

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

Title of the project activity	Clean Energy generation from wind energy in the state of Andhra Pradesh
Reference number of the project activity	5821
Version number of the monitoring report	1
Completion date of the monitoring report	23/01/2013
Registration date of the project activity	21/02/2012
Monitoring period number and duration of this monitoring period	01/03/2012-31/12/2012 1 st Monitoring Period
Project participant(s)	Vish Wind Infrastructure LLP
Host Party(ies)	India
Sectoral scope(s) and applied methodology(ies)	Sectoral Scope 1 Energy industries (renewable/ non-renewable sources). AMS-I.D, “Grid connected renewable electricity generation”, (Version 17.0, EB 61)
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	10,259 tCO ₂
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	11,791 tCO ₂

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

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- (a) *Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks;*

The purpose of the project activity is to utilize renewable wind energy for generation of electricity. The project activity replaces anthropogenic emissions of greenhouse gases (GHG's) into the atmosphere, which is estimated to be approximately 11,791 tCO₂e for this monitoring period, by displacing the 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. In the absence of the project activity the equivalent amount of electricity would have been generated from the connected/ new power plants in the Southern grid, which are/ will be predominantly based on fossil fuels. Whereas the electricity generation from operation of Wind Energy Convertors (WEC's) is emission free.

The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development.

Enercon (India) Ltd ("Enercon") is equipment supplier and the operations and maintenance contractor for the Project. The generated electricity is supplied to APTRANSCO under long-term power purchase agreements (PPA). Project is owned by Vish Wind Infrastructure LLP.

The first machine under the project activity was commissioned on 14/10/2010 and the last machine under the project activity was commissioned on 31/03/2011. The expected operational lifetime of the project is for 20 years. The total emission reductions achieved under this monitoring period (01/03/2012 to 31/12/2012) is 11,791 tCO₂.

- (b) *Brief description of the installed technology and equipments;*

The project activity involves supply, erection, commissioning and operation of 8 machines of rated capacity 800 KW each. The machines are Enercon E-53 make. Enercon (India) Ltd (EIL) is the turbine supplier and is the operations and maintenance contractor.

- (c) *Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.);*

The WECs under the project activity were commissioned between 14/10/2010 and 31/03/2011. The expected operational lifetime of the project is for 20 years. The project activity was registered as CDM project on 21/02/2012. The first monitoring period is from 01/03/2012 to 31/12/2012.

- (d) *Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period.*

The total emission reductions achieved under this monitoring period (01/03/2012 to 31/12/2012) is 11,791 tCO₂.

A.2. Location of project activity

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- (a) *Host Party(ies);*

India

- (b) *Region/State/Province, etc.;*

Southern Region/Andhra Pradesh State

- (c) *City/Town/Community, etc.;*



The Project is spread across villages of Kurnool District of Andhra Pradesh state in India.

(d) *Physical/ Geographical location.*

The project is located across the Petnikota village of Kurnool District of Andhra Pradesh state in India.

Nearest railway station is at Tadipatri which is about 25 kms away from the site. Nearest airport is at Bangalore which is about 250 kms from the site.

Sr. No.	Project Owner	Loc. No.	Latitude			Longitude		
			Deg.	Min.	Sec.	Deg.	Min.	Sec.
1	Vish Wind Infrastructure LLP	52	15	03	52.3	78	02	28.8
2		80	15	05	35.1	78	01	17.9
3		81	15	05	41.2	78	01	20.0
4		82	15	05	43.0	78	01	32.8
5		83	15	05	35.1	78	01	36.0
6		84	15	05	28.6	78	01	41.3
7		88	15	03	19.3	78	02	44.1
8		89	15	03	13.0	78	02	44.0

A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Vish Wind Infrastructure LLP	No

A.4. Reference of applied methodology

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AMS-I.D, “Grid connected renewable electricity generation”, (Version 17.0, EB 61)

http://cdm.unfccc.int/filestorage/6/W/S/6WSEL75KUBQD2XYPHC9ZO84VATNF1M/eb61_repan17.pdf?t=QVd8bWhjNDR1fDCuGiRsTesiUd2ywetYiYwT

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 01/03/2012 (from 01/03/2012 to 28/02/2022).

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 14/10/2010 and last machine under the project activity was commissioned on 31/03/2011. The project activity consists of 38 machines (800 kWh) of Enercon make E-48 totalling to a capacity of 6.4 MW.

