



Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT

Title of the project activity	Bundled wind energy power projects (2003 policy) in Rajasthan	
UNFCCC reference number of the project activity	1167	
Version number of the PDD applicable to this monitoring report	Revised PDD version 08	
Version number of this monitoring report	01	
Completion date of this monitoring report	06/10/2020	
Monitoring period number	7 th	
Duration of this monitoring period	01/01/2018 to 30/06/2020 (Inclusive of both dates)	
Monitoring report number for this monitoring period	Not Applicable	
Project participants	M/s Wind World (India) Limited	
Host Party	India	
Applied methodologies and standardized baselines	Sectoral Scope: 1, Energy industries (renewable / non-renewable sources)	
Sectoral scopes	ACM0002 / Version 06 Approved baseline and monitoring methodology title "Consolidated methodology for grid-connected electricity generation from renewable sources"	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0	125,298 tonnes of CO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	125,229 ¹ tonnes of CO ₂ e	

¹ Please refer section E.5.1 for the detailed calculation of estimated emission reduction as per the registered PDD.

SECTION A. Description of project activity

A.1. General description of project activity

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Bundled wind energy power project of 29.76 MW ("Project") is installed in the state of Rajasthan and provides reliable, renewable power to the Rajasthan state electricity grid. The Project leads to reduction of greenhouse gas emissions because it displaces electricity from fossil fuel based electricity generation plants. The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. M/s Wind World (India) Ltd is the equipment supplier and the operations and maintenance contractor for the Project. The generated electricity is supplied to the utility (DISCOM) under a long-term power purchase agreement (PPA). The details of the subprojects comprising the Project are as under:

Name of the Customer	M/C Model	Capacity of M/C	No. of M/C	Capacity (MW)
Wind World Wind Farms (Rajasthan) Pvt. Ltd.	E-48	0.8	30	24
Modular Power	E-30	0.23	1	0.23
Vijay Traders	E-30	0.23	1	0.23
Vijay Developers	E-30	0.23	1	0.23
Vikas Agencies	E-30	0.23	1	0.23
G. C. Chemie Pharmie Ltd.	E-30	0.23	1	0.23
Cooper Metals Pvt. Ltd.	E-30	0.23	2	0.46
Kataria Infrastructure Corporation	E-40	0.6	1	0.6
D.P.Power	E-30	0.23	1	0.23
Kataria Infrastructure Corporation	E-30	0.23	1	0.23
Kataria Wires	E-30	0.23	1	0.23
Ratlam Wires	E-30	0.23	1	0.23
Kwality Tobacco Products	E-30	0.23	1	0.23
D P Power	E-40	0.6	1	0.6
Unique Power Corporation	E-40	0.6	1	0.6
P.V.Chandran	E-40	0.6	1	0.6
Srinivaas Sirigeri	E-40	0.6	1	0.6
Total Capacity (MW)			47.00	29.76

Brief description of the installed technology and equipments:

The Project involves 30 wind energy converters (WEGs) of Wind World make 800 kW E-48, 5 WEGs of Wind World make 600 kW E-40 and 12 WEGs of Wind World make 230 kW E-30 with internal electrical lines connecting the Project with local evacuation facility. The WEGs generates 3-phase power at 400V, which is stepped up to 33 KV. 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.

M/s 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.



Revolutionary Gearless Technology

- | | |
|---------------------|-----------------|
| 1. Generator | 6. Blade Flange |
| 2. Generator Stator | 7. Pitch Drive |
| 3. Generator Rotor | 8. Main Carrier |
| 4. Main Pin | 9. Wind Sensor |
| 5. Rotor Blade | 10. Tower |

Technology Diagram

Relevant dates for the project activity:

The date of placement of purchase order for the first project in the bundle is 30/04/2003. The first machine under the project activity was commissioned on 29/07/2003 and the last machine under the project activity was commissioned on 29/05/2005. The expected operational lifetime of the project is for 20 years. The crediting period of the project activity has commenced on 17/05/2011. This is the 7th monitoring report. The details of issuance of CERs for the previous monitoring periods are as follows:

