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

CONTENTS

MONITORING REPORT
Version 1.2 and Date 19/01/2012

Title: "Roaring 40s Wind Farms (Khandke) Private Limited - Phase II"
Project Reference No: 3298
Monitoring Period Number: 1
Monitoring Period Date – FROM 04/12/2010 TO 31/12/2011 (BOTH DAYS INCLUSIVE)

SECTION A. General description of the project activity

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

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CLP Wind Farms (Khandke) Pvt. Ltd. (CLPWFK, formerly known as Roaring 40s wind Farms (Khandke) Pvt. Limited) has developed a 50.4 MW wind farm in the state of Maharashtra, India in 3 phases (Phase-I, II & III). The project activity under consideration is Phase-II of the project consisting of 24 machines of 800kW each, amounting to 19.2 MW.

The Project harnesses renewable resource (wind) in the region, and thereby displacing electricity generation by non-renewable natural resources and hence ultimately leading to sustainable economic and environmental development. Enercon (India) Limited ("Enercon") is the equipment supplier and the operations and maintenance contractor for the Project. The Project is owned by CLP Wind Farms (Khandke) Private Limited and Enercon is responsible for operation and maintenance of the wind farm. The generated electricity is being supplied to Maharashtra State Electricity Distribution Company Limited ("MSEDCL") under a long-term power purchase agreement (PPA) for 13 years.

The first machine was commissioned on 18th February 2008 and the last machine was commissioned on 31st May 2008.The expected operational lifetime of the project is for 20 years. The total emission reductions achieved under this monitoring period (04/12/2010 to 31/12/2011) is **41,678 tCO2e**.

A.2. Project Participants

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CLP Wind Farms (Khandke) Pvt. Ltd. (formerly known as Roaring 40s wind Farms (Khandke) Pvt. Limited)

A.3. Location of the project activity:

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The Project is spread across Agadgaon, Ratadgaon, Ranjani, Balewadi and Pimpalgaon Ghat villages in Khandke Taluka of Ahmednagar District of Maharashtra state in India.

The Project area extends between latitude 19^o, 6' to 19^o, 11' North and longitude 74^o, 49.5' to 74^o, 57.5' East. The Project is connected to the Enercon (India) Limited (EIL) substation (to be owned by MSETCL) at Village Mehekari (near 33kV Mehekari S/S), Ahmednagar district. The Project activity is located at a distance of 120 km from Pune by road. The nearest major railway station is at Pune.

The details of the physical location of the project activity are presented below:

Name of Village	WEC Loc No.	Latitude	Longitude	Date of Commissioning	Unique Identification of WECs
Agadgaon	105	N19 08 50.9	E74 52 34.6	18-Feb-08	R 40s K-22
	106	N19 08 43.1	E74 52 38.4	18-Feb-08	R 40s K-23
	107	N19 08 42.9	E74 52 23.8	18-Feb-08	R 40s K-24
Ratadgaon	108	N19 08 41.8	E74 52 05.5	18-Feb-08	R 40s K-25
	109	N19 08 34.0	E74 52 07.8	18-Feb-08	R 40s K-26
	111	N19 08 28.2	E74 52 20.2	18-Feb-08	R 40s K-27

	114	N19 07 57.6	E74 52 37.4	18-Feb-08	R 40s K-28
	116	N19 07 51.9	E74 51 52.9	18-Feb-08	R 40s K-29
	117	N19 07 44.9	E74 51 58.6	18-Feb-08	R 40s K-30
Agadgaon	98	N19 09 40.0	E74 52 49.0	31-Mar-08	R 40s K-31
Ranjani	225	N19 10 26.6	E74 55 07.5	12-May-08	R 40s K-32
	226	N19 10 24.7	E74 54 36.2	12-May-08	R 40s K-33
Ratadgaon	21	N19 07 46.6	E74 49 59.9	23-May-08	R 40s K-34
Balewadi	217	N19 08 45.2	E74 56 00.1	31-Mar-08	R 40s K-35
	218	N19 08 36.7	E74 56 04.7	31-Mar-08	R 40s K-36
	219	N19 08 30.7	E74 56 00.3	31-Mar-08	R 40s K-37
	220	N19 08 19.5	E74 55 53.8	31-Mar-08	R 40s K-38
Pimpalgaon Ghat	146	N19 07 56.2	E74 56 43.2	12-May-08	R 40s K-39
	147	N19 07 41.4	E74 56 55.3	28-May-08	R 40s K-40
	148	N19 07 41.4	E74 56 55.3	23-May-08	R 40s K-41
	149	N19 07 36.8	E74 57 04.1	12-May-08	R 40s K-42
	150	N19 07 32.6	E74 57 08.1	12-May-08	R 40s K-43
	151	N19 07 19.4	E74 57 05.6	31-May-08	R 40s K-44
	152	N19 07 05.3	E74 57 43.5	28-May-08	R 40s K-45

A.4. Technical description of the project

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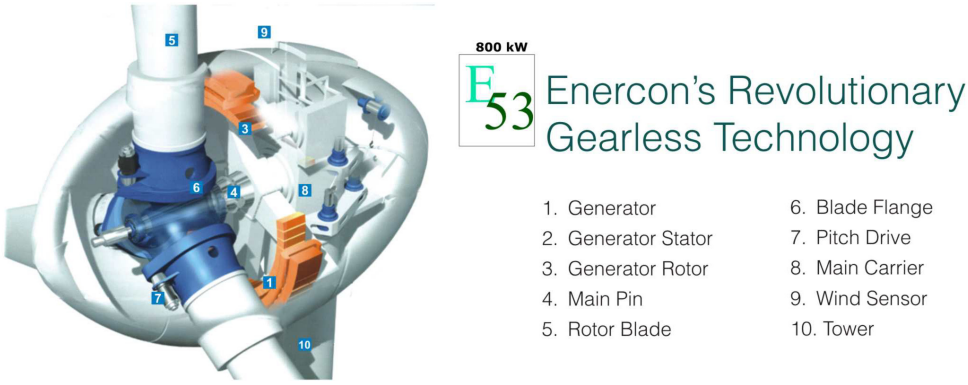
The Project involves 24-wind energy converters (WECs) of Enercon make (800 kW E-48) with internal electrical lines connecting the Project with local evacuation facility. The WECs generate 3-phase power at 400V, which is stepped up to 33 KV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%. The other salient features of the technology are:

