MONITORING REPORT

Positive Climate Care 4.67 MW Bundled Grid connected Wind Power Project Activity in Jaisalmer, Rajasthan, India

Version: 4

Monitoring period: April 1st, 2006 to June 30th, 2009
(Inclusive of both days)

Emission reductions: 21927 tCO_2e

Date of report: August 18, 2010

PROJECT PROPONENT

RAJESH CONSTRUCTION COMPANY LIMITED

SAVLA TWISTERS PRIVATE LIMITED

VIJAY INDUSTRIES LIMITED

SAURABH AGROTECH PRIVATE LIMITED

PROJECT CONSULTANT

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CONTENTS

Project Title: Positive Climate Care 4.67 MW Bundled Grid connected Wind Power Project Activity in Jaisalmer, Rajasthan, India

Date: August 18th, 2010
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1. Introduction

This is the Monitoring Report for the referred project activity. The purpose of this document is to:

1. Report the emission reductions generated by 4.67 MW Wind Power Project in Rajasthan, India during the period April 1st, 2006 to June 30th, 2009 and

2. To serve as the basis for verification, certification and issuance of VCUs.

2. General description of the project

Reference:

VCS PD- Project title - Positive Climate Care 4.67 MW Bundled Grid connected Wind Power Project Activity in Jaisalmer, Rajasthan, India

Version 2, Dated – 10th November 2009

Validation Report – V-3-I-01-B-0050/01 dated 16th November 2009

2.1 Project activity

The project activity involves the development and operation of grid connected wind based electricity generation facilities involving installation of 7 wind electric generators (WEGs) that includes 3 machines of individual capacity 1.25 MW each and 4 machines of 0.23 MW each with aggregate installed capacity of 4.67 MW located at District Jaisalmer in the states of Rajasthan. The generated electricity is being supplied to the State Electricity Utility Rajasthan Vidyut Prasaran Nigam Limited (RVPNL). The Rajasthan State grid forms part of the NEWNE Regional Grid of India (Since August 2006, all regional grids except the Southern grid have been integrated and are operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids are treated as a single grid and is being named as NEWNE grid) which depends mainly on fossil fuels and this project contributes to reduced greenhouse gas emissions caused by reliance on fossil fuels.

The purpose of the project activity is to harness renewable resources in the region, and thereby displacing non- renewable natural resources thereby ultimately leading to sustainable economic and environmental development. The project activity includes development, design, engineering, procurement, finance, construction, operation and maintenance of wind energy based electric generating stations supplying electricity to the RVPNL grid.

All the WEGs are connected to the grid interconnection point; supply the generated electricity to the DISCOM through power purchase and wheeling & banking agreement. The electricity generated by the WEGs are measured in the metering points to which the WEG/group of WEG are connected. By virtue of the fact that all the WEGs are in same geographic location and the individual project supply electricity to the RVPNL, they are bundled as one single Project. The project proponents Vijay Industries and Saurabh Agrotech are wheeling the electricity generated from the wind mills to their respective industrial units under a Wheeling and banking Agreement with RVPNL.

The list of project promoters, capacity of WEGs, commissioning date of the WEGs and their Latitude and Longitude details are as tabulated below –

Table 1: Investor wise- Locational details and Commissioning Date of Project Activity

S. No.	Project Promoter	Location	WEG Capacity (MW)/ Location number	Latitude & Longitude	Date of Commissioning
1.	Rajesh Construction Co. Ltd.	Village – Akal, District – Jaisalmer, State - Rajasthan	1.25 (Suzlon)/ J-137	N26° 46' 37.5" & E71° 05' 33.5"	October 31st, 2003
			1.25 (Suzlon)/ J-132	N26° 46' 52.0" & E71° 05' 41.5"	
2.	Savla Twisters Pvt. Ltd	Village – Soda-Mada, District – Jaisalmer, State - Rajasthan	1.25 (Suzlon)/ J-224	N26° 40' 55.1" & E70° 52' 49.6"	April 30th, 2004
3.	Vijay Industries Ltd.	Village – Themdarai, District – Jaisalmer, State - Rajasthan	0.23 (Enercon)/ VIKL-01	N26° 45' 24.5" & E70° 53' 25.7"	March 29th, 2003
			0.23 (Enercon)/ VIKL-02	N26° 45' 30.5" & E70° 53' 25.8"	
4.	Saurabh Agrotech Pvt. Ltd.	Village – Themdarai, District – Jaisalmer, State – Rajasthan	0.23 (Enercon)/ SAPL-01	N26° 45' 48.5" & E70° 53' 27.1"	March 29th, 2003
			0.23 (Enercon)/ SAPL-02	N26° 45' 52.4" & E70° 53' 25.4"	

3. Monitoring Methodology and Plan

Title: "Grid connected renewable electricity generation" AMS I D
Reference: Appendix B to the simplified M&P for Small-scale CDM project activities, Version 14

Valid from 31st July 2009

This is in accordance with the Appendix B of the Simplified modalities and procedures for small-scale CDM project activities. The reference to the proposed monitoring methodology is Clause 31 of Appendix B of simplified modalities and procedures for small-scale CDM project activities. The installed capacity of the project is 4.67 MW, which is less than the limiting capacity of 15 MW and is thus eligible to use small-scale simplified methodologies. The project is a grid-connected wind energy generation, and thus belongs to the category "Renewable electricity generation for a grid".