Issuance no.	Period covered	CER issued	
First Issuance	17/05/2011 to 31/10/2011 (Inclusive of both days)	17,809	CP1
Second Issuance	01/11/2011 to 30/09/2012 (Inclusive of both days)	35,260	CP1
Third Issuance	01/10/2012 to 31/03/2014 (Inclusive of both days)	42,388	(3718 from CP1)
Fourth Issuance	01/04/2014 to 31/08/2015 (Inclusive of both days)	44,068	
Fifth Issuance	01/09/2015 to 31/07/2017 (Inclusive of both days)	34,897	

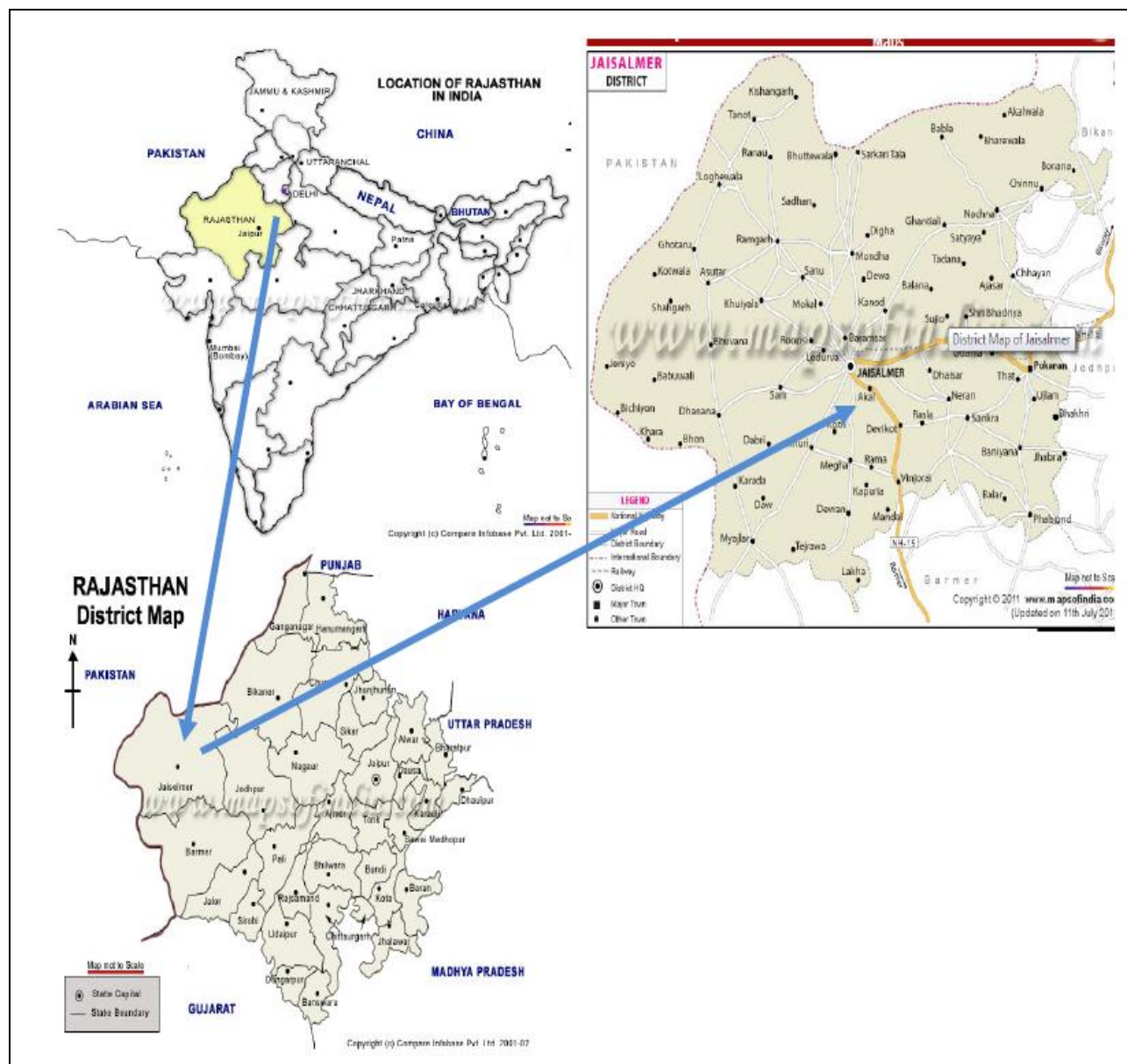
Total emission reductions achieved in this monitoring period