The commissioning date for all the WECs included in the project activity is given in the table below.

Sr. No.	Project Owner	Loc. No.	Commissioning Date
1	Vish Wind Infrastructure LLP	52	14/10/2010
2		80	14/10/2010
3		81	14/10/2010
4		82	24/12/2010



5		83	24/12/2010
6		84	24/12/2010
7		88	31/03/2011
8		89	31/03/2011

The project activity comprises of 8 WEGs of Enercon's model E-53. The project uses technology that is environmentally clean and safe since there are no GHG emissions associated with the electricity generation from the windmills. VWILLP has contracted Enercon (India) Limited for the safe disposal of solid/oily waste. The solid /oily wastes generated as a result of the O&M activity at the site are disposed of through authorized third party contracted by Enercon for further disposal. The third party disposes the waste according to the environmental policies prevalent in Host country.

The WEGs generates 3-phase power at 400V, which is stepped up to 33 KV. The project activity can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of $400\text{ V} \pm 12.5\%$. The average life time of the WEG is around 20 years as per the industry standards.

The other salient features of the state-of-art-technology are:

E 53 Specifications

Turbine Model	Enercon E-53
Rated Power	800 kW
Rotor Diameter	53m
Hub Height	75m
Turbine Height	Gearless horizontal axis wind turbine with variable rotor speed
Power Regulation	Independent electromechanical pitch system for each blade
Cut in wind speed	2.5m/s
Rated wind speed	12m/s
Cut out wind speed	28-34m/s
Extreme Wind Speed	59.5m/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

B.2. Post registration changes

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

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Not Applicable

B.2.2. Corrections

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Not Applicable

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

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Not Applicable

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

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Not Applicable.

B.2.5. Changes to start date of crediting period

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Not Applicable

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

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Not Applicable

SECTION C. Description of monitoring system

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Wind based electricity generation is not associated with any kind of leakages. Hence, the sole parameter for monitoring is the electricity supplied to the grid. The Project is operated and managed by Enercon. They follow 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.

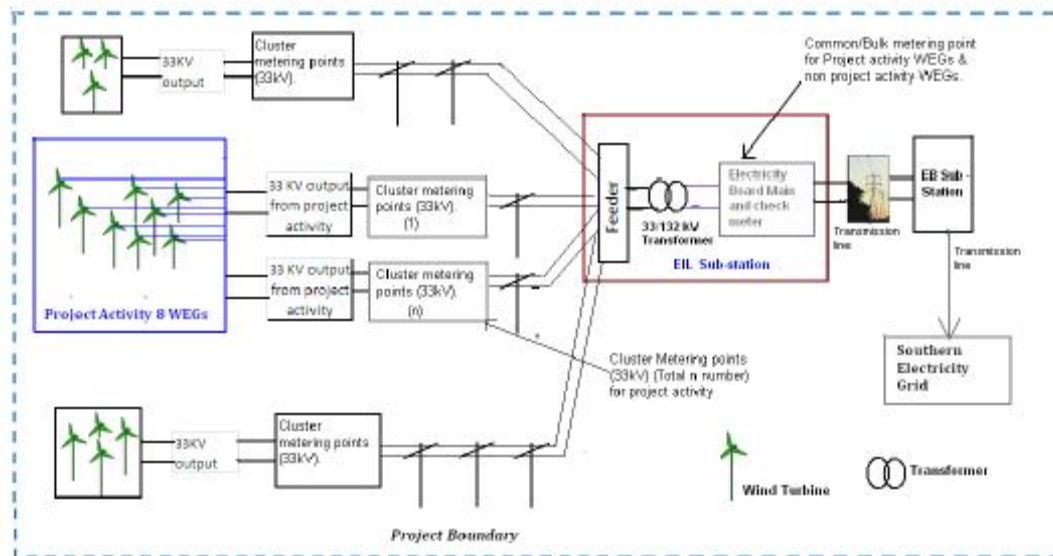
This approved monitoring methodology requires monitoring of the electricity generation from the project activity.

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. 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 and supplied to the grid.

The Project is operated by Enercon and managed by the PP. The operational and maintenance contract for the project is with Enercon. Enercon is an ISO 9001:2000 certified Quality Management system from Germanischer Lloyd. Enercon 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.