- Gearless Construction - Rotor & Generator Mounted on same shaft eliminating the Gearbox.
- Variable speed function – has the speed range of 18 to 33 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times.
- Minimum drawl (less than 1% of kWh generated) of Reactive Power from the grid.
- No voltage peaks at any time.
- Operating range of the WEC with voltage fluctuation of -20 to +20%.
- Less Wear & Tear since the system eliminates mechanical brake, which are not needed due to low speed generator, which runs at maximum speed of 33 rpm and uses Air Brakes.
- Three Independent Braking Systems.
- Generator achieving rated output at only 33 rpm.
- Incorporates lightning protection system, which includes blades.
- Starts Generation of power at wind speed of 3 m/s.



Source: Enercon

Technology transfer:
No technology transfer from other countries is involved in this project activity

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

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Title: Consolidated baseline and monitoring methodology for "Grid-connected electricity generation from renewable sources"
Reference: Approved consolidated baseline methodology ACM0002 (Version 09)

ACM0002 draws upon the following tools which have been used in the PDD:

- Tool to calculate the emission factor for an electricity system – Version 02
- Tool for the demonstration and assessment of additionality – Version 5.2

A.6. Registration date of the project activity:

>>
04/12/2010

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

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As per the registered PDD, the length of the Crediting period of the project activity is 10 years and 0 months (Fixed). The start date of the crediting period is 04/12/2010 and the end date will be 03/12/2020.

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

>>
Mahesh Makhija
Director – Business Development – Renewables
CLP Wind Farms (Khandke) Private Limited
(formerly known as "Roaring 40s Wind Farms (Khandke) Private Limited")
Off Western Express Highway, Goregaon (East),
15th Floor, Oberoi Commerz,
Mumbai
Maharashtra.
400 063
INDIA

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

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The first machine was commissioned on 18th February 2008 and the last machine was commissioned on 31st May 2008. The project activity consists of 24 machines of 800kW each amounting to a total of 19.2 MW.

The commissioning schedule is provided below:

S.No.	Unique Identification of WECs	Location No.	Date of Commissioning
1	R 40s K-22	105	18-Feb-08
2	R 40s K-23	106	18-Feb-08
3	R 40s K-24	107	18-Feb-08
4	R 40s K-25	108	18-Feb-08
5	R 40s K-26	109	18-Feb-08
6	R 40s K-27	111	18-Feb-08
7	R 40s K-28	114	18-Feb-08
8	R 40s K-29	116	18-Feb-08
9	R 40s K-30	117	18-Feb-08
10	R 40s K-31	98	31-Mar-08
11	R 40s K-32	225	12-May-08
12	R 40s K-33	226	12-May-08
13	R 40s K-34	21	23-May-08
14	R 40s K-35	217	31-Mar-08
15	R 40s K-36	218	31-Mar-08
16	R 40s K-37	219	31-Mar-08
17	R 40s K-38	220	31-Mar-08
18	R 40s K-39	146	12-May-08
19	R 40s K-40	147	28-May-08
20	R 40s K-41	148	23-May-08
21	R 40s K-42	149	12-May-08
22	R 40s K-43	150	12-May-08
23	R 40s K-44	151	31-May-08
24	R 40s K-45	152	28-May-08

The project activity has been implemented as per the description in the registered CDM PDD. The Project is owned by CLP Wind Farms (Khandke) Private Limited and Enercon is responsible for operation and maintenance of the wind farm. All the events are recorded in the log book available at the project site. During the monitoring period considered in this report, there was no major / special event for any of the machines that are included in the project activity. As part of regular maintenance, the machines are stopped for annual electrical & mechanical maintenance for 16 to 18 hours and for visual inspection for 3 to 6 hours quarterly.

No event or situation has occurred during this monitoring period, which impacts the applicability of the methodology

B.2. Revision of the monitoring plan

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Not Applicable

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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Not Applicable

SECTION C. Description of the monitoring system

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Approved monitoring methodology ACM0002 Version 09 Sectoral Scope: 1, "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources", by CDM - Meth Panel is proposed to be used to monitor the emission reductions.

This approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid, where *ex post* determination of grid emission factor has been chosen

Since the baseline methodology is based on ex ante determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required. Further, wind based electricity generation is not associated with any kind of leakages.

The Project is operated and managed by CLPWFK (formerly Roaring 40s). The operational and maintenance contract for the project is with Enercon. Enercon follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

The accuracy of monitoring parameter is ensured by adhering to the calibration and testing procedure. The project will adhere to all the mandatory regulatory and statutory requirements at the state as well as national level. Enercon is Operation and Maintenance contractor for the project activity and provides the daily generation report to the Project proponent. The project proponent also maintains the records of daily generation report and joint meter report.

Calibration Details
The metering equipment were inspected & calibrated by state utility. Meter calibration details are given in the table below:-

Metering Point	Meter No.	Meter Type	Accuracy Class	Test 1	Test 1 (Valid till)	Test 2	Test 2 (Valid till)
Feeder No. 1	4880812	Main	0.2	14/7/2010	13/7/2011	1/8/2011	31/7/2012
Feeder No. 2	4880814	Main	0.2	14/7/2010	13/7/2011	2/9/2011	1/9/2012
Feeder No. 3	4880816	Main	0.2	14/7/2010	13/7/2011	2/9/2011	1/9/2012

The first monitoring period of the project activity extends from 4th December 2010 to 31st December 2011. The results of all the 3 tests conducted are satisfactory and all the instruments are functioning within the maximum permissible limit. But due to the delay in conducting the tests, the calibration is not applicable for the following periods:

- Between 13/07/2011 and 01/08/2011 for Meter no. 04880812
- Between 13/07/2011 and 02/09/2011 for Meter no. 04880814
- Between 13/07/2011 and 02/09/2011 for Meter no. 04880816

As per Annex 60, EB 52 "Guidelines for Assessing Compliance with the Calibration Frequency Requirements" (Version 01), the maximum permissible error of the instrument needs to be applied to the measured values and the error shall be applied for all measured values taken during the period between the scheduled date of calibration and the actual date of calibration. As per guidance, the maximum permissible error has been applied conservatively to the monthly generation data considered for calculating emission reductions.

