Protection Class (IEC529)      | IP54                                  |
| Machine Frame          |                                |                                       |
| 33.                    | Type                           | Casted front end                      |
| 34.                    | Material                       | EN-GJS-400-18U-LT                     |
| Yawing System          |                                |                                       |

|                  |                      |                                |
|------------------|----------------------|--------------------------------|
| 35.              | Yaw Nearing Type     | Ball bearing, internal gearing |
| 36.              | Yaw Motor            | 6 nos.                         |
| 37.              | Yaw Gear             | 6 pcs                          |
| 38.              | Gearing Ration       | 1:1666                         |
| 39.              | Yaw Brake            | Hydraulic disc break, 6 pcs    |
| Mechanical Brake |                      |                                |
| 40.              | Type                 | Fail safe – Hydraulic release  |
| 41.              | Position             | Mounted on high speed shaft    |
| 42.              | Number of calipers   | 1 pc.                          |
| Tower            |                      |                                |
| 43.              | Type                 | Conical tubular                |
| 44.              | Height               | 75.5 m                         |
| 45.              | Corrosion protection | Acc. To ISO 12944:C5I          |
| Control System   |                      |                                |
| 46.              | Manufacture          | NEGM Control System            |
| 47.              | Type                 | Microprocessor based           |

Relevant dates for the project activity:

Table- 3: Relevant dates

| Tower No. | Start date of the project activity | Commissioning of WTGs | Registration of project activity under CDM | First Monitoring Period  |
|-----------|------------------------------------|-----------------------|--|--------------------------|
| R – 8     | 16/01/2008                         | 31/03/2008            | 17/07/2012                                 | 01/08/2012 to 29/10/2013 |
| R – 22    |                                    | 31/03/2008            |  |                          |

Total emission reductions achieved in this monitoring period:

During the reported monitoring period 01/08/2012 to 29/10/2013 (First date included & last Date included) the project activity has supplied 7576 MWh of electricity, and thus contributing to the GHG reductions of 6,875 tCO<sub>2</sub>.

#### A.2. Location of project activity

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Table- 4: Location details

| Location No. | R - 8            | R – 22           |
|--------------|------------------|------------------|
| Country      | India            | India            |
| State        | Maharashtra      | Maharashtra      |
| District     | Sangli           | Sangli           |
| Taluka       | Khanapur         | Khanapur         |
| Village      | Revangoan (Bhud) | Revangoan (Bhud) |
| Latitude     | 17° 16' 48.7" N  | 17° 16' 27.1" N  |
| Longitude    | 74° 38' 13.2" E  | 74° 38' 50.2" E  |
| Gat No.      | 722              | 297              |

The project activity is located at Revangon village of Maharashtra state of India. The site is about 400 km from Mumbai and 200 km from Pune. The nearest railway station is Karad which is 45 km from the project site. The nearest airport is Pune which is 200 km from project site.

**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)                                   | M/s Hindustan Platinum Pvt. Ltd. (Private Entity)                      | No   |

**A.4. Reference of applied methodology**

&gt;&gt;

**Title:** Grid connected renewable electricity generation

**Reference:** The project activity meets the eligibility criteria to use the simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7. Details of methodology for baseline calculations for CDM projects of capacity less than 15 MW are available in the "Appendix B of the simplified modalities and procedure for small scale CDM project activities".

**Methodology:** AMS I. D Grid Connected Renewable Electricity Generation (Version 17, EB 61)

**Type I:** Renewable Energy Project (Small Scale)

**Category:** I. "D", Grid Connected Renewable Electricity Generation

Reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

Tool referred with above methodology is –

Version 02.2.1 (EB 63, Annex 19)<sup>2</sup> of "Tool to calculate the emission factor for an electricity system".