The project activity supplies electricity to DISCOM(s) through RVPNL grid. As per their agreement with state electricity utility, Project promoters, Rajesh constructions and Savla Twisters' wind machines are supplying electricity to Jaipur DISCOM, whereas Vijay Industries' and Saurabh Agrotech' WEGs are supplying electricity to Jodhpur DISCOM. Electricity supplied to the grid by the project is measured through national standard electricity metering instruments recorded monthly by the project entity. As per the methodology AMS I D, EGy is the electricity supplied by the project activity to the grid (MWh). Accordingly, the EGy has been defined as per the law applicable and implemented in practice to the wind farm in the state of Rajasthan and the provisions of the power purchase agreement (PPA)/ wheeling & banking agreement (WBA).

Parameter to be monitored for this project activity: Electricity supplied to NEWNE grid.

Data / Parameter:	EGy
Data unit:	kWh
Description:	The Total Net Electricity generated by the WEG units.
Source of the data used:	As reported in monthly electricity joint meter readings for the WTGs of the project by the state electricity department (DISCOM).
Value of data applied for the purpose of calculating emission reductions	01.04.2006 – 31.12.2006 = 5883149 01.01.2007 – 31.12.2007 = 6984578 01.01.2008 – 31.12.2008 = 7695433 01.01.2009 – 30.06.2009 = 3641590 Total =24204749 (see Annex-1)
Description of measurement methods and procedures applied:	The Joint Meter Reading taken at common evacuation system together with meter readings of individual WTG controller readings. Based on this break up, limited to total energy export, the power purchase from the individual WTGs is calculated for the purpose of payment. The total net electricity generated from the project activity is calculated as the summation of the annual net electricity generation of the wind turbines in the project activity.

Data / Parameter:	EG_{Export}
Data unit:	kWh
Description:	The Total Electricity Exported by the WEG units.
Source of the data used:	As reported in monthly electricity joint meter

	readings for the WEGs of the project by the DISCOM.
Value of data applied for the purpose of calculating emission reductions	01.04.2006 – 31.12.2006 = 5910233 01.01.2007 – 31.12.2007 = 7023671 01.01.2008 – 31.12.2008 = 7730501 01.01.2009 – 30.06.2009 = 3657564 Total =24321969 (see Annex-1)
Description of measurement methods and procedures applied:	The electricity exported by the each individual WEG of the project activity is measured using the export meter installed at the Grid sub station (GSS). The total exported electricity units from the project activity is calculated as the summation of the monthly measured exported electricity data of the wind mills in the project activity.
Data / Parameter:	EG_{Import}
Data unit:	kWh
Description:	The Total Electricity Imported by the WEG units.
Source of the data used:	As reported in monthly electricity joint meter readings for the WEGs of the project by the DISCOM.
Value of data applied for the purpose of calculating emission reductions	01.04.2006 – 31.12.2006 = 27084 01.01.2007 – 31.12.2007 = 39093 01.01.2008 – 31.12.2008 = 35068 01.01.2009 – 30.06.2009 = 15974 Total =117220 (see Annex-1)
Description of measurement methods and procedures applied:	The electricity imported by the each individual WEG of the project activity is measured using the import meter installed at the Grid sub station (GSS). The total imported electricity units from the project activity is calculated as the summation of the monthly measured imported electricity data of the wind mills in the project activity.
Data / Parameter:	$EG_{y\ Controller}$
Data unit:	kWh/ year
Description:	Electricity Generation at WTG measured
Source of the data used:	Controller reading as measured at individual WTG
Description of measurement methods and procedures applied:	As per standard operating procedure manual of the technology supplier/ O & M contractor.

3.1 QA/QC Procedures undertaken

ID number	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
EG_y	Low	The generated electricity is measured through a two step procedure wherein the first metering is carried out at the controller of the machine. The second metering is carried out at grid interconnection point wherein the Joint Meter Reading (JMR) is carried out on first day of every month in presence of the representatives of the project proponent & the state electricity utility (RVPNL/DISCOM). This JMR is used for calculation of the amount of electricity pumped into the grid against which the utility makes the payment to the project proponent. The meter located at the grid sub-station are sealed, maintained and calibrated by the state electricity utility. The electronic controllers are self calibrated to ensure and maintain online system diagnostics.

3.1.1 Calibration / Maintenance of Measuring and Analytical Equipments

1. The generated electricity is purchased by the state electricity utility (Jaipur/Jodhpur DISCOM) of Rajasthan. The meters are therefore calibrated, sealed and managed by the state electricity utility (RVPNL/DISCOM).