The total emission reductions achieved under the current monitoring period 01/01/2018 to 30/06/2020 (Inclusive of both days) is 125,298 tCO_{2e}.

A.2. Location of project activity

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- (a) Host Party(ies) : India
- (b) Region/State/Province, etc. : Rajasthan State
- (c) City/Town/Community, etc. : Kita. Bhu, Sodabhandhan and Temdarai villages in Jaisalmer district of Rajasthan of India.
- (d) Physical/ Geographical location : The detailed individual WEGs location numbers and coordinates of project activity are provided in Appendix 2. A location map is provided below:



A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Government of India (host)	Wind World (India) Limited (Private Entity)	No

A.4. References to applied methodologies and standardized baselines

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The approved consolidated baseline and monitoring methodology ACM0002, Version 6.0 (19 May, 2006) has been used. The title of the baseline and monitoring methodology is "Consolidated methodology for grid-connected electricity generation from renewable sources".

The tool used for the project is as follows:

"Tool for the demonstration and assessment of additionality" version 3.0

References:

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

<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v3.pdf>

A.5. Crediting period type and duration

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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 : 17/05/2011

The end date of crediting period : 16/05/2021

Both first and last days are included.

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

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The start date of the project activity is 30/04/2003, which is the date of placement of purchase order for the first project in the bundle. The first machine under the project activity was commissioned on 29/07/2003 and last machine under the project activity was commissioned on 29/05/2005. The commissioning dates for all the machines included in the project activity are given in the table below:

S. No.	Name of the Customers	Unique identification no.	Capacity MW	No. of M/C	Total Capacity (MW)	Date of Commissioning
1	Wind World Wind Farms (Rajasthan) Pvt. Ltd.	EWRPL 01	0.80	30	24	29/05/2005
		EWRPL 02				
		EWRPL 03				
		EWRPL 04				
		EWRPL 05				
		EWRPL 06				
		EWRPL 07				
		EWRPL 08				
		EWRPL 09				
		EWRPL 10				
		EWRPL 11				

		EWRPL 12				
		EWRPL 13				
		EWRPL 14				
		EWRPL 15				
		EWRPL 16				
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		EWRPL 18				
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		EWRPL 21				
		EWRPL 22				
		EWRPL 23				
		EWRPL 24				
		EWRPL 25				
		EWRPL 26				
		EWRPL 27				
		EWRPL 28				
		EWRPL 29				
		EWRPL 30				
2	Modular Power	MPPL - 01	0.23	1	0.23	29/03/2004
3	Vijay Traders	VT - 01	0.23	1	0.23	29/03/2004
4	Vijay Developers	VD - 01	0.23	1	0.23	29/03/2004
5	Vikas Agencies	VA - 01	0.23	1	0.23	29/03/2004
6	G. C. Chemie Pharmie Ltd.	GCCPL - 01	0.23	1	0.23	29/03/2004
7	Cooper Metals Pvt. Ltd.	CMPL – 01	0.23	2	0.46	29/03/2004 & 12/06/2004
8	Kataria Infrastructure Corporation	KIC – 01	0.60	1	0.60	29/07/2003
9	D.P.Power	DPP - 01	0.23	1	0.23	29/07/2003
10	Kataria Infrastructure Corporation	KIC – 02	0.23	1	0.23	29/07/2003
11	Kataria Wires	KWPL - 02	0.23	1	0.23	29/07/2003
12	Ratlam Wires	RWPL - 02	0.23	1	0.23	29/07/2003
13	Kwality Tobacco Products	KTP - 01	0.23	1	0.23	29/07/2003
14	D P Power	DPP - 02	0.60	1	0.60	30/06/2004
15	Unique Power Corporation	UPC - 01	0.60	1	0.60	30/06/2004
16	P.V.Chandran	PVC – 01	0.60	1	0.60	30/11/2003
17	Srinivaas Sirigeri	SS – 01	0.60	1	0.60	03/03/2004