The line diagram describing the project layout is provided in Appendix 2.

Monitoring Information

- **Metering:** Electricity supplied to the grid is metered by MSEDCL in the presence of representatives of Enercon (O&M Contractor for the project activity) and MSEDCL.

- **Metering Equipment:** Metering system for the project activity consists of main and check meter. Both the meters are two-way trivector meters capable of recording import and export of electricity and provide output in the form of net electricity supplied to the grid. The metering equipment is maintained in accordance with electricity standards prevalent in Maharashtra.

- **Meter Readings:** The Net electricity supplied to the grid is recorded by taking a Joint Meter Reading (JMR) in the presence of Officials from off-taking Utility and Enercon, O&M contractor, on behalf of project owner. The Joint meter reading contains the value of energy imported and

exported and the net export to the grid during the recording period. This Joint meter reading is certified by the Executive engineer of the utility and by Enercon Officials. The procedure for calculating net electricity supplied to the grid is described under B.7.2. The net electricity supplied to the grid can be cross verified from the Energy Breakup Report certified by MSEDCL.

- **Inspection of Energy Meters:** All the main and check energy meters (export and import) and all associated instruments, transformers installed at the Project are of 0.2% accuracy class. Each meter is jointly inspected and sealed on behalf of the Parties and is not to be interfered with by either Party except in the presence of the other Party or its accredited representatives.

- **Meter Test Checking**: There is a separate check and main meter for each 33 kV bay. The Main Meter will be tested for accuracy, with a portable standard meter, by the MSEDCL's Testing Division; The MSEDCL will carry out the calibration, periodical testing, sealing and maintenance of meters. All the meters will be tested at the Metering Point. The MSEDCL will provide a copy of the test reports .If during any of the monthly meter readings, the variation between the main meter and the check meter is more than the permissible limit, all the meters will be re-tested and calibrated immediately by MSEDCL.

Apportioning Procedure Implemented by Enercon and Certified by MSEDCL

STEP 1: MEASURING ELECTRICITY GENERATION FOR EACH TURBINE

Electricity generation readings of the LCS meters on each Turbine are recorded on continuous basis and fed to the central monitoring system. Data on generation for each Turbine within the wind farm are accessed and archived electronically in the central monitoring system database.

Electricity generation from the project during a monitoring period connected to feeder 1 ($EG_{f1,gross,\ y}$), feeder 2 ($EG_{f2,gross,\ y}$) and feeder 3 ($EG_{f3,gross,\ y}$) is noted from central monitoring system database by Enercon as:

$$\sum_{y=0}^{N_{f1}} EG_{f1,gross,y}$$

$$\sum_{y=0}^{N_{f2}} EG_{f2,gross,y}$$

$$\sum_{y=0}^{N_{f3}} EG_{f3,gross,y}$$

Where N_{f1} = *number of Turbines comprising the Project activity connected to the feeder 1*

Where N_{f2} = *number of Turbines comprising the Project activity connected to the feeder 2*

Where N_{f3} = *number of Turbiness comprising the Project activity connected to the feeder 3*

Electricity generation from other Turbines connected to feeder 1 ($EG_{f1,gross,\ y}$) , feeder 2 ($EG_{f2,gross,\ y}$) and feeder 3 ($EG_{f3,gross,\ y}$) is noted from central monitoring system database by Enercon as:

$$\sum_{y=0}^{M_{f1}} EG_{f1,gross,x}$$

M_{f2}

$\sum EG_{f2,gross,x}$

y=0

M_{f3}

$\sum EG_{f3,gross,x}$

y=0

Where M_{f1} = number of Turbines that are not part of the project activity but are connected to the feeder 1.

Where M_{f2} = number of Turbines that are not part of the project activity but are connected to the feeder 2.

Where M_{f3} = number of Turbines that are not part of the project activity but are connected to the feeder 3.

STEP 2: DETERMINING ELECTRICITY EXPORTS FROM THE TURBINES

2.1 MEASURING AGGREGATE ELECTRICITY EXPORTS FROM THE FEEDER

Aggregate electricity exports, to the grid, from the turbines connected to feeder1, feeder 2 and feeder 3 is measured through the main and check meters installed at the 33kV side of the Substation. There are one set of main and check meter at each feeder. Joint Meter Reading (JMR) of the main and check meter is carried out on first day of every month in presence of the representatives of the Enercon (the O&M contractor) & the state electricity utility (MSETCL). The JMR gives both the "export" and "import" of the electricity to/ from the grid, which forms the basis on which the utility makes the payment to the project proponent. Electricity export and import for feeder 1, feeder 2 and feeder 3 is denoted as:

Electricity Export from feeder 1: $EG_{f1,JMR,export}$

Electricity Import from feeder 1: $EG_{f1,JMR,import}$

Electricity Export from feeder 2: $EG_{f2,JMR,export}$

Electricity Import from feeder 2: $EG_{f2,JMR,import}$

Electricity Export from feeder 3: $EG_{f3,JMR,export}$

Electricity Import from feeder 3: $EG_{f3,JMR,import}$

2.2 DETERMINING ELECTRICITY EXPORTS FROM PROJECT ACTIVITY

Net electricity exported by individual wind turbines is determined by MSEDCL by apportioning electricity export and electricity import to the project and non-project Turbines in proportion to their generated electricity.

This apportioning activity is carried out by Enercon, the O&M contractor. Operation and maintenance personnel from Enercon prepare a monthly report on generation and consumption. This report contains details of power exported/imported to/from the grid by each of the wind turbines connected to the feeder.