2. The primary recording of the electricity fed to the state utility grid is carried out jointly at the incoming feeder of the state power utility (RVPNL). Individual WTGs are connected to feeder which is further connected to Grid substation via transformers. For billing purposes, readings are taken from Electricity Board (EB) meters installed at feeder and then apportioning of the electricity is done for individual WTG.

3. The joint measurements are carried out once in a month in presence of both parties (the developer's representative and officials of the state power utility).

   - The RVPNL/DISCOM and the developer's representative jointly read the Metering System on the first (1^{st}) day of every month at the interconnection point.

   - In the event that the main metering system is not in service as a result of maintenance, repairs or testing, then the backup metering system is used during the period the main metering system is not in service.

- Meter readings taken jointly at the appointed date and time are signed by the representatives of RVPNL/DISCOM and the developer.

4. The RVPNL/DISCOM seals the main metering system and the back up metering system in the presence of representatives of Power Producer/Developer.

5. When the main metering system and/or back up metering system and/or any component thereof is found to be outside the acceptable limits of accuracy or otherwise not functioning properly, it is repaired, re-calibrated or replaced as soon as possible by the Power Developer or by the RVPNL/DISCOM.

6. RVPNL/DISCOM ensures that metering system is tested for accuracy at least once in a year and report furnished along with joint meter reading.

7. Any meter seal(s) can be broken only by authorized officer of RVPNL's / DISCOM's in the presence of representatives of Power Producer/Developer, whenever the main metering system or the backup metering system is to be inspected, tested, adjusted, repaired or replaced.

8. The monitoring at WEG end: each WEG is equipped with an integrated electronic controller meter. These meters are connected to the Central Monitoring Station (CMS) of the entire wind farm through a wireless Radio Frequency (RF) network (SCADA). The generation data of individual machine can be monitored as a real-time entity at CMS. The snapshot of generation on the last day of every calendar month is kept as a record both in electronic as well as printed (paper) form.

9. In case of both the EPC contractors, Suzlon & Enercon, the individual WTG has installed panel meters and no calibration is required for these meters as there is a quality procedure incorporated in software itself.

   Suzlon- SCS Controller is a micro-processor based intelligent controller which has been specially designed for control of wind turbines. It uses a Woodward Multi function Relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current/ voltage is converted into digital signal internally using A/D Converters at very high sampling rate. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed / stored. Woodward relay is having no display and needs special protocol to view energy readings as this relay is communicating digital signal through special communication protocol, hence, it is not possible to calibrate, Moreover, turbine can not run without this relay hence it can not be removed for calibration during operation.(Please refer Annex-II)

   Enercon- The individual WEG come with installed panel meters and no calibration has been carried out for these meters. There is quality procedure incorporated in software, which react to deviations higher than range of 10 units. Main processor unit of WEG compares the converter output & energy meter out put if difference is greater than 20kw for 1 hour, machine stops with fault status 62:07-diff. P-actual/Kwh measurement. (Reference for this status message has been provided to verifier). Replacement of the WEGs panel meter with new one solves the problem.(Please refer Annex-III)

10. Calibration of Meters:

Reference: Calibration reports issued by Rajasthan Rajya Vidyut Prasaran Nigam Limited in respect of Main and Backup metering equipment.

Rajesh Constructions Co. Ltd., 2.5 MW			
S. No.	Reference Reports (Feeder – SEL-06)	Main meter (Sr. No. – RJU00336)	Backup meter (Sr. No. – GJU00659)
1.	Joint inspection/test report of windfarm power plant in respect of Main and backup metering equipment	Dated – 11.03.2007	Dated – 11.03.2007
2.		Dated – 16.02.2008	Dated – 16.02.2008
Savla Twisters Pvt. Ltd., 1.25 MW			
S. No.	Reference Reports (Feeder – SEL-07)	Main meter (Sr. No. – RJB 00102)	Backup meter (Sr. No. – RJB00257)
1.	Joint inspection/test report of windfarm power plant in respect of Main and backup metering equipment	Dated – 10.03.2007	Dated – 10.03.2007
2.		Dated – 16.02.2008	Dated – 16.02.2008
3.		Dated – 30.01.2009	Dated – 30.01.2009
Saurabh Agrotech Pvt. Ltd.- 0.46 MW			
S. No.	Reference Reports (Temderai- Amarsagar GSS)	Main meter (Sr. No. – TNU 00946, TNU 00945)	Backup meter (Sr. No. – ABB 00691, RJB 00052)
1.	Joint inspection/test report of windfarm power plant in respect of Main and backup metering equipment	Dated – 03.09.2007	Dated – 03.09.2007 (Sr. No. – TNU00951, RJB 00052)
2.		Dated – 15.02-.2008	Dated – 15.02-.2008 (Sr. No. – TNU00951, RJB 00052)
3.		Dated – 29.01.2009	Dated – 30.01.2009
Vijay Industries Limited- 0.46 MW			
S. No.	Reference Reports (Temderai- Amarsagar GSS)	Main meter (Sr. No. – TNU 00946, TNU 00945)	Backup meter (Sr. No. – ABB 00691, RJB 00052)
1.	Joint inspection/test report of windfarm power plant in respect of Main and backup metering equipment	Dated – 03.09.2007	Dated – 03.11.2007 (Sr. No. – TNU00951, RJB 00052)
2.		Dated – 15.02-.2008	Dated – 15.02.2008 (Sr. No. – TNU00951,

