

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

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* 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; Date: - 19/08/2011

Title of Project Activity
5 MW Wind Power Project of Alembic Ltd at Bhavnagar, Gujarat, India.
UNFCCC Reference Number: - 1456

Monitoring Period Number: 02
and
Monitoring Period Dates; 25/12/2008 - 31/12/2010
(first and last days included)

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

1. Purpose of the project activity & the measures taken to reduce green house gas emissions:

The Project activity is generating 5 MW of electricity with efficient utilization of the available wind energy through adoption of the latest, efficient and modern technology. The generated electricity is displacing equivalent electricity procured from Gujarat Urja Vikas Nigam Limited (GUVNL) in the Vadodara plant, as per the Alembic Limited requirements.

Alembic Limited, Vadodara have the ownership rights for the project activity and would be the sole transaction entity with the Executive Board of the United Nations Framework Convention on Climate Change.

2. Brief description of the installed technology and equipments;

Technology Employed

Alembic Limited has procured the Wind Energy Generators (WEGs) from Indian company M/S. Suzlon Energy Ltd. The technology is a clean and safe technology since there are no GHG emissions associated with the electricity generation. A direct grid-connected high-speed horizontal axis generator, in combination with the multiple-stage combined spur / planetary gearbox delivers harmonics-free and grid-friendly power. The technical details of the WEG are as follows:

Operating Data	S.64/1250 (50 Hz)
Rotor diameter	64m
Hub height	65m (Variable as per requirement)
Installed elec. Output	1250 kW
Cut-in wind speed	3 m/s
Rated wind speed	12 m/s

Cut-out wind speed	25 m/s
Survival wind speed	67 m/s

Rotor	S.64/1250 (50 Hz)
Swept area	3217 m ²
Blade type	3 blade horizontal axis
Rotational speed	13.9/20.8 rpm

Generator	S.64/1250 (50 Hz)
Type	Asynchronous 4/6 poles
Rated output	250/1250 kW
Rotational speed	1006/1506 rpm
Frequency	50 Hz

Gearbox	S.64/1250 (50 Hz)
Type	Integrated (1 planetary & 2 helical)
Ratio	74.917 :1

Yaw System	S.64/1250 (50 Hz)
Drive	4 electrical driven planetary gear box
Bearings	Polyamide slide bearings

Braking System	S.64/1250 (50 Hz)
Aerodynamic brake	3 independent systems with blade pitching
Mechanical brake	Hydraulic fail-safe disc brake system

Control Unit	S.64/1250 (50 Hz)
Type	Programmable microprocessor-based; high speed data communication, active multilevel

	security, sophisticated operating software, advance data collection remote monitoring & control option, UPS back up, Real time operation indication
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Tower	S.64/1250 (50 Hz)
Type	Lattice / Tubular, Hot Dip Galvanized, Epoxy / PU coated

Erection	S.64/1250 (50 Hz)
Type	With Crane

3. Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.)

The start date of the project activity is 08/07/2003 (Date of purchase order released) and 30/09/2003 is the Commissioning date of S-5, S-6 & S-7 WTGs of Alembic Limited and S-4 on 02/10/2003 and of the crediting period was 07/02/2008 which is date of registration of the project¹.

Commissioning date of each tower:

Sr. No.	Company	Tower	Commissioning date
1	Alembic Limited	S-4	02/10/2003
		S-5	30/09/2003
		S-6	30/09/2003
		S-7	30/09/2003

4. Total emission reductions achieved in this monitoring period

The total emission reduction achieved during this current monitoring period (25/12/2008 - 31/12/2010) is 16,311 tCO₂e.

A.2. Project Participants

Name of Party Involved	Private and/or Public entity (ies) Project Participants	Kindly indicate if the Party involved wishes to be considered as Project Participant (Yes/No)
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¹ <http://cdm.unfccc.int/Projects/DB/RWTUV1196336030.26/view>

India (Host)	Alembic Limited (Private Entity)	No
A.3. Location of the project activity:		

Project Location:

The project site is located at Ukharla Trambak in the district of Bhavnagar and in the Indian state of GUJARAT. Bhavnagar is approximately at 250 kms from AHMEDABAD.