$EG_{f1,export}$ the electricity supplied to the grid by turbines of the project activity connected to feeder 1 is calculated as follows:

$$EG_{f1,export} = \frac{EG_{f1,JMR,\ export} \times \sum_{y=0}^{N} EG_{f1,gross,\ y}}{\left(\sum_{y=0}^{N} EG_{f1,gross,\ y} + \sum_{y=0}^{M} EG_{f1,gross,\ y}\right)}$$

$EG_{f1,import}$ the electricity drawn from the grid by turbines of the project activity connected to feeder 1 is calculated as follows:

$$EG_{f1,import} = \frac{EG_{f1,JMR,\ import} \times \sum_{y=0}^{N} EG_{f1,gross,\ y}}{(\sum_{y=0}^{N} EG_{f1,gross,\ y} + \sum_{y=0}^{M} EG_{f1,gross,\ y})}$$

$EG_{f1,}y$, the net electricity supplied to the grid by Turbines of the project activity connected to feeder 1, is calculated as follows:

$EG_{f1,}y = EG_{f1,export} - EG_{f1,import}$

Similarly for feeder 2, $EG_{f2,export}$, $EG_{f2,import}$ and $EG_{f2,}y$, is calculated as follows:
$EG_{f2,export}$ the electricity supplied to the grid by turbines of the project activity connected to feeder 2 is calculated as follows:

$$EG_{f2,export} = \frac{EG_{f2,JMR,\ export} \times \sum_{y=0}^{N} EG_{f2,gross,\ y}}{(\sum_{y=0}^{N} EG_{f2,gross,\ y} + \sum_{y=0}^{M} EG_{f2,gross,\ y})}$$

$EG_{f2,import}$ the electricity drawn from the grid by turbines of the project activity connected to feeder 2 is calculated as follows:

$$EG_{f2,import} = \frac{EG_{f2,JMR,\ import} \times \sum_{y=0}^{N} EG_{f2,gross,\ y}}{(\sum_{y=0}^{N} EG_{f2,gross,\ y} + \sum_{y=0}^{M} EG_{f2,gross,\ y})}$$

$EG_{f2,}y$, the net electricity supplied to the grid by Turbines of the project activity connected to feeder 2, is calculated as follows:

$EG_{f2,}y = EG_{f2,export} - EG_{f2,import}$

Similarly for feeder 3, $EG_{f3,export}$, $EG_{f3,import}$ and $EG_{f3,}y$, is calculated as follows:
$EG_{f3,export}$ the electricity supplied to the grid by turbines of the project activity connected to feeder 3 is calculated as follows:

$$EG_{f3,export} = \frac{EG_{f3,JMR,\ export} \times \sum_{y=0}^{N} EG_{f3,gross,\ y}}{(\sum_{y=0}^{N} EG_{f3,gross,\ y} + \sum_{y=0}^{M} EG_{f3,gross,\ y})}$$

$EG_{f3,import}$ the electricity drawn from the grid by turbines of the project activity connected to feeder 3 is calculated as follows:

$$EG_{f3,import} = \frac{EG_{f3,JMR,\ import} \times \sum_{y=0}^{N} EG_{f3,gross,\ y}}{(\sum_{y=0}^{N} EG_{f2,gross,\ y} + \sum_{y=0}^{M} EG_{f3,gross,\ y})}$$

$EG_{f3,}y$, the net electricity supplied to the grid by Turbines of the project activity connected to feeder 3, is calculated as follows:

$EG_{f3,}y = EG_{f3,export} - EG_{f3,import}$

Net electricity exported to the grid by the project activity is calculated as:

$EGy = EG_{f1,}y + EG_{f2,}y + EG_{f3,}y$

The meter reading from the LCS of each turbine is noted by CMS (Central Monitoring Station) directly in the soft format. The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the Turbines (Turbines). In case there is any mismatch in the energy values recorded by the LCS meter and

the energy values calculated by the inverting system; the machine will stop working and generate the error report.

Enercon operates an ISO 9001:2000 certified Quality Management system from Germanischer Lloyd. Enercon follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, construction, commissioning and operation of the wind power project. The accuracy of monitoring parameter is ensured by adhering to the calibration and testing procedure. The project will adhere to all the mandatory regulatory and statutory requirements at the state as well as national level. Enercon is Operation and Maintenance contractor for the project activity and provides the daily generation report to the Project proponent. The project proponent also maintains the records of daily generation report and joint meter report.

Mismatch in dates

In case the meter reading dates of the MSEDCL do not match the monitoring period, the data for that period of time (for which a separate MSEDCL statement will not be available) will be on the basis of the daily LCS meter readings taken by Enercon. The procedure for calculating the monthly generation in case such a situation arises will be as follows:

$$EG_{N,f\Gamma,export} = \frac{EG_{f\Gamma,export} \times \sum^{N} EG_{LCS,y}}{\sum^{M} EG_{LCS,y}}$$

Where

N = No. of days in a month upto when generation is considered for emission reduction calculation

M = No. of days in that month

$^{N}EG_{LCS,y}$ = LCS meter reading for N^{th} day

$EG_{f\Gamma,export}$ = Electricity exported in that month as per the JMR

$EG_{N,f\Gamma,export}$ = Electricity exported in that month upto N^{th} day

$$EG_{N,f\Gamma,import} = \frac{EG_{f\Gamma,import} \times \sum^{N} EG_{LCS,y}}{\sum^{M} EG_{LCS,y}}$$

Where

N = No. of days in a month upto when generation is considered for emission reduction calculation

M = No. of days in that month

$^{N}EG_{LCS,y}$ = LCS meter reading for N^{th} day

$EG_{f\Gamma,export}$ = Electricity imported in that month as per the JMR

$EG_{N,f\Gamma,export}$ = Electricity imported in that month upto N^{th} day

SECTION D. Data and parameters

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D.1. Data and parameters determined at registration and not monitored during the

monitoring period, including default values and factors	
Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO2e/MWh
Description:	Operating Margin Emission Factor of Western Regional Electricity Grid, now part of the NEWNE Grid (Fixed ex-ante as per the registered CDM PDD)
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) :	0.99455
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	To calculate Baseline Emission Factor
Additional comment:	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002.