Description of metering arrangement for project activity:-

Layout of Metering arrangement for project activity is as follows:-



From the above line diagram it is clear that metering system for the project activity consists of clusters of individual metering points at 33kV at project site. Each 33kV metering points will have one main meter of 0.2% of accuracy class which is exclusively be connected to WEGs of the project activity i.e. there will be no WEGs of other project owners that are connected to these metering point. The 8 WEGs of project activity is connected to total 3 cluster metering points at the project site.

In addition the 33kV metering points there is one set of main & check meter of 0.2% accuracy class at 132kV Enercon Pooling sub-station at Ankireddy palli (common/Bulk metering point) where all the WEGs of project activity and non-project activity are connected.

From the above line diagram it is clear that the machines of the project activity and other project developers at the wind farm have individual metering points at 33kV at the project site. Further PP will make clusters of WEGs at the project site for the purpose of metering. Each cluster will have a main meter & check meter. The WTGs of the project activity will be connected to individual dedicated cluster meters.

From the above layout it is clear that the clusters meters (dedicated meters/ individual meters) of project activity and other customers are connected to the Enercon pooling sub-station at Ankireddipalli at bulk metering point at 132 kV. There is one main and one check meter at the Enercon substation. Since the main and check meters (bulk meter) at 132 kV metering point at the ENERCON pooling 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 at 132 kV at the ENERCON substation, the state utility apply Line loss to the meter reading recorded at the 33 KV.

The total % of Line loss from WEGs (33kV metering point) to Enercon substation (132kV 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 is set-out below:

$$T_E = \frac{(X_1 + X_2 + X_3 + X_4 + \dots + X_n) - Y}{(X_1 + X_2 + X_3 + X_4 + \dots + X_n)} \times 100\%$$

Where,

T_E = *Percentage Line loss incurred in 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 132kV metering point (bulk meter: main and check) at high voltage side of receiving sub-station. Refer above picture for schematic of the flow diagram.*

$(X_1+X_2+X_3+X_4+.....X_n)$ = *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 connecting machines of the project activity and other project developers. Refer above picture for schematic of the flow diagram.*

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:-

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

Where,

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

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

In Andhra Pradesh state the electricity imported by WEGs (Electricity exported by grid to WEGs) is charged by state utility based on KVAH & KVA reading of import instead of the reading of kWh and at the rate of applicable HT tariff, while payment against electricity exported by WEGs (Electricity imported by grid from WEGs) to PP is made based on kWh reading (after deducting transmission loss between 33kV & 132 kV level). Hence to arrive the net import at 132 kV PP has applied the same transmission loss (value in %) factor in import value (kWh reading) of WEGs recorded at 33kV as per formula mentioned above (refer formula 2).

In case the date of registration or start date of the crediting period of the project activity does not match with the date of joint meter report or billing cycle, PP will forego the emission reductions for that particular period.

Procedure to deal with data uncertainty:

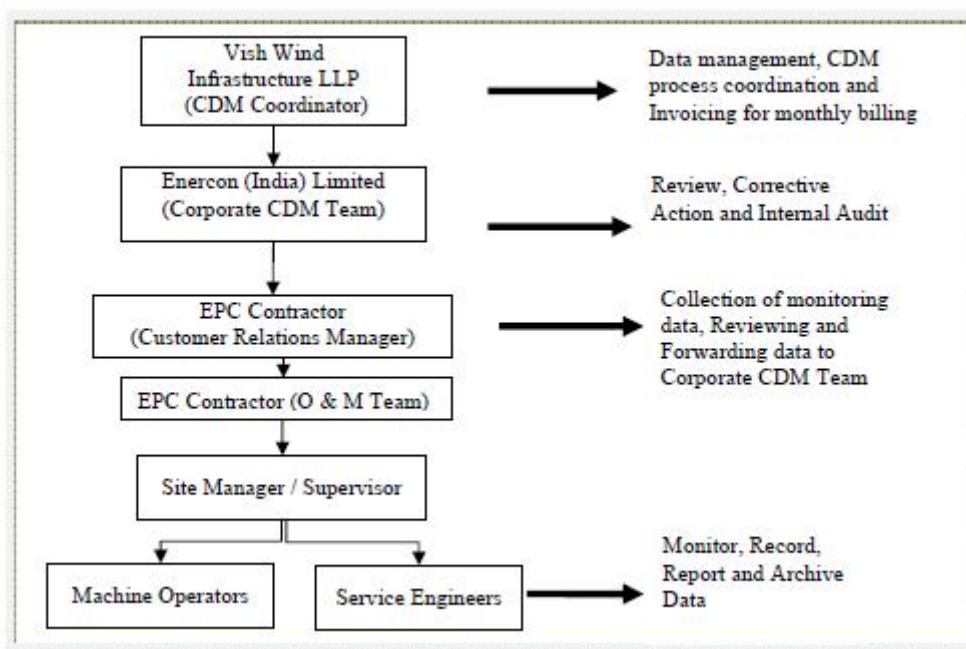
During the annual calibration, if the meter is found to be outside the permissible limits of the error and if that meter readings have been used in JMR, the (–ve) error value would be applied to electricity export and (+ve) error value will be applied to import of electricity from grid to all the JMR values since the date of last calibration. The meter would be replaced immediately with new calibrated meter.

