



Monitoring report form
(Version 05.1)

| MONITORING REPORT | | |
|--|--|---|
| Title of the project activity | Enercon Wind Farm (Hindustan) Ltd in Karnataka | |
| UNFCCC reference number of the project activity | 1259 | |
| Version number of the monitoring report | 1 | |
| Completion date of the monitoring report | 12/07/2016 | |
| Monitoring period number and duration of this monitoring period | 07 (01/01/2015 – 31/05/2016; including first and last days of monitoring period.) | |
| Project participant(s) | M/s Wind World (India) Limited ¹ | |
| Host Party | India | |
| Sectoral scope(s) | Sectoral Scope: 1: Energy industries (renewable - / non-renewable sources) | |
| Selected methodology(ies) | Applied Methodology: ACM0002, Version 06 | |
| 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 | 210,848 | |
| 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 | 120,270 |

¹ With effect from 01/01/2013 name of Enercon (India) Limited has been changed to 'Wind World (India) Limited'

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The project activity is installation of 68.8 MW wind power project ("Project") by Enercon Wind Farm (Hindustan) Ltd. in Karnataka state of India to provide reliable, renewable power to the Karnataka state electricity grid which is part of the Southern regional electricity grid. The Project will lead to reduced greenhouse gas emissions because it displaces electricity from grid connected fossil fuel based electricity generation plants.

The project activity consists of 86 WEGs of Enercon make E-48 and each machine capacity is of 800 kW (E-48) totalling to the capacity of 68.8 MW. The WEGs generates 3-phase power at 400V, which is stepped up to 33 kV and connected to 33kV metering points. From 33 kV metering point electricity transmitted to Wind World (India) Limited (hereafter referred as "WWIL") Sub-station. At sub-station electricity is step-up to 220 kV. From WWIL substation electricity is further evacuated to the state electricity grid at 220kV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V \pm 12.5%.

The first machine under the project activity was commissioned on 29/09/2006 and last machine under the project activity was commissioned on 28/12/2006. The expected operational lifetime of the project is for 20 years.

The total emission reductions achieved under current monitoring period (01/01/2015 to 31/05/2016) is 120,270 tCO₂.

A.2. Location of project activity

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Project activity is located in Karnataka state of India. The turbines are uniquely identified as EWHPL-01 to EWHPL-86. The details of the physical location are as follows:

| S.No. | District | Taluka | Village | No. of WEG's |
|-------|-------------|---------------------|-------------------|--------------|
| 1 | Tumkur | Chikkanayakanahalli | Dasudi | 20 |
| | | Chikkanayakanahalli | Nelenuru | 5 |
| | | Chikkanayakanahalli | Ganadu | 6 |
| | | Gubbi | Annenhalli | 6 |
| | | Gubbi | Siddapura | 9 |
| 2 | Chitradurga | Hosadurga | Chikkabyaledakere | 16 |
| | | Hosadurga | Kanubehalli | 11 |
| | | Hosadurga | Arasinagundi | 8 |
| | | Hosadurga | Elladakere | 5 |
| | | | Total | 86 |

Individual WEG location numbers and coordinates are detailed out in below table:-

| S.No. | WEG Unique Identification Number | Location No. | Latitude (N) | | | Longitude (E) | | |
|-------|----------------------------------|--------------|--------------|---------|---------|---------------|---------|---------|
| | | | Degree | Minutes | Seconds | Degree | Minutes | Seconds |
| 1 | EWHPL 01 | 1 | 13 | 43 | 20.9 | 76 | 31 | 3.9 |
| 2 | EWHPL 02 | 2 | 13 | 43 | 25.4 | 76 | 31 | 1.5 |
| 3 | EWHPL 03 | 3 | 13 | 43 | 30.0 | 76 | 30 | 59.0 |
| 4 | EWHPL 04 | 4 | 13 | 43 | 34.6 | 76 | 30 | 57.2 |
| 5 | EWHPL 05 | 5 | 13 | 43 | 39.3 | 76 | 30 | 55.6 |
| 6 | EWHPL 06 | 6 | 13 | 43 | 43.8 | 76 | 30 | 53.1 |
| 7 | EWHPL 07 | 7 | 13 | 43 | 50.0 | 76 | 30 | 50.5 |
| 8 | EWHPL 08 | 8 | 13 | 43 | 54.5 | 76 | 30 | 48.0 |
| 9 | EWHPL 09 | 9 | 13 | 44 | 3.9 | 76 | 30 | 44.9 |
| 10 | EWHPL 10 | 10 | 13 | 45 | 33.0 | 76 | 31 | 5.9 |
| 11 | EWHPL 11 | 11 | 13 | 45 | 28.2 | 76 | 31 | 6.4 |

