



**Monitoring report form
(Version 05.1)**

MONITORING REPORT

| | | |
|--|---|---|
| Title of the project activity | Grid Connected Wind Energy Generation at Andhra Pradesh | |
| UNFCCC reference number of the project activity | 5921 | |
| Version number of the monitoring report | 1.0 | |
| Completion date of the monitoring report | 06/05/2017 | |
| Monitoring period number and duration of this monitoring period | Third monitoring period, 01/01/2014 to 05/04/2017 (Including first and last day) | |
| Project participant(s) | Vish Wind Infrastructure LLP (Private entity) | |
| Host Party | India | |
| Sectoral scope(s) | Sectoral Scope: 1 Energy industries (renewable/ non-renewable sources) | |
| Selected methodology(ies) | Approved consolidated baseline methodology ACM0002 (Version 12.3.0, Annex 35, EB 66) | |
| Selected standardized baseline(s) | Not Applicable | |
| Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD | 119,877 tonnes of CO ₂ e | |
| Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period | GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012 | GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards |
| | NA | 109,361 tonnes of CO ₂ e |

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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

The purpose of the project activity is to utilize wind energy potential for generation of electricity. The project activity replaces anthropogenic emissions of greenhouse gases (GHG's) into the atmosphere, which is estimated to be approximately 36,738 tCO_{2e} per year, by displacing an equivalent amount of electricity generation through the operation of existing fuel mix in the grid comprising mainly fossil fuel based power plants and future capacity expansions connected to the grid. M/s Vish Wind Infrastructure LLP (hereafter referred as "VWILLP") installed a 20.8 MW of capacity wind energy power plant in the state of Andhra Pradesh in India. The project activity involves supply, erection, commissioning and operation of 26 machines with rated capacity of 800 KW each. All the machines are E-53 make.

The first machine under the project activity was commissioned on 30/09/2011 and the last machine under the project activity was commissioned on 15/07/2012. The expected operational lifetime of the project is for 20 years. The total emission reductions achieved under this monitoring period (01/01/2014 to 05/04/2017) is 109,361 tCO₂.

Brief description of the installed technology and equipment:

The technical specifications of the Wind World WW-53 make WECs with rated capacity 800 KW are given below:

| Main Specifications E-53 | |
|----------------------------|--|
| Turbine model | Wind World WW-53 |
| Rated power | 800 KW |
| Rotor diameter | 53 m |
| Hub height | 75 m |
| Turbine Type | Gearless horizontal axis wind turbine with variable rotor speed |
| Power regulation | Independent electromechanical pitch system for each blade. |
| Cut in wind speed | 2.5 m/s |
| Rated wind speed | 12 m/s |
| Cut out Wind speed | 28-34 m/s |
| Extreme Wind Speed | 59.5 m/s |
| Rated rotational speed | 32 rpm |
| Operating range rot. speed | 12-29 rpm |
| Orientation | Upwind |
| No of Blades | 3 |
| Blade Material | Fibre Glass Epoxy reinforced with integral lightning protection |
| Gear box type | Gear less |
| Generator type | Synchronous generator |
| Braking | Aerodynamic |
| Output Voltage | 400 V |
| Yaw System | Active yawing with 4 electric yaw drives with brake motor and friction bearing |
| Tower | 74 m concrete |

Wind World (India) Ltd has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH, has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured.



Technology Diagram

Relevant dates for the project activity:

The first machine under the project activity was commissioned on 30/09/2011 and last machine under the project activity was commissioned on 15/07/2012. The project activity consists of 26 machines (800 kW each) of Wind World make E-53, with a total capacity of 20.8 MW. The expected operational lifetime of the project is for 20 years. The details of issuance of CERs for the previous monitoring periods are as follows:

| Monitoring Period No. | Monitoring Period | CER Issued |
|-----------------------|--|------------|
| First Issuance | 01 Apr 2012 - 31 Dec 2012 (Inclusive of both days) | 18,532 |
| Second issuance | 01 Jan 2013 - 31 Dec 2013 (Inclusive of both days) | 40,401 |

Total emission reductions achieved in this monitoring period

This is the third monitoring report for the project activity. The total emission reductions achieved under the monitoring period 01/01/2014 to 05/04/2017 (Including first and last day) is 109,361 tCO₂e.

A.2. Location of project activity

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- (a) Host Party(ies); India
- (b) Region/State/Province, etc.; Andhra Pradesh State
- (c) City/Town/Community, etc.; Nallakonda & Thummalapenta villages in Kurnool and Anantapur district in Indian State of Andhra Pradesh.
- (d) Physical/ Geographical location.