			RJB 00052)
3.		Dated – 29.01.2009	Dated – 30.01.2009

Class of Accuracy= 0.2s

The calibration certificates for all the meters involved in the project activity have been provided to PJRCDM.

As per CDM EB meeting 52, Annex 60, the correction factor of 0.2% has been applied in emission reduction calculations for the period where calibration of meters has been delayed.

3.2 Description of the Monitoring Plan

To ensure trouble free operations and efficient generations through all the wind turbines, PPs have entered into a comprehensive Operation and Maintenance agreement with the manufactures of the turbines for a period of 10 years. The contractor Suzlon & Enercon, under the O&M contract with PPs, are responsible for the operation and maintenance of the project activity for the entire crediting period.

The authority and responsibility of project management as well as registration, monitoring, and supervising O & M activities lies with PPs. PPs have formulated a Project Team to ensure proper and continuous monitoring of the performance of turbines and generation of power. The wind power project abides and will abide by all regulatory and statutory requirements as prescribed under the state and central laws and regulations. The project team is delegated with the responsibility of monitor and document the electricity generated and also safe keeping of the recorded data. The project team is also responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner. The same has been outlined as follows:

Table 2: Project Monitoring Team- Roles and Responsibilities

Designation	Responsibilities
Project Head (Project proponent)	• Registration • Project Execution
Project Executor and Controller (Representative of PP at Jaipur office of O&M contractor)	• Recording • Verification • Storage of Data
Site Incharge (Representative of PP at Jaisalmer office of O&M contractor)	• Operation, Monitoring and Verification of Data • Data Recording • Storage of data
Operation and Maintenance Contractor	• Suzlon Infrastructure Services Limited (for Rajesh Constructions & Savla Twisters) • Enercon India Ltd. (for Vijay Industries & Saurabh Agrotech)

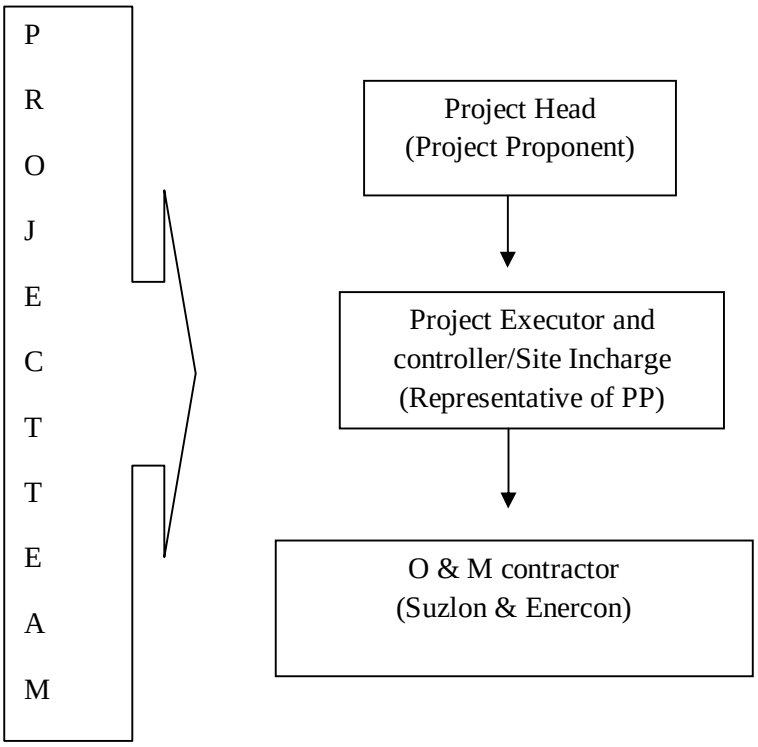

Figure 1: Project Monitoring Team

PP's representatives maintain an accurate and up-to-date operating log at the project site with records of:

i. 24 Hours logs of real and reactive power generation, frequency, transformer tap position, bus voltage(s), Main meter and other meter readings and any other data mutually agreed.

ii. Any unusual conditions found during operation/inspections.

Procedure adopted by Suzlon/Enercon to get Joint meter reading/ Credit report is summarised below:

Initially, joint readings of all Energy Meters fixed at Substation are taken at 01st of every month with RVPNL, DISCOM & the PP's representatives-Suzlon / Enercon personnel. Then, JMR Readings are prepared in formats specified by DISCOM. These reading are signed and audited from representatives of RVPNL, DISCOM and Suzlon/Enercon personnel.