**A.5. Crediting period of project activity**

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|  |                          |
|--|--------------------------|
| <b>Type of crediting period</b>        | Fixed                    |
| <b>Crediting period from</b>           | 01/08/2012 to 31/07/2022 |
| <b>Length of the Crediting Period</b>  | 10 Years                 |
| <b>Monitoring period from</b>          | 01/08/2012 to 29/10/2013 |
| <b>Length of the Monitoring Period</b> | 1 Year 3 Months          |

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

&gt;&gt;

The total installed capacity of the project is 3.30 MW, which comprises in total 2 no. of 1650 kW Wind Turbine Generator (WTG). The technology used for the project activity is supplied by well established firm - Vestas Wind Technology India Private Limited, which is 100% subsidiary of VESTAS A/S Denmark. Both the WTGs used in the project activity are V 82 type WTGs with nominal power capacity 1650 kW. The commissioning date of All the WTGs of the project activity is given below:

<sup>2</sup> <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf>

| PP   | Capacity | Tower No. | Site (Village)   | Commissioned On |
|------|----------|-----------|------------------|-----------------|
| HPPL | 1650 kW  | R – 8     | Revangoan (Bhud) | 31/03/2008      |
|      | 1650 kW  | R – 22    | Revangoan (Bhud) | 31/03/2008      |

Both the WTGs have run successfully during the reported monitoring period. All the physical and technical features as stated in the registered PDD are in place and project has been operated as described in the registered PDD.

No events or situations happened during the reported monitoring period which can alter the applicability of the applied methodology.

## **B.2. Post registration changes**

### **B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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There is no request for deviation applied during this monitoring period.

### **B.2.2. Corrections**

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There have not been any corrections to project information or parameters fixed at validation during the current monitoring period.

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

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There has not been any change in the monitoring plan during the current monitoring period.

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

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There has not been any change in the PDD during the current monitoring period.

### **B.2.5. Changes to start date of crediting period**

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Not Applicable.

### **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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### **Roles and responsibilities:**

**Director – Finance:** In the project management structure Director – Finance is responsible for the overall project management. Director – Finance is responsible to plan and allocate the annual budget for operation, estimation of the likely operating cost, electricity dispatch, organizing third party contractors, revenue collection etc. Director – Finance will check the monthly electricity generated and annual emission reduction calculations. Director – Finance is responsible for any leakage of emissions in the project boundary.

**Manager:** Manager is assisting to Director – Finance for completing the task discussed above. He/She is responsible for the electricity generations at the individual wind turbine installations. He/She will crosscheck the credit notes with the log book regularly and report to Director – Finance for any abnormality. Operation and maintenance of wind generators will be done by Vestas and they will be responsible to Manager. He/she is also responsible for conducting annual calibration of main & check meters.

**Site Supervisor:** Site supervisor from Vestas is responsible for onsite activities like operations & maintenance etc. Site supervisor is also responsible for recording the electricity meter reading and upkeep of WTG controllers.

**Record Handling:** OEM contractors are collecting daily report with all the related parameters. All the records are given to Manager every month. Manager can further pass on the information to concern person as shown in above organization chart. Manager is also responsible for record keeping.

**JMR Procedure:** Once in a month MSEDCL Asst engineer is taking reading at Karve sub station where both the machines are connected. Readings are noted by representatives from different division which is one official from Dy Elect. Engineer from Sangli Windmill division, one official from Asst. Engineer / Junior Engineer from Vita Sub division, Executive Engineering from Vita division, and one engineer from Vestas will present.

Once this JMR is completed, then within 5 days (approx.), JMR report to be submitted to Vita division and sub division and MSEDCL, Sangli circle office. Thereafter processing this JMR, MSEDCL will release the credit notes to individual developers name within 15th of every month. Accordingly invoice can be raised based on credit notes and payment releases after 45 days of invoice submission.

#### **Internal Audits and performance review**

These records are regularly audited and checked by the senior officials from PP during their visits to the site. The senior officials visit once in a year and audit the records. The officials will crosscheck the emissions reductions claimed in PDD with respect to actual emissions reduction.

For any deviation from the actual emission reduction values and reported values corrective action will be suggested by senior official to calculate the conservative emission reduction. All corrective actions will be recorded in the logbook.

#### **Data will be cross checked in following manner to determine accuracy and uncertainty level,**

1. Reading of main meter and check meter will compared
2. Difference between these values are calculated
3. If difference cross the permitted limits the meters will be checked for accuracy
4. In case of abnormality meter calibration will be done or meter will be replaced with similar meter.

#### **Monitoring and Calibration**

As emission reductions from the project are determined by the number of units exported to the grid, it is mandatory to have a monitoring system in place and ensure that the project activity produces and exports the rated power at the stipulated norms. The sole objective of having monitoring system is to have a constant watch on the emission reductions.

