MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

CONTENTS

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 01 23/01/2012
Generation of electricity from 1.2 MW capacity wind mills by Sun-n-Sand Hotels Pvt. Ltd. at Satara, Maharashtra.UNFCCC
Ref. No.: 0560
Monitoring Period # 3
01 January 2009 to 31 December 2011 (first and last days included 01/01/2009 to 31/12/2011)

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

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Purpose of the project activity and the measures taken to reduce greenhouse gas emissions:

The Sun-n-Sand Hotels Pvt. Ltd (hereby referred as SNS) set up two 600 kW capacity wind turbines supplied by Enercon in Satara, in the state of Maharashtra in India. The total capacity of the project was 1.2 MW. The project had been designed to supply electricity to Maharashtra state grid, which is part of the western regional state grid. However, after supplying to the state grid for one year, the project proponent did not receive any payment. Hence they were compelled to sign a power purchase agreement with a third party, at ~15% lower power rate for a period of 2 years.

Later, SNS requested for the change of option from sale to third party to sale of power to MSEDCL on 11/10/2004. The consent for the change of option from third party sale to sale to MSEDCL was obtained on 18 November 2005 i.e., prior to the start date of the current monitoring period. In the current monitoring period from January 2009 to March 2011 100% of the electricity generated from both the wind mills was sold to the MSECDL, and from April 2011 to December 2011 it was sold to third party.

The project activity is generating electricity from wind for which GHG emission is nil. The generated electricity is supplied to MSEDCL/Third party, thus the power generated in the project activity is actually displacing the electricity generated from the fossil fuels in the grid. In case the project activity would not have been there, the same amount of electricity would have been generated from the power plants connected to the grid of which majority are based on fossil fuels. Thus the project is replacing the anthropogenic emission from the fossil fuel based power plant connected to the state electricity grid.

Brief description of the installed technology and equipments:

The wind mills were supplied by Enercon (India) Limited, having the technology support of Enercon GmbH who claims to have developed the 'most grid friendly' technology in the field of wind mills. They supplied their then latest model E-40 machines for this project. The machines uses gear less technology which enables it to operate at a higher range of wind velocity. The mills have 3 rotor blades of diameter 43.7m, with swept area of 1500 sq m. As supplier of wind energy converters (wind mills), Enercon is well known in the market. They have a strong R&D back up and are the leaders in the German market with their new gearless technology, increased grid compatibility and additional safety features of their technology.

The project start date is 26/02/2001 and got commissioned on 28/12/2001. The project complied with all legal requirements during the verification period.

Relevant dates for the project activity:

Date of Purchase Order to Enercon	**:** 08th August, 2001
Date of signing of PPA	**:** 19th April, 2006
Date of Registration	**:** 01st October, 2006
Crediting period	**:** 01st January 2002 to 31 December 2011(Fixed)
First Monitoring period	**:** 01st January 2002 to 30th September 2006
Second Monitoring period	**:** 01st October 2006 to 31st December 2008
Third Monitoring period	**:** 01st January 2009 to 31st December 2011

Total emission reductions achieved in this monitoring period:

The emission reductions ER_y by the project activity during a given year y is:

$ER_y = BE_y - PE_y – LE_y$

Since PE_y and $LE_y = 0$

Hence, $ER_y=BE_y$

As described in the registered PDD,

$BE_y=EG_y*EF_y$

Since $ER_y=BE_y$,

$ER_y =EG_y * EF_y$

$EG_y = EG_{export} - EG_{import} - EG_{loss}$

Where:

ER_y	=	Emission reductions achieved by the project (tCO_2/year)
EF_y	=	Baseline CO_2 emission factor for the electricity displaced due to the project activity during the year y (tCO_2/MWh) which is 0.8234 tCO_2/MWh
EG_y	=	Net electricity supplied to the grid (MWh)
EG_{loss}	=	In case of third party sale, transmission losses and wheeling losses to be calculated as per MERC guidelines.
EG_{export}	=	Electricity exported to western regional grid represents the difference of gross electricity generated at the wind turbines of the project activity and the line losses up to grid interconnection point (i.e "joint meter").
EG_{import}	=	Auxiliary consumption of the wind turbines.

ER_y= 6071.209 MWh* 0.8234 tCO_2e/MWh

= 4,999.033 tCO_2e
= 4,999 tCO_2e (rounded down)

A.2. Project Participants

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Sun-n-Sand Hotels Pvt. Ltd. (India)
KfW Bankengruppe (Germany)

A.3. Location of the project activity:

The project is located at a village named Varekarwadi, 92 km from the city of Satara in Maharashtra. The nearest railway station is Satara and airport is Pune. The following table provides the unique location details of the individual windmills included in the project activity.