There are no changes that have happened in project activity which may impact the applicability of the methodology. The operation and maintenance activities of M/s Wind World (India) Limited 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 of breakdown 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.

B.2. Post-registration changes**B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents**

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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 PDD² during this monitoring period.

B.2.3. Changes to the start date of the crediting period

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There is no change to start date of crediting period.

B.2.4. Inclusion of monitoring plan

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Not Applicable

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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There was a permanent change (PRC-1167-001)³ requested to the registered monitoring plan. The revision has been requested via Revised PDD version 8.0; dated 25/01/2012, which was approved by UNFCCC on 02/11/2012. (Link: <https://cdm.unfccc.int/Projects/DB/SGS-UKL1181738388.43/view>).

B.2.6. Changes to project design

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There was a permanent change (PRC-1167-001) in project design of registered project activity, which was approved by UNFCCC on 02/11/2012 (Link: <http://cdm.unfccc.int/PRCContainer/DB/prcp122432218/view>).

B.2.7. Changes specific to afforestation or reforestation project activity

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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", by CDM – Meth Panel is proposed to be used to monitor the emission reductions.

This approved monitoring methodology requires monitoring of the following:

² A permanent change to the registered PDD was requested by PP (as referred in the section 2.5); and a revised PDD version 8.0; dated 25/01/2012 was approved by UNFCCC on 02/11/2012

³ <http://cdm.unfccc.int/PRCContainer/DB/prcp122432218/view>

- ✓ 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.

In order to determine the net electricity supplied to the grid by the project, the following procedure is followed:

All the WEGs of the Project along with the other wind firms are connected to the backup/check meter at Temderai sub-station, which is further connected to the Sub-station at Amarsagar at 220 kV. The generation readings of all WEGs of all the customers are collectively displayed at this Main Billing meter at 220 kV Amarsagar substation. Therefore, the main meter reading reflects the aggregate electricity supplied by all these wind farms, including the project activity. Representatives of Discom and Wind World will jointly take the main meter reading at Amarsagar and sign the meter reading on the first day of every month. Simultaneously, the joint meter reading of the backup metering system at Temderai substation will also be taken by representatives of the Discom and M/s Wind World (India) Limited.

To calculate the net amount of electricity generation from each wind turbine, apportionment of this collective meter reading of the main billing meter (recorded at Main meter 1 & Main meter 2) is done on the basis of the controller panel reading at the individual wind turbine end. This controller panel reading is recorded and maintained by M/s Wind World (India) Limited.