The delivered energy shall be metered by Vestas and state electricity board at the low voltage side of the step up transformers in substations. Metering is done either for two /three / more wind mills depending on

the location of wind mills and service connection number. Metering equipment is electronic tri-vector meters. The metering equipment is maintained in accordance with electricity standards and has the capability of recording hourly and monthly readings. Records of joint meter reading are maintained at site and a copy is maintained at the head office. All the meters shall be tested for accuracy every calendar year with reference to a portable standard meter. As the instruments are calibrated and marked at regular intervals, the accuracy of measurement can be assured at all times. Necessary records of calibration are maintained by Manager (Wind Project) and state electricity board.

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante or at renewal of crediting period

|                          |   |
|--------------------------|---|
| <b>Data / Parameter:</b> | EF <sub>grid,OM,y</sub>   |
| Unit:                    | tCO <sub>2</sub> e/MWh  |
| Description:             | Grid Emission factor ( <i>Operating Margin</i> ), NEWNE Grid                |
| Source of data:          | Central Electricity Authority: CO <sub>2</sub> Baseline Database, Version 4 |
| Value(s) applied):       | 1.01  |
| Purpose of data:         | Calculation of baseline emissions or baseline net GHG removals by sinks     |
| Additional comment:      | None  |

|                          |   |
|--------------------------|---|
| <b>Data / Parameter:</b> | EF <sub>grid,BM,y</sub>   |
| Unit:                    | tCO <sub>2</sub> e/MWh  |
| Description:             | Grid Emission factor ( <i>Build Margin</i> ), NEWNE Grid                    |
| Source of data:          | Central Electricity Authority: CO <sub>2</sub> Baseline Database, Version 4 |
| Value(s) applied):       | 0.60  |
| Purpose of data:         | Calculation of baseline emissions or baseline net GHG removals by sinks     |
| Additional comment:      | None  |

|                          |   |
|--------------------------|---|
| <b>Data / Parameter:</b> | EF <sub>grid,CM,y</sub>   |
| Unit:                    | tCO <sub>2</sub> e/MWh  |
| Description:             | Grid Emission factor ( <i>Combine Margin</i> ), NEWNE Grid                  |
| Source of data:          | Central Electricity Authority: CO <sub>2</sub> Baseline Database, Version 4 |
| Value(s) applied):       | 0.9075  |
| Purpose of data:         | Calculation of baseline emissions or baseline net GHG removals by sinks     |
| Additional comment:      | None  |

### D.2. Data and parameters monitored

|                          |  |
|--------------------------|--|
| <b>Data / Parameter:</b> | <b>Net Electricity Exported (EGBL<sub>y</sub>)</b>                           |
| Unit:                    | MWh  |
| Description:             | Net units of electricity due to substituted in the grid during the period y. |



|  |  |
|--|--|
| Measured/<br>Calculated /<br>Default:          | Calculated   |
| Source of data:                                | Data will be calculated from by Joint Meter Reading and Apportioning Procedure. Steps to calculate EGBL <sub>y</sub> is given in Annex 4. Same will appear in the electricity bill or MSEDCL credit note.  |
| Value(s) of monitored parameter:               | 7576 MWh   |
| Monitoring equipment:                          | <u>Monitoring</u> : tri-vector meter (accuracy class 0.2), located in sub-station, is used for monitoring of import and export values at feeder and WTG controllers, located in each WTGs, are used for monitoring of Net Electricity at each WTG, value of EGBL <sub>y</sub> will be calculated based on these data.        |
| Measuring/<br>Reading/<br>Recording frequency: | <u>Frequency</u> : Monthly<br><u>Archiving Policy</u> : Paper & Electronic<br><u>Responsibility</u> : Manager (Wind Project) would be responsible for regular calibration of the meter.<br><u>Calibration Frequency</u> : Once in a year. Only main & check meters will be calibrated. WTG controllers cannot be calibrated. |
| Calculation method<br>(if applicable):         | Net electricity generated by Individual WTG<br>= Electricity Import by the Grid from Individual WTG - Electricity Export from the Grid to the Individual WTG   |
| QA/QC procedures:                              | Yes, Quality Management System will be used and the same procedures would be available at the project site. The net electricity exported data appearing in the credit note will be cross-checked with the invoices against sale of power raised by PP.   |
| Purpose of data:                               | Calculation of baseline emissions or baseline net GHG removals by sinks  |
| Additional comment:                            | Data archived: Crediting period + 2 yrs  |