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO2e/MWh
Description:	Build Margin Emission Factor of Western Regional Electricity Grid, now part of the NEWNE Grid (Fixed ex-ante as per the registered CDM PDD)
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) :	0.77722
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	To calculate Baseline Emission Factor
Additional comment:	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002.

Data / Parameter:	EF_y or $EF_{CM,y}$
Data unit:	tCO2e/MWh
Description:	Combined Margin Emission Factor of Western Regional Electricity Grid, now part of the NEWNE Grid (Fixed ex-ante as per the registered CDM PDD)
Source of data used:	Combined Margin Emission Factor ($EF_{CM,y}$) is calculated as the weighted average of Operating Margin Emission Factor ($EF_{OM,y}$) and Build Margin Emission Factor ($EF_{BM,y}$). "CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) :	In case of wind power projects default weights of 0.75 for EF_{OM} and 0.25 for EF_{BM} are applicable as per ACM0002. Combined Margin Emission Factor (EFy or $EF_{CM,y}$): 0.94022 Refer Section 5.2 for comprehensive calculation of Combined Margin Emission Factor.
Indicate what the data are used for (Baseline/ Project/ Leakage emission	To calculate Baseline Emission Factor

calculations)	
Additional comment:	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002.

D.2. Data and parameters monitored	
Data / Parameter:	$EG_{f1,JMR,export}$,$EG_{f2,JMR,export}$ and $EG_{f3,JMR,export}$
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported by all the Turbines connected to feeder1, feeder 2 and feeder 3(Turbines included in the project activity and Turbines that are not part of the project activity) at main (04880812-feeder 1, 04880814-feeder 2 and 04880816- feeder 3) and the check meter (04880813-feeder 1, 04880815- feeder 2 and 04880817- feeder 3) at 33 kV.
Measured /Calculated /Default:	Measured through 0.2 accuracy class main and check meters installed at the 33kV side of the Substation.
Source of data:	Joint meter reading records
Value(s) of monitored parameter:	Refer to Appendix 1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This value will not be directly used for estimation of emission reduction.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	0.2 accuracy class main and check meters installed at the 33kV side of the Substation Serial Numbers: Feeder 1 Main Meter: 04880812 Check Meter: 04880813 Feeder 2 Main Meter: 04880814 Check Meter: 04880815 Feeder 3 Main Meter: 04880816 Check Meter: 04880817
Measuring/ Reading/ Recording frequency:	Joint Meter Reading (JMR) of the main and check meter is carried out on first day of every month in presence of the representatives of the Enercon (the O&M contractor) & MSEDCL (distribution wing of Maharashtra state electricity board).
Calculation method (if	Not Applicable

applicable):	
QA/QC procedures applied:	Joint Meter Reading (JMR) of the main and check meter is carried out on first day of every month in presence of the representatives of the Enercon (the O&M contractor) & MSEDCL (distribution wing of Maharashtra state electricity board). It can be cross checked against sales invoices raised to state electricity utility. Electricity meters will be calibrated by MSEDCL (distribution wing of Maharashtra state electricity board) on annual basis.

Data / Parameter:	$EG_{f1,JMR,Import}$, $EG_{f2,JMR,Import}$ and $EG_{f3,JMR,Import}$
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity imported by all the Turbines (Turbines included in the project activity and Turbines that are not part of the project activity) connected to feeder1, feeder 2 & feeder 3 at main (04880812-feeder 1, 04880814-feeder 2 and 04880816- feeder 3) and the check meter (04880813-feeder 1, 04880815- feeder 2 and 04880817- feeder 3) at 33 kV.
Measured /Calculated /Default:	Measured through 0.2 accuracy class main and check meters installed at the 33kV side of the Substation.
Source of data:	Joint meter reading records
Value(s) of monitored parameter:	Refer to Appendix 1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This value will not be directly used for estimation of emission reduction.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Measured through 0.2 accuracy class main and check meters installed at the 33kV side of the Substation Serial Numbers: Feeder 1 Main Meter: 04880812 Check Meter: 04880813 Feeder 2 Main Meter: 04880814 Check Meter: 04880815 Feeder 3 Main Meter: 04880816 Check Meter: 04880817
Measuring/ Reading/ Recording frequency:	Joint Meter Reading (JMR) of the main and check meter is carried out on first day of every month in presence of the representatives of the Enercon (the O&M contractor) & MSEDCL (distribution wing of Maharashtra state electricity board).
Calculation method (if	Not Applicable

applicable):	
QA/QC procedures applied:	Joint Meter Reading (JMR) of the main and check meter is carried out on first day of every month in presence of the representatives of the Enercon (the O&M contractor) & MSEDCL (distribution wing of Maharashtra state electricity board). It can be cross checked against sales invoices raised to state electricity utility. Electricity meters will be calibrated by MSEDCL (distribution wing of Maharashtra state electricity board) on annual basis.

Data / Parameter:	$EG_{f1,y}$, $EG_{f2,y}$ and $EG_{f3,y}$
Data unit:	MWh (Mega-watt hour)
Description:	Net Electricity supplied to the grid by the WTGs of the project activity connected to feeder 1, feeder 2 & feeder 3.
Measured /Calculated /Default:	The main and the check meters are connected to the machines of the project activity and other WTGs that are not part of project activity but connected to feeder1, feeder 2 & feeder 3. The net electricity exported by the project activity is determined by system of apportioning wherein the aggregate electricity exports and imports (recorded by the main or check meter, as applicable) are allocated to project and non-project WECs in proportion to their generated electricity by MSEDCL. The apportioning will be done based on LCS meters readings of all WTGs connected to feeder 1, 2 and 3. The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WECs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. The project proponent does not have any control over the LCS meter readings of other project developers and therefore the values certified by the MSEDCL will be directly used for the purpose of calculating the electricity exports to the grid.
Source of data:	This value will be directly applied from **Energy Breakup Report** certified by MSEDCL
Value(s) of monitored parameter:	Refer to Appendix 1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emission Calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated from monitored parameters
Measuring/ Reading/ Recording frequency:	Monthly (Calculated)