| | | | | | | | | |
|----|----------|----|----|----|------|----|----|------|
| 12 | EWHPL 12 | 12 | 13 | 45 | 23.4 | 76 | 31 | 7.0 |
| 13 | EWHPL 13 | 13 | 13 | 45 | 18.9 | 76 | 31 | 7.7 |
| 14 | EWHPL 14 | 14 | 13 | 45 | 14.3 | 76 | 31 | 8.3 |
| 15 | EWHPL 15 | 15 | 13 | 45 | 10.2 | 76 | 31 | 9.5 |
| 16 | EWHPL 16 | 16 | 13 | 44 | 54.0 | 76 | 31 | 12.3 |
| 17 | EWHPL 17 | 17 | 13 | 44 | 49.2 | 76 | 31 | 13.1 |
| 18 | EWHPL 18 | 18 | 13 | 44 | 44.5 | 76 | 31 | 14.7 |
| 19 | EWHPL 19 | 19 | 13 | 44 | 39.8 | 76 | 31 | 16.7 |
| 20 | EWHPL 20 | 20 | 13 | 44 | 35.4 | 76 | 31 | 19.9 |
| 21 | EWHPL 21 | 21 | 13 | 44 | 30.5 | 76 | 31 | 19.8 |
| 22 | EWHPL 22 | 22 | 13 | 44 | 25.6 | 76 | 31 | 20.2 |
| 23 | EWHPL 23 | 23 | 13 | 44 | 21.7 | 76 | 31 | 26.4 |
| 24 | EWHPL 24 | 24 | 13 | 44 | 16.9 | 76 | 31 | 27.7 |
| 25 | EWHPL 25 | 25 | 13 | 44 | 12.0 | 76 | 31 | 28.2 |
| 26 | EWHPL26 | 26 | 13 | 44 | 8.0 | 76 | 31 | 29.8 |
| 27 | EWHPL 27 | 27 | 13 | 43 | 57.6 | 76 | 31 | 53.8 |
| 28 | EWHPL 28 | 28 | 13 | 43 | 54.1 | 76 | 31 | 55.1 |
| 29 | EWHPL 29 | 29 | 13 | 43 | 49.5 | 76 | 31 | 57.1 |
| 30 | EWHPL 30 | 30 | 13 | 43 | 44.8 | 76 | 31 | 58.6 |
| 31 | EWHPL 31 | 31 | 13 | 43 | 40.0 | 76 | 31 | 59.5 |
| 32 | EWHPL 32 | 32 | 13 | 43 | 35.4 | 76 | 32 | 1.9 |
| 33 | EWHPL 33 | 33 | 13 | 43 | 30.6 | 76 | 32 | 4.8 |
| 34 | EWHPL 34 | 34 | 13 | 43 | 0.6 | 76 | 32 | 22.1 |
| 35 | EWHPL 35 | 35 | 13 | 42 | 54.7 | 76 | 32 | 19.9 |
| 36 | EWHPL 36 | 36 | 13 | 42 | 50.3 | 76 | 32 | 23.0 |
| 37 | EWHPL 37 | 37 | 13 | 42 | 45.6 | 76 | 32 | 24.7 |
| 38 | EWHPL 38 | 38 | 13 | 42 | 40.9 | 76 | 32 | 26.3 |
| 39 | EWHPL 39 | 39 | 13 | 42 | 36.3 | 76 | 32 | 28.5 |
| 40 | EWHPL 40 | 40 | 13 | 42 | 31.1 | 76 | 32 | 31.4 |
| 41 | EWHPL 41 | 41 | 13 | 40 | 57.2 | 76 | 35 | 58.1 |
| 42 | EWHPL 42 | 42 | 13 | 40 | 52.4 | 76 | 35 | 59.4 |
| 43 | EWHPL 43 | 43 | 13 | 40 | 47.7 | 76 | 36 | 0.9 |
| 44 | EWHPL 44 | 44 | 13 | 40 | 43.1 | 76 | 36 | 2.6 |
| 45 | EWHPL 45 | 45 | 13 | 40 | 38.4 | 76 | 36 | 4.2 |
| 46 | EWHPL 46 | 46 | 13 | 40 | 33.7 | 76 | 36 | 5.8 |
| 47 | EWHPL 47 | 47 | 13 | 40 | 13.7 | 76 | 36 | 10.7 |
| 48 | EWHPL 48 | 48 | 13 | 40 | 9.1 | 76 | 36 | 12.6 |
| 49 | EWHPL 49 | 49 | 13 | 40 | 4.7 | 76 | 36 | 15.7 |
| 50 | EWHPL 50 | 50 | 13 | 39 | 2.8 | 76 | 36 | 34.8 |
| 51 | EWHPL 51 | 51 | 13 | 38 | 58.7 | 76 | 36 | 36.8 |
| 52 | EWHPL 52 | 52 | 13 | 38 | 54.1 | 76 | 36 | 38.9 |
| 53 | EWHPL 53 | 53 | 13 | 38 | 49.5 | 76 | 36 | 41.3 |
| 54 | EWHPL 54 | 54 | 13 | 38 | 44.9 | 76 | 36 | 43.1 |
| 55 | EWHPL 55 | 55 | 13 | 38 | 40.2 | 76 | 36 | 44.9 |
| 56 | EWHPL 56 | 56 | 13 | 38 | 35.6 | 76 | 36 | 46.9 |
| 57 | EWHPL 57 | 57 | 13 | 38 | 30.9 | 76 | 36 | 48.7 |
| 58 | EWHPL 58 | 58 | 13 | 38 | 26.4 | 76 | 36 | 50.9 |
| 59 | EWHPL 59 | 59 | 13 | 38 | 22.3 | 76 | 36 | 56.3 |
| 60 | EWHPL 60 | 60 | 13 | 38 | 17.8 | 76 | 36 | 58.8 |
| 61 | EWHPL 61 | 61 | 13 | 38 | 11.8 | 76 | 37 | 2.5 |
| 62 | EWHPL 62 | 62 | 13 | 38 | 7.2 | 76 | 37 | 4.6 |
| 63 | EWHPL 63 | 63 | 13 | 38 | 2.6 | 76 | 37 | 6.8 |
| 64 | EWHPL 64 | 64 | 13 | 37 | 58.0 | 76 | 37 | 9.2 |
| 65 | EWHPL 65 | 65 | 13 | 37 | 53.5 | 76 | 37 | 11.5 |

| | | | | | | | | |
|----|-----------|----|----|----|------|----|----|------|
| 66 | EWHPPL 66 | 66 | 13 | 37 | 48.9 | 76 | 37 | 13.7 |
| 67 | EWHPPL 67 | 67 | 13 | 37 | 44.3 | 76 | 37 | 16.0 |
| 68 | EWHPPL 68 | 68 | 13 | 37 | 39.8 | 76 | 37 | 18.4 |
| 69 | EWHPPL 69 | 69 | 13 | 37 | 35.1 | 76 | 37 | 20.3 |
| 70 | EWHPPL 70 | 70 | 13 | 37 | 30.5 | 76 | 37 | 22.3 |
| 71 | EWHPPL 71 | 71 | 13 | 37 | 25.9 | 76 | 37 | 24.7 |
| 72 | EWHPPL 72 | 72 | 13 | 32 | 25.1 | 76 | 43 | 45.2 |
| 73 | EWHPPL 73 | 73 | 13 | 32 | 30.0 | 76 | 43 | 44.4 |
| 74 | EWHPPL 74 | 74 | 13 | 32 | 34.8 | 76 | 43 | 44.7 |
| 75 | EWHPPL 75 | 75 | 13 | 32 | 39.7 | 76 | 43 | 44.5 |
| 76 | EWHPPL 76 | 76 | 13 | 32 | 44.6 | 76 | 43 | 43.9 |
| 77 | EWHPPL 77 | 77 | 13 | 32 | 49.5 | 76 | 43 | 42.5 |
| 78 | EWHPPL 78 | 78 | 13 | 32 | 54.4 | 76 | 43 | 42.1 |
| 79 | EWHPPL 79 | 79 | 13 | 33 | 6.1 | 76 | 43 | 33.2 |
| 80 | EWHPPL 80 | 80 | 13 | 33 | 11.0 | 76 | 43 | 34.1 |
| 81 | EWHPPL 81 | 81 | 13 | 33 | 15.9 | 76 | 43 | 34.6 |
| 82 | EWHPPL 82 | 82 | 13 | 33 | 20.8 | 76 | 43 | 34.5 |
| 83 | EWHPPL 83 | 83 | 13 | 34 | 19.9 | 76 | 44 | 0.8 |
| 84 | EWHPPL 84 | 84 | 13 | 34 | 27.5 | 76 | 44 | 2.3 |
| 85 | EWHPPL 85 | 85 | 13 | 34 | 50.5 | 76 | 44 | 14.8 |
| 86 | EWHPPL 86 | 86 | 13 | 34 | 54.9 | 76 | 44 | 14.8 |

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 whether the Party involved wishes to be considered as project participant (yes/no) |
|---|--|--|
| Party A (host) | Private entity A: M/s Wind World (India) Limited | No |

A.4. Reference of applied methodology and standardized baseline

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

Reference: Approved consolidated methodology ACM0002 (Version 06, EB 24, Annex 7)