Loc No	Longitude	Latitude	Country
SNS 01	73°58'47''N	17°12'49''E	India
SNS 02	73°58'48''N	17°12'45''E	India

A.4. Technical description of the project

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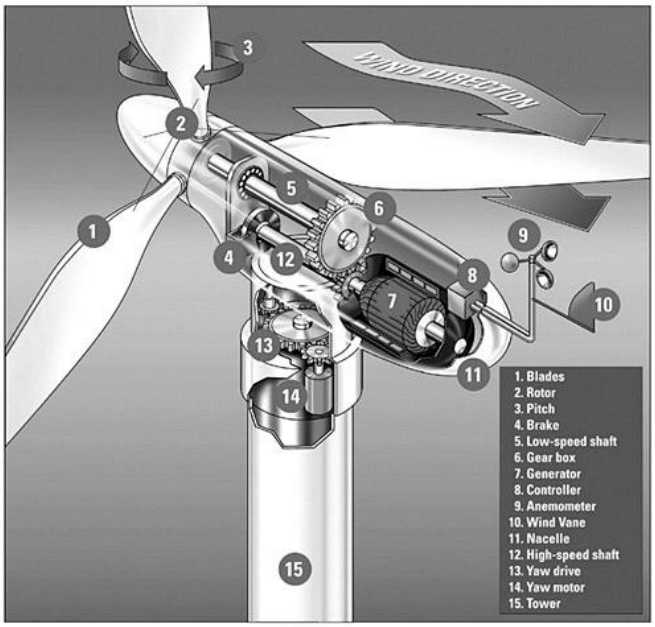
The project activity consists of 2 WEG's of capacity 0.6 MW each.



Major Mechanical Parts of a Wind Turbine

The wind mills were supplied by Enercon (India) Limited, having the technology support of Enercon GmbH who claims to have developed the 'most grid friendly' technology in the field of wind mills. They supplied their then latest model E-40 machines for this project. The machines uses gear less technology which enables it to operate at a higher range of wind velocity. The mills have 3 rotor blades of diameter 43.7m, with swept area of 1500 sq m. As supplier of wind energy converters (wind mills), Enercon is well known in the market. They have a strong R&D back up and are the leaders in the German market with their new gearless technology, increased grid compatibility and additional safety features of their technology.

The rated wind speed is 13.5 m/s with cut in and cut off speed ranging from 2.5 m/s to 25 m/s and extreme gust of 59.5 m/s. The variable speed and active pitch control system was designed for a rated output of 600 kW. Each machine is then connected to 400/33000 V, 3 phase transformers with internal electrical lines connecting the projects with local evacuation facility. The local evacuation facility consist of a 33kV line connecting to 33 kV Varekarwadi-Kale line which is connected to 33/110 kV 25 MVA transformer in Kale grid substation located 20 km away from the wind mills. The Wind mills generate 3-phase power at 400V, which is stepped up to 33KV. The wind farms operate as base load units and can operate in the frequency range of 47.5 - 51.5 Hz and in the voltage range of 400 V +/- 12.5%.

Installation and operation of the windmills do not pose any environmental hazards. The technology of harnessing wind power through windmills is environmentally safe and sound. The host Government also agrees to this fact and does not ask for Environmental Impact Assessment for this type of projects.

The technical specifications are included in **Appendix 2**.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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Approved baseline methodology AMS I. D: "Grid connected renewable electricity generation", Version 08 dated 03 March 2006, has been applied to this project, having sectoral scope 01 – Energy Industries (Renewable/ Non-renewable).

A.6. Registration date of the project activity:

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01st October 2006

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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Crediting Period : 01st January2002 – 31st December 2011 (Fixed)

A.8. Name of responsible person(s)/entity(ies):

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Name of person/entity responsible for completing the monitoring report form (CDM-MR):

Mr. Rajesh G. Advani

Director,

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SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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The project is currently operational. The monitoring plan was implemented in compliance with the registered PDD and the revised monitoring plan.

The starting date of operation of the project activity:

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The table below describes the date of commissioning of the WTGs included in the project activity.

