

# MONITORING REPORT

29.7 MW wind power project in Karnataka, India.

CDM Project activity reference number: 1949

Version 03

Monitoring period: June 6<sup>th</sup> 2008 to 21<sup>st</sup> November 2008  
(Inclusive of both days)

Emission reductions: **20,526** tCO<sub>2</sub>e

Date of report: April 3<sup>rd</sup> 2009

Acciona Wind Energy Pvt. Ltd.  
C1-001, Tower C, The Millenia  
1&2 Murphy Road  
Ulsoor, Bangalore 560 008  
Tel: +91 80 4155 7100  
Fax: +91 80 4155 7110  
Email: [rsapra@acciona.com](mailto:rsapra@acciona.com)

## **CONTENTS**

1. Introduction
2. General description of the project
  - 2.1. Project activity
  - 2.2. Technology employed by the project activity
3. Monitoring methodology and plan
4. Quality control and assurance
  - 4.1. QA/QC procedures
  - 4.2. Roles and responsibilities
5. Calibration of the meters
6. Operation and maintenance
7. Calculation of emission reductions
  - 7.1. Emission reduction calculation equation
  - 7.2. Project emissions
  - 7.3. Leakages
  - 7.4. Baseline emissions
  - 7.5. Emission reductions
8. Information reference list
9. Submission and authorization

## **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 29.7 MW Wind Power Project in Karnataka, India (CDM registration reference number 1,949) during the period June 6<sup>th</sup> 2008 to November 21<sup>st</sup> 2008, and
2. To serve as the basis for verification, certification and issuance of VERs.

## **2. General description of the project.**

### 2.1. Project activity

The project activity involved construction, ownership, operation and maintenance of wind power projects at two sites Arasinagundi and Anabaru in close proximity in district Davangere in the Indian State of Karnataka for providing renewable power to the Karnataka State electricity grid i.e. Bangalore Electricity Supply Company (BESCOM). The Karnataka State grid forms part of the Southern Regional Grid of India which depends mainly on fossil fuels and this project contributes to reduced greenhouse gas emissions caused by reliance on fossil fuels.

The aggregate 29.70 MW (1.65 MW x 18) project activity comprises of 18 numbers of Vestas V82 make Wind Turbine Generators (WTGs), with each WTG having a capacity of 1,650kW. All turbines entered into operation before the project registration.

The sites of Anabaru and Arasinagundi are located at a latitude and longitude of 14°28' – 14°34' N and 76°20' – 76°23' E.

### 2.2. Technology employed by the project activity

The project is owned by Acciona Wind Energy Pvt. Ltd. and adopts Vestas V82 make WTGs manufactured as per stringent European quality standards in accordance with Indian climatic conditions. The project activity employs state-of-art three bladed active stall regulated horizontal axis WTGs.

## **3. Monitoring methodology and plan.**

Among the methodologies approved by UNFCCC for grid-connected electricity generation from renewable sources based CDM project activities, ACM0002 (version 6) was chosen as the most suitable for this project activity. This baseline methodology shall be used in conjunction with the approved monitoring methodology ACM0002 "Consolidated monitoring methodology for grid-connected electricity generation from renewable sources".

Taking into account that project used ex-ante Operating Margin and ex-ante Building Margin, the only parameter to be monitored is the Net electricity supply to the grid by the project ( $EG_{net-y}$ ).

Data unit will be kWh and plant records and maintains the records of all the electricity supply to the grid.

#### **4. Quality Control and Quality Assurance.**

##### **4.1. QA/QC procedures**

Electricity supplied to the grid by the project is measured through national standard electricity metering instruments recorded monthly by the project entity.

Two meters (main and check) are installed at the high voltage side of the step-up transformers installed at the Hiremallanahole receiving station. Consumption registered by the main meter alone holds good for the purpose of billing as long as the error, if any, between the main and check meters is within the permissible limits. The check meter is used when the main meter is out of order. Both the meters are read for electricity generation purposes on a monthly basis by BESCO officials jointly with company representatives. KPTCL/BESCO officials are responsible for calibration of main and check meters. The meters are sealed and presently calibrated on a quarterly basis by KPTCL/BESCO officials.

The import of electricity from the grid ( $EG_{im,y}$ ) are recorded by the same meters, since these are an import-export meters. Net electricity supply to the grid ( $EG_{net-y} = EG_y - EG_{im,y}$ ) is used to calculate VERs. This data has been cross-verified with the invoices raised by BESCO and payment received against the invoices.

The main and check meters have the same accuracy level of 0,2S, and both have been tested for accuracy before installation. These are tested for accuracy with reference to a portable standard meter every calendar quarter.