Then Customer wise generation bifurcation & Individual Credit Reports are prepared. Break up sheet provides the value of Export, Import and Net Export of energy. Afterwards, these Credit Reports are handed over to Project Proponent who in turn raises the invoices and submit to DISCOM for payment.

In case of Vijay Industries and Saurabh Agrotech (Enercon WTG), Enercon personnel raise the invoices to DISCOM on behalf of Investors.

The apportioning of the electricity in break up sheet is done as per the following method-

Break up of Energy Export (in break up sheets)

$$= \frac{\text{EB meter Export (JMR)}}{\text{Total readings from all Controllers of WTGs connected to Feeder}} \times \text{Individual Controller Reading}$$

Break up of Energy Import (in break up sheets)

$$= \frac{\text{EB meter Import (JMR)}}{\text{Total readings from all Controllers of WTGs connected to Feeder}} \times \text{Individual Controller Reading}$$

Net Export = Export – Import

E.g.,

(1) Rajesh Constructions Co. Ltd. (April 2009)

Total of readings from all Controllers of WTGs = 819295 kWh

Energy Meter Reading Export = 775080 kWh

Energy Meter Reading Import = 8280 kWh

Reading of Individual Controllers of J-132 & J-137 = (155438+163834) = 319272 kWh

$$\text{Energy Export} = \frac{775080}{819295} * 319272 = 302042 \text{ kWh}$$

$$\text{Energy Import} = \frac{8280}{819295} * 319272 = 3227 \text{ kWh}$$

Net Export = 302042 – 3227 = 298815 kWh

(2) Saurabh Agrotech Pvt. Ltd. (May-2009)

Panel Export Reading of Entire Wind farm = 29082248 kWh

EB main Billing Meter (JMR) EXPORT = 28109000 kWh

EB main Billing Meter (JMR) IMPORT = 9500 kWh

SAPL-01 Panel Generation:

	Initial Reading	Final Reading	NET
SAPL-01	2571247	2721185	45938
SAPL-02	2577063	2627490	50427
TOTAL	5251310	5348675	96365

Export Multiplication Factor:

= (Export of EB Main billing Meter Reading / Panel Reading of Entire Wind Farm).

= 28109000 / 29082248

= 0.966534636524659

Import Multiplication Factor:

= (Import of EB Meter Reading / Panel Reading of Entire Wind Farm)

= 9500 / 29082248

=0.000326659754775491

Exported Units:

= Export Multiplication Factor X Customer Panel Generation

= 0.9554321X 96365

= 93140 kWh

Imported Units:

=Import Multiplication Factor X Customer Panel Generation

= 0.0010001 X 96365 = 31 kWh

Net Export Units:

= Export Generation - Import Generation

= 93140 – 31 = 93109 kWh

4 Emission Reduction Calculations

4.1 Baseline Emissions

The baseline emissions are estimated as the product of the electricity generated by the project activity and the ex-ante Emission factor of the regional electricity grid.

$BEy = EG_y \text{ X } EF_y$

Where,

EF_y is the ex-ante baseline emission factor for the year y

EG_y is the electricity generation for the year y

This project uses the Combined Margin methodology as suggested in AMS ID. As per AMS I D version 14 paragraph 9, the baseline for power generation is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in $kgCO_2e/kWh$) calculated in a transparent and conservative manner as a combined margin (CM), consisting of the combination of operating margin

(OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system (version 01.1)" (hereafter referred to as "Tool").

The Operating Margin can be calculated by dividing the region's total CO_2 emissions by the net generation of all thermal stations. The simple OM has been referred for the OM calculation. The ex-ante option has been selected for the Project. The Operating Margin is calculated considering of the average of Operating Margin date for the NEWNE Grid as published by CEA during the years 2005-2006, 2006-2007 and 2007-2008. The average value for the NEWNE Grid is 1.0090 tCO_2/MWh.

The Build Margin is calculated as the generation-weighted average emission factor of a sample of power plants. The ex-ante option has been selected for the Project. The Build Margin considered is for the year 2007-2008 for the NEWNE grid and the value is 0.5977 tCO_2/MWh.

The data for the Build Margin and the Operating Margin is taken from the Central Electricity Authority CO_2 Baseline Data base Version 04 dated September 2008.

The Combined Margin Emission factor is calculated as follows:

Input values and data sources for the calculation of $EF_{y,grid,CM}$

Table 3: Combined Margin Emission Factor

Parameter	Description	Unit	Source
$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$			"Tool to calculate the emission factor for an electricity system" version 0.1.1, equation 13
$EF_{grid,CM,y}$	Combined margin CO2 emission factor in year y. This equals to $EF_{y,grid.}$	tCO_2/MWh	Calculated
$EF_{grid,OM,y}$	Simple Operating margin CO_2 emission factor in year y	tCO_2/MWh	1.0090
$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y	tCO_2/MWh	0.5977
w_{OM}	Weighting of Operating margin emission factor	0.75	"Tool to calculate the emission factor for an electricity system" version 0.1.1, equation 13
w_{BM}	Weighting of Build margin emission factor	0.25	"Tool to calculate the emission factor for an electricity system" version 0.1.1, equation 13

Baseline Emission Factor: Combined Margin OM & BM = 0.9062 tCO_2/MWh.