The detailed individual WECs location numbers and coordinates of project activity are provided in below:

1) Location details for Anantapur Site, Village – Nallakonda

| Sl. no. | Commissioning date | Location no. | Latitude | Longitude |
|---------|--------------------|--------------|---------------|---------------|
| 1. | 15/07/2012 | 1 | 14° 03' 51.2" | 77° 32' 06.9" |

| | | | | |
|-----|------------|----|---------------|---------------|
| 2. | 15/07/2012 | 2 | 14° 03' 55.8" | 77° 32' 03.4" |
| 3. | 15/07/2012 | 3 | 14° 03' 49.4" | 77° 32' 29.6" |
| 4. | 15/07/2012 | 4 | 14° 03' 59.9" | 77° 32' 26.1" |
| 5. | 15/07/2012 | 5 | 14° 04' 22.9" | 77° 32' 22.1" |
| 6. | 15/07/2012 | 6 | 14° 04' 27.5" | 77° 32' 17.4" |
| 7. | 15/07/2012 | 7 | 14° 04' 34.0" | 77° 32' 12.3" |
| 8. | 15/07/2012 | 8 | 14° 04' 33.5" | 77° 32' 00.5" |
| 9. | 15/07/2012 | 9 | 14° 04' 40.7" | 77° 32' 15.2" |
| 10. | 15/07/2012 | 10 | 14° 04' 45.4" | 77° 32' 12.6" |
| 11. | 15/07/2012 | 11 | 14° 04' 50.0" | 77° 32' 10.5" |
| 12. | 15/07/2012 | 12 | 14° 04' 41.1" | 77° 31' 44.2" |
| 13. | 15/07/2012 | 13 | 14° 04' 47.4" | 77° 31' 44.5" |
| 14. | 15/07/2012 | 14 | 14° 04' 51.5" | 77° 31' 44.0" |
| 15. | 15/07/2012 | 15 | 14° 04' 56.5" | 77° 31' 41.9" |
| 16. | 15/07/2012 | 16 | 14° 05' 01.1" | 77° 31' 40.8" |
| 17. | 09/07/2012 | 39 | 14° 08' 41.1" | 77° 35' 29.0" |
| 18. | 09/07/2012 | 41 | 14° 08' 50.3" | 77° 35' 01.0" |
| 19. | 09/07/2012 | 42 | 14° 08' 57.2" | 77° 34' 53.4" |
| 20. | 09/07/2012 | 43 | 14° 09' 01.2" | 77° 34' 50.5" |
| 21. | 09/07/2012 | 44 | 14° 09' 43.5" | 77° 36' 02.6" |
| 22. | 09/07/2012 | 45 | 14° 09' 51.4" | 77° 35' 57.9" |
| 23. | 09/07/2012 | 46 | 14° 09' 57.4" | 77° 35' 50.2" |
| 24. | 09/07/2012 | 47 | 14° 10' 00.8" | 77° 35' 48.5" |

2) Location details for Kurnool Site, Village - Thummalapenta

| Sl. no. | Commissioning date | Location no. | Latitude | Longitude |
|---------|--------------------|--------------|---------------|---------------|
| 1. | 30/09/2011 | 91 | 15° 02' 40.3" | 78° 02' 54.0" |
| 2. | 30/09/2011 | 93 | 14° 03' 59.2" | 78° 03' 04.9" |

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) |
|--|--|--|
| Government of India (host) | Vish Wind Infrastructure LLP (Private entity) | No |

A.4. Reference of applied methodology and standardized baseline

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

Reference: Approved consolidated baseline methodology ACM0002 (Version 12.3.0, Annex 35, EB 66)

ACM0002 draws upon the following tools which have been used in the PDD:

- Tool to Calculate the Emission Factor for an Electricity System – Version 02.2.1, Annex 19, EB 63
- Tool for the Demonstration and Assessment of Additionality – Version 06.0.0, Annex 21, EB 65

Further information with regards to the methodology / tools can be obtained at

<http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT>

A.5. Crediting period of project activity

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The length of the Crediting period of the project activity as per registered PDD is 10 years (Fixed). The crediting period start date is 01/04/2012 and length of crediting period is 10 years (from 01/04/2012 to 31/03/2022).

A.6. Contact information of responsible persons/entities

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The detailed contact information has been provided in Annex 1. The above mentioned person/entity is also a project participant.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The first machine under the project activity was commissioned on 30/09/2011 and last machine under the project activity was commissioned on 15/07/2012. The project activity consists of 26 machines (800 kW each) of Wind World make E-53, with a total capacity of 20.8 MW. The commissioning date for all the machines included in the project activity is given in the section A.2.

There are no changes that have happened in project activity which may impact the applicability of the methodology. The operation and maintenance activities of Wind World are ISO certified and all the events are recorded in the log book available at the project site. Referring to the data available it can be inferred that there have not been any major special events for any of the machines that are included in the project activity. As a part of regular maintenance the machines are stopped for mechanical and electrical maintenance for 16 to 18 hours annually and for visual inspection for 6 to 7 hours quarterly. During the monitoring period there were no events or situation occurred, which may impact the applicability of the methodology.

Description of maintenance intervals:

There is a pre-defined maintenance schedule for annual maintenance for all the WECs at project site. There are four types of maintenance activity have been executed for all the WECs. During maintenance, WEC needs to stop for defined time period which are as follows:

- 1) Visual maintenance : Average 3 to 4 hr stoppage of WEC
- 2) Grease maintenance : Average 3 to 4 hr stoppage of WEC
- 3) Electrical maintenance : Average 16 to 20 hr stoppage of WEC
- 4) Mechanical maintenance: Average 16 to 20 hr stop of WEC

Other than the above mentioned maintenance activity, WEC were generating electricity continuously without any technical fault. Hence no break down has been noted during the monitoring period.

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

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There is no deviation from registered monitoring plan or applied methodology during this monitoring period.

B.2.2. Corrections

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There are no corrections from the registered PDD during this monitoring period.

B.2.3. Changes to start date of crediting period

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There are no changes to the start date of the crediting period.