Calculation method (if applicable):	Refer to Section C.
QA/QC procedures applied:	Not Applicable

Data / Parameter:	EGy
Data unit:	MWh (Mega-watt hour)
Description:	Net electricity supplied to the grid by the WTGs of the project activity
Measured /Calculated /Default:	The net electricity exported by the project activity is determined by apportioning of aggregate electricity exports and imports (recorded by the main or check meter, as applicable). The allocation is done by O&M contractor (Enercon) and apportioned values for energy export and import are certified by the MSEDCL in the Energy Breakup Report.
Source of data:	Net Electricity supplied to the grid is summation of net electricity supplied to the grid by the Turbines of the project activity connected to feeder 1 ($EG_{f1,y}$), net electricity supplied to the grid by the Turbines of the project activity connected to feeder 2 ($EG_{f2,y}$) and net electricity supplied to the grid by the Turbines of the project activity connected to feeder 3 ($EG_{f3,y}$).
Value(s) of monitored parameter:	44,328.022 MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emission Calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated from monitored parameters
Measuring/ Reading/ Recording frequency:	Monthly (Calculated)
Calculation method (if applicable):	Refer to Section C.
QA/QC procedures applied:	QA/QC procedures will be as implemented by MSEDCL pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PD.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2e/kWh) calculated in a transparent and conservative manner as the weighted average emissions (in kg CO2e/kWh) as described in registered PDD.

$$\mathbf{BE_y = EG_y * EF_y}$$

Where,

BE is baseline emissions in year y, tCO2e

EGy is the net electricity supplied to the grid in year y and is applied directly from JMR certified by state utility. This value can also be cross checked from the invoice. The details of electricity generation during the monitoring period are presented in Appendix 1.

EFy *is* the CO2 emission factor of the grid (940.22 tCO_2e/GWh fixed ex-ante).

Emission reduction calculation for the period 04/12/2010 to 31/12/2011:

Emission Reductions (ER) **=** 44,328.022 (MWh) * 0.94022 (tCO_2/MWh)

= **41,678 tCO_2**

E.2. Project emissions calculation

>>

Since the project activity is a renewable energy project which generates electricity using wind power therefore there are no resulting project emissions.

E.3. Leakage calculation

>>

No leakage is considered from the project activity as per approved methodology ACM0002 (Version 09).

E.4. Emission reductions calculation / table

>>

$BE_y = EG_y * EF_y$

Where,

BE is baseline emissions in year y, tCO2e

EGy is the net electricity supplied to the grid in year y and is applied directly from JMR certified by state utility. This value can also be cross checked from the invoice. The details of electricity generation during the monitoring period are presented in Appendix 1.

EFy *is* the CO2 emission factor of the grid (940.22 tCO_2e/GWh fixed ex-ante).

Emission reduction calculation for the period 04/12/2010 to 31/12/2011:

Emission Reductions (ER) **=** 44,328.022 (MWh) * 0.94022 (tCO_2/MWh)

= **41,678 tCO_2**

The total emission reductions achieved during the monitoring period is 41,678 tCO2.

Total baseline emissions: 41,678 tCO2
Total project emissions: Zero
Total leakage: Zero

Total Emission reductions, ER = BEy – Pey
= 41,678 tCO2

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

>>

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	**35,875** (12 months and 28 days equivalent of annual emission reduction presented in the PDD i.e 33,319)	41,678

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

>>

There is change of 16.18% on the higher side than the expected annual emission reductions. The difference in the total CERs is due to higher than estimated wind availability.

Appendix 1: Net Electricity Exported to Grid (EGy)

			EgF'i',Y	Dec-10			Jan-11			Feb-11		
Location No.	**Feeder No.**	**Commissioning Date**	**Unique Identification No.**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**
217	1	31-Mar-08	R 40s K-35	305523.3	210.0366	305313.2	209477	235	209242	282358	128	282230
218	1	31-Mar-08	R 40s K-36									
219	1	31-Mar-08	R 40s K-37									
220	1	31-Mar-08	R 40s K-38									
146	1	12-May-08	R 40s K-39	227947.7	156.2126	227791.5	161076	181	160895	167592	82	167510
149	1	12-May-08	R 40s K-42									
150	1	12-May-08	R 40s K-43									
148	1	23-May-08	R 40s K-41	68898.75	46.81282	68851.94	44489	50	44439	51939	26	51913
147	1	28-May-08	R 40s K-40	138205.2	95.25547	138109.9	91288	103	91185	100656	49	100607
152	1	28-May-08	R 40s K-45									
151	1	31-May-08	R 40s K-44	62709.2	42.86404	62666.34	43619	49	43570	48798	24	48774
105	2	18-Feb-08	R 40s K-22	636302.9	423.5052	635879.4	568446	562	567884	606102	732	605370
106	2	18-Feb-08	R 40s K-23									
107	2	18-Feb-08	R 40s K-24									
108	2	18-Feb-08	R 40s K-25									
109	2	18-Feb-08	R 40s K-26									
111	2	18-Feb-08	R 40s K-27									
114	2	18-Feb-08	R 40s K-28									
116	2	18-Feb-08	R 40s K-29									
117	2	18-Feb-08	R 40s K-30									
98	2	31-Mar-08	R 40s K-31	61668.45	41.04359	61627.4	58967	58	58909	53813	65	53748
225	2	12-May-08	R 40s K-32	152963.6	102.123	152861.5	133862	132	133730	124881	151	124730
226	2	12-May-08	R 40s K-33									
21	3	23-May-08	R 40s K-34	97178.92	63.3111	97115.61	77163	81	77082	78128	150	77978