4.2 Project Activity Emissions: NIL

The project activity is a wind based power generation project and so there are no emissions.

4.3 Leakage

The equipment used in the wind power generation activity is not transferred from another activity and hence leakage calculations are not considered.

4.4 Emission Reductions

The emission reduction ER_y by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as follows:

$ER_y = BE_y – PE_y - L_y$

As there are no emissions due to the project activity and there are no leakages, the emission reduction is equal to the baseline emission.
Hence, $ER_y = BE_y = EG_y X EF_y$

Table 4: Project Proponent wise Actual Emission Reductions

Emission Reduction achieved by the Project Activity							
S. No.	Project Promoter	Net Electricity generation (kWh)	Baseline emission factor tCO_2/MWh	Baseline Emissions (BE_y) (tCO_2e)	Project Activity Emission (PE_y) (tCO_2e)	Leakage (L_y) (tCO_2e)	Net emission Reductions (ER_y) (tCO_2e)
1.	Rajesh Construction Co. Ltd. (2.5 MW)	13079140	0.9062	11851	0	0	11851
2.	Savla Twisters Pvt. Ltd. (1.25 MW)	5848833	0.9062	5298	0	0	5298
3.	Vijay Industries Ltd. (0.46 MW)	2678038	0.9062	2425	0	0	2425
4.	Saurabh Agrotech Pvt. Ltd. (0.46 MW)	2598738	0.9062	2353	0	0	2353

Table 5: Vintage –wise Actual Emission Reductions

Emission Reduction achieved by the Project Activity							
Sl. No.	Period of measurement	Net Electricity generation (kWh)	Baseline emission factor tCO_2/MWh	Baseline Emissions (BE_y) (tCO_2e)	Project Activity Emission (PE_y) (tCO_2e)	Leakage (L_y) (tCO_2e)	Net emission Reductions (ER_y) (tCO_2e)
1.	April 1st, 2006 – December 31st, 2006	5883149	0.9062	5329	0	0	5329
2.	January 1st, 2007- December 31st, 2007	6984578	0.9062	6328	0	0	6328
3.	January 1st, 2008- December 31st, 2008	7695433	0.9062	6971	0	0	6971
4.	January 1st, 2009- June 30th, 2009	3641590	0.9062	3299	0	0	3299
Total VCUs							21927

Table 6: Project Proponent and Vintage wise Actual Emission Reduction

Vintage Year / Project Proponent	2006	2007	2008	2009
Rajesh Construction Co. Ltd. (2.5 MW)	2864	3376	3800	1811
Savla Twisters Pvt. Ltd. (1.25 MW)	1258	1526	1693	821
Vijay Industries Ltd. (0.46 MW)	610	722	748	345
Saurabh Agrotech Pvt. Ltd. (0.46 MW)	597	704	730	322
Total VCUs	5329	6328	6971	3299
Grand Total of project activity				21927

The Total Emission Reduction from the project activity between April 1st, 2006 and June 30th, 2009 is 21,927 VCUs.

4.5 Submission

This monitoring report has been prepared and submitted by the Project Consultant, Positive Climate Care Pvt. Ltd. on behalf of following project proponents:

Rajesh Constructions Company Limited

Savla Twisters Private Limited

Vijay Industries Limited

Saurabh Agrotech Private Limited

Annex-I

MONTHLY OPERATING DATA AFTER CORRECTION FOR CALIBRATION

Rajesh Construction Co. -(1.25 X 2 = 2.5 MW)				
Year	Month	Corrected Export	Corrected Import	Corrected Net Export
2006	April	350525	2477	348048
	May	647485	699	646786
	June	479419	1379	478040
	July	611709	1183	610526
	August	277848	1611	276237
	September	234796	2150	232646
	October	281439	2253	279185
	November	106047	3834	102214
	December	189118	1710	187408
Sub Total (i)		3178387	17298	3161090
2007	January	175983	1889	174095
	February	220730	1283	219447
	March	219670	2666	217003
	April	285038	2454	282584
	May	507600	2108	505492
	June	620848	512	620336
	July	521573	904	520669
	August	502703	1157	501546
	September	267179	2976	264203
	October	145995	5235	140760
	November	82197	3764	78433
	December	202405	1504	200901
Sub Total (ii)		3751921	26452	3725469
2008	January	271218	1012	270206
	February	151635	2493	149142
	March	314838	2889	311949
	April	265824	4157	261667
	May	768070	652	767418
	June	512711	1144	511567
	July	591186	1152	590034
	August	437872	1463	436409
	September	336931	1261	335670
	October	209308	4388	204920
	November	174319	2815	171504
	December	184559	1657	182902
Sub Total (iii)		4218471	25083	4193388