UNFCCC web reference of methodology: http://cdm.unfccc.int/EB/024/eb24_repan07.pdf ; (Refer page no. 1 & 14 for title of baseline & monitoring methodology)

Baseline Methodology: Consolidate baseline methodology for grid-connected electricity generation from renewable sources

Monitoring Methodology: Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources

Tool: Tool for the demonstration and assessment of additionality, version 3.0 (weblink: <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v3.pdf>)

A.5. Crediting period of project activity

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Type of crediting period : Fixed

Start date of crediting period : 27/10/2008

Length of crediting period : 10 years

A.6. Contact information of responsible persons/entities

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| | |
|--|--|
| Project participant and/or responsible person/ entity | <input checked="" type="checkbox"/> Project participant <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM |
| Organization name | Wind World (India) Limited |
| Street/P.O. Box | Wind World Tower, A-9, Veera Industrial Estate, Veera Desai Road, Andheri (W) |
| Building | |
| City | Mumbai |
| State/region | Maharashtra |
| Postcode | 400 053 |
| Country | India |
| Telephone | +91-22-6692 4848 |
| Fax | +91-22 - 67040473 / 66921175 |
| E-mail | yogesh.mehra@windworldindia.com |
| Website | www.windworldindia.com |
| Contact person | |
| Title | Managing Director |
| Salutation | Mr. |
| Last name | Mehra |
| Middle name | |
| First name | Yogesh |
| Department | Corporate |
| Mobile | +91-98200 40301 |
| Direct fax | +91-22-6692 1177 |
| Direct tel. | +91-22-6702 2832 |
| Personal e-mail | yogesh.mehra@windworldindia.com |

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

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The project activity consists of 86 machines (800 kW) of Enercon make E-48. The first machine under the project activity was commissioned on 29/09/2006 and last machine under the project activity was commissioned on 28/12/2006. Project activity WEGs were commissioned in three phases between 29/09/2006 & 28/12/2006. 56 WEGs under phase-I were commissioned on 29 Sep 2006, 9 WEGs under phase-II were commissioned on 26/10/2006 & 21 WEGs under phase-III were commissioned on 28/12/2006. The commissioning dates for all the machines included in the project activity are given in the table below.

| Loc. no. | Unique Identification Number | Date of Commissioning |
|----------|------------------------------|-----------------------|
| 1 | EWHPL 01 | 26/10/2006 |

| | | |
|----|----------|------------|
| 2 | EWHPL 02 | 26/10/2006 |
| 3 | EWHPL 03 | 26/10/2006 |
| 4 | EWHPL 04 | 28/12/2006 |
| 5 | EWHPL 05 | 28/12/2006 |
| 6 | EWHPL 06 | 28/12/2006 |
| 7 | EWHPL 07 | 28/12/2006 |
| 8 | EWHPL 08 | 28/12/2006 |
| 9 | EWHPL 09 | 28/12/2006 |
| 10 | EWHPL 10 | 29/09/2006 |
| 11 | EWHPL 11 | 29/09/2006 |
| 12 | EWHPL 12 | 29/09/2006 |
| 13 | EWHPL 13 | 29/09/2006 |
| 14 | EWHPL 14 | 29/09/2006 |
| 15 | EWHPL 15 | 29/09/2006 |
| 16 | EWHPL 16 | 29/09/2006 |
| 17 | EWHPL 17 | 29/09/2006 |
| 18 | EWHPL 18 | 29/09/2006 |
| 19 | EWHPL 19 | 29/09/2006 |
| 20 | EWHPL 20 | 29/09/2006 |
| 21 | EWHPL 21 | 29/09/2006 |
| 22 | EWHPL 22 | 29/09/2006 |
| 23 | EWHPL 23 | 29/09/2006 |
| 24 | EWHPL 24 | 29/09/2006 |
| 25 | EWHPL 25 | 29/09/2006 |
| 26 | EWHPL26 | 26/10/2006 |
| 27 | EWHPL 27 | 29/09/2006 |
| 28 | EWHPL 28 | 29/09/2006 |
| 29 | EWHPL 29 | 29/09/2006 |
| 30 | EWHPL 30 | 29/09/2006 |
| 31 | EWHPL 31 | 29/09/2006 |
| 32 | EWHPL 32 | 29/09/2006 |
| 33 | EWHPL 33 | 29/09/2006 |
| 34 | EWHPL 34 | 29/09/2006 |
| 35 | EWHPL 35 | 29/09/2006 |
| 36 | EWHPL 36 | 29/09/2006 |
| 37 | EWHPL 37 | 29/09/2006 |
| 38 | EWHPL 38 | 29/09/2006 |
| 39 | EWHPL 39 | 29/09/2006 |
| 40 | EWHPL 40 | 29/09/2006 |
| 41 | EWHPL 41 | 29/09/2006 |
| 42 | EWHPL 42 | 29/09/2006 |
| 43 | EWHPL 43 | 29/09/2006 |
| 44 | EWHPL 44 | 29/09/2006 |
| 45 | EWHPL 45 | 29/09/2006 |
| 46 | EWHPL 46 | 29/09/2006 |
| 47 | EWHPL 47 | 29/09/2006 |
| 48 | EWHPL 48 | 29/09/2006 |
| 49 | EWHPL 49 | 29/09/2006 |
| 50 | EWHPL 50 | 26/10/2006 |
| 51 | EWHPL 51 | 26/10/2006 |
| 52 | EWHPL 52 | 29/09/2006 |
| 53 | EWHPL 53 | 29/09/2006 |
| 54 | EWHPL 54 | 29/09/2006 |
| 55 | EWHPL 55 | 29/09/2006 |

| | | |
|----|----------|------------|
| 56 | EWHPL 56 | 29/09/2006 |
| 57 | EWHPL 57 | 29/09/2006 |
| 58 | EWHPL 58 | 29/09/2006 |
| 59 | EWHPL 59 | 26/10/2006 |
| 60 | EWHPL 60 | 26/10/2006 |
| 61 | EWHPL 61 | 26/10/2006 |
| 62 | EWHPL 62 | 29/09/2006 |
| 63 | EWHPL 63 | 29/09/2006 |
| 64 | EWHPL 64 | 29/09/2006 |
| 65 | EWHPL 65 | 29/09/2006 |
| 66 | EWHPL 66 | 29/09/2006 |
| 67 | EWHPL 67 | 29/09/2006 |
| 68 | EWHPL 68 | 29/09/2006 |
| 69 | EWHPL 69 | 29/09/2006 |
| 70 | EWHPL 70 | 29/09/2006 |
| 71 | EWHPL 71 | 29/09/2006 |
| 72 | EWHPL 72 | 28/12/2006 |
| 73 | EWHPL 73 | 28/12/2006 |
| 74 | EWHPL 74 | 28/12/2006 |
| 75 | EWHPL 75 | 28/12/2006 |
| 76 | EWHPL 76 | 28/12/2006 |
| 77 | EWHPL 77 | 28/12/2006 |
| 78 | EWHPL 78 | 28/12/2006 |
| 79 | EWHPL 79 | 28/12/2006 |
| 80 | EWHPL 80 | 28/12/2006 |
| 81 | EWHPL 81 | 28/12/2006 |
| 82 | EWHPL 82 | 28/12/2006 |
| 83 | EWHPL 83 | 28/12/2006 |
| 84 | EWHPL 84 | 28/12/2006 |
| 85 | EWHPL 85 | 28/12/2006 |
| 86 | EWHPL 86 | 28/12/2006 |

WWIL operation and maintenance activities are ISO 9001:2008 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. Further the consolidated performance report of project WEGs during the monitoring period including the down time, machine availability, grid availability, etc. has been added in Appendix 2. During the monitoring period there were no events or situations occurred, which may impact the applicability of the methodology.