Owner	Capacity of the Wind Mills	Date of Commissioning

	(MW)	
Sun-n-Sand Hotels Pvt. Ltd. (SNS) – 01	0.6	28/12/2001
Sun-n-Sand Hotels Pvt. Ltd. (SNS) – 02	0.6	28/12/2001
Total	**1.2**	

Actual operation of the project activity during this monitoring period

The project complied with all legal requirements during the current monitoring period. The project performance of the project during the current verification period (01 January 2009 to 31 December 2011) was normal. The details of the down time of the wind mills are as follows:

WTG Location	Type of Maintenance	Planned Date	Actual Date	Total Hours
SNS-01	Visual	23-May-09	5-Jun-09	2:00
		21-May-10	25-May-10	1:45
		20-May-11	11-Jun-11	0:56
	Visual and Grease	25-Aug-09	28-Aug-09	2:45
		23-Aug-10	28-Aug-10	2:30
		22-Aug-11	7-Sep-11	3:15
	Electrical	5-Dec-09	6-Dec-09	13:45
		4-Dec-10	2-Jan-11	8:45
		2-Dec-11	18-Dec-11	10:35
	Mechanical	16-Mar-09	25-Mar-09	8:00
		16-Mar-10	26-Mar-10	9:00
		15-Mar-11	31-Mar-11	9:00
SNS-02	Visual	24-May-09	21-May-09	2:30
		22-May-10	26-May-10	1:45
		21-May-11	8-Jun-11	2:00
	Visual and Grease	28-Aug-09	28-Aug-09	3:00
		24-Aug-10	26-Aug-10	2:20
		24-Aug-11	8-Sep-11	3:30
	Electrical	8-Dec-09	7-Dec-09	13:45

		7-Dec-10	5-Jan-11	10:42
		5-Dec-11	25-Dec-11	10:46
	Mechanical	18-Mar-09	28-Mar-09	8:00
		18-Mar-10	27-Mar-10	8:00
		17-Mar-11	03-Apr-11	9:00

Events affecting the applicability of the methodology

No events or situations occurred that could impact the applicability of the methodology. The project activity did not increase the capacity of final outputs and lifetime of the existing equipment during the monitoring period.

B.2. Revision of the monitoring plan

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A revision in the monitoring plan dated 7 August 2008 was approved by the CDM Executive Board on 26 December 2008.

A second revision in monitoring plan is being requested by the Project Proponents. This Monitoring Report has been prepared in accordance with the changes requested by the project proponent in the revised monitoring plan.

B.3. Request for deviation applied to this monitoring period

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Not applicable

B.4. Notification or request of approval of changes

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No notification or request of approval of changes has been made.

SECTION C. Description of the monitoring system

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The monitoring system for the project activity is described in the following sections.

Data Collection Procedure:

Net Electricity supplied to state grid (EG_y) from the project activity will be calculated from three monitored parameters: (i) Electricity exported to the grid (EG_{export}) and (ii) Auxiliary consumption (EG_{import}) and (iii) transmission losses in case of third party sale (EG_{loss}).

The formula for calculation of EG_y is as follows:

$EG_y = EG_{,export} - EG_{import} - EG_{loss}$

EG_{export}, the electricity exported to western regional grid represents the difference of gross electricity generated at the wind turbines of the project activity and the line losses up to grid interconnection point (i.e “joint meter”).

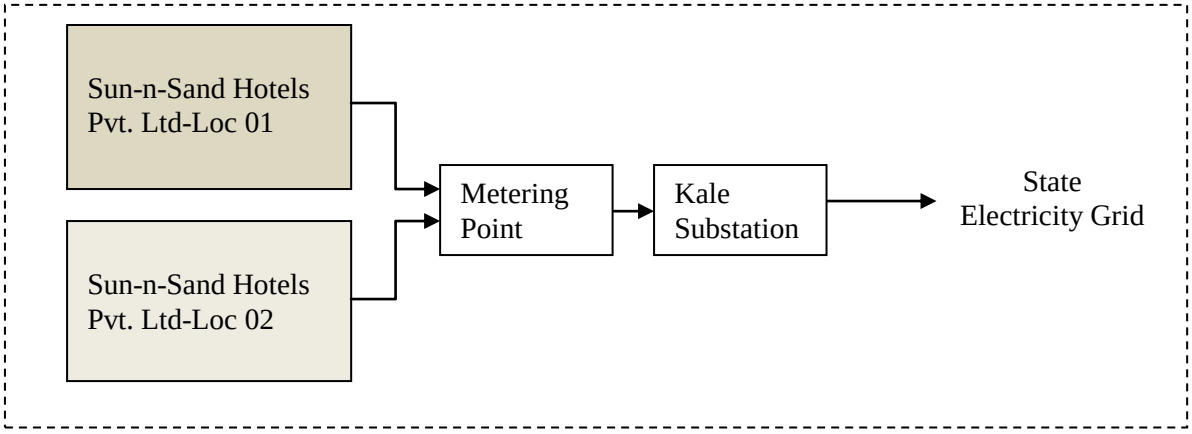
EG_{import} represents the auxiliary consumption at the wind turbines.

EG_{loss} in case of third party sale, transmission losses and wheeling losses to be calculated as per MERC guidelines.

The Joint Meter Reading (JMR) gives the "export" of the electricity to the western grid and "Import" reading as well. The export meter reading (EGproject,export) by MSEDCL meter takes into account the line losses between the individual windmills and the MSEDCL meter.