The apportionment procedure has been explained as follows:

$EG_{JMR, Export}$	= Electricity exported, as recorded by the main meter at the substation
$EG_{JMR, Import}$	= Electricity imported, as recorded by the main meter at the substation
$EG_{Controller, Export}$	= Electricity exported by a WEG, as measured at the controller
$\sum EG_{Controller, Export}$	= Electricity exported by all the WEGs connected to the main meter at the substation, measured at the controller of each WEG
$EG_{WEG, Export}$	= Electricity exported by a WEG to the grid, calculated
$EG_{WEG, Import}$	= Electricity imported by a WEG from the grid, calculated

Electricity exported by each WEG is apportioned on the basis of electricity export recorded at the controller of each WEG and the electricity export at the main meter as mentioned in the JMR. The export multiplication factor is calculated as follows:

$$\text{Export Multiplication factor} = \frac{EG_{JMR, Export}}{\sum EG_{Controller, Export}} \dots\dots\dots(1)$$

Therefore, the energy exported by a WEG to the grid is calculated as:

$$EG_{WEG, Export} = \text{Export Multiplication factor} \times EG_{Controller, Export} \dots\dots\dots(2)$$

As the controller meter doesn't record import, the apportioning of energy import by each WEG is also done on the basis of electricity exported recorded at the controller of each WEG and the electricity import at the main meter as mentioned in the JMR. The import multiplication factor is calculated as follows:

$$\text{Import Multiplication factor} = \frac{EG_{JMR, Import}}{\sum EG_{Controller, Export}} \dots\dots\dots(3)$$

Therefore, the energy imported by a WEG to the grid is calculated as:

$$EG_{WEG, Import} = \text{Import Multiplication factor} \times EG_{Controller, Export} \dots\dots\dots(4)$$

Hence, the net electricity exported by a WEG of the project is calculated as:

$$EG_{WEG, Export} - EG_{WEG, Import}$$

The net electricity exported by all the WEGs of the project activity is calculated as:

$$\begin{aligned} \text{EG}_y &= \sum \text{EG}_{\text{WEG, Export}} - \sum \text{EG}_{\text{WEG, Import}} \\ &= \text{EG}_{\text{Export}} - \text{EG}_{\text{Import}} \end{aligned}$$

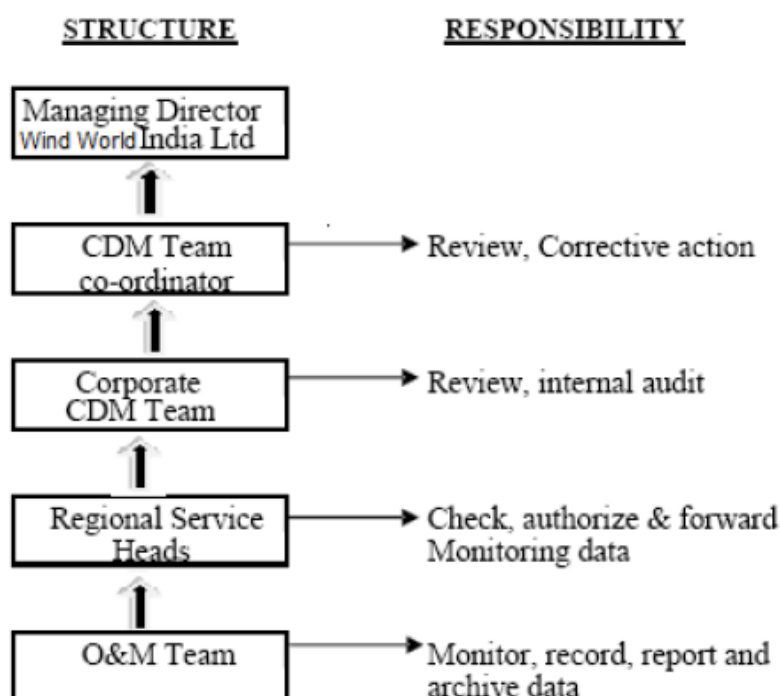
Where,

$\sum \text{EG}_{\text{WEG, Export}}$ = Export from all the WEGs under the project activity

$\sum \text{EG}_{\text{WEG, Import}}$ = Import from all the WEGs under the project activity

The summation is done considering the WEGs which belong to the project activity.