Rajesh Construction Co. -(1.25 X 2 = 2.5 MW)				
2009	January	252173	1252	250921
	February	151247	2246	149000
	March	250595	2805	247790
	April	301438	3233	298204
	May	544678	1174	543504
	June	511016	1243	509772
Sub Total (iv)		2011147	11954	1999193

Grand Total (i+ii+iii+iv)	13159926	80787	13079140

Plant Load Factor Year 2007 = 17.01%
Year 2008 = 19.15%

Savla Twisters Pvt. Ltd - 1.25 MW				
Year	Month	Corrected Export	Corrected Import	Net Generation Corrected
2006	April	118225	858	117367
	May	258779	117	258662
	June	233479	444	233035
	July	314232	510	313722
	August	140869	627	140241
	September	103327	731	102595
	October	107173	916	106257
	November	38892	1894	36998
	December	81240	849	80392
Sub Total (i)		1396217	6946	1389271

2007	January	67063	854	66209
	February	103536	650	102885
	March	94922	1204	93717
	April	127852	777	127075
	May	226286	542	225744
	June	310380	160	310220
	July	231847	173	231674
	August	222670	345	222325
	September	128413	965	127448
	October	64685	1609	63076
	November	33224	1683	31541
	December	83092	643	82449
Sub Total (ii)		1693969	9605	1684363

Savla Twisters Pvt. Ltd - 1.25 MW				
2008	January	110942	388	110554
	February	59874	1163	58711
	March	140614	837	139777
	April	104024	1098	102926
	May	352268	27	352241
	June	192741	132	192609
	July	271165	203	270962
	August	206484	416	206068
	September	157855	283	157572
	October	103414	1477	101937
	November	70407	1087	69320
	December	107038	742	106296
Sub Total (iii)		1876826	7853	1868973
2009	January	111663	518	111145
	February	62593	783	61810
	March	111534	695	110839
	April	140819	918	139901
	May	251683	241	251442
	June	231206	118	231088
Sub Total (iv)		909498	3273	906225
Grand Total (i+ii+iii+iv)		5876510	27677	5848833

Plant Load Factor Year 2007 = 15.38%
Year 2008 = 17.07%

Vijay Industries Ltd - 0.46 MW				
Year	Month	Corrected Export	Corrected Import	Net Generation Corrected
2006	April	67032	235	66796
	May	127422	56	127366
	June	112391	74	112317
	July	145426	104	145321
	August	60123	99	60023
	September	48293	112	48181
	October	55537	159	55377
	November	22970	428	22542
	December	35498	158	35340
Sub Total (i)		674690	1427	673263

Vijay Industries Ltd - 0.46 MW				
2007	January	35225	190	35035
	February	46646	121	46524
	March	50371	202	50169
	April	62672	86	62586
	May	107860	71	107789
	June	134179	26	134153
	July	112368	48	112320
	August	104451	48	104403
	September	59486	109	59377
	October	29845	276	29569
	November	16996	275	16721
	December	38982	72	38910
Sub Total (ii)		799081	1526	797555
2008	January	51218	62	51156
	February	30197	171	30026
	March	67177	93	67084
	April	52440	143	52297
	May	160820	5	160815
	June	79758	22	79736
	July	129470	44	129426
	August	87138	58	87080
	September	66629	43	66586
	October	37224	177	37047
	November	30710	131	30579
	December	34772	119	34653
Sub Total (iii)		827553	1068	826485
2009	January	46104	76	46028
	February	27621	90	27531
	March	47903	61	47842
	April	54967	104	54863
	May	112797	38	112759
	June	91722	10	91712
Sub Total (iv)		381114	379	380735
Grand Total (i+ii+iii+iv)		2682438	4399	2678038

Plant Load Factor Year 2007 = 19.79%
Year 2008 = 20.51%

Saurabh Agrotech Pvt. Ltd. - 0.46 MW				
Year	Month	Corrected Export	Corrected Import	Net Generation Corrected
2006	April	64866	228	64638
	May	124719	55	124664
	June	110003	73	109929
	July	138326	99	138227
	August	60018	99	59919
	September	48403	112	48291
	October	52995	152	52842
	November	22510	419	22091
	December	39100	175	38924
Sub Total (i)		660938	1414	659525
2007	January	38642	208	38433
	February	47523	124	47399
	March	47739	192	47547
	April	58548	80	58468
	May	103454	68	103386
	June	131747	25	131722
	July	107902	46	107856
	August	102467	47	102420
	September	57264	105	57159
	October	29035	269	28766
	November	17105	276	16829
	December	37276	69	37207
Sub Total (ii)		778700	1511	777190
2008	January	55577	68	55509
	February	31444	178	31266
	March	63833	88	63745
	April	49483	135	49348
	May	159242	5	159237
	June	73508	20	73488
	July	124744	42	124702
	August	82745	55	82690
	September	61971	40	61931
	October	35096	167	34929
	November	31671	135	31536
	December	38337	131	38206
Sub Total (iii)		807651	1064	806587