  

|                                       |  |
|---------------------------------------|--|
| <b>Data / Parameter:</b>              | <b>Gross Electricity Exported (EG<sub>Export,y</sub>)</b>  |
| Unit:                                 | MWh  |
| Description:                          | Gross units of Electricity Exported from the Grid to the Individual WTG during the period y.   |
| Measured/<br>Calculated /<br>Default: | Measured   |
| Source of data:                       | Data will be monitored by Main and/or Check meter, located at sub-station.   |
| Value(s) of monitored parameter:      | 42 MWh   |
| Monitoring equipment:                 | <u>Monitoring</u> : tri-vector meter (accuracy class 0.2) is used for monitoring of export value (EG <sub>Export,y</sub> ). This value is gross export metered at substation feeder and it includes electricity export from project activity and other WTGs connected to same feeder |

|  |   |
|--|---|
| Measuring/<br>Reading/<br>Recording frequency: | <u>Frequency</u> : Measured continuously, recorded Monthly.<br><u>Archiving Policy</u> : Paper & Electronic<br><u>Responsibility</u> : Manager (Wind Project) would be responsible for regular calibration of the meter.<br><u>Calibration Frequency</u> : Once in a year. Only main & check meters will be calibrated. WTG controllers cannot be calibrated.         |
| Calculation method<br>(if applicable):         | Joint meter reading at the Feeder is recorded by MSEDCL Officials & an energy break-up sheet is issued by MSEDCL after apportioning based on controller data.<br>$\text{Export from the Grid} = \frac{\text{Generation at WTG controller}}{\text{Total Generation at All WTG controllers connected to the Feeder}} \times \text{Export from MSEDCL main/check meter}$ |
| QA/QC procedures:                              | Yes, Quality Management System will be used and the same procedures would be available at the project site. The net electricity exported data appearing in the credit note will be cross-checked with the invoices against sale of power raised by PP.  |
| Purpose of data:                               | Calculation of baseline emissions or baseline net GHG removals by sinks   |
| Additional comment:                            | Data archived: Crediting period + 2 yrs   |
| <b>Data / Parameter:</b>                       | <b>Gross Electricity Imported (EGImport,y)</b>  |
| Unit:  | MWh   |
| Description:                                   | Gross Units of Electricity Imported by the Grid from the Individual WTG during the period y.  |
| Measured/<br>Calculated /<br>Default:          | Measured  |
| Source of data:                                | Data will be monitored by Main and/or Check meter, located at sub-station.  |
| Value(s) of monitored parameter:               | 7,618 MWh   |
| Monitoring equipment:                          | <u>Monitoring</u> : tri-vector meter (accuracy class 0.2) is used for monitoring of export value (EGImport,y). This value is gross export metered at substation feeder and it includes electricity export from project activity and other WTGs connected to same feeder   |
| Measuring/<br>Reading/<br>Recording frequency: | <u>Frequency</u> : Measured continuously, recorded Monthly.<br><u>Archiving Policy</u> : Paper & Electronic<br><u>Responsibility</u> : Manager (Wind Project) would be responsible for regular calibration of the meter.<br><u>Calibration Frequency</u> : Once in a year. Only main & check meters will be calibrated. WTG controllers cannot be calibrated.         |
| Calculation method<br>(if applicable):         | Joint meter reading at the Feeder is recorded by MSEDCL Officials & an energy break-up sheet is issued by MSEDCL after apportioning based on controller data.<br>$\text{Import by the Grid} = \frac{\text{Generation at WTG controller}}{\text{Total Generation at All WTG controllers connected to the Feeder}} \times \text{Import from MSEDCL main/check meter}$   |

|                     |  |
|---------------------|--|
| QA/QC procedures:   | Yes, Quality Management System will be used and the same procedures would be available at the project site. The net electricity exported data appearing in the credit note will be cross-checked with the invoices against sale of power raised by PP. |
| Purpose of data:    | Calculation of baseline emissions or baseline net GHG removals by sinks  |
| Additional comment: | Data archived: Crediting period + 2 yrs  |