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

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Not applicable

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

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The monitoring plan has been revised and the calibration frequency has been changed to once in five years during the previous monitoring period. This is in line with para 5 (a) of the Appendix 1 of the CDM project standard and is beyond the control of the PP and does not have any impact on the emission reduction calculation. Hence, does not require any prior approval. (approved on 07/06/2013; PRC-5921-001).

B.2.6. Changes to project design of registered project activity

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There are no permanent changes to project design of registered project activity.

B.2.7. Types of changes specific to afforestation or reforestation project activity

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Not applicable to the project activity.

SECTION C. Description of monitoring system

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Approved monitoring methodology ACM0002 (Version 12.3.0), Sectoral Scope: 1, "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources", is proposed to be used to monitor the emission reductions.

This approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid, where *ex-post* determination of grid emission factor has been chosen

Since the baseline methodology is based on *ex-ante* determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required.

Monitoring at Kurnool site:

The metering system for the project activity consists of cluster metering points at 33 kV at project site. Each cluster metering point has one main and one check meter (33 kV metering point). All the WEGs of project activity will exclusively connected to individual cluster metering points i.e. there will be no WEGs

of other project owners that are connected to these cluster metering points. In a particular wind-farm of Wind World, each cluster has WEGs of only one project owner.

In addition to the cluster metering point, there is one set of main & check meter (bulk/billing metering point) at 132 kV Ankireddypalli sub station, where all the WEGs of the project activity and non-project activity are connected.

Monitoring at Anantapur site:

The metering system for the project activity consists of cluster metering points at 33 kV at project site. Each cluster metering point has one main and one check meter (33 kV metering point). All the WEGs of project activity will exclusively connected to individual cluster metering points i.e. there will be no WEGs of other project owners that are connected to these cluster metering points. In a particular wind-farm of Wind World, each cluster has WEGs of only one project owner.

In addition to the cluster metering point, there is one set of main & check meter (bulk/billing metering point) at 220 kV Shapuram Sub-station, where all the WEGs of the project activity and non-project activity are connected.

Calculation of Net Electricity Supplied to the grid by project activity

Since the main and check meters (bulk meter) at 132 kV (for Kurnool) or 220 kV (for Anantpur) metering point is connected to the machines of the project activity and the machines commissioned by the other project developers, therefore in order to determine the net electricity supplied to the grid at 132 kV (for Kurnool) or 220 kV (for Anantpur), the state utility apply Line loss to the meter reading recorded at the 33 kV.

The summation of net electricity supplied to the grid from the two sites (Kurnool & Anantpur) under the project activity shall comprise the "Net Electricity Supplied to the Grid by the Project Activity ($EG_{PJ,y}$)".

The total % of Line loss from WEGs (33 kV metering point) to 132 kV (for Kurnool) or 220 kV (for Anantpur) metering point is calculated by the state utility. Net Electricity supplied to the grid by project activity is calculated by applying Line loss to the meter readings taken at 33 kV metering point of the project activity.

The procedure for calculation of the percentage Line loss has been shown below:

Where,

TE = Percentage Line loss incurred in Line between the meters located at 33 kV metering point and the meters located at 132 kV (for Kurnool) or 220 kV (for Anantpur) metering point (bulk meter: main and check) at high voltage side of receiving sub-station.

$(X_1+X_2+X_3+X_4+.....X_n)$ = Summation of meter readings (Export) at 33 kV metering points for all the project developers connected to receiving substation (including the machines of the project activity and other project developers)

Y = Export Reading at bulk meter installed at high voltage side of transformer of the receiving substation at 132 kV (for Kurnool) or 220 kV (for Anantpur) metering point, connecting machines of the project activity and other project developers.

Monthly JMR recorded at 33 kV metering points as given by APCPDCL contains the following data:-

1. Electricity Export ($EG_{JMR, Export,y}$) : Electricity export to the grid at 33kV metering point.
2. Electricity Import ($EG_{JMR, Import,y}$) : Electricity import from grid at 33kV metering point.

Net Electricity supplied to the Grid is calculated as:-

$$EG_{PJ,y} = EG_{Export,y} - EG_{Import,y}$$

Where,

$$EG_{\text{Export},y} = EG_{\text{JMR, Export},y} \times (1 - TE) \dots\dots\dots(1)$$

$$EG_{\text{Import},y} = EG_{\text{JMR, Import},y} \times (1 + TE) \dots\dots\dots(2)$$

The metering diagrams for both the sites (Kurnool & Anantpur) have been shown in Appendix I.

Metering Equipment:

- All main and check meters are two-way tri-vector meters capable of recording import and export of electricity and under the control of state electricity utility.
- All main and check meters are of 0.2s of accuracy class.