Saurabh Agrotech Pvt. Ltd. - 0.46 MW				
2009	January	42365	69	42296
	February	27940	91	27849
	March	46222	59	46163
	April	56754	108	56646
	May	93140	31	93109
	June	89384	10	89374
Sub Total (iv)		355805	368	355437

Grand Total (i+ii+iii+iv)	2603095	4356	2598738

Plant Load Factor Year 2007 = 19.29%
Year 2008 = 20.02%

SUMMARY				
PROJECT PROMOTER	EXPORT (kWh)	IMPORT (kWh)	NET EXPORT) (kWh	ERs (tCO_2e)
Rajesh Construction Company Limited (2.5 MW)	13159926	80787	13079140	11,851
Savla Twisters Pvt. Ltd (1.25 MW)	5876510	27677	5848833	5298
Vijay Industries Limited (0.46 MW)	2682438	4399	2678038	2425
Saurabh Agrotech Pvt. Ltd. (0.46 MW)	2603095	4356	2598738	2353
Total	24321969	117220	24204749	21,927

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Note on SCS Controller

SCS Controller is also a micro-processor based intelligent controller which has been specially designed for control of wind turbines. It uses a Woodward Multi function Relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current / voltage is converted into digital signal internally using A/D Converters at very high sampling rate. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed / stored. Woodward relay is having no display and needs special protocol to view energy readings as this relay is communicating digital signal through special communication protocol hence, it is not possible to calibrate. Moreover, turbine can not run without this relay hence it can not be removed for calibration during operation.

Mr. Prakash Vora
Engineering - Head

ENERCON

ISO 9001 : 2000

MGMT. SYS RvA C 039

Techinical Details for Monitoring System Deployed for measuring the enrgy generation by WTG

Data Monitoring

The project activity has installed the latest state of art monitoing and control equipment that measure, Record, Report, Monitor and Control various parameters. There are towerwise (WTG) meters which are used to monitor WTG wise power generation data. These meters are maintained by O&M team of Enercon. A daily generation report is prepared which is sent to customer/senior management everyday through web. Overall windfarm electicity generation is evacuated through 132KV Temderai GSS to Amarsagar RRVPNL GSS and monitored using main billing meter at Amarsagar GSS. Representative from Rajatshan Rajya Vidyut Parivahan Nigam Ltd and Jodhpur Vidyut Vitaran Nigam, Ltd take the reading of power generation every month; this data is used for billing purpose. This meter maintained by RRVPNL Main billing meters and backup meters are calibrated regularly by RRVPNL- Protection division as per practice of SEB meter testing. If there are any changes taking place in the meter like replacements, repairs etc same records are maintained

The individual WTGs come with installed panel meters and no calibration has been carried out for these meters. There is quality procedure incorporated in software, which react to deviations higher than range of 10 units. Main Processor Unit of WTG compares the converter out put & energy meter out put if difference is greater than 20kw for 1 hour machines stops with fault status **62:07 - Diff. P-actaul/Kwh measurement**.Replacement of the WTGs panel meter with new one will solve the problem

S. Patel

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Status 62:7 : diff. P-set - P-actual

Adjusting the wind energy converter's power ensures that on average the actual power value deviates from the set value by only one to two kW, provided the excitation rheostat also has sufficient reserves at rated output. The required exciting current primarily depends on the power depending on the speed, the air gap, the stator and rotor temperature and, in boost converter operation, on the pre-set converter set value. If the maximum possible exciting current is not sufficient to generate the required output and therefore, at 60 one-minute averages, the difference between P-set and P-target is greater than 20 kW (4% of Pmax), the converter stops with status 62:7.

The electrical function is as follows:

The maximum exciting current which the excitation rheostat can give in the magnet wheel (rotor), depends primarily on the power supply of the excitation rheostat and the internal resistance of the magnet wheel (U / R = I). At a rated speed of 38 r/min, a rated output of 535 kW (indirect circuit) and a temperature of 100°C, an average generator requires an exciting current of about 36 to 38 A. A thyristor excitation rheostat is usually fed with 400 V. This results in a maximum output voltage of 540 V. An IGBT excitation rheostat is powered by the indirect current of converter 1 with a voltage of 660 V at rated output and supplies a maximum output voltage of 640 V. With a magnet wheel resistance of 13.552 (100°C), a thyristor excitation rheostat can supply maximum 40 A and an IGBT excitation rheostat can supply maximum 47 A.

If because of a reduced rated speed or an above average air gap, an exciting current is needed which is higher than the possible maximum, the MPU can no longer adjust the actual power value. At maximum possible excitation, the actual power value is then only dependent on the speed.