The project activity consists of 86 WEGs of Enercon make E-48 and each machine capacity is of 800 kW (E-48) totalling to the capacity of 68.8 MW. The WEGs generates 3-phase power at 400V, which is stepped up to 33 kV and connected to 33kV metering points. From 33 kV metering points electricity transmitted to WWIL Sub-station. At sub-station electricity is step-up to 220 kV. From WWIL substation electricity is further evacuated to the state electricity grid at 220kV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V \pm 12.5%. The other salient features of the state-of-art-technology are:-

- Gearless Construction - Rotor & Generator Mounted on same shaft eliminating the Gearbox.
- Variable speed function – has the speed range of 18 to 33 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times.
- Minimum drawal (less than 1% of kWh generated) of Reactive Power from the grid.
- No voltage peaks at any time.
- Operating range of the WEG with voltage fluctuation of -20 to +20%.

- Less Wear & Tear since the system eliminates mechanical brake, which are not needed due to low speed generator which runs at maximum speed of 33 rpm and uses Air Brakes.
- Three Independent Braking System.
- Generator achieving rated output at only 33 rpm.
- Incorporates lightning protection system, which includes blades.
- Starts generation of power at wind speed of 3 m/s

WWIL 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. Diagram of main component of Enercon make E-48 is shown in below picture:-

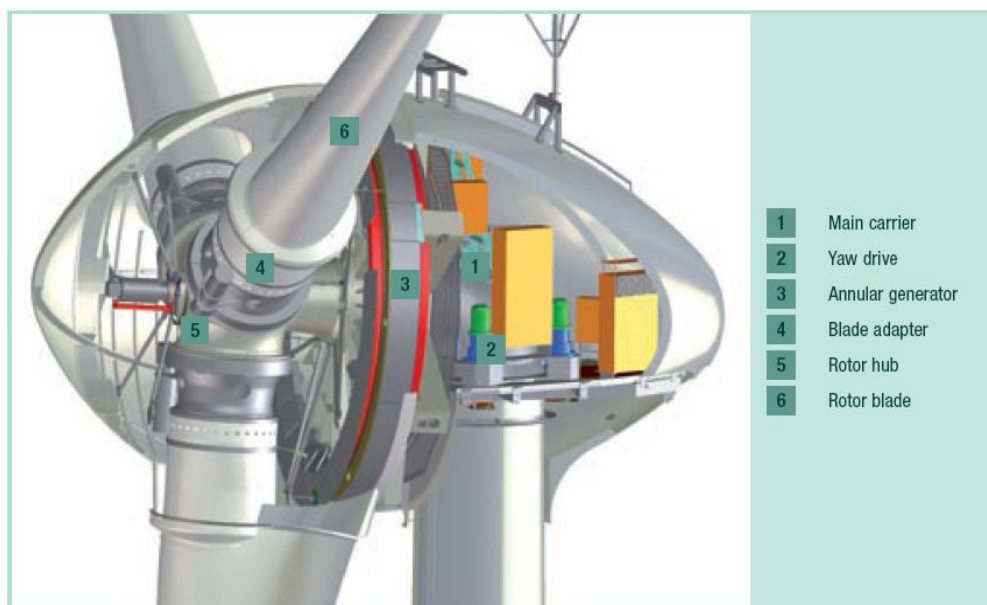


Figure: Enercon make E-48 Diagram.

B.2. Post-registration changes

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

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Not applicable

B.2.2. Corrections

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A revision in the PDD has been approved on 08/01/2013 by UNFCCC. Reference of revised PDD: Version 6, dated 03/09/2012.

B.2.3. Changes to start date of crediting period

>>

Not applicable

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

>>

Not applicable

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

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A revision² in Monitoring Plan has been approved on 15/03/2011 by UNFCCC.

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

>>

Not Applicable

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

>>

Not Applicable

SECTION C. Description of monitoring system

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Approved monitoring methodology ACM0002 / Version 06, Sectoral Scope: 1, "Consolidated methodology for grid-connected electricity generation from renewable sources" --- Version 6, by CDM - Meth Panel 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 combined margin emission factor has been fixed ex-ante in the PDD during validation, hence the monitoring of operating margin emission factor and build margin emission factor is not required. Value of operating margin, build margin & combine margin has been fixed throughout the crediting period. Further, wind based electricity generation is not associated with any kind of leakages. Hence, the sole parameter for monitoring is the electricity generated by the project activity and supplied to the state utility which is part of southern grid.

There are two main and check meters dedicated to project activity at 33 kV metering point for the project activity. The one set of main and check meter is connected to 56.8 MW and other set of the main and check meter is connected to 12 MW of the project activity. In addition to this there is one set of main and check meter (bulk meter) at 220 kV metering point at the WWIL substation 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 by the project at 220 kV at the WWIL substation, the state utility applies the transmission loss to the meter reading recorded at the 33 kV metering point.

For the current monitoring period; at 220kV sub-station only the WEGs of project activity are connected and there is no WEGs of other customers while at the time of validation WEGs of other project activity were also connected to same 220kV sub-station that's why the generic procedure of apportion is mentioned below. Further it may be noted in future WEGs of other project activity might be connected to 220kV same sub-station depending on the requirements. Monitoring system and apportioning procedure mentioned below is given to provide the generic scenario and method of calculation to arrive the net electricity export of individual customers in case there is other project WEGs are also connected to same 220kV sub-station. This procedure of apportioning is applied by state utility only.

The transmission loss calculated by the state utility is endorsed / confirmed jointly by the representatives of WWIL and the state utility. The transmission loss applied to the project activity by the state utility is reflected in the joint meter readings (Form B) recorded at 33kV metering point. Net electricity supplied to the grid is calculated by applying transmission loss to the meter readings taken at 33 kV metering location of the project activity.