The details of the meters have been given below:

| S.N. | Meter type | Make | Accuracy class | Meters | Main/Check | Calibration prior to the monitoring period | Calibration Date | Calibration due Date |
|------|-------------------|-------|----------------|--------|------------|--|------------------|----------------------|
| 1. | Vish Wind Phase 1 | L & T | 0.2s | Main | 12092978 | 06/08/2012 | 22/09/2016 | 22/09/2021 |
| | | | | Check | 12092998 | 06/08/2012 | 22/09/2016 | 22/09/2021 |
| 2. | Vish Wind Phase 2 | L & T | 0.2s | Main | 12092976 | 08/08/2012 | 23/09/2016 | 23/09/2021 |
| | | | | Check | 12092979 | 08/08/2012 | 23/09/2016 | 23/09/2021 |
| 3. | Vish Wind Phase 4 | L & T | 0.2s | Main | APW00074* | 05/07/2011 | 22/02/2016 | 22/02/2021 |
| | | | | Check | APW00075** | 05/07/2011 | 17/03/2016 | 17/03/2021 |

* Old meter Number AP902988 was replaced with new meter number APW00074 on 25/10/2016

** Old meter Number AP902990 was replaced with new meter number APW00075 on 25/10/2016

| SI No. | Substation name | Make | Accuracy class | Main meter | Check meter | Calibration prior to the monitoring period | Calibration Date | Calibration due on |
|--------|-------------------------------------|-------|----------------|------------|-------------|--|------------------|--------------------|
| 1. | 220/33 kV Shapuram substation | L & T | 0.2s | 12093025 | 12093032 | 07/08/2012 | 23/12/2016 | 23/12/2021 |
| 2. | 132/33 kV Ankireddipalli Substation | L & T | 0.2s | 11070264 | 11070337 | 27/12/2011 | 23/12/2016 | 23/12/2021 |

Meter Readings:

The meter readings are noted in the form of joint meter report and are signed jointly by the representatives of WWIL and the state utility. WWIL provides the report to the Project proponent and the project proponent maintains the report afterwards.

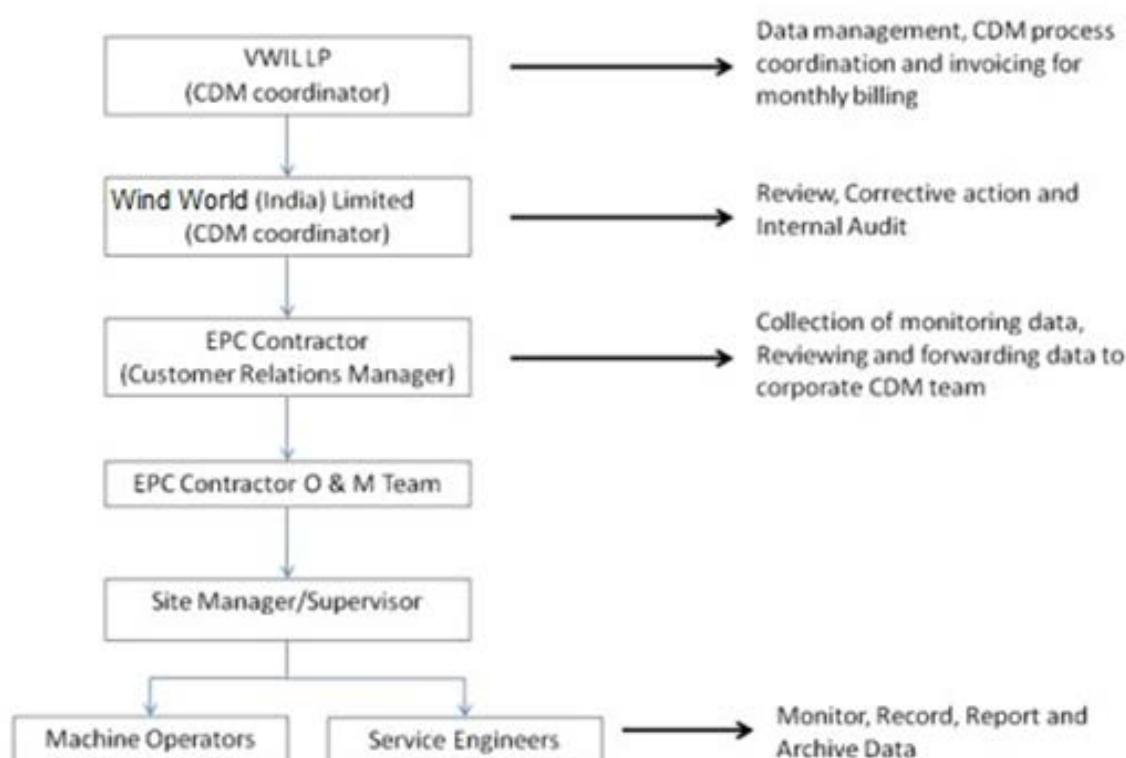
In case the main meter(s) is found to be operating outside the permissible limits, the main meter will be either replaced or calibrated immediately. Whenever a main meter goes defective, the consumption recorded by the Check meter will be referred.

QA/QC process:

All the meters are calibrated/ tested once in five years. The calibration is done by the officials of the state utility. The copy of the calibration/testing certificate is kept as record by the PP.

The Project is operated and maintained by WWIL. WWIL is an ISO 9001:2008 certified Quality Management system from Germanischer Lloyd. WWIL follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

The operational and management structure implemented for data monitoring is as follows:



Training and maintenance:

In order to ensure that WWIL's staffs who are positioned to take care all the activities starting from project construction to operation and maintenance, WWIL Training Academy provides need based periodical training to meet the requirements of the project. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all the trainees. The training facility is located at Daman and is fully functional and equipped with qualified trainers, training equipments, classrooms and hostel facilities.