The Project is operated and managed by M/s Wind World (India) Ltd. According to the above mentioned procedure, the monthly credit notes are issued and the invoices are raised to the respective DISCOM and the copies are archived electronically as well as on paper. These documents are used for calculation of the emission reduction and cross checking of data. The operational and management structure implemented by M/s Wind World (India) Limited is as follows:



The details of the metering arrangement have been described below:

Metering:

- ✓ The project along with the other wind farms are connected to grid through common metering point (backup meter) at Temderai substation and further connected to Amarsagar substation (EB main meter), where metering is done for billing purpose. The line diagram of the relevant metering points has been shown below as Appendix 1.

Meter Reading:

- ✓ Representatives of DISCOM and M/s Wind World (India) Limited will jointly take the main reading and sign the meter reading on the first day of every month at Temderai and Amarsagar substation.

- ✓ The export, import and net electricity supplied to the grid by individual customer will be sourced from the credit notes and can be cross-checked with the invoices raised to the DISCOM and will be used for calculation of emission reduction.

Metering Equipment:

- ✓ The meters used are Tri-vector of accuracy class 0.2 and the manufacturer is the Secure Meters Ltd. The meters are two-way meters and measure the electricity import and export.

Meter Test Checking:

- ✓ The main and backup/ check meters will jointly inspected/tested once in a year as per the terms of the PPA.
- ✓ The LCS meters (for panel reading) do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case, there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system, the machine will stop working and generate the error report.

Inspection of Energy Meters:

- ✓ 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 backup meter will be referred.
- ✓ The main and the backup metering systems will be sealed in presence of representatives of Wind World India and RRVPNL/Jodhpur DISCOM.

Calibration Details

The metering equipment's were inspected & calibrated by state utility. Meter details for all the main and backup meters are as follows:-

Details of the meters					2015	2016	Meter Replacement
Meter description	Serial No.	Make	Accuracy class	Metering point	Calibration Dates	Calibration Dates	New Meter ⁴
Main meter (Line I)	TNU0 0946	Secure	0.2	Amarsagar Substation	13/02/2015	Meter Replaced and new meter calibrated on 13/04/2016	13195563
Backup meter (Line I)	RJB00 052	Secure	0.2	Temdarai Substation	14/02/2015	13/04/2016	
Main meter (Line II)	TNU0 0945	Secure	0.2	Amarsagar Substation	13/02/2015	Meter Replaced and new meter calibrated on 13/04/2016	13195562
Backup meter (Line II)	ABB0 0691	Secure	0.2	Temdarai Substation	14/02/2015	13/04/2016	

⁴ Only Line I & Line II Main meter (Amarsagar Substation) had been replaced on 13/04/2016 due to display was not clear though meter was working correctly. Meter replacement MOM is being submitted to the DOE.

Details of the meters					2017
Meter description	Serial No.	Make	Accuracy class	Metering point	Calibration Dates
Main meter (Line I)	13195563	L&T	0.2	Amarsagar Substation	29/05/2017
Backup meter (Line I)	RJB00052	Secure	0.2	Temdarai Substation	30/05/2017
Main meter (Line II)	13195563	L&T	0.2	Amarsagar Substation	29/05/2017
Backup meter (Line II)	ABB00691	Secure	0.2	Temdarai Substation	30/05/2017

The main and the backup meters are calibrated once each year. The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. Therefore there is no data uncertainty.