² <http://cdm.unfccc.int/Projects/DB/DNV-CUK1185356859.49/view>

The procedure for calculation of transmission loss as given in the PPA is set-out below:-

$$Z = \frac{(X1 + X2 + X3 + X4 + \dots + Xn) - Y}{(X1 + X2 + X3 + X4 + \dots + Xn)} \times 100$$

Where,

Z = Percentage transmission loss for export incurred in transmission line between the meters located at 33 kV metering point (including the machines of the project activity and other project developers) and the meters located at 220kV metering point (bulk meter: main and check) at high voltage side of receiving sub-station. **Refer Annex 3 for schematic of the flow diagram.**

Summation of meter readings 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)

$$= (X1 + X2 + X3 + X4 + \dots + Xn)$$

X_i = Energy Export Reading (X_i) noted at energy meter installed at 33kV metering point where i vary from 1 to n which represents the meters connected to project activity and other project developers. $X_1, X_2, X_3, \dots, X_n$ are the meters that are installed at 33kV metering point (including the machines of the project activity and other project developers) and further connected to the receiving substation at 220 kV by internally connected lines. **Refer Annex 3 for schematic of the flow diagram.**

Y = Energy Export Reading at bulk meter installed at high voltage side of transformer of the receiving sub-station at 220 kV connecting machines of the project activity and other project developers. **Refer Annex 3 for schematic of the flow diagram.**

Energy Export by the project activity at 33 kV metering point is as follows:

$$EG_{\text{export}} = X1 + X2$$

Where, X_1 & X_2 is the export reading recording at 33kV metering points for project activity.

$$\text{Transmission Loss in Export (T}_E\text{)} = \text{Transmission Loss (Z) * Energy Export at 33kV metering point (EG}_{\text{Export}}\text{)}$$

Empirical Formula for Energy Export after adjustment of transmission loss (Equation 1)

$$\text{Net Energy Export after adjustment of transmission loss} = \text{EG}_{\text{export}} - \text{Transmission Loss (T}_E\text{)}$$

The transmission loss in export is generally less than 5%. However in case of Energy Import, the state utility conservatively applies adjustment of 15% to the import values noted at 33 kV metering point.

$$\text{Transmission Loss in Import (T}_I\text{)} = 15\% * \text{Energy Import at 33kV metering point (EG}_{\text{import}}\text{)}$$

Empirical Formula for Energy Import after adjustment of transmission loss (Equation 2)

$$\begin{aligned} \text{Net Energy Import after adjustment of transmission loss} &= \text{EG}_{\text{import}} + 15\% * \text{EG}_{\text{import}} \\ &= 115\% * \text{EG}_{\text{import}} \end{aligned}$$

Therefore Energy Supplied to Grid after adjustment of transmission loss is difference of equation 1 and 2 as given in the joint meter readings (Form B) signed jointly by WWIL and the state utility.

$$EG_y = \text{EG}_{\text{export}} - 115\% * \text{EG}_{\text{import}} - \text{Transmission Loss (T}_E\text{)}$$

The Joint meter reading noted at 33 kV metering location contains the following data:-

1. Electricity Export (EG_{export})
2. Electricity Import (EG_{import})

3. Transmission Loss (T_E) between 33 kV metering point and 220 kV metering point at WWIL substation
4. Net Electricity supplied to the Grid [$EG_{\text{export}} - 115\% \cdot EG_{\text{import}} - T_E$]

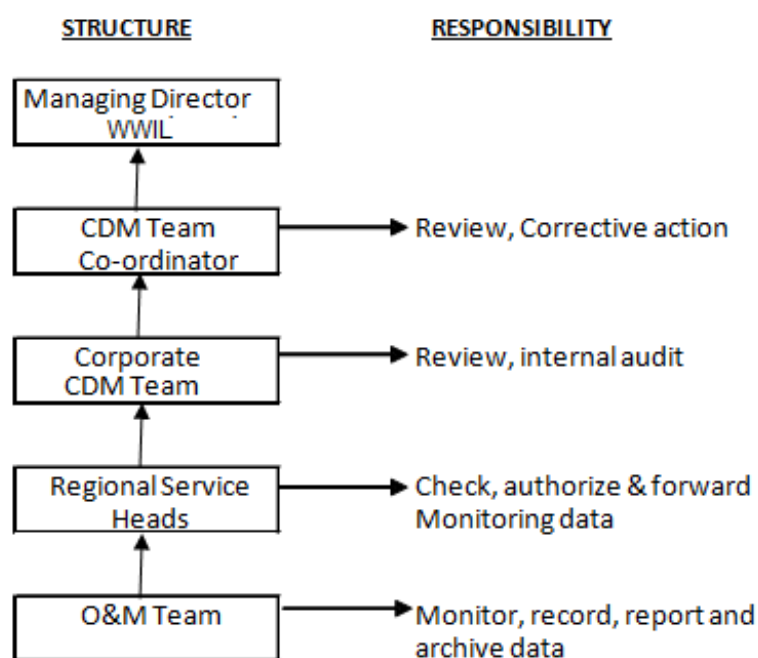
Joint meter reading (Form B) is signed by the representatives of WWIL and the state utility. The meter readings (both export and import), transmission loss and net electricity supplied to the grid are recorded in the joint meter readings (Form B) (33 kV metering point). Hence all these values will be reproduced from the joint meter readings (Form B) for calculation of emission reductions.

In addition to the joint meter readings (Form B) at 33kV metering location for the project activity, the following documents have been provided to the DoE for verification:

1. Joint Meter Readings (Form B) at 220kV metering point (bulk meters: main and check) at WWIL substation
2. Transmission loss calculation endorsed / confirmed jointly by the representatives of WWIL and the state utility.

The net electricity supplied to the grid can be cross checked from the invoices raised on the state utility for supply of net electricity supplied to the grid. Refer Annex – 2 for an illustration of the provisions for measurement methods.

The Project is operated and managed by WWIL. The operational and management structure implemented by WWIL is as follows:



Training imparted to the Personnel

Wind World (India) Limited has been instrumental in imparting training to the persons it recruits to serve in the organisation. Wind World (India) Limited has a separate training facility, called Wind World (India) Limited Training Academy, which gives training to the persons who are to be deployed On-Site to take care of all the activities starting from project construction to operation to maintenance. The training facility is located at Daman and is fully functional and equipped with qualified trainers, training equipments, classrooms and hostel facilities. The training academy has a fixed schedule which is applicable to all those who reside in the training academy. The training schedule and the training period depend upon the role the trainee has to perform. The trainers are well equipped to judge the capabilities of the trainees. All trainees, who are to be associated to the technical side of project are given six to twelve months' rigorous training on all the aspects of wind turbine installation and maintenance depending upon the requirements. Wind World (India) Limited conducts periodical test to rate the trainees and thus they are deployed as per the outcomes of their performance during the training period.