SECTION D. Data and parameters

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

| | |
|--|--|
| Data/parameter: | $EF_{grid,OM,y}$ |
| Unit | tCO ₂ e/MWh |
| Description | Operating Margin Emission Factor of Southern Regional Electricity Grid |
| Source of data | “CO ₂ Baseline Database for Indian Power Sector”, version 6 published by the Central Electricity Authority, Ministry of Power, Government of India. The “CO ₂ Baseline Database for Indian Power Sector” is available at www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm |
| Value(s) applied) | 0.9684 |
| Choice of data or measurement methods and procedures | Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002. |
| Purpose of data | Baseline emission calculations |
| Additional comments | The value is calculated on ex-ante basis and it will remain same throughout the crediting period. |

| | |
|--|---|
| Data/parameter: | $EF_{grid,BM,y}$ |
| Unit | tCO ₂ e/MWh |
| Description | Build Margin Emission Factor of Southern Regional Electricity Grid |
| Source of data | “CO ₂ Baseline Database for Indian Power Sector” version 6 published by the Central Electricity Authority, Ministry of Power, Government of India. The “CO ₂ Baseline Database for Indian Power Sector” is available at www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm |
| Value(s) applied) | 0.7634 |
| Choice of data or measurement methods and procedures | Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002. |
| Purpose of data | Baseline emission calculations |
| Additional comments | The value is calculated on ex-ante basis and it will remain same throughout the crediting period. |

| | | | |
|--|--|--|--------|
| Data/parameter: | $EF_{grid,CM,y}$ | | |
| Unit | tCO ₂ e/MWh | | |
| Description | Combined Margin Emission Factor of Southern Regional Electricity Grid | | |
| Source of data | The “CO ₂ Baseline Database for Indian Power Sector” version 6 published by the Central Electricity Authority, Ministry of Power, Government of India. The “CO ₂ Baseline Database for Indian Power Sector” is available at www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm | | |
| Value(s) applied) | In case of wind power projects default weights of 0.75 for $EF_{grid,OM}$ and 0.25 for $EF_{grid,BM}$ are applicable as per ACM0002. <table border="1" data-bbox="526 1899 1348 1948"> <tr> <td>Combined Margin Emission Factor (EF_y or EF_{CM,y})</td><td>0.9172</td></tr> </table> | Combined Margin Emission Factor (EF _y or EF _{CM,y}) | 0.9172 |
| Combined Margin Emission Factor (EF _y or EF _{CM,y}) | 0.9172 | | |
| Choice of data or measurement methods and procedures | Combined Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with CDM methodologies: ACM0002, and Tool to Calculate the emission Factor for an Electricity System. | | |

| | |
|---------------------|---|
| Purpose of data | Baseline emission calculations |
| Additional comments | The value is calculated on ex-ante basis and it will remain same throughout the crediting period. |

D.2. Data and parameters monitored

| | |
|---------------------------------------|---|
| Data/Parameter | EG_{PJ,y} |
| Unit | MWh (Mega-watt hour) |
| Description | Net electricity supplied to the grid by the Project activity |
| Measured/Calculated /Default | Calculated |
| Source of data | Calculated |
| Value(s) of monitored parameter | 119234.371 MWh |
| Monitoring equipment | Not applicable |
| Measuring/Reading/Recording frequency | Monthly |
| Calculation method (if applicable) | <p>Metering system of the project activity consists of cluster metering points at 33 kV at project site (both at Kurnool & Anantpur). Each cluster metering point will have one main and one check meter (33 kV metering point).</p> <ul style="list-style-type: none"> In addition to cluster metering point there is one set of main & check meter (bulk/billing metering point), where all the WEGs of project activity and non-project activity are connected and billing is done. All main and check meters are two-way electronic tri-vector meters and under the control of state electricity utility. All main and check meters are of 0.2s of accuracy class. The procedures for metering and meter reading will be as per the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD. Monthly Joint Meter Reading will be recorded by the State utility in the presence of PP's representative (Wind World). Net electricity supplied to the grid value is used in calculation of emission reduction of the project activity. <p>The calculation procedure has been explained in details in section C.</p> |
| QA/QC procedures | <p>All the main meter and check meters are calibrated by state utility annually.</p> <p>QA/QC procedures are as implemented by Discom/ State utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD.</p> |
| Purpose of data | Baseline Emissions calculations |
| Additional comment | The data has been archived both in electronic and hard paper format for crediting period + 2 years. |

| | |
|---------------------------------|---|
| Data/Parameter | EG_{JMR Export,y} |
| Unit | MWh (Mega-Watt hour) |
| Description | Electricity export recorded at 33 kV (in the form of Joint meter reading report) cluster metering points connecting all WEGs of the project activity. |
| Measured/Calculated /Default | Measured |
| Source of data | Electricity export to the grid as per the joint meter reading recorded at cluster metering point. |
| Value(s) of monitored parameter | 120612.552 MWh |

| | |
|---------------------------------------|---|
| Monitoring equipment | Two-way tri-vector meters of 0.2s of accuracy class. |
| Measuring/Reading/Recording frequency | Monthly basis |
| Calculation method (if applicable) | Electricity export to the grid will be recorded by cluster meters (main and check) connecting all turbines at 33 kV level. |
| QA/QC procedures | <p>This value can be crosschecked from transmission loss calculation sheet provided by the state utility.</p> <p>All the main meter and check meters are calibrated by state utility annually.</p> <p>QA/QC procedures are as implemented by Discom/ State utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD.</p> |
| Purpose of data | Baseline Emissions calculations |
| Additional comment | The data has been archived both in electronic and hard paper format for crediting period + 2 years. |