Training and maintenance:

In order to ensure that Wind World's staffs who are positioned to take care all the activities starting from project construction to operation and maintenance, Wind World 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 (India) 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

Data/Parameter	$EF_{OM, y}$
Unit	tCO _{2e} /MWh
Description	Operating Margin Emission Factor of Northern Regional Electricity Grid
Source of data	"CO ₂ Baseline Database for Indian Power Sector", version 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO ₂ Baseline Database for Indian Power Sector", version 01.1 is available at http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver1.pdf

Value(s) applied	2002 – 2003 = 0.9993 2003 – 2004 = 0.9869 2004 – 2005 = 0.9756
Choice of data or measurement methods and procedures	The data has been taken from CEA database.
Purpose of data/parameter	Calculation of Baseline Emissions
Additional comments	None

Data/Parameter	$EF_{BM, y}$
Unit	tCO _{2e} /MWh
Description	Build Margin Emission Factor of Northern Regional Electricity Grid
Source of data	“CO ₂ Baseline Database for Indian Power Sector”, version 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India. The “CO ₂ Baseline Database for Indian Power Sector”, version 01.1 is available at http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver1.pdf .
Value(s) applied	2004 – 2005 = 0.5335
Choice of data or measurement methods and procedures	The data has been taken from CEA database.
Purpose of data/parameter	Calculation of Baseline Emissions
Additional comments	None

Data/Parameter	$EF_{CM, y}$
Unit	tCO _{2e} /MWh
Description	Combined Margin Emission Factor of Northern Regional Electricity Grid
Source of data	“CO ₂ Baseline Database for Indian Power Sector”, version 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India. The “CO ₂ Baseline Database for Indian Power Sector”, version 01.1 is available at http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver1.pdf .
Value(s) applied	0.87387
Choice of data or measurement methods and procedures	The data has been taken from CEA database.
Purpose of data/parameter	Calculation of Baseline Emissions
Additional comments	None

D.2. Data and parameters monitored

Data/parameter	EGy
Unit	MWh (Mega-Watt hour)
Description	Net electricity supplied to the grid by the Project
Measured/calculated/default	Calculated

Source of data	Calculated as the difference of EG Export and EG Import and sourced from the monthly credit notes. This value can be cross-checked from the invoices raised to the DISCOM.
Value(s) of monitored parameter	143,382.31
Monitoring equipment	Calculated as per the procedures shown in section C.
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	The net electricity supply is calculated as follows: $= (EG_{\text{Export}} - EG_{\text{Import}})$ <p>This value is directly used for calculation of emission reduction. Detailed procedures have been described in section C.</p>
QA/QC procedures	Details of the QA/QC procedures have been described in section C. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	None

Data/parameter	EG_{JMR, Export}
Unit	MWh (Mega-Watt hour)
Description	Electricity exported as recorded by the main meter at EB substation.
Measured/calculated/default	Measured
Source of data	Export value from the Joint Meter reading taken at the substation in the presence of Wind World India representatives and the State Utility representatives.
Value(s) of monitored parameter	-
Monitoring equipment	Meter Details are provided in Section C Frequency of Calibration- Annual
Measuring/reading/recording frequency	Measured in continuous basis and recorded on Monthly basis
Calculation method (if applicable)	Not Applicable
QA/QC procedures	The meters will be calibrated once in a year. Details of the QA/QC procedures have been described in section C. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	None

Data/parameter	EG_{JMR, import}
Unit	MWh (Mega-Watt hour)

Description	Electricity import as recorded by the main meter at EB substation.
Measured/calculated/default	Measured
Source of data	Import value from the Joint Meter reading taken at the substation in the presence of Wind World India representatives and the State Utility representatives.
Value(s) of monitored parameter	-
Monitoring equipment	Meter Details are provided in Section C Frequency of Calibration- Annual
Measuring/reading/recording frequency	Measured in continuous basis and recorded on Monthly basis
Calculation method (if applicable)	Not Applicable
QA/QC procedures	The meters will be calibrated once in a year. Details of the QA/QC procedures have been described in section C. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	None

Data/parameter	ΣEG Controller, Export
Unit	MWh (Mega-Watt hour)
Description	Electricity exported by all the WEGs connected to the main meter at the substation, as measured at the controller panel.
Measured/calculated/default	Measured
Source of data	This value is monitored on continuous basis by online monitoring system at the site and can also be seen at the electronic panel inside the WTG tower.
Value(s) of monitored parameter	-
Monitoring equipment	The LCS meters (for panel reading) do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case, there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system, the machine will stop working and generate the error report.
Measuring/reading/recording frequency	Monthly basis; This value is monitored on continuous basis by online monitoring system at the site.
Calculation method (if applicable)	Not Applicable