This JMR is used for calculating the amount of electricity supplied to the grid from the project activity against which the MSEDCL makes the payment to the project proponent. There is also a provision of "check" MSEDCL meter as a failsafe measure, in case the main MSEDCL meter is not working accurately and requires calibration or replacement.

EG_{loss} in case of third party sale, transmission losses and wheeling losses to be calculated as per MERC guidelines[1].



Detailed discussion on emission reduction calculation based on the data collection described above is provided in Section E.

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

ID Number	**Data monitored**	**Uncertainty level of data (High/ Medium/ Low)**	**Are QA/QC procedures planned for these data?**	**Outline explanation why QA/QC procedures are or are not being planned**
1 EG_{export}	Gross Electricity generated by the project	Low	Yes	This data will be used for the calculation of net electricity generated. Sun n Sand has installed Real Time TOD Meters with online reading features at the Metering Point (the Main Meter). The metering equipment is duly approved, tested and sealed by MSEDCL.

[1] EG_{loss} calculation has been changed based on the revision in monitoring plan being requested by SNS. This has been changed from 5% of the net electricity exported to calculation of transmission losses and wheeling losses as per MERC guidelines.

ID Number	Data monitored	Uncertainty level of data (High/ Medium/ Low)	Are QA/QC procedures planned for these data?	Outline explanation why QA/QC procedures are or are not being planned
				The metering equipment consisting of a Main Meter (**0.5** accuracy class) was replaced by a Main Meter (**0.2** accuracy class) and a Check Meter (**0.2**[2] accuracy class) on 26-27/08/2011[3]. These meters are owned, operated and maintained by MSEDCL. The main meter and check meters are two way electronic tri-vector meters and in a dedicated metering point for SnS project. These meters comply with the requirements of the Electricity Rules. The meter readings at the Metering Point are undertaken jointly by the representatives of the State Grid/ MSEDCL and Enercon representative in first week of every month. The meter readings are jointly certified by representatives of the State Grid/ MSEDCL and Enercon. That is why the Main Meter is also referred to as Joint Meter. The Joint Meter Reading (JMR) gives the "export" of the electricity to the western grid and "Import" reading as well. The export meter reading (EGproject,export) by MSEDCL meter takes into account the line losses between the individual windmills and the MSEDCL meter. This JMR is used for calculating the amount of electricity supplied to the grid from the project activity against which the MSEDCL makes the payment to the project proponent. There is also a provision of "check" MSEDCL meter as a fail safe measure, in case the main MSEDCL meter is not working accurately and requires calibration or replacement.

[2] Accuracy class of the check meter has been changed based on the revision in monitoring plan being requested by SNS. The accuracy class of check meters has been changed from an accuracy class of 0.5 to 0.2.

[3] A letter from MSEDCL stating the replacement of meter will be provided to DOE.

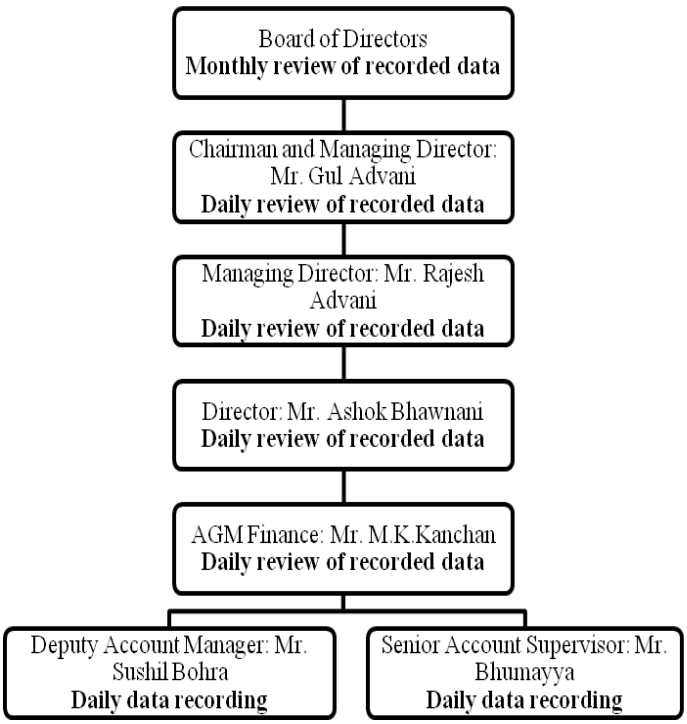
ID Number	Data monitored	Uncertainty level of data (High/ Medium/ Low)	Are QA/QC procedures planned for these data?	Outline explanation why QA/QC procedures are or are not being planned
				The calibration of the main and check meter will be carried out as per the MSEDCL procedure
2. EG_{import}	Auxiliary consumption	Low	Yes	This value is represented by "import" value in the Joint Meter Reading recorded by MSEDCL meter.
3. EG_{loss}[4]	Transmission and wheeling losses	Low	Yes	MSECDL credit note clearly specifies the pattern of electricity sale indicating sale to grid or to third party. Based on this data the MERC guidelines will apply.
4. EG_y	Net Electricity supplied to grid	Low	No	The figure of net electricity supplied to grid mentioned in the credit note of MSEDCL would serve as the basis for emission reduction calculation.
5. EF_y[5]	CO_2 emission factor for the electricity displaced due to the project activity	Low	No	This value will be taken from the latest available version of CO_2 baseline database published by CEA.