Meter Test Checking Details:

The metering equipments were inspected & tested by State Utility. Meter details for the all the main and check meters are as follows:-

| Parameter | Type of meter | Meter description | Meter Serial No. | Make | Accuracy class | Meter Type |
|-----------------------|---------------------|-------------------|------------------|------|----------------|---|
| KBCWP-01 (68.8 MW) | 220 kV Bulk meter | Main Meter | 6605121 | L&T | 0.2 | All the meters are two-way Tri-vector meters capable of recording import and export of electricity. |
| | | Check Meter | 6605122 | L&T | 0.2 | |
| KBCWP-02 (56.8 MW) | 33 kV billing meter | Main Meter | 5389967 | L&T | 0.2 | |
| | | Check Meter | 5389970 | L&T | 0.2 | |
| KBCWP-03 (12 MW) | 33 kV billing meter | Main Meter | 5463844 | L&T | 0.2 | |
| | | Check Meter | 5463845 | L&T | 0.2 | |

Details of meter test checking during monitoring period are as follows:-

| Parameter | Meter description | Meter Serial No. | Meter Test Checking Frequency | Calibration | |
|-----------------------|-------------------|------------------|-------------------------------|-------------|------------|
| | | | | 2014 | 2015 |
| KBCWP-01 (68.8 MW) | Main Meter | 13191156 | Annual | 20/11/2014 | |
| | Check Meter | 14194655 | | | |
| KBCWP-02 (56.8 MW) | Main Meter | 5389967 | | 22/08/2014 | 26/02/2015 |
| | Check Meter | 5389970 | | | |
| KBCWP-03 (12 MW) | Main Meter | 5463844 | | 22/08/2014 | 26/02/2015 |
| | Check Meter | 5463845 | | | |

The main and check meters are tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by state utility. Further during the annual meter testing, all the meters were under the permissible limit of error and accordingly none of the meter was calibrated during the current monitoring period.

The line diagram showing all relevant monitoring points for the project activity has been given in Annex 3.

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

| | |
|------------------------|---|
| Data/parameter: | $EF_{CM,y}$ |
| Unit | tCO ₂ e/MWh |
| Description | Combined Margin Emission Factor of Southern Regional Electricity Grid. |
| Source of data | "CO ₂ Baseline Database for Indian Power Sector", version 1.1, published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO ₂ Baseline Database for Indian Power Sector" is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm |
| Value(s) applied) | = 0.93204 |

| | |
|--|--|
| 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 | Calculation of Baseline Emissions |
| Additional comments | None |

| | | | | | | | | | |
|--|--|-----------|---------|-----------|---------|-----------|---------|---------|---------|
| Data/parameter: | $EF_{OM,y}$ | | | | | | | | |
| 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 1.1, published by the Central Electricity Authority, Ministry of Power, Government of India. The “CO ₂ Baseline Database for Indian Power Sector” is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm | | | | | | | | |
| Value(s) applied) | <table border="1"> <tr> <td>2002 – 03</td><td>0.99702</td></tr> <tr> <td>2003 – 04</td><td>1.00937</td></tr> <tr> <td>2004 – 05</td><td>1.00376</td></tr> <tr> <td>Average</td><td>1.00338</td></tr> </table> | 2002 – 03 | 0.99702 | 2003 – 04 | 1.00937 | 2004 – 05 | 1.00376 | Average | 1.00338 |
| 2002 – 03 | 0.99702 | | | | | | | | |
| 2003 – 04 | 1.00937 | | | | | | | | |
| 2004 – 05 | 1.00376 | | | | | | | | |
| Average | 1.00338 | | | | | | | | |
| 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 | Calculation of Baseline Emissions | | | | | | | | |
| Additional comments | None | | | | | | | | |

| | | | |
|--|--|-----------|---------|
| Data/parameter: | $EF_{BM,y}$ | | |
| 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 1.1, published by the Central Electricity Authority, Ministry of Power, Government of India. The “CO ₂ Baseline Database for Indian Power Sector” is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm | | |
| Value(s) applied) | <table border="1"> <tr> <td>2004 – 05</td><td>0.71799</td></tr> </table> | 2004 – 05 | 0.71799 |
| 2004 – 05 | 0.71799 | | |
| 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 | Calculation of Baseline Emissions | | |
| Additional comments | None | | |

Please refer Annex 1 for combined margin calculation.

There is an inconsistency in the decimal places between the values in section B.6.2 and Annex 3 of the revised PDD. The value mentioned in the Annex 3 of the revised PDD is being consistently used in this section and annex 1 of this MR.

D.2. Data and parameters monitored

| | |
|------------------------|---|
| Data/parameter: | EG_y |
| Unit | MWh (Mega-Watt hour) |
| Description | Net electricity supplied to the grid by the Project |

| | |
|--|--|
| Measured/calculated/default | Calculated |
| Source of data | Electricity supplied to the grid as per two joint meter readings (Form B) taken at 33 kV metering point. |
| Value(s) of monitored parameter | Net electricity supplied to the grid by the Project 129040.558 MWh |
| Monitoring equipment | Since it is calculated value, hence not applicable. |
| Measuring/reading/recording frequency: | Frequency of recording data: Monthly Refer section C and Annex – 2 for details. |
| Calculation method (if applicable): | The procedures for calculation of net electricity supplied to grid has been followed as per the provisions of the power purchase agreement and details of calculation method has been explained in monitoring plan under section C of monitoring report. |
| QA/QC procedures: | QA/QC procedures were implemented by state utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD. The values of net electricity supplied to the grid mentioned in the two joint meter readings (Form B) of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values mentioned in the invoice raised on the state utility. Further no inconsistency was found between the values as mentioned in Form B & invoices raised on state utility during the current monitoring period. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kV metering point) & KBCWP03 (33kV metering point) (please refer project layout Annex 3) were tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCO. Further during the annual meter testing, all the meters were found under the permissible limit of error and accordingly none of the meter was calibrated during the current monitoring period. Refer Annex – 2 for an illustration of the provisions for QA/QC procedures. Refer Annex 3 for location of metering points at 33kV and 220 kV. |
| Purpose of data: | Calculation of Baseline Emissions |
| Additional comments: | The data has been archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period. |

| | |
|--|--|
| Data/parameter: | EG_{export} |
| Unit | MWh (Mega-Watt hour) |
| Description | Summation of electricity Export recorded at meters (two main and two check) connecting 86 machines of the project activity and can be sourced from two joint meter readings (Form B) issued by BESCO for 56.8 MW and 12 MW at 33 kV metering point |
| Measured/calculated/default | Measured |
| Source of data | Electricity export to the grid as per two joint meter readings (Form B) taken at 33 kV metering point. |
| Value(s) of monitored parameter | 130250.700 MWh |
| Monitoring equipment | Please refer section 'C' (Description of monitoring system) for the details of meter type, accuracy class, serial number, meter test checking frequency, date of last meter test checking and validity under the heading 'Meter Test Checking Details' |
| Measuring/reading/recording frequency: | Frequency of recording data: Monthly. Further all the meters have the capability of continuous measurement of data. Refer section C and Annex – 2 for an illustration of the provisions for measurement methods. |

| | |
|-------------------------------------|---|
| Calculation method (if applicable): | - |
| QA/QC procedures: | QA/QC procedures were implemented by state utility and the PP except or otherwise explicitly stated in the PDD. Refer Annex – 2 for an illustration of the provisions for QA/QC procedures. |
| Purpose of data: | Calculation of Baseline Emissions (EG_{export} is used to calculate Net electricity supplied to the grid by the Project which is used to calculate baseline emissions) |
| Additional comments: | The data has been archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period. |