| | |
|---------------------------------------|---|
| Data/Parameter | EG_{JMR Import,y} |
| Unit | MWh (Mega-Watt hour) |
| Description | Electricity Import recorded at 33 kV (in the form of Joint meter reading report) cluster metering points connecting all WEGs of the project activity. |
| Measured/Calculated /Default | Measured |
| Source of data | Electricity Import to the grid as per the joint meter reading recorded at cluster metering point. |
| Value(s) of monitored parameter | 80.802 MWh |
| Monitoring equipment | Two-way tri-vector meters of 0.2s of accuracy class. |
| Measuring/Reading/Recording frequency | Monthly basis |
| Calculation method (if applicable) | Electricity Import to the grid will be recorded by cluster meters (main and check) connecting all turbines at 33 kV level. |
| QA/QC procedures | <p>This value can be crosschecked from transmission loss calculation sheet provided by the state utility.</p> <p>All the main meter and check meters are calibrated by state utility annually.</p> <p>QA/QC procedures are as implemented by Discom/ State utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD.</p> |
| Purpose of data | Baseline Emissions calculations |
| Additional comment | The data has been archived both in electronic and hard paper format for crediting period + 2 years. |

| | |
|------------------------------|--|
| Data/Parameter | EG_{Export,y} |
| Unit | MWh (Mega-Watt hour) |
| Description | Electricity exported by the project activity to the grid after apportioning of line losses between 33 kV metering point (Cluster meter) & Bulk metering point (132 kV metering point at Kurnool /220 kV metering point at Anantapur) |
| Measured/Calculated /Default | Calculated |
| Source of data | Certified "transmission loss calculation sheet" given by state utility/APCPDCL (Andhra Pradesh Central Power Distribution Company Limited). |

| | |
|---------------------------------------|---|
| Value(s) of monitored parameter | 119316.073 MWh |
| Monitoring equipment | Two-way tri-vector meters of 0.2s of accuracy class. |
| Measuring/Reading/Recording frequency | Monthly basis |
| Calculation method (if applicable) | Value is calculated by State Utility independently. Wind World or PP does not have any role or control on calculation of net electricity generation/export. The calculation procedure has been explained in details in section C. |
| QA/QC procedures | Value can be cross - checked from the invoices raised by PP to the DISCOM. All the main meter and check meters are calibrated by state utility annually. QA/QC procedures are as implemented by Discom/ State utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD. |
| Purpose of data | Baseline Emissions calculations |
| Additional comment | The data has been archived both in electronic and hard paper format for crediting period + 2 years. |

| | |
|---------------------------------------|---|
| Data/Parameter | EG_{Import,y} |
| Unit | MWh (Mega-Watt hour) |
| Description | Electricity Imported by the project activity to the grid after apportioning of line losses between 33 kV metering point (Cluster meter) & Bulk metering point (132 kV metering point at Kurnool /220 kV metering point at Anantapur) |
| Measured/Calculated /Default | Calculated |
| Source of data | Certified "transmission loss calculation sheet" given by state utility/APCPDCL (Andhra Pradesh Central Power Distribution Company Limited). |
| Value(s) of monitored parameter | 81.702 MWh |
| Monitoring equipment | Two-way tri-vector meters of 0.2s of accuracy class. |
| Measuring/Reading/Recording frequency | Monthly basis |
| Calculation method (if applicable) | Value is calculated by State Utility independently. Wind World or PP does not have any role or control on calculation of net electricity generation/Import. The calculation procedure has been explained in details in section C. |
| QA/QC procedures | Value can be cross - checked from the invoices raised by PP to the DISCOM. All the main meter and check meters are calibrated by state utility annually. QA/QC procedures are as implemented by Discom/ State utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD. |
| Purpose of data | Baseline Emissions calculations |
| Additional comment | The data has been archived both in electronic and hard paper format for crediting period + 2 years. |

| | |
|----------------|---|
| Data/Parameter | T_E |
| Unit | % |
| Description | Percentage Line loss between the 33 kV metering points (cluster meters including project activity and non - project activity) and the Bulk metering |

| | |
|---|---|
| | point (132 kV metering point at Kurnool /220 kV metering point at Anantapur) |
| Measured /Calculated /Default | Calculated |
| Source of data | Certified “transmission loss calculation sheet” given by state utility/APCPDCL (Andhra Pradesh Central Power Distribution Company Limited). |
| Value(s) of monitored parameter | Directly applied. |
| Monitoring equipment | Not Applicable |
| Measuring/ Reading/ Recording frequency | Monthly |
| Calculation method (if applicable) | The calculation procedure has been explained in details in section C. |
| QA/QC procedures | QA/QC procedures are as implemented by Discom/ State utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD. |
| Purpose of data | Baseline Emissions calculations |
| Additional comment | The data has been archived both in electronic and hard paper format for crediting period + 2 years. |

D.3. Implementation of sampling plan

>>

As the parameter to be monitored does not require sampling approach for its determination this section is not applicable for the proposed project activity.

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

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

>>

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} * EF_y$$

Where:

BE_y = Baseline emissions in year y (tCO₂/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (tCO₂e/MWh)

Accordingly:

Baseline emissions calculation for the monitoring period is as follows:

$$BE_y = 119234.371 \text{ (MWh)} * 0.9172 \text{ (tCO}_2\text{e/MWh)/1000}$$

$$= 109,361 \text{ tCO}_2\text{e}$$

The details of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity is provided in ER spreadsheet.