### D.3. Implementation of sampling plan

>>

Not applicable

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

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

>>

As per the approved methodology AMS I.D version 17 baseline emissions for the project activity are calculated by multiplying the net quantity of electricity supplied by this project activity ( $E_{GBL,y}$ ) with the CO<sub>2</sub> baseline emission factor for the electricity displaced due to the project ( $E_{FCO_2}$ ) as follows:

$$BE_y = E_{GBL,y} \times E_{FCO_2,grid,y} = E_{GBL,y} \times E_{Fgrid,CM,y}$$

Where,

|                    |   |   |
|--------------------|---|---|
| $E_{FCO_2,grid,y}$ | = | Baseline emission factor                                  |
|                    | = | 0.9075 tCO <sub>2</sub> e/MWh                             |
| $E_{GBL,y}$        | = | Net electricity supplied to the NEWNE regional grid (MWh) |
|                    | = | 7576 MWh  |

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

>>

Since the project activity is a renewable energy project which generates electricity using wind power therefore there are no resulting project emissions.

### E.3. Calculation of leakage

>>

No leakage is considered from the project activity as per approved methodology AMS-I.D.

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

| Item  | Baseline emissions or baseline net GHG removals by sinks (t CO <sub>2</sub> e) | Project emissions or actual net GHG removals by sinks (t CO <sub>2</sub> e) | Leakage (t CO <sub>2</sub> e) | Emission reductions or net anthropogenic GHG removals by sinks (t CO <sub>2</sub> e) |
|-------|--|---|-------------------------------|--|
| Total | 6,875  | 0   | 0                             | 6,875  |

**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 (t CO <sub>2</sub> e) | $(5729 \times 457 / 365) = 7,173$                         | 6,875  |

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

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From E.5 above, we can observe that actual emission reduction for the monitoring is lower than estimated emission reductions by 4.16%.

**E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards**

| Item   | Actual values achieved up to 31 December 2012 | Actual values achieved from 1 January 2013 onwards |
|--|---|--|
| Emission reductions or GHG removals by sinks (t CO <sub>2</sub> e) | 2,421   | 4,454  |

**Annexure 1:**

Meter calibration details are given in the following table:

Meter is Calibrated Quarterly.

| Tower No. | Feeder No. | Accuracy Class | Make   | Type     | Main meter SI. No. | Check meter SI. No. | Calibration | Test Result  |
|-----------|------------|----------------|--------|----------|--------------------|---------------------|-------------|--------------|
| R – 8     | F. No. 13  | 0.2s           | Elster | Alpha M+ | 04880949           | 04880948            | 14/06/2012  | Satisfactory |
| R – 22    | F. No. 11  | 0.2s           | Elster | Alpha M+ | 04880946           | 04880945            | 14/06/2012  | Satisfactory |

**Annexure 2:**

Generation details are given in the following table:

| <b>WTG ID : R-22</b> |                                 |           |                           |                   |                   |
|----------------------|---------------------------------|-----------|---------------------------|-------------------|-------------------|
| <b>JMR</b>           | <b>Meter Reading for Period</b> |           | <b>Break-up of Energy</b> |                   |                   |
| <b>No.</b>           | <b>From</b>                     | <b>To</b> | <b>Import kWh</b>         | <b>Export kWh</b> | <b>Net</b>        |
| 07858                | 30-Jul-12                       | 30-Aug-12 | 507932.92                 | 135.05            | 507797.87         |
| 08838                | 30-Aug-12                       | 29-Sep-12 | 278336.32                 | 901.18            | 277435.14         |
| 09986                | 29-Sep-12                       | 30-Oct-12 | 205964.74                 | 1651.02           | 204313.72         |
| 10825                | 30-Oct-12                       | 29-Nov-12 | 167412.93                 | 2309.14           | 165103.79         |
| 00305                | 29-Nov-12                       | 29-Dec-12 | 197505.16                 | 1518.21           | 195986.95         |
| 01277                | 29-Dec-12                       | 29-Jan-13 | 124118.55                 | 2911.42           | 121207.13         |
| 02248                | 29-Jan-13                       | 27-Feb-13 | 138872.47                 | 1990.45           | 136882.02         |
| 03346                | 27-Feb-13                       | 30-Mar-13 | 177708.85                 | 1423.95           | 176284.9          |
| 04259                | 30-Mar-13                       | 29-Apr-13 | 145082.78                 | 1288.48           | 143794.3          |
| 05287                | 29-Apr-13                       | 30-May-13 | 143173.9                  | 859.9             | 142314            |
| 06128                | 30-May-13                       | 29-Jun-13 | 454083.92                 | 531.25            | 453552.67         |
| 06989                | 29-Jun-13                       | 29-Jul-13 | 565360.9                  | 0                 | 565360.9          |
| 07961                | 29-Jul-13                       | 30-Aug-13 | 492946.1                  | 0                 | 492946.1          |
| 09132                | 30-Aug-13                       | 28-Sep-13 | 156440.29                 | 1462.06           | 154978.23         |
| 09863                | 28-Sep-13                       | 29-Oct-13 | 154841.36                 | 1379.15           | 153462.21         |
| <b>Total</b>         |                                 |           | <b>3909781.19</b>         | <b>18361.26</b>   | <b>3891419.93</b> |