			EgF'i',Y	Mar-11			Apr-11			May-11		
Location No.	**Feeder No.**	**Commissioning Date**	**Unique Identification No.**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**
217	1	31-Mar-08	R 40s K-35	378747	127	378620	493631	262	493369	735674	63	735611
218	1	31-Mar-08	R 40s K-36									
219	1	31-Mar-08	R 40s K-37									
220	1	31-Mar-08	R 40s K-38									
146	1	12-May-08	R 40s K-39	243173	82	243091	324602	172	324430	506208	43	506165
149	1	12-May-08	R 40s K-42									
150	1	12-May-08	R 40s K-43									
148	1	23-May-08	R 40s K-41	71357	24	71333	88638	47	88591	140659	12	140647
147	1	28-May-08	R 40s K-40	153231	51	153180	165253	88	165165	278374	24	278350
152	1	28-May-08	R 40s K-45									
151	1	31-May-08	R 40s K-44	68000	23	67977	78395	41	78354	134891	11	134880
105	2	18-Feb-08	R 40s K-22	974682	231	974451	929121	432	928689	1695008	197	1694811
106	2	18-Feb-08	R 40s K-23									
107	2	18-Feb-08	R 40s K-24									
108	2	18-Feb-08	R 40s K-25									
109	2	18-Feb-08	R 40s K-26									
111	2	18-Feb-08	R 40s K-27									
114	2	18-Feb-08	R 40s K-28									
116	2	18-Feb-08	R 40s K-29									
117	2	18-Feb-08	R 40s K-30									
98	2	31-Mar-08	R 40s K-31	83597	20	83577	80603	38	80565	175388	20	175368
225	2	12-May-08	R 40s K-32	172716	41	172675	215211	100	215111	450791	52	450739
226	2	12-May-08	R 40s K-33									
21	3	23-May-08	R 40s K-34	131643	62	131581	122600	115	122485	183290	21	183269

			EgF'i',Y	Jun-11			Jul-11			Aug-11		
Location No.	**Feeder No.**	**Commissioning Date**	**Unique Identification No.**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**
217	1	31-Mar-08	R 40s K-35	1531855	59	1531796	1158401	113	1155971	1308624	171	1305835
218	1	31-Mar-08	R 40s K-36									
219	1	31-Mar-08	R 40s K-37									
220	1	31-Mar-08	R 40s K-38									
146	1	12-May-08	R 40s K-39	1190175	45	1190130	921516	90	919583	1011341	132	1009186
149	1	12-May-08	R 40s K-42									
150	1	12-May-08	R 40s K-43									
148	1	23-May-08	R 40s K-41	373582	14	373568	283744	28	283148	315725	41	315052
147	1	28-May-08	R 40s K-40	706412	27	706385	580282	55	579066	627305	82	625968
152	1	28-May-08	R 40s K-45									
151	1	31-May-08	R 40s K-44	310849	12	310837	270031	26	269465	304123	40	303475
105	2	18-Feb-08	R 40s K-22	2616769	183	2616586	2071968	122	2067702	2271489	121	2266825
106	2	18-Feb-08	R 40s K-23									
107	2	18-Feb-08	R 40s K-24									
108	2	18-Feb-08	R 40s K-25									
109	2	18-Feb-08	R 40s K-26									
111	2	18-Feb-08	R 40s K-27									
114	2	18-Feb-08	R 40s K-28									
116	2	18-Feb-08	R 40s K-29									
117	2	18-Feb-08	R 40s K-30									
98	2	31-Mar-08	R 40s K-31	322851	23	322828	253941	15	253418	276814	15	276245
225	2	12-May-08	R 40s K-32	712681	50	712631	588451	34	587240	641864	34	640546
226	2	12-May-08	R 40s K-33									
21	3	23-May-08	R 40s K-34	276354	19	276335	197143	18	196731	211667	28	211216