In case both main and check meters are found not to be working in the accuracy range during the calibration test, both the meters shall be replaced immediately and the correction will be applied to the consumption registered by the main meter to arrive the correct delivered energy for the billing purpose for the period of one month upto the time of such test check, computation of the delivered energy for the period thereafter till the next monthly meter reading shall be as per the replaced main meter.

Monitoring roles and responsibilities

The operational and maintenance contract for the project is with Enercon. Enercon is an ISO 9001:2008 certified Quality Management system from Germanischer Lloyd. Enercon 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:



PP will be monitoring the data sent by the O&M contractor and the data for electricity generated by the project activity will be kept as records for the period of 10+2 years i.e. 2 years beyond the term of crediting period. Enercon is O&M contractor and will be responsible for data recording.

The project participant is Vish Wind Infrastructure LLP will be keeping and monitoring the data for electricity generation and calibration reports post project implementation. Enercon (India) Limited will be the O&M contractor who will be having the responsibility of activities such as maintaining electricity generation records, calibration records and maintenance of the WEGs (Wind Energy Generators).

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	<p>“CO₂ Baseline Database for Indian Power Sector”, version 6.0 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector” is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</p>
Value(s) applied	0.96843
Purpose of data	Calculated by using 3 years vintage (2007-2008, 2008-2009 and 2009-10) data obtained from “CO ₂ Baseline Database for Indian Power Sector” version 6.0, published by the Central Electricity Authority, Ministry of Power, Government of India, which is based on the tool “Tool to calculate the emission factors for an electricity system”.
Additional comment	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	<p>“CO₂ Baseline Database for Indian Power Sector”, version 6.0 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector” is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</p>
Value(s) applied	0.76340
Purpose of data	2009-10 data obtained from “CO ₂ Baseline Database for Indian Power Sector” version 6.0, published by the Central Electricity Authority, Ministry of Power, Government of India, which is based on the tool “Tool to calculate the emission factors for an electricity system”.
Additional comment	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data/Parameter	$EF_{CO_2,grid,y}$
Unit	tCO ₂ e/MWh
Description	Combined Margin Emission Factor of Southern Regional Electricity Grid
Source of data	<p>Combined Margin Emission Factor ($EF_{CM,y}$) is calculated as the weighted average of Operating Margin Emission Factor ($EF_{OM,y}$) and Build Margin Emission Factor ($EF_{BM,y}$).</p> <p>The “CO₂ Baseline Database for Indian Power Sector” version 6.0 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector” is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</p>
Value(s) applied	Combined Margin Emission Factor ($EF_{CO_2,grid,y}$) = 0.91717
Purpose of data	<p>In case of wind power projects default weights of 0.75 for EF_{OM} and 0.25 for EF_{BM} are applicable as per ACM0002.</p> <p>Refer Annex – 3 for comprehensive calculation of Combined Margin Emission Factor.</p> <p>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.</p>
Additional comment	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_{Bly}
Unit	MWh (Mega-watt hour)
Description	Net electricity supplied to the grid by the Project
Measured/Calculated/Default	Calculated
Source of data	Calculated
Value(s) of monitored parameter	Annual electricity supplied to the grid by the Project (EG_y) = 12856.74474 MWh
Monitoring equipment	Calculated as per formulas better described under section C.
Measuring/Reading/Recording frequency	Monthly
Calculation method (if applicable)	$EG_{Bly} = EG_{Export} - EG_{import}$
QA/QC procedures	<p>QA/QC procedures will be as implemented by Discom/State utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD.</p> <p>Please refer Annex 4 for details for QA/QC procedure.</p>
Purpose of data	To calculate emission reduction.
Additional comment	The data will be archived for crediting period + 2 years.