Operational and Management Structure:

The organization structure, along with the respective roles and responsibilities, is described in the following figure:

[4] The calculation approach to determine EG_{loss} has been changed based on the revision in monitoring plan being requested by SNS.

[5] EFy has been included as a monitored parameter based on the revision in monitoring plan being requested by SNS.



QC/QA procedures being undertaken for data monitored:

The Quality Control and Quality Assurance (QC & QA) procedures are equivalent to applicable National and International Standards as well as standards given by the technology supplier. The QA & QC procedures are set and implemented in order to:

- Secure a good consistency through planning to implement the project activity,
- Assign the responsibility as per the requirements and,
- Avoid any misunderstanding between people and organization involved.

The following table provides the calibration and maintenance of measurement instruments:

Location	Meter Type	MSEDCL Meter Sr. No.	Accuracy Class	Make	Calibration Frequency	Calibration done on
SnS Metering Point	Main	52719	0.5	Duke Arnics	As per the MSEDCL procedure	30/03/2008, 17/03/2009, 23/05/2009, 21/08/2010
		05245385	0.2	Elster	As per the MSEDCL procedure	27/08/2011
	Check	05245386	0.2	Elster	As per the MSEDCL procedure	27/08/2011

SECTION D. Data and parameters

The parameters used to calculate baseline, project, and leakage emissions as well as other relevant parameters required by the approved methodology and the monitoring plan and specific information on

how data and parameters have been monitored during the monitoring period are presented in the Sections below:

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

There are no parameters that have determined at registration and that are not monitored during the monitoring period.

D.2. Data and parameters monitored

Data that is monitored or calculated throughout the crediting period are described in the following section:

Data / Parameter:	EG_{export}
Data unit:	MWh
Description:	Gross Electricity generated by the project
Measured/ Calculated/ default:	Measured
Source of data:	EGexport represents the "export" reading at MSEDCL 2-way-meter (also referred to as "joint meter"), i.e. gross electricity generated at the windmills minus the line losses between the individual wind turbine meter and the MSEDCL meter. The meter readings at the Metering Point are undertaken jointly by the representatives of the State Grid/ MSEDCL and Enercon representative in first week of every month. The meter readings are jointly certified by representatives of the State Grid/ MSEDCL and Enercon. That is why the Main Meter is also referred to as Joint Meter. This JMR is used for calculating the amount of electricity supplied to the grid from the project activity against which the MSEDCL makes the payment to the project proponent.
Value(s) of monitored parameter:	6,384.760
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring Equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The metering equipment consisting of a Main Meter (**0.5** accuracy class) was replaced by a Main Meter (**0.2** accuracy class) and a Check Meter (**0.2**[6] accuracy class) on 26-27/08/2011[7]. These meters are owned, operated and maintained by MSEDCL. The main meter and check meters are two way electronic tri-vector meters and in a dedicated metering point for SnS project. These meters comply with the requirements of the Electricity Rules.
Measuring/ reading/ recording frequency:	Continuously

[6] Accuracy class of the check meter has been changed based on the revision in monitoring plan being requested by SNS. The accuracy class of check meters has been changed from an accuracy class of 0.5 to 0.2.

[7] A letter from MSEDCL stating the replacement of meter will be provided to DOE.

Calculation method (if applicable):	Not applicable
QA/ QC procedures applied:	Please refer Section C above

Data / Parameter:	EG_{import}
Data unit:	MWh
Description:	Auxiliary consumption
Measured/ Calculated/ default:	Measured
Source of data:	Auxiliary consumption of the project metered at MSEDCL 2-way-meter as "import" (the 2-way meter is also referred to as "joint meter") This value is represented by "import" value in the Joint Meter Reading recorded by MSEDCL meter.
Value(s) of monitored parameter:	12.129
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring Equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The metering equipment consisting of a Main Meter (**0.5** accuracy class) was replaced by a Main Meter (**0.2** accuracy class) and a Check Meter (**0.2**[8] accuracy class) on 26-27/08/2011[9]. These meters are owned, operated and maintained by MSEDCL. The main meter and check meters are two way electronic tri-vector meters and in a dedicated metering point for SnS project. These meters comply with the requirements of the Electricity Rules.
Measuring/ reading/ recording frequency:	Continuously
Calculation method (if applicable):	Not applicable
QA/ QC procedures applied:	Please refer Section C above

