

MONITORING REPORT

Registered PDD Details

- **Project 0310:** Bundled Wind power project in Jaisalmer (Rajasthan in India) managed by Enercon (India) Ltd.
- **Version:** Version 2.0
- **Date of PDD:** 15/12/2005

First Monitoring Period

1 July 2004 to 30 June 2006

Commencement of crediting period

1 July 2004

Date of the first monitoring report

Date: 4 September 2006

Version: Version2.0

Project Description

The Project Activity involves the development and operation of grid-connected wind based electricity generation facilities with aggregate installed capacity of 58.2 MW, located within a wind park.

The wind park is located near Jaisalmer and supplies electricity using internal electrical lines to a local sub-station of the state electricity transmission utility named Rajasthan Rajya Vidyut Prasaran Nigam Ltd. (RRVPNL) at Badabagth using local transmission lines. The Project Activity has many sub-projects (individual wind farms owned by several entities) of smaller capacities sharing common facilities within a wind park managed by Enercon (India) Ltd. (EIL); hence these sub-projects have been bundled in the Project Activity.

The Project Activity generates and sells electricity to the RRVPNL/Jodhpur Electricity Distribution Company (Jodhpur Discom) under 20 year power purchase agreements (PPAs) under similar tariff. Enercon (India) provides operation and maintenance

services under contract to the sponsors for the entire 58.2 MW capacities. All the component wind farms have been commissioned and supplies electricity to the RRVPNL in accordance with the preferential dispatching system.

Project Location

The wind farm is located at Soda village, in Jaisalmer District of Rajasthan state in India. The project area is located in a wind zone of geographic location 26°54'N and 70°55'E. The project area extends between 26°40'N latitude and 69°36'E longitude to 26°42'N latitude and 69°38'E longitude. The sites are located at a distance of 5 – 45 km from Jaisalmer, 300 km from Jodhpur by road. The nearest railway station is at Jaisalmer.

Methodology Used

Title: “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”

Reference: ACM 0002, version 03

Monitoring Parameters

The monitoring requirement for this Project Activity is as follows:

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	Comment
1.EG _y	Electricity supplied to the grid by the project	Electricity meters	MWh	M	Continuous	100%	This is the summation of the electricity supplied by all the subprojects to the grid.

The only monitoring parameter for the Project Activity is the electricity supplied to the grid. As commented in the above table, it is the summation of the electricity supplied by all the sub-projects comprising the 58.2 MW bundle to the Rajasthan grid and is calculated as follows:

$$EG_y = \sum_i (G_{i-} - L_i)$$

EG_y : Electricity supplied to grid by the project activity

G_i : Generation of electricity by individual turbines i (measured at individual turbines by meters installed at the site)

L_i : Transmission loss allotted on each turbine

Transmission loss is calculated as:

L : $\sum_j G_j - N$

$\sum_j G_j$: Summation of electricity generation data measured at the site feeding to the meter at the grid substation

N : Electricity generation data measured at grid substation

L : Total transmission loss

L_i : $G_i * (L / \sum_j G_j)$

Grid emission factor

The emission factor for the Northern grid has been calculated *ex ante* and does not require monitoring.

QA/QC Measures in Monitoring

The QA/QC measures for the data to be monitored for the Project Activity are as follows:

Data	Uncertainty level of data (High/Medium/Low)	Are QA/QC procedures planned for these data	Outline explanation how QA/QC procedures are planned
I, EGy	Low	Yes	This data will be directly used for calculation of emission reductions. Sales record to the grid and other records are used to ensure the consistency. The details of the procedure are available in the monitoring plan.

Monitoring of the electricity supplied to the grid is carried out in accordance with the monitoring plan, which is by reference to the general conditions set out for metering, recording, meter readings, meter inspections, test & checking and communication are governed as per the PPA (Power purchase agreement) with RRVPNL/Jodhpur Discom. The metering arrangements are also governed by the Metering Code for Rajasthan Grid (Part-III of the Grid Code) of December 2002 ("Metering Code").