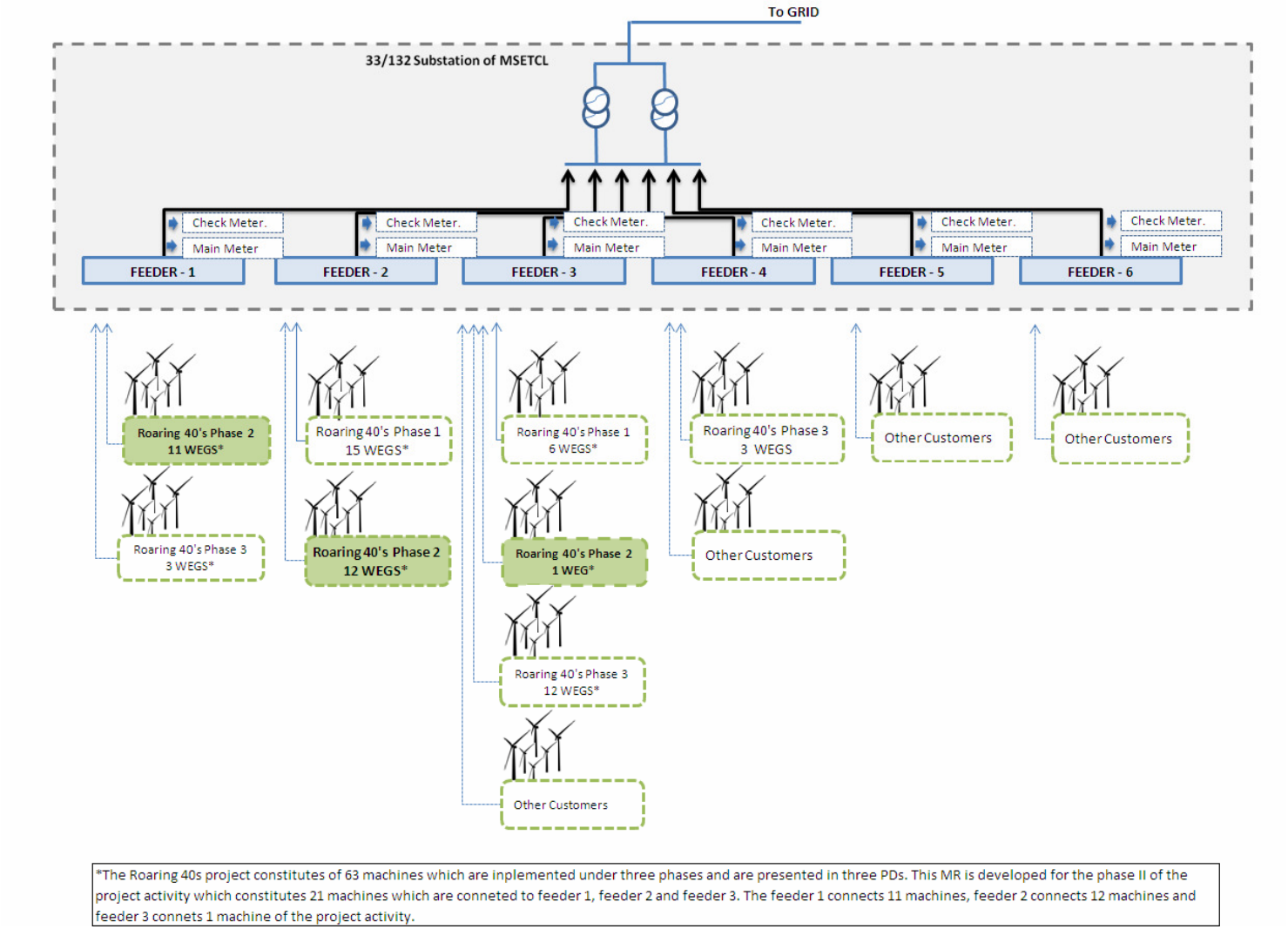
			EgF'i',Y	Sep-11			Oct-11			Nov-11		
Location No.	**Feeder No.**	**Commissioning Date**	**Unique Identification No.**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**
217	1	31-Mar-08	R 40s K-35	946539	179	944467	284326	316	284010	273564	61	273503
218	1	31-Mar-08	R 40s K-36									
219	1	31-Mar-08	R 40s K-37									
220	1	31-Mar-08	R 40s K-38									
146	1	12-May-08	R 40s K-39	704542	133	703000	205386	229	205157	205988	46	205942
149	1	12-May-08	R 40s K-42									
150	1	12-May-08	R 40s K-43									
148	1	23-May-08	R 40s K-41	219937	42	219455	51372	57	51315	52667	12	52655
147	1	28-May-08	R 40s K-40	417856	79	416941	105508	117	105391	111726	25	111701
152	1	28-May-08	R 40s K-45									
151	1	31-May-08	R 40s K-44	198289	38	197854	48671	54	48617	55867	12	55855
105	2	18-Feb-08	R 40s K-22	1482052	237	1478850	742610	634	741976	649154	144	649010
106	2	18-Feb-08	R 40s K-23									
107	2	18-Feb-08	R 40s K-24									
108	2	18-Feb-08	R 40s K-25									
109	2	18-Feb-08	R 40s K-26									
111	2	18-Feb-08	R 40s K-27									
114	2	18-Feb-08	R 40s K-28									
116	2	18-Feb-08	R 40s K-29									
117	2	18-Feb-08	R 40s K-30									
98	2	31-Mar-08	R 40s K-31	183445	29	183049	61223	52	61171	60014	13	60001
225	2	12-May-08	R 40s K-32	436656	70	435713	135214	115	135099	151159	34	151125
226	2	12-May-08	R 40s K-33									
21	3	23-May-08	R 40s K-34	137884	18	137590	104552	70	104482	97461	10	97451

			EgF'i',Y	Dec-11				
Location No.	**Feeder No.**	**Commissioning Date**	**Unique Identification No.**	**Export (kWh)**	**Import (kWh)**	**Net units (kWh)**		**Total (kWh)**
217	1	31-Mar-08	R 40s K-35	191487	185	191302		8091269
218	1	31-Mar-08	R 40s K-36					
219	1	31-Mar-08	R 40s K-37					
220	1	31-Mar-08	R 40s K-38					
146	1	12-May-08	R 40s K-39	141502	136	141366		6004246
149	1	12-May-08	R 40s K-42					
150	1	12-May-08	R 40s K-43					
148	1	23-May-08	R 40s K-41	36403	35	36368		1797337
147	1	28-May-08	R 40s K-40	81252	78	81174		3553224
152	1	28-May-08	R 40s K-45					
151	1	31-May-08	R 40s K-44	39691	38	39653		1661977
105	2	18-Feb-08	R 40s K-22	479400	350	479050		15707083
106	2	18-Feb-08	R 40s K-23					
107	2	18-Feb-08	R 40s K-24					
108	2	18-Feb-08	R 40s K-25					
109	2	18-Feb-08	R 40s K-26					
111	2	18-Feb-08	R 40s K-27					
114	2	18-Feb-08	R 40s K-28					
116	2	18-Feb-08	R 40s K-29					
117	2	18-Feb-08	R 40s K-30					
98	2	31-Mar-08	R 40s K-31	46567	34	46533		1717040
225	2	12-May-08	R 40s K-32	107845	79	107766		4019966
226	2	12-May-08	R 40s K-33					
21	3	23-May-08	R 40s K-34	62621	57	62564		1775879
							Total	**44328021.59**

MONTHLY GENERATION DATA:

Month	*$EG_{fi,export}$ (kWh)	*$EG_{fi,import}$ (kWh)	*EGfi,y (kWh)
Dec-10	1751398	1181	1750217
Jan-11	1388387	1451	1386936
Feb-11	1514267	1407	1512860
Mar-11	2277146	661	2276485
Apr-11	2498054	1295	2496759
May-11	4300283	443	4299840
Jun-11	8041528	432	8041096
Jul-11	6325477	501	6312324
Aug-11	6968952	664	6954349
Sep-11	4727200	825	4716919
Oct-11	1738862	1644	1737218
Nov-11	1657600	357	1657243
Dec-11	1186768	992	1185776
		Total Net Generation	**44328022**

Appendix 2: Line diagram of the project activity



*The Roaring 40s project constitutes of 63 machines which are inplemented under three phases and are presented in three PDs. This MR is developed for the phase II of the project activity which constitutes 21 machines which are conneted to feeder 1, feeder 2 and feeder 3. The feeder 1 connects 11 machines, feeder 2 connects 12 machines and feeder 3 connets 1 machine of the project activity.

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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		