Data / Parameter:	EG_{loss}
Data unit:	MWh
Description:	Transmission losses
Measured/ Calculated/ default:	Calculated
Source of data:	Calculated for transmission and wheeling losses in case of a third party sale of electricity as per the prevailing guidelines of MERC. In case of electricity sale to MSEDCL EG_{loss} is zero. In the current monitoring period from January 2009 to March 2011 100% of the electricity generated from both the wind mills was sold to the MSEDCL, and from April 2011 to December 2011 it was sold to third party. The transmission loss for April 2011 to December 2011 period was calculated and presented in this section.
Value(s) of monitored	301.421

[8] Accuracy class of the check meter has been changed based on the revision in monitoring plan being requested by SNS. The accuracy class of check meters has been changed from an accuracy class of 0.5 to 0.2.

[9] A letter from MSEDCL stating the replacement of meter will be provided to DOE.

parameter:	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring Equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ reading/ recording frequency:	Monthly
Calculation method (if applicable):	Calculated in case of a third party sale of electricity as per the prevailing guidelines of MERC. In case of electricity sale to MSEDCL EG_{loss} is zero. MSECDL credit note clearly specifies the pattern of electricity sale indicating sale to grid or to third party. Based on this data the MERC guidelines will apply.
QA/ QC procedures applied:	Please refer Section C above

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net Electricity supplied to State grid
Measured/ Calculated/ default:	Calculated
Source of data:	Calculated as $EG_y = EG_{export} – EG_{import} - EG_{loss}$ on the basis of the joint meter. Data can be cross checked from credit note of MSEDCL
Value(s) of monitored parameter:	6071.209
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring Equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ reading/ recording frequency:	Monthly
Calculation method (if applicable):	Calculated as $EG_y = EG_{export} – EG_{import} - EG_{loss}$ on the basis of the joint meter reading taken by MSEDCL official in presence of O&M contractor for Sun n Sand and MERC guidelines. Data can be cross checked from credit note of MSEDCL
QA/ QC procedures applied:	Please refer Section C above

Data / Parameter:	EF_y
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor for the electricity displaced due to the project activity
Measured/ Calculated/ default:	Estimated
Source of data:	This value will be taken from the latest available version of CO_2

	baseline database published by CEA. In case the CEA database is not updated, the project proponent will calculate the weighted average emission using the available CEA data. The latest available version of the CEA baseline database Version 6[10] published in March, 2011 has been used for this monitoring period.
Value(s) of monitored parameter:	0.8234
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring Equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Not applicable
Measuring/ reading/ recording frequency:	Yearly
Calculation method (if applicable):	The CO_2 emission factor would be the weighted average emission rate of the current generation mix provided in the latest version of the CO_2 baseline database published by Central Electricity Authority (CEA). In case the CEA database is not updated, the project proponent will calculate the weighted average emission using the available CEA data.
QA/ QC procedures applied:	-

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

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Baseline calculations are given as:

$$BE_y = EG_y \times EF_y$$

Where:

BE_y = Baseline emissions (tCO_2/year)

EF_y = Baseline CO_2 emission factor for the electricity displaced due to the project activity during the year y (tCO_2/MWh).

= 0.8234 tCO2/MWh (NEWNE Grid, reported as weighted average emission factor of the current generation mix as presented column 6 of attached **Appendix 1**)

EG_y = Net Electricity supplied to state grid (EG_y) from the project activity

The net Electricity supplied to state grid (EG_y) from the project activity is calculated from three monitored parameters:

(i) Electricity exported to the grid (EG_{export}),
(ii) Auxiliary consumption (EG_{import}) and
(iii) Transmission losses in case of third party sale (EG_{loss}).

The formula for calculation of EG_y is as follows:
$EG_y = EG_{export} – EG_{import} – EG_{loss}$
Where,

[10] (http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm).

EG_{export}, the electricity exported to western regional grid represents the difference of gross electricity generated at the wind turbines of the project activity and the line losses up to grid interconnection point (i.e "joint meter").

EG_{import} represents the auxiliary consumption of the wind turbines.

EG_{loss} in case of third party sale, transmission losses and wheeling losses to be calculated as per MERC guidelines.