Data/Parameter	EG _{Export}
Unit	MWh (Mega-watt hour)
Description	Electricity Export recorded at meters (main and check meters). All the subprojects included in the project activity have dedicated main and check meters at 33 kV metering point.
Measured/Calculated /Default	Measured at Main & Check Meters
Source of data	Electricity Export recorded at meters (main and check meters). All the subprojects included in the project activity have dedicated main and check meters at 33 kV metering point.
Value(s) of monitored parameter	12866.05356
Monitoring equipment	Accuracy Class-0.2 Serial Number of Main Meter: Refer Appendix III of the MR Serial Number of Check Meter: Refer Appendix III of the MR Calibration Frequency: Annually Date of Last Calibration: Refer Appendix III of the MR
Measuring/Reading/Recording frequency	Monthly
Calculation method (if applicable)	NA
QA/QC procedures	Refer section C for an illustration of the provisions for QA/QC procedures.
Purpose of data	To calculate net electricity exported to grid.
Additional comment	The data will be archived for crediting period + 2 years.



Data/Parameter	EG _{import}
Unit	MWh (Mega-watt hour)
Description	Electricity Import recorded at meters (main and check meters). All the subprojects included in the project activity have dedicated main and check meters at 33 kV metering point.
Measured/Calculated /Default	Measured at Main & Check Meters.
Source of data	Electricity import from the grid as per joint meter reading for each of the subproject taken at 33kV metering point.
Value(s) of monitored parameter	9.30882
Monitoring equipment	Accuracy Class-0.2 Serial Number of Main Meter: Refer Appendix III of the MR Serial Number of Check Meter: Refer Appendix III of the MR Calibration Frequency: Annually Date of Last Calibration: Refer Appendix III of the MR
Measuring/Reading/ Recording frequency	Monthly
Calculation method (if applicable)	NA
QA/QC procedures	Refer section C for an illustration of the provisions for QA/QC procedures.
Purpose of data	To calculate net electricity exported to grid.
Additional comment	The data will be archived for crediting period + 2 years.



Data/Parameter	T _E
Unit	MWh (Mega-watt hour)
Description	Transmission loss for export between the metering location at 33 kV metering point and the high voltage side of the substation to which the subproject is connected.
Measured/Calculated /Default	Calculated as per the procedure mentioned in the PPA. Refer section C of the MR.
Source of data	Transmission Loss for export is sourced from the joint meter reading (Form B) taken at 33kV metering point for all the sub projects included in the project activity.
Value(s) of monitored parameter	0.02787
Monitoring equipment	Calculated as per formulas better described under section C.
Measuring/Reading/Recording frequency	Monthly
Calculation method (if applicable)	Monitoring: Transmission loss between metering location at 33 kV and the metering location at receiving substation is applied to the meter reading taken at meters connected at 33 KV point for the project activity. The Substation is connected to the machines of the project activity and the machines commissioned by the other project owners. Therefore transmission loss is applied by the state utility as reflected in the JMR (Form B) taken at 33kV point for all the sub projects included in the project activity. The JMR is signed by the representatives of Enercon and the state utility. Refer section C of MR. Frequency of recording data: Monthly Recording: The value of transmission loss is sourced from JMR for all the subprojects at 33 kV metering point. Responsibility: Joint responsibility of Enercon and state utility
QA/QC procedures	Refer section C for an illustration of the provisions for QA/QC procedures.
Purpose of data	To calculate emission reduction.
Additional comment	The data will be archived for crediting period + 2 years.

D.3. Implementation of sampling plan

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No sampling plan is followed by PP.

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

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

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The baseline emissions are to be calculated as follows:

$$BE_y = EG_y * EF_y$$

Where:

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

EG_y = Net electricity supplied to the grid in year y and is applied directly from JMR certified by state utility.

This value can also be cross checked from the invoice. (MWh/yr)

EF_y = CO₂ emission factor of the grid (917.17 tCO₂e/GWh fixed ex-ante). Refer Appendix 3 for detail.