| | |
|--|--|
| Data/parameter: | EG_{import} |
| Unit | MWh (Mega-Watt hour) |
| Description | Summation of electricity Import recorded at the meters (two main and two check) connecting 86 machines of the project activity and can be sourced from two joint meter readings (Form B) issued by BESCOM for 56.8 MW and 12 MW at 33 kV metering point. |
| Measured/calculated/default | Measured |
| Source of data | Electricity import from the grid as per two joint meter reading (Form B) taken at 33kV metering point. |
| Value(s) of monitored parameter | 107.640 MWh |
| Monitoring equipment | Please refer section 'C' (Description of monitoring system) for the details of meter type, accuracy class, serial number, meter test checking frequency, date of last meter test checking and validity under the heading 'Meter Test Checking Details' |
| Measuring/reading/recording frequency: | Frequency of recording data: Monthly Further all the meters have the capability of continuous measurement of data. Refer section C and Annex – 2 for an illustration of the provisions for measurement methods. |
| Calculation method (if applicable): | - |
| QA/QC procedures: | QA/QC procedures were implemented by state utility and the PP except or otherwise explicitly stated in the PDD. Refer Annex – 2 for an illustration of the provisions for QA/QC procedures. |
| Purpose of data: | Calculation of Baseline Emissions (EG_{import} is used to calculate Net electricity supplied to the grid by the Project which is used to calculate baseline emissions) |
| Additional comments: | The data has been archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period. |

| | |
|-----------------------------|---|
| Data/parameter: | T_E |
| Unit | MWh (Mega-Watt hour) |
| Description | Transmission loss for export between the metering location at 33 kV point and the metering location at 220 kV at the WWIL substation. |
| Measured/calculated/default | Calculated |
| Source of data | Transmission Loss for export has been sourced from the joint meter reading (Form B) taken at 33kV metering point for the project activity |

| | |
|--|--|
| Value(s) of monitored parameter | 1102.502 MWh |
| Monitoring equipment | Since it is calculated value, hence not applicable. |
| Measuring/reading/recording frequency: | Frequency of recording data: Monthly Refer section C and Annex – 2 for details. |
| Calculation method (if applicable): | Transmission loss calculation has been done exclusively by officials of electricity board (EB) and PP has no role in calculation of transmission loss. Transmission loss value has been sourced directly from certified joint meter reading (Form B) recorded at 33kV metering point. Please refer section C of monitoring report for calculation method of transmission loss applied by EB officials as per the provision of PPA. |
| QA/QC procedures: | QA/QC procedures were implemented by state utility and the PP except or otherwise explicitly stated in the PDD. Refer Annex – 2 for an illustration of the provisions for QA/QC procedures. |
| Purpose of data: | Calculation of Baseline Emissions (T_E is used to calculate Net electricity supplied to the grid by the Project which is used to calculate baseline emissions) |
| Additional comments: | The data has been archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period. |

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

>>

"The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh) calculated in a transparent and conservative manner as the weighted average emissions (in kg CO₂e/kWh) as described in revised PDD.

$$BE_y = EG_y * EF_y$$

Where,

BE_y is baseline emissions in year y, tCO₂e

EG_y is the net electricity supplied to the grid in year y and is applied directly from joint meter readings (Form B) certified by state utility. This value can also be cross checked from monthly invoice.

EF_y is the CO₂ emission factor of the grid (0.93204 tCO₂e/MWh fixed ex-ante).

Baseline Emission Reductions calculation for project activity:-

| Duration | Net electricity supplied to the grid by the Project 68.8 [MWh] * | Baseline Emission Factor (tCO ₂ e/MWh) | Baseline Emissions (tCO ₂ e) |
|--------------------------|--|---|---|
| | [EG _y] | [EF _y] | [BE _y] |
| 01/01/2015 to 31/12/2015 | 102676.219 | 0.93204 | 95698 |
| 01/01/2016 to 31/05/2016 | 26364.340 | 0.93204 | 24572 |
| Total | 129040.55800 | | 1,20,270 |

* Summation of Net Export to grid as per joint meter readings (Form B) recorded at meters KBCWP 02 & KBCWP 03.

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 and hence does not result in project emissions.

E.3. Calculation of leakage

>>

No leakage is considered from the project activity as per approved methodology ACM0002, Version 06.

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 |
| 01/01/2015 to 31/12/2015 | 95,698 | 0 | 0 | NA | 95,698 | 95,698 |
| 01/01/2016 to 31/05/2016 | 24,572 | 0 | 0 | NA | 24,572 | 24,572 |
| Total | 120,270 | 0 | 0 | NA | 120,270 | 120,270 |

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) | 210,848 | 120,270 |

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

>>

The CERs for the current monitoring period is 42.96% lower than the estimated volume in the PDD. This is primarily due to seasonal nature of wind power projects. During the monitoring period CERs are low due to considerably low monsoon availability and low wind availability leading to low PLF.

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 type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM |
| Organization name | Wind World (India) Limited |
| Street/P.O. Box | Wind World Tower, A-9, Veera Industrial Estate, Veera Desai Road, Andheri (W) |
| Building | |
| City | Mumbai |
| State/region | Maharashtra |
| Postcode | 400 053 |
| Country | India |
| Telephone | +91-22-6692 4848 |
| Fax | +91-22 - 67040473 / 66921175 |
| E-mail | yogesh.mehra@windworldindia.com |
| Website | www.windworldindia.com |
| Contact person | |
| Title | Managing Director |
| Salutation | Mr. |
| Last name | Mehra |
| Middle name | |
| First name | Yogesh |
| Department | Corporate |
| Mobile | +91-98200 40301 |
| Direct fax | +91-22-6692 1177 |
| Direct tel. | +91-22-6702 2832 |
| Personal e-mail | yogesh.mehra@windworldindia.com |

Annex 1**BASELINE INFORMATION**

The Operating Margin data for the most recent three years and the Build Margin data for the Southern Region Electricity Grid as published in the CEA database version 1.1³ are as follows:

Simple Operating Margin

| | tCO ₂ e/GWh |
|--|------------------------|
| Simple Operating Margin - 2002-03 | 997.02 |
| Simple Operating Margin - 2003-04 | 1,009.37 |
| Simple Operating Margin - 2004-05 | 1,003.76 |
| Average Operating Margin of last three years | 1,003.38 |

Build Margin

| | tCO ₂ e/GWh |
|-----------------------|------------------------|
| Build Margin- 2004-05 | 717.99 |

Combined Margin calculations

| | Weights | tCO ₂ e/GWh |
|------------------------|---------|------------------------|
| Operating Margin | 0.75 | 1003.38 |
| Build Margin | 0.25 | 717.99 |
| Combined Margin | | 932.04 |

Detailed information on calculation of Operating Margin Emission Factor and Build Margin Emission Factor is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

³ http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Annex 2**MONITORING INFORMATION**

- **Metering:** Net electricity supplied to the grid is metered jointly by state utility and WWIL through two sets of main and check meters at 33 kV metering point connecting exclusively the machines of project activity after adjusting for transmission loss.

In addition to this there is one set of main and check meter (Bulk meter) at 220 KV metering point at WWIL substation covering machines of the project activity and machines of other project developers. The schematic diagram indicating location of meters at 33 kV and 220 kV metering points for the project activity is attached as Annex 3.