EG_y and BE_y estimation for the period 1 January 2009 to 31 December 2010:

Parameter		**Value**[11]	**Unit**
EG_{export}	=	**6384.760**	MWh
EG_{import}	=	**12.129**	MWh
EG_{loss}	=	**301.421**	MWh
EG_y	=	**6071.209**	MWh
EF_y	=	**0.8234**	tCO_2/MWh

CO_2 Emission Reduction	=	**EG_y * EF_y**(Net Electricity supplied to state grid X Baseline emission factor)
CO_2 Emission Reduction	=	6071.209 MWh X 0.8234 tCO_2/MWh
CO_2 Emission Reduction	=	**4,999 tCO_2** (reflected in Column 7 of the attached Appendix 1)

E.2. Project emissions calculation

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$PE_y = 0$

E.3. Leakage calculation

>>

$LE_y = 0$

E.4. Emission reductions calculation / table

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The Emission Reduction is the difference between the Baseline Emission and the Project and Leakage Emission during the Monitoring Period calculated as follows:

$ER_y = BE_y - PE_y – LE_y$

Total baseline emissions: 4,999 tCO_2e
Total project emissions: 0
Total leakage: 0
Total emission reductions: 4,999 tCO_2e

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

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Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period

[11] Reference: Appendix 1 of this document

Emission reductions (tCO_2e)	**7929 tCO_2e (**for three years**)**	**4,999 tCO_2e** (for three years from 01 January 2009 to 31 December 2011)

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

>>

ER PDD: 2,643 tCO_2e for one year or 7,929 tCO_2e for two years

ER monitoring period: 4,999 tCO_2e for two years

ER PDD > ER monitoring period; there was no increase in the actual emission reductions achieved during the monitoring period compared to the registered CDM-PDD.

The emission reductions for the period 01 January 2009 to 31 December 2011 are 4,999 tCO_2. A difference in the emission reduction has been observed between the emission reduction estimated in the registered PDD and emission reduction calculated in the monitoring report. This difference between estimated and actual CERs was due to the variability in the wind pattern during the monitoring period.

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History of the document

Version	**Date**	**Nature of revision**
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory **Document Type**: Guideline, Form **Business Function**: Issuance		

Appendix 1

Generation of electricity from 1.2 MW capacity wind mills by Sun-n-Sand Hotels Pvt. Ltd. at Satara, Maharashtra.

UNFCCC Ref. No.: 0560

Monitoring Period # 3 : 01/01/2009 to 31/12/2011 (first and last days included)

Electricity Generation Data for 1.2 MW Wind Mill Project, Satara, Maharashtra

1	2	3	4	2-3-4=5	6	7
Month	**Export**	**Import**	**As per MERC guidelines**	**Net Electricity Supplied to the state grid**	**Baseline emission factor**	**Emission Reductions**
	EGexport	**EGimport**	**EGloss**	**EGy**	**EFy**	**BEy**
	KWh	**KWh**	**KWh**	**KWh**	**tCO2/MWh**	**tCO2**
Jan-09	54,197	540	-	53,657	0.8234	44
Feb-09	41,975	611	-	41,364	0.8234	34
Mar-09	83,423	762	-	82,661	0.8234	68
Apr-09	64,043	260	-	63,783	0.8234	53
May-09	164,535	281	-	164,255	0.8234	135
Jun-09	217,608	1,143	-	216,465	0.8234	178
Jul-09	518,858	12	-	518,846	0.8234	427
Aug-09	544,412	105	-	544,307	0.8234	448
Sep-09	169,695	311	-	169,385	0.8234	139
Oct-09	102,378	326	-	102,053	0.8234	84
Nov-09	140,466	566	-	139,901	0.8234	115
Dec-09	54,627	672	-	53,955	0.8234	44
Jan-10	31,590	365	-	31,226	0.8234	26
Feb-10	44,907	723	-	44,184	0.8234	36
Mar-10	61,716	617	-	61,100	0.8234	50
Apr-10	73,149	339	-	72,810	0.8234	60
May-10	171,437	437	-	171,000	0.8234	141
Jun-10	295,709	413	-	295,296	0.8234	243
Jul-10	276,411	6	-	276,405	0.8234	228
Aug-10	420,332	71	-	420,261	0.8234	346
Sep-10	295,155	95	-	295,061	0.8234	243
Oct-10	59,640	641	-	59,000	0.8234	49
Nov-10	96,290	398	-	95,892	0.8234	79
Dec-10	76,259	470	-	75,789	0.8234	62
Jan-11	31,977	695	-	31,283	0.8234	26
Feb-11	37,712	579		37,133	0.8234	31
Mar-11	79,937	699		79,238	0.8234	65
Apr-11	56,172	-	7,780	48,392	0.8234	40
May-11	117,960	-	16,337	101,623	0.8234	84
Jun-11	371,315	-	51,427	319,887	0.8234	263
Jul-11	534,255	-	73,994	460,261	0.8234	379
Aug-11	512,966	-	71,046	441,920	0.8234	364
Sep-11	356,344	-	49,354	306,991	0.8234	253
Oct-11	65,118	-	9,019	56,100	0.8234	46
Nov-11	76,196	-	10,553	65,642	0.8234	54

Generation of electricity from 1.2 MW capacity wind mills by Sun-n-Sand Hotels Pvt. Ltd. at Satara, Maharashtra.