QA/QC procedures	<p>The LCS meters (for panel reading) do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case, there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system, the machine will stop working and generate the error report.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	None

Data/parameter	EG_{Export}
Unit	MWh (Mega-Watt hour)
Description	Electricity exported to the grid by the project activity.
Measured/calculated/default	Calculated
Source of data	The calculation procedure has been shown in the section C.
Value(s) of monitored parameter	-
Monitoring equipment	Calculated as per the procedures shown in section C.
Measuring/reading/recording frequency	Monthly basis
Calculation method (if applicable)	Calculated as per the procedures shown in section C.
QA/QC procedures	<p>No separate QA/QC procedures will be followed.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	None

Data/parameter	EG_{import}
Unit	MWh (Mega-Watt hour)
Description	Electricity imported from the grid by the project activity.
Measured/calculated/default	Calculated
Source of data	The calculation procedure has been shown in the section C.
Value(s) of monitored parameter	-
Monitoring equipment	Calculated as per the procedures shown in section C.
Measuring/reading/recording frequency	Monthly basis
Calculation method (if applicable)	Calculated as per the procedures shown in section C.

QA/QC procedures	No separate QA/QC procedures will be followed. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	None

D.3. Implementation of sampling plan

>>

Not applicable to the project activity.

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

>>

As described in the registered PDD, the baseline emission (BE_y) = $EG_y \times EF_y$

Where,

BE is baseline emissions in year y, tCO₂e

EG_y is the net electricity supplied to the grid in year y

EF_y is the CO₂ emission factor of the grid (0.87387 tCO₂e/ MWh; fixed ex-ante).

Baseline Emission reduction calculation for the period 01/01/2018 to 30/06/2020 (Inclusive of both days):

$$\begin{aligned} \text{Baseline Emission Reductions (BE}_y) &= 143,382.31 \text{ (MWh)} \times 0.87387 \text{ (tCO}_2\text{e/ MWh)} \\ &= 125,298 \text{ tCO}_2\text{e (rounded up value)} \end{aligned}$$

Therefore, total baseline emissions are 125,298 tCO₂e.

Total project emissions: Zero

Total leakage: Zero

$$\begin{aligned} \text{Total Emission reductions, ER} &= \text{Baseline Emissions} - \text{Project Emissions} - \text{Leakage} \\ &= 125,298 - 0 - 0 \\ &= \mathbf{125,298 \text{ tCO}_2\text{e}} \end{aligned}$$

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 spread sheet.

E.2. Calculation of project emissions or actual net removals

>>

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 emissions

>>

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

Hence, $L_y = 0$

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	125,298	0	0	0	125,298	125,298

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante for this monitoring period in the PDD (t CO ₂ e)
125,298	125,229

E.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the PDD”

>>

The annual estimated volume of CERs as per registered PDD is 50,119 tCO_{2e}. The total nos. of days included in this monitoring period (i.e. 01/01/2018 to 30/06/2020, inclusive of both the days) = 912. Thus, to calculate the ex-ante estimated value corresponds to this monitoring period, the value has been apportioned and made equivalent to 912 days, which results in 125,229 tCO_{2e}.

The same has been mentioned in the ER spreadsheet.

E.6. Remarks on increase in achieved emission reductions

>>

The actual emission reduction achieved is 0.05% higher than the estimated figure as per registered PDD. This is due to slightly higher electricity generation compared to estimated generation in registered PDD (for the equivalent period) during the monitoring period.

E.7. Remarks on scale of small-scale project activity

>>

Not Applicable

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN); • Make editorial improvements.
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 (EB 70, 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).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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