- **Metering Equipment:** Metering system for the project activity consists of two sets of main and checks meters at 33kV metering point and one set of main and check meters at 220 kV metering point. All the meters are **two-way Trivector meters capable of recording import and export of electricity**. The meters installed are capable of recording and storing half hourly readings of all electrical parameters for a minimum period of 35 days with digital output.
- **Meter Readings:** The electricity supplied to the grid is recorded by taking two joint meter readings (Form B) at 56.8 MW and 12 MW at 33kV metering point in the presence of representatives of state utility and WWIL. The joint meter readings (Form B) at 33kV metering point contains the value of energy exported, energy imported, transmission loss and net electricity supplied to the grid during the recording period. This joint meter readings (Form B) is certified by the Executive Engineer of the state utility and WWIL. These certified readings are then used to prepare the invoices to be raised on BESCOM. Thus the net electricity supplied to the grid as mentioned in the joint meter readings (Form B) can be crosschecked with the value mentioned in the invoices. Further no inconsistency was found between the values as mentioned in Form B & invoices raised on state utility during the current monitoring period.
- **Inspection of Energy Meters:** All main and check energy meters and all associated instruments, transformers installed at the Project are of 0.2% accuracy class. Each meter is jointly inspected and sealed on behalf of the Parties and is not to be interfered with by either Party except in the presence of the other Party or its authorized representatives.

Meter Test Checking: All main and check meters are tested for accuracy with reference to a portable standard meter. The portable standard meter is owned by state utility. The main and check meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. The consumption registered by the main meters alone will hold good for the purpose of metering electricity supplied to the grid as long as the error in the main meters is within the permissible limits. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kV metering point) & KBCWP03 (33kV metering point) (please refer project layout Annex 3) will be tested for accuracy on annual basis by state utility and in case of error beyond permissible limit; meters are calibrated by either of KPTCL or BESCOM based on the availability of EB officials. Further during the annual meter testing, all the meters were found under the permissible limit of error and accordingly none of the meter was calibrated during the current monitoring period. KPTCL is a transmission utility and BESCOM is distribution licensee in the state of Karnataka.

If during the meter test checking,

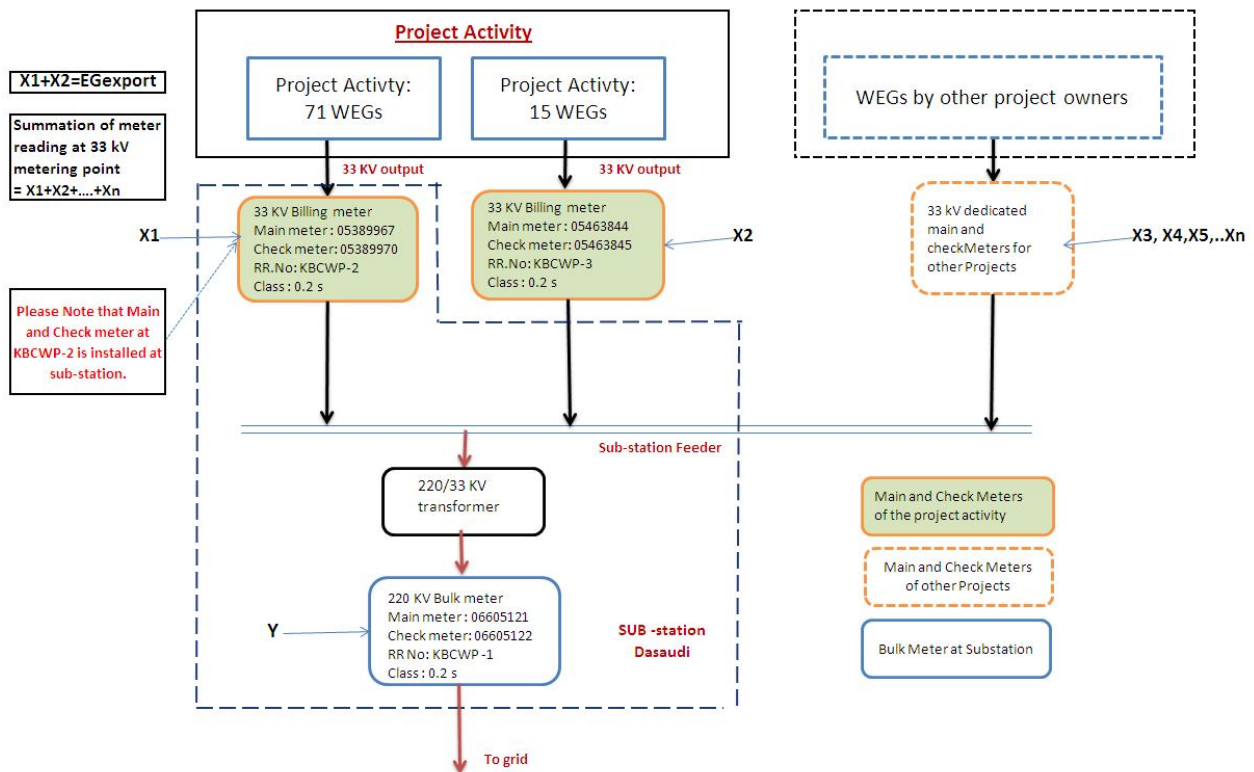
- The main meter is found to be within the permissible limit of error and the corresponding check meter is beyond the permissible limits, then the meter reading will be as per the main meter as usual. The check meter shall, however, be calibrated immediately.
- The main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within permissible of error, then the meter reading for the month up to the date and time of such test shall be as per the check meter. There will be a revision in the meter reading for the period from the previous calibration test up to the current test based on the readings of the check meter. The main meter shall be calibrated immediately and meter reading for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.
- Both the main meters and the corresponding check meters are found to be beyond the permissible limits of error, both the main meters and the corresponding check meters shall be immediately calibrated and the correction applied to the reading registered by the main meter to arrive at the correct reading of energy supplied for metering electricity supplied to the grid for the period from the

last meter test reading up to the current test. Meter reading for the period thereafter till the next monthly reading shall be as per the calibrated main meter.

- During the monitoring period all the meter were found under the permissible limit of error and accordingly none of the meter was calibrated, and there was no occurrence of emergency events.

The schematic showing the location of meters for the project activity is given in Annex 3:

Annex 3: Line Diagram Showing Relevant Metering Points



For the current monitoring period; at 220kV sub-station only the WEGs of project activity are connected and there is no WEGs of other customers while at the time of validation WEGs of other project activity were also connected to same 220kV sub-station that's why the generic layout of monitoring system is presented in above diagram . Further it may be noted in future WEGs of other project activity might be connected to 220kV same sub-station depending on the requirements. Monitoring system shown above is given to provide the generic scenario and method of calculation to arrive the net electricity export of individual customers in case there is other project WEGs are also connected to same 220kV sub-station. This procedure of apportioning is applied by state utility only.

- - - - -

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 | | |