Baseline Emission for the period (01/03/2012 to 31/12/2012)
= 12856.74474 (MWh) * 0.91717 (tCO₂/MWh)
= 11,791 tCO₂

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

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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

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

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

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO _{2e})	Project emissions or actual net GHG removals by sinks (tCO _{2e})	Leakage (tCO _{2e})	Emission reductions or net anthropogenic GHG removals by sinks (tCO _{2e})
01/03/2012 – 31/12/2012	11,791	0	0	11,791
Total	11,791	0	0	11,791

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

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO _{2e})	10,259	11,791

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

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The emission reduction has been calculated for 10 months under the present monitoring period, while in registered PDD the Emission Reductions are calculated for a year (12 months). Proportionate number of CERs for a period of ten months as per registered PDD comes out to be 10,259. However, actual number of CERs achieved in the present monitoring period is 11,791. This reflects a difference of 14.93% on the upside, which is due to the high PLF achieved by the project activity.



History of the document

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

Appendix I

MONITORING INFORMATION

Metering procedure:-

- Metering system for the project activity consists of cluster metering system at 33kV. Each cluster point will have one main and one check meter (33kV metering point). All the clusters of the project activity will exclusively be connected to WEGs of the project activity i.e. there will be no WEGs of other project owners that are connected to these clusters. Summation of meter reading for all the clusters (connecting 8 machines) will provide total electricity generated by the project activity.
- In addition to cluster meters there is one set of main & check meter at Enercon Pooling sub-station (132kV metering point/Bulk metering point) where all the WEGs of project activity and non-project activity are connected.
- 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 at all the meters will be done by DISCOM utility/APCPDCL in the presence of PP's representative (Enercon).
- Joint meter reading recorded at cluster metering point indicates the values of export & import by the WEGs of project activity connected to 33 kV metering point. There will be individual Joint meter reading for individual cluster metering point.
- Joint meter reading recorded at 132kV metering point at Enercon pooling sub-station indicates the values of export & import by the all the WEGs of project activity and WEGs of non-project activity connected to 132 kV metering point.

Metering Equipment details:-

- 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 0.2% of accuracy class.
- All the main meter and check meters are calibrated by state utility annually and records are available with PP.

QA/QC procedure:-

QA/QC procedures will be as implemented by Discom/State utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD.

In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated. Whenever a main meter goes defective, the consumption recorded by the check meter will be referred.



In case both main and check meters are found not to be working in the accuracy range during the calibration test, both the meters shall be replaced immediately and the correction will be applied to the consumption registered by the main meter to arrive the correct delivered energy for the billing purpose for the period of one month up to the time of such test check, computation of the delivered energy for the period thereafter till the next monthly meter reading shall be as per the replaced main meter.

**Appendix II:****Net Electricity Exported to Grid (EG_y)**

Electricity Generation and CER Calculation

Month	E_{WEG,Export}	E_{WEG,Import}	EG_y	Emission Factor	CER
Mar-12	466325.07	1529.78	464795.29	0.91717	426.30
Apr-12	444374.06	1962.02	442412.04	0.91717	405.77
May-12	914225.42	1558.83	912666.59	0.91717	837.07
Jun-12	2588914.42	354.81	2588559.60	0.91717	2374.15
Jul-12	2538676.53	151.20	2538525.33	0.91717	2328.26
Aug-12	2637425.57	171.17	2637254.40	0.91717	2418.81
Sep-12	1841003.30	292.76	1840710.54	0.91717	1688.24
Oct-12	539637.42	1741.34	537896.09	0.91717	493.34
Nov-12	518854.55	1052.36	517802.19	0.91717	474.91
Dec-12	376617.21	494.55	376122.66	0.91717	344.97
Total	12866053.56	9308.82	12856744.74		11791.00



Project Participant	Location No.	Meter Serial No.		Make	Accuracy Class	Calibration Certificate			
		Main Meter	Check Meter			2010 (Main)	2010 (Check)	2012 (Main)	2012 (Check)
Vish Wind Infrastructure LLP	52	AP900310	AP900311	Secure Meters Ltd.	0.2s	02/09/2010	02/09/2010	13/06/2012	13/06/2012
	80,81,82,83,84	AP900316	AP900317			02/09/2010	02/09/2010	17/08/2012	17/08/2012
	88,89	AP900028	AP900076			13/03/2010	21/03/2010	25/05/2012	25/05/2012