Baseline Emission Reductions calculations for project activity:-

| Duration | Net electricity supplied to the grid by the Project [MWh] | Baseline Emission Factor (tCO ₂ e/MWh) | Baseline Emissions (tCO ₂ e) |
|--------------------------|---|---|---|
| | [EGP _{J,y}] | [EF _y] | [BE _y] |
| 01/01/2014 to 05/04/2017 | 119234.371 ¹ | 0.9172 | 109,361 |
| Total | 119234.371 | | 109,361 |

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

>>

The project activity uses wind power to generate electricity and hence, the emissions from the project activity have been taken as zero.

$$PE_y = 0$$

E.3. Calculation of leakage

>>

No leakage has been considered from the project activity as per approved methodology ACM0002. Hence, $Ly = 0$

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

| Item | Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e) | Project emissions or actual net GHG removals by sinks (t CO ₂ e) | Leakage (t CO ₂ e) | GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period | | |
|--------------|--|---|-------------------------------|--|-----------------|--------------|
| | | | | Up to 31/12/2012 | From 01/01/2013 | Total amount |
| Total | 109,361 | 0 | 0 | 0 | 109,361 | 109,361 |

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

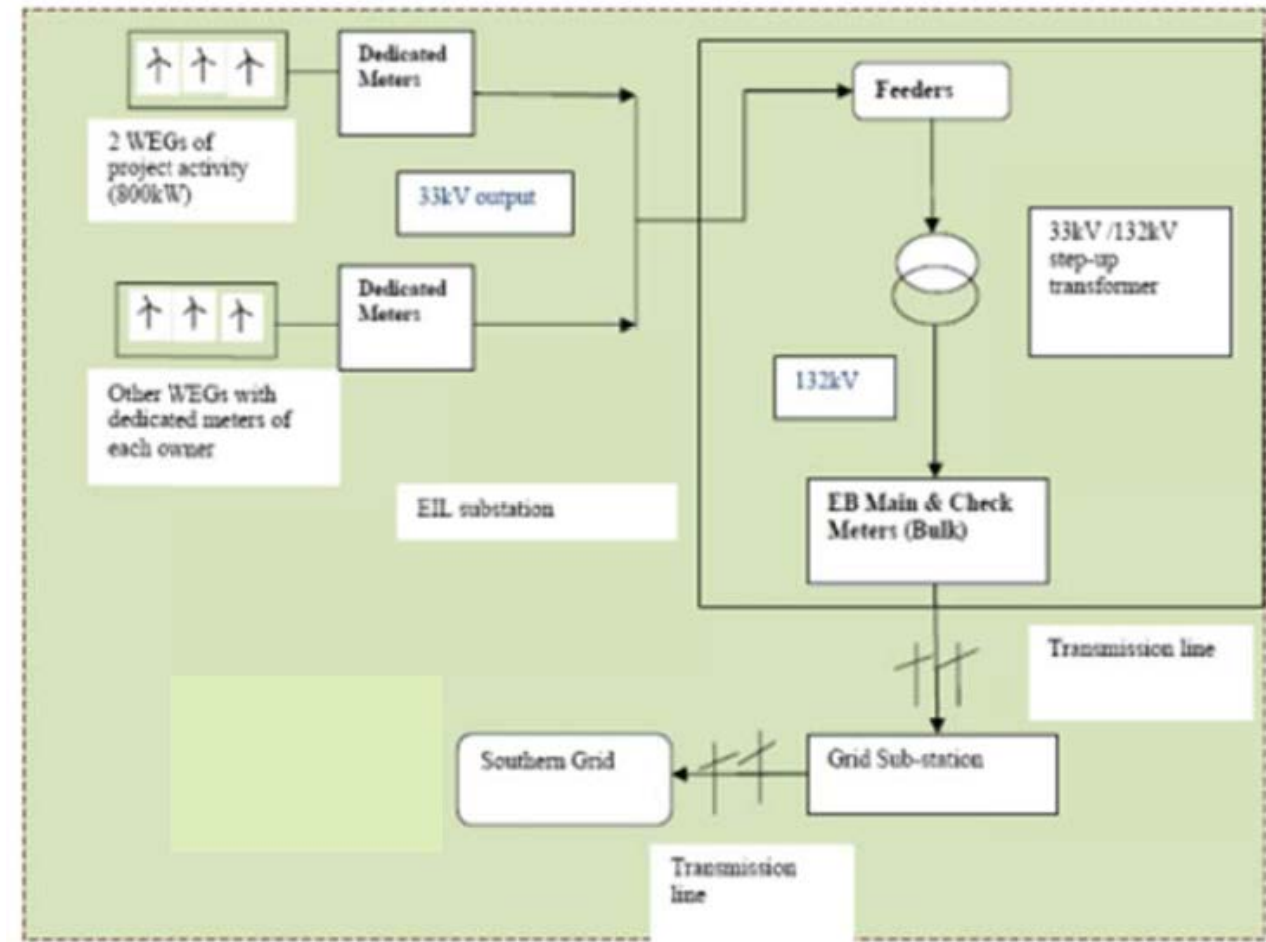
| Item | Values estimated in ex ante calculation of registered PDD | Actual values achieved during this monitoring period |
|--|---|--|
| Emission reductions or GHG removals by sinks (t CO ₂ e) | 119,877 | 109,361 |