For Arasinagundi identification codes for main and check meters are as follows:

- ✓ Serial numbers: 06675265 and 06760793
- ✓ Regulatory number (RR nr.): HMP 01

For Anabaru identification codes for main and check meters are as follows:

- ✓ Serial numbers: 06767617 and 06774503
- ✓ Regulatory number (RR nr.): HMP 03

##### **4.2. Roles and responsibilities**

Organisational structure, roles and responsibilities are stated in a separate document titled: 'Monitoring and verification manual for CDM/VCS purposes'. This has been shared with the verifier.

## 5. Calibration of the meters.

Main meter and check meter were calibrated after installation on 25<sup>th</sup> January 2008 by KPTCL for Arasinagundi and on 22<sup>nd</sup> September 2008 by KPTCL for Anabaru.

During monthly meter readings, the variation between the main meter and check meter have been less than +/- 2%. Generation Notes (reference 11) used as source of data has been provided to verifier for verification along with excel sheet results.

References 7 to 10 have been provided to verifier for verification.

## 6. Operation & Maintenance.

Acciona Wind Energy Pvt. Ltd. has entered into a Maintenance and Services Agreement (MSA) with Vestas Wind Technology India Pvt. Ltd. for carrying out the necessary operation and maintenance of the project activity for the first two years of the designed life of the project during which the periodical checks on the procedures being followed will be carried out by AWEPL.

References 13, 14 and 15 have been provided to verifier for verification.

## 7. Calculation of emission reductions.

### 7.1. Emission reductions calculation equation.

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:

$$ER_y = BE_y - PE_y - L_y$$

### 7.2. Project emissions.

The project involves the operation of a zero-emission wind farm, so  $PE_y = 0$

### 7.3. Leakage.

According to ACM0002, the main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction, fuel handling (extraction, processing, and transport), and land inundation (for hydroelectric projects). Project participants do not need to consider these emission sources as leakage in applying this methodology. Project activities using ACM0002 shall not claim any credit for the project on account of reducing these emissions below the level of the baseline scenario. Thus the leakage emissions are NIL.

There is no leakage to this project so  $L_y = 0$ . Thus,  $ER_y = BE_y$ . i.e. the emission reductions are the baseline emissions in this project.

#### 7.4. Baseline Emissions.

The baseline emissions ( $BE_y$  in  $tCO_2$ ) are the product of the baseline emissions factor ( $EF_y$  in  $tCO_2/MWh$ ) times the electricity supplied by the project activity to the grid ( $EG_y$  in MWh).

$$BE_y = EF_y * EG_y$$

Auxiliary power supply will be required for operation of equipment like hydraulic motors and yaw system for which active power will be drawn from the grid. The metering of the drawn power will be done by the same import-export meters. Net electricity supply to the grid ( $EG_{net,y} = EG_y - EG_{im,y}$ ) is used to calculate CERs.

Baseline emission factor ( $EF_y$ ) has been calculated ex-ante and will not be updated during the crediting period of ten years. As per PDD registered,  $EF_y = 0.93$ .

Net electricity supplied to the grid by the project is calculated using below table:

ARASINAGUNDI						
PERIOD	ELECTRICITY SUPPLIED TO THE GRID			ELECTRICITY IMPORTED FROM THE GRID		
	MAIN METER (KWh)	CHECK METER (KWh)	VALUE FOR CERS (MWh)	MAIN METER (KWh)	CHECK METER (KWh)	VALUE FOR CERS (MWh)
0	-	-	-	-	-	-
0	-	-	-	-	-	-
JUNE 2008*	4,152,000.00	4,150,800.00	4,152.00	1,200.00	1,200.00	1.20
JULY 2008	5,653,200.00	5,650,800.00	5,653.20	2,400.00	1,200.00	2.40
AUGUST 2008	4,830,000.00	4,827,600.00	4,830.00	4,800.00	6,000.00	4.80
SEPTEMBER 2008	3,846,000.00	3,843,600.00	3,846.00	7,200.00	7,200.00	7.20
OCTOBER 2008	2,066,400.00	2,066,400.00	2,066.40	12,000.00	12,000.00	12.00
NOVEMBER 2008#	1,279,200.00	1,278,000.00	1,279.20	6,000.00	6,000.00	6.00
	-	-	-	-	-	-
TOTAL			18,481.20			15.60