The site Ukharla has a latitude and longitude of around 21° 34' 23.2'' N & 72° 05' 52.1'' E respectively. It is located at approximately 225 meters from the mean sea level. These sites have been identified as ideally suited for wind power generation based on the studies and data analysis carried out by eminent agencies like M/s Suzlon Energy Ltd. The feasibility of these sites for wind power production has been established by Ministry of Non Conventional Energy Sources, Govt. of India.

<u>Sr. No</u>	<u>Turbine</u>	<u>Survey Number as per Power Wheeling Agreement with GETCO</u>
<u>1</u>	<u>S4</u>	<u>46/P1</u>
<u>2</u>	<u>S5</u>	<u>30/P1</u>
<u>3</u>	<u>S6</u>	<u>30/P2</u>
<u>4</u>	<u>S7</u>	<u>30/P3</u>

A.4. Technical description of the project

Technology Employed

Alembic Limited has procured the Wind Energy Generators (WEGs) from Indian company M/S. Suzlon Energy Ltd. The technology is a clean and safe technology since there are no GHG emissions associated with the electricity generation. A direct grid-connected high-speed horizontal axis generator, in combination with the multiple-stage combined spur / planetary gearbox delivers harmonics-free and grid-friendly power. The technical details of the WEG are as follows:

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Yaw System	S.64/1250 (50 Hz)
Drive	4 electrical driven planetary gear box
Bearings	Polyamide slide bearings

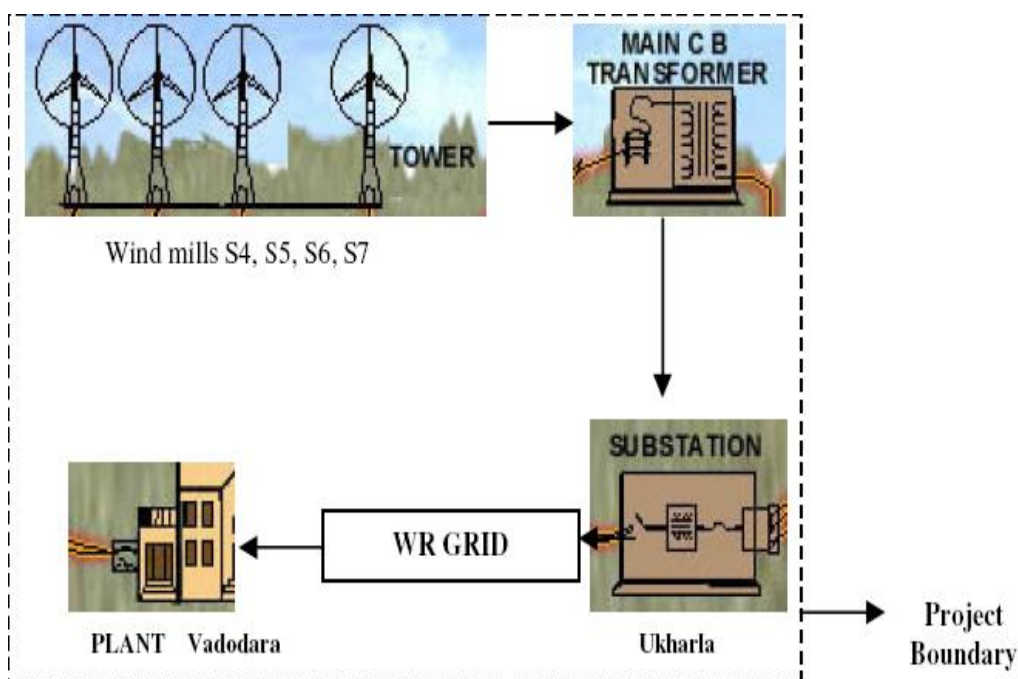
Braking System	S.64/1250 (50 Hz)
Aerodynamic brake	3 independent systems with blade pitching
Mechanical brake	Hydraulic fail-safe disc brake system