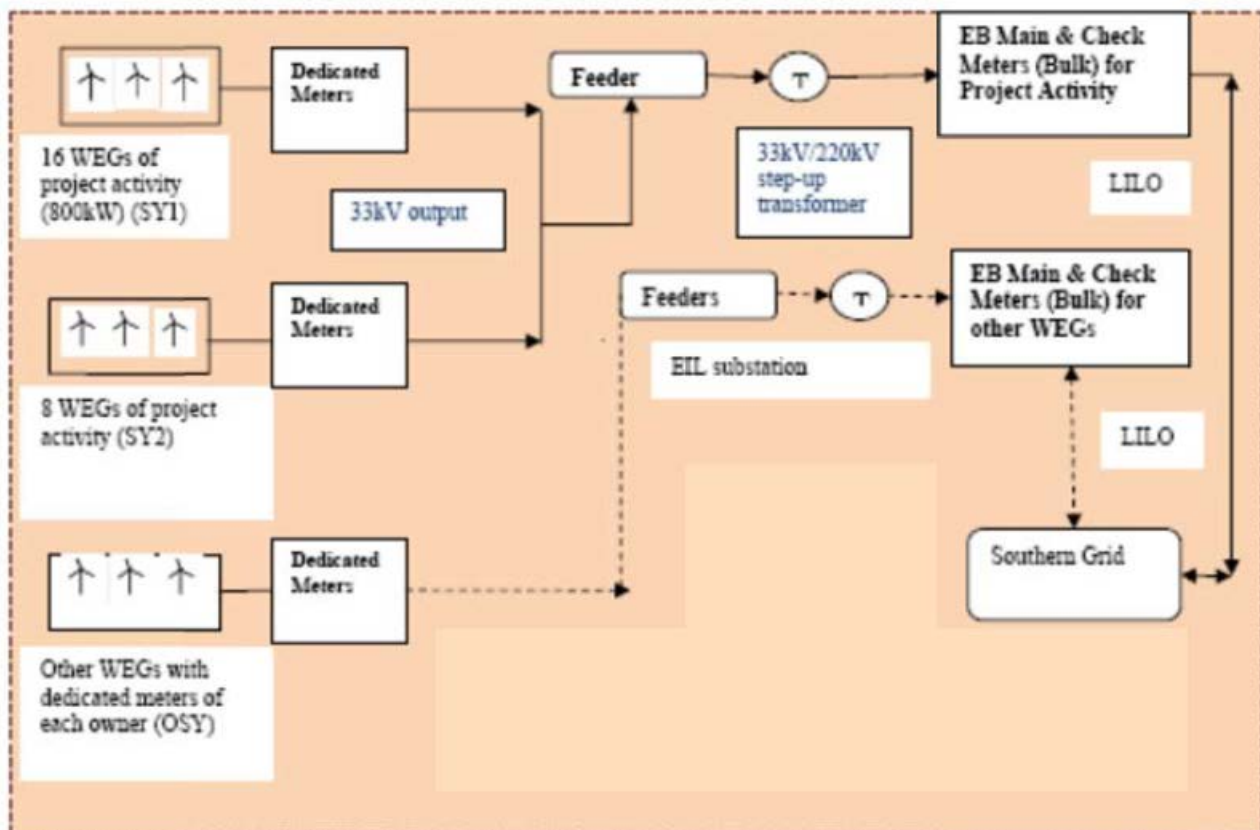
¹ Detailed calculations has been provided in ER spreadsheet.

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

>>

There is a difference of 8.77 % (downside) in the expected and actual emission reductions due to lower PLF achieved during the monitoring period under consideration.

Annex 1Kurnnool site:

Anaantapur site:

SY1 – Switch yard 1

SY2 – Switch yard 2

OSY – Switch yard for other WEGs outside CDM project activity

Appendix 1. Contact information of project participants and responsible persons/entities

| | |
|--|--|
| Project participant and/or responsible person/ entity | <input checked="" type="checkbox"/> Project participant <input checked="" type="checkbox"/> Responsible person/ entity for completing the CDM-MR-FORM |
| Organization name | Vaayu (India) Power Corporation Private Limited |
| Street/P.O. Box | Plot No. 33, Daman Patalia Road |
| Building | |
| City | Bhimpore |
| State/Region | Daman (UT) |
| Postcode | 396210 |
| Country | India |
| Telephone | +91-22-2671 7176 |
| Fax | +91 22 66921177 |
| E-mail | yogesh.mehra@windworldindia.com |
| Website | www.windworldindia.com |
| Contact person | |
| Title | Director |
| Salutation | Mr. |
| Last name | Mehra |
| Middle name | |
| First name | Yogesh |
| Department | Corporate |
| Mobile | +91-9820040301 |
| Direct fax | +91 22 66921177 |
| Direct tel. | +91-22-6692 4848 extn. 7111 |
| Personal e-mail | yogesh.mehra@windworldindia.com |

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Document information

| <i>Version</i> | <i>Date</i> | <i>Description</i> |
|---|-----------------|--|
| 05.1 | 4 May 2015 | Editorial revision to correct version numbering. |
| 05.0 | 1 April 2015 | Revisions to: <ul style="list-style-type: none"> • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement. |
| 04.0 | 25 June 2014 | Revisions to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement. |
| 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 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 | | |