| <b>WTG ID : R-08</b> |                                 |           |                           |                   |                   |
|----------------------|---------------------------------|-----------|---------------------------|-------------------|-------------------|
| <b>JMR</b>           | <b>Meter Reading for Period</b> |           | <b>Break-up of Energy</b> |                   |                   |
| <b>No.</b>           | <b>From</b>                     | <b>To</b> | <b>Import kWh</b>         | <b>Export kWh</b> | <b>Net</b>        |
| 07860                | 30-Jul-12                       | 30-Aug-12 | 473377.67                 | 97.89             | 473279.78         |
| 08840                | 30-Aug-12                       | 29-Sep-12 | 297241.53                 | 1070.82           | 296170.71         |
| 09988                | 29-Sep-12                       | 30-Oct-12 | 189174.62                 | 1625.87           | 187548.75         |
| 10827                | 30-Oct-12                       | 29-Nov-12 | 168301.3                  | 2866.74           | 165434.56         |
| 00307                | 29-Nov-12                       | 29-Dec-12 | 196544.33                 | 1999.89           | 194544.44         |
| 01279                | 29-Dec-12                       | 29-Jan-13 | 120918.62                 | 3824.03           | 117094.59         |
| 02250                | 29-Jan-13                       | 27-Feb-13 | 138722.47                 | 2583.29           | 136139.18         |
| 03348                | 27-Feb-13                       | 30-Mar-13 | 185382.78                 | 2459.02           | 182923.76         |
| 04261                | 30-Mar-13                       | 29-Apr-13 | 162426.32                 | 2103.97           | 160322.35         |
| 05289                | 29-Apr-13                       | 30-May-13 | 163248.9                  | 1416.27           | 161832.63         |
| 06130                | 30-May-13                       | 29-Jun-13 | 445650.93                 | 573.06            | 445077.87         |
| 06992                | 29-Jun-13                       | 29-Jul-13 | 513096.46                 | 0                 | 513096.46         |
| 07963                | 29-Jul-13                       | 30-Aug-13 | 389352.93                 | 0                 | 389352.93         |
| 09134                | 30-Aug-13                       | 28-Sep-13 | 107529.13                 | 1313.86           | 106215.27         |
| 08965                | 28-Sep-13                       | 29-Oct-13 | 157308.2                  | 1732.89           | 155575.31         |
| <b>Total</b>         |                                 |           | <b>3708276.19</b>         | <b>23667.6</b>    | <b>3684608.59</b> |

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**Document information**

| <i>Version</i>                                      | <i>Date</i>     | <i>Description</i>   |
|---|-----------------|--|
| 03.2  | 5 November 2013 | Editorial revision to correct table in page 1.   |
| 03.1  | 2 January 2013  | Editorial revision to correct table in section E.5.  |
| 03.0  | 3 December 2012 | Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11). |
| 02.0  | 13 March 2012   | Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).   |
| 01  | 28 May 2010     | EB 54, Annex 34. Initial adoption.   |
| Decision Class: Regulatory                          |                 |  |
| Document Type: Form                                 |                 |  |
| Business Function: issuance                         |                 |  |
| Keywords: monitoring report, performance monitoring |                 |  |