UNFCCC Ref. No.: 0560

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Electricity Generation Data for 1.2 MW Wind Mill Project, Satara, Maharashtra

1	2	3	4	2-3-4=5	6	7
Month	**Export**	**Import**	**As per MERC guidelines**	**Net Electricity Supplied to the state grid**	**Baseline emission factor**	**Emission Reductions**
	EGexport	**EGimport**	**EGloss**	**EGy**	**EFy**	**BEy**
	KWh	**KWh**	**KWh**	**KWh**	**tCO2/MWh**	**tCO2**
Dec-11	86,003	-	11,911	74,091	0.8234	61
TOTAL	**6,384,760**	**12,129**	**301,421**	**6,071,209**		**4,999**

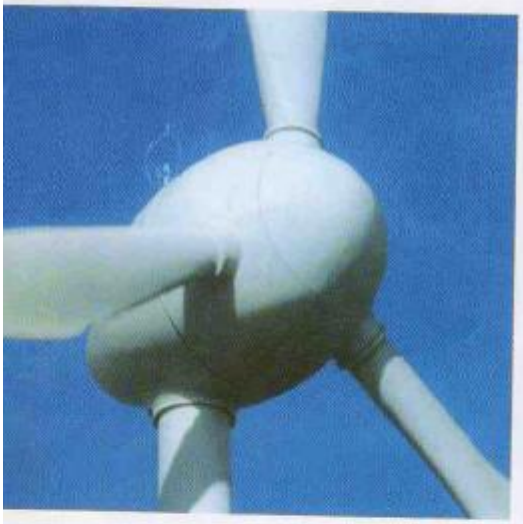
Appendix 2

THE LOGIC OF EFFICIENCY

E-40

As the first gearless wind energy converter, E-40 made wind-converter history. And when one also considers the impressive total of over 3,000 E-40 installations throughout the world, this ENERCON product alone is generating about 2 Gigawatt of clean energy, an invaluable contribution to the global use of sustainable power sources. It now features 100 kw of additional output, dual load capacity and the fruit of ENERCON`s experience with thousands of wind-power installations.

Every component of 600 kW E-40 has been re-scaled in systematic application of the ENERCON design principle. It benefits from in-house manufacture of all key components, so that engineering advances are passed directly on to production facilities worlwide. Gearless by virtue of its direct-driven ring generator, with variable blade pitch, variable speed and the internationally admired ENERCON grid feeding system, this is a design with one outstanding feature: it succeeds.



In addition to higher output, effeciency has been doubled by redesigning the load-bearing components: existing material design standards have been enhanced by a factor of 2 following ENERCON`s in-house load studies. E-40 is, therefore, designed for maximum cost-effectiveness and reliability on the one hand, whilst on the other offering optimum utilisation of the materials employed-optimally cut-out for strong-wind and weak-wind locations. Furthermore, innovations on those components subject to the highest loadings, the use of the latest materials and modified control engineering have increased suitability for use in locations with extremely high winds. No wonder, this converter is in such strong demand modified control engineering have increased suitability for use in locations with extremely high winds. No wonder, this converter is in such high demand.

Technical specifications subject to change - JANUARY 2003

GEARLESS E-40: SPECIFICATIONS

Rated capacity:	600 kW
Rotor diameter:	44m
Hub height:	46m/56m (variety of towers and foundations)
Turbine concept:	gearless, variable speed, variable blade pitch
Rotor with pitch control	
Type:	upwind rotor with active pitch control
Direction of rotation:	clockwise
Number of blades:	3
Swept area:	1521m²
Blade material:	fiberglass (rein forced epoxy) with integral lightning protection
Rotor Speed:	variable, 18-34rpm
Tip speed:	41-78 m/s
Pitch control:	three synchronised blade pitch systems with emergency supply
Generator with drive train	
Hub:	rigid
Main bearings:	tapered roller bearings
Generator:	direct-driven synchronous ENERCON ring generator
Grid feeding:	ENERCON inverter
Braking system:	-3 independent pitch-control systems with emergency supply -rotor brake -rotor lock for services and maintenance
Yaw control:	active through adjustment gears, load-dependent damping
Cut-in wind speed:	2.5 m/s
rated wind speed:	12.0 m/s
Remote monitoring system:	ENERCON SCADA

ENERCON

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