NET ELECTRICITY	18,465.60	MWh
BASELINE EMISSION	0.93	tns $CO_2/MWh$
REDUCTIONS	17,173.01	tns $CO_2$

ANABARU						
PERIOD	ELECTRICITY SUPPLIED TO THE GRID			ELECTRICITY IMPORTED FROM THE GRID		
	MAIN METER (KWh)	CHECK METER (KWh)	VALUE FOR CERS (MWh)	MAIN METER (KWh)	CHECK METER (KWh)	VALUE FOR CERS (MWh)
SEPTEMBER 2008**	1,200.00	1,200.00	1.20	-	-	-
OCTOBER 2008	2,007,600.00	1,996,800.00	2,007.60	9,600.00	9,600.00	9.60
NOVEMBER 2008#	1,614,000.00	1,603,200.00	1,614.00	6,000.00	6,000.00	6.00
DECEMBER 2008	-	-	-	-	-	-
JANUARY 2009	-	-	-	-	-	-
FEBRUARY 2009	-	-	-	-	-	-

TOTAL		3,621.60	15.60
NET ELECTRICITY	3,606.00	MWh	
BASELINE EMISSION	0.93	tns CO <sub>2</sub> /MWh	
REDUCTIONS	3,353.58	tns CO <sub>2</sub>	

<b>TOTAL</b>	<b>ARASINAGUNDI + ANABARU</b>		
NET ELECTRICITY	22,071.60	MWh	
BASELINE EMISSION	0.93	tns CO <sub>2</sub> /MWh	
REDUCTIONS	20,526.59	tns CO <sub>2</sub>	

\* Initial Main and Check meter Calibration Report is dated 25-Jan-08

\*\* Initial Main and Check meter Calibration Report is dated 22-Sep-08

# Considered until the meter reading certified on 21-Nov-08 during calibration post which we have considered for CER purposes. Calibration meter readings are provided to the Verifier.

The original meter reading of the main meter with the related invoices and payment details during the monitoring period have been provided to the verifier.

#### 7.5. Emission reductions.

As explained above,  $ER_y = BE_y$ .

Main and check meters have been working properly in the crediting period for which this report is prepared and both were tested. 'Minimum' export and import data from both the main and check meters has been used for a conservative approach. Total emission reductions during the monitoring period is 20,526 tn CO<sub>2</sub>

#### 8. Information Reference List.

Reference no.	Document or type of information
1	Final Project Design Document for CDM project '29,7 MW Wind Power project in Karnataka, India', CDM registration reference n° 1,949 dated 20 November 2008, UNFCCC website reference: <a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1216117082.43/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1216117082.43/view</a>
2	Final validation report n° 2007-1094 version 01, issued by DNV Certification, International Climate Change Service, dated on June 5 <sup>th</sup> 2008, UNFCCC website reference: <a href="http://cdm.unfccc.int/Projects/DB/DNV-CUK1216117082.43/view">http://cdm.unfccc.int/Projects/DB/DNV-CUK1216117082.43/view</a>
3	Power Purchase Agreement for Arasinagundi, dated April 21 <sup>st</sup> 2008, articles 6-7
4	Power Purchase Agreement for Anabaru, dated May 2 <sup>nd</sup> 2008, articles 6-7
5	Monitoring and verification manual for CDM/VCS purposes, dated June 5 <sup>th</sup> 2008
6	Training evidence
7	Initial calibration certificate for main meter regulatory n° HMP01 for Arasinagundi tested by KPTCL dated 25 <sup>th</sup> January 2008.
8	Initial calibration certificate for check meter regulatory n° HMP01 for Arasinagundi tested by KPTCL dated 25 <sup>th</sup> January 2008.
9	Initial calibration certificate for main meter regulatory n° HMP03 for Anabaru tested by KPTCL dated 22 <sup>nd</sup> September 2008
10	Initial calibration certificate for check meter regulatory n° HMP03 for Anabaru tested by KPTCL dated 22 <sup>nd</sup> September 2008
11	Monthly Generation Notes created from jointly meters readings
12	Excel sheet with monthly deviations for main and check meters.

13	April 27 <sup>th</sup> 2007 contract for Arasinagundi Maintenance, Service and Availability agreement and the corresponding service manual and operation and user manual
14	September 20 <sup>th</sup> 2007 contract for Anabaru Maintenance, Service and Availability agreement and the corresponding service manual and operation and user manual
15	Monthly operating status report for Arasinagundi and Anabaru
16	Excel sheet for net electricity calculation for period June 6 <sup>th</sup> to November 21 <sup>st</sup> 2008
17	Invoices from period June 2008 to November 2008
18	Payment received from invoices period June 2008 to November 2008
19	Monitoring report dated April 3 <sup>rd</sup> 2009

## 9. Submission and authorization

This monitoring report has been prepared and submitted by the Project Entity, Acciona Wind Energy Pvt. Ltd. The below officer declares that the contents of the report provides an accurate representation of the monitoring results.

Name: Rajnish Krishanlal Sapra  
Position: Chief Finance Officer