The data for electricity supplied to grid is directly used for calculation of emission reductions. The measurement and recording of the net supply to grid is done as follows:

- The net delivered energy (using export and import meters) is metered at the 132 kV level at the RRVPN substation at Amarsagar (main metering system). Representatives of RRVPN/Jodhpur Discom and Enercon jointly take the reading and sign the meter reading on the first day of every month RRVPN substation at Amarsagar. Simultaneously, the joint meter reading at the 132 kV level of the backup metering system at Temdarai Enercon substation Ltd is also taken by representatives of RRVPN/Jodhpur Discom and Enercon.
- The main and backup metering systems are at the two ends of the 132 kV feeder between Amarsagar (main meters) and Temdarai (backup meters). The distance between Amarsagar and Temdarai is approximately 28 kilometers. There is a double circuit 132 kV line connecting the Enercon substation at Temdarai and RRVPN substation at Amarsagar. Each of the two 132 kV lines carries a set of main meter at RRVPN substation and backup meter at Temdarai.
- The meters are jointly inspected and tested once in a year as per the terms of the PPA. The recent annual inspection and testing report is attached for reference. Joint inspection and testing will also be carried out as and when difference in meter readings exceeds the sum of maximum error as per accuracy class of main and backup meters.
- In case the meters are operating outside the permissible limits, the meters will be either replaced immediately or calibrated. To cover for loss of time, spare meters will be kept available. Error correction will be applied to the meter reading. Whenever a main meter goes defective, the consumption recorded by the backup meter will be referred. The details of the malfunctioning along with date and time and snapshot parameters along with load survey will be retrieved from the main meter. The exact nature of the malfunctioning will be determined after analyzing the data so retrieved and the consumption recorded by the main meter will be assessed accordingly. Further, correction for the transmission loss between Temdarai and Amarsagar will be carried by reference to the transmission loss calculated using the data of the main meter and backup meter on the other double circuit line. This transmission loss will be applied to the backup meter reading to arrive at the electricity supplied to the grid where the main meter has been found to be defective.
- If main as well as backup metering system becomes defective, the assessment of energy consumption for the outage period will be done from the backup meters by the concerned parties as mutually agreed or at the level of Metering Committee set up under the Metering Code.
- The main and the backup metering systems are sealed in presence of representatives of Enercon and RRVPN/Jodhpur Discom.

The main and backup metering systems have operated within acceptable limits of accuracy during the monitoring period (1 July 2004 to 30 June 2006) and therefore did not require any re-calibration, repair or replacement.

CER Calculations

As per methodology ACM0002 the emission reduction **ERy** is calculated as:

$$ERy = EGy * EFy(1)$$

where *EGy* is the electricity supplied to the grid, *EFy* is the CO₂ emission factor of the grid .

Month-wise electricity supplied to the grid for the Project Activity during the period July 2004 to June 2006 is shown below.

Month	EGy Electricity supplied to grid (MWh)
Jul-04	19,064.40
Aug-04	7,684.48
Sep-04	8,847.79
Oct-04	4,720.96
Nov-04	2,333.77
Dec-04	3,862.85
Jan-05	4,646.97
Feb-05	4,664.30
Mar-05	5,400.19
Apr-05	5,301.12
May-05	8,356.98
Jun-05	12,362.82
Jul-05	15,164.32
Aug-05	15,532.05
Sep-05	5,826.52
Oct-05	4,572.05
Nov-05	2,485.04
Dec-05	3,644.97
Jan-06	4,899.72
Feb-06	4,205.07
Mar-06	3,875.11
Apr-06	6,230.99
May-06	13,144.64
Jun-06	12,188.03
Total	179,015.13

EFy for this Project Activity as reported in the registered project design document (PDD) is 908.52 tCO₂/GWh. Accordingly:

Emission reduction calculation **for the period July 2004 to June 2006:**

EGy (Net supply to grid) = 179,015.13 MWh

ER = 179,015.13 (MWh) * 0.90852 (tCO₂/MWh)

= **162,638 tCO₂**