Control Unit	S.64/1250 (50 Hz)
Type	Programmable microprocessor-based; high speed data communication, active multilevel security, sophisticated operating software, advance data collection remote monitoring & control option, UPS back up, Real time operation indication

Tower	S.64/1250 (50 Hz)
Type	Lattice / Tubular, Hot Dip Galvanized, Epoxy / PU coated

Erection	S.64/1250 (50 Hz)
Type	With Crane

The diagram below represents the Project Boundary:



Definitions & Interpretations:

1. ABT meter - Availability Based Tariff Meter

Energy recorded in (ABT) meter is in every 15 minutes basis. Data storage capacity varies from manufacturer to manufacturer.

2. TVM - Tri Vector Meter

Energy recorded in (TVM) meter is in half hourly basis. Data storage capacity of TVM meter is 35 days.

3. GUVNL - Gujarat Urja Vikas Nigam Limited

The GUVNL is engaged in the business of bulk purchase and sale of electricity, Supervision, Co-ordination and facilitation of the activities of its six Subsidiary Companies.

GUVNL & its subsidiary companies are as follows:

- i) Gujarat State Electricity Corporation Ltd
- ii) Gujarat Energy Transmission Corporation Ltd.
- iii) Madhya Gujarat Vij Company Ltd
- iv) Uttar Gujarat Vij Company Ltd
- v) Paschim Gujarat Vij Company Ltd.
- vi) Dakshin Gujarat Vij Company Ltd.

4. GEDA - Gujarat Energy Development Agency

5. **SLDC Gujarat - State Load Dispatch Centre, Gujarat:** SLDC issues certificate for share of electricity generated by wind farm on periodic monthly basis.
6. **S/S - Sub Station**
7. **OEM - Original Equipment Manufacturer** – M/s Suzlon Energy Ltd, & M/s Suzlon Infra Structures Service Ltd
8. **Energy Meter monitoring responsibility:**
 - i) 33kV metering point: OEM
 - ii) 66 kV metering point: GUVNL & its subsidiary companies/ GEDA.
9. **33/66kV switch yard (S/S)**
This is the single switch yard where 33kV common supply (generated from all WTGs) is step-up to 66kV voltage level & connected with state grid.
10. **Electricity Supplied** - It means the kWh/MWh supplied to the system, which is difference of export and import.
11. **Periodic Monthly** - Cut off date for initial and final value of energy meter reading, decided by GUVNL & its subsidiary companies/GEDA/SLDC.
12. **Periodic Year** - Duration of each monitoring period.
13. **Net** - It is the difference between export and import.
14. **Export** - Electricity supplied to the system
15. **Import** - Electricity taken from the system
16. **kWh** - Kilo Watt Hour
17. **V** - Volt
18. **kV** - Kilo Volt
19. **CT** - Current Transformer
20. **PT** - Potential Transformer

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

As defined under Appendix B of simplified modalities and procedures for small-scale CDM project activities, the project activity falls under following project types and categories:
The project activity has applied following baseline and monitoring methodology,

Project Type: I – Renewable Energy projects
 Project Category: . I.D – Grid connected renewable electricity generation (Version 11)²
 Reference: ‘Appendix B of the simplified M&P for small-scale CDM project activities.
 Methodology AMS.I.D also refers to:
 Revision to the approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”
 And
 Revision to the approved consolidated methodology ACM0002:consolidated monitoring methodology for zero- emissions grid-connected electricity generation from renewable sources”.

Scope No: 1

Sectoral Scope Energy Industries: (renewable - / non- renewable sources).

A.6. Registration date of the project activity:

²

http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_UYF1PQNDY5FZ4VH4HZ28FYA_P13SI9W

The project was registered as CDM project activity with UNFCCC (Ref Number 1456) on 07/02/2008 and the details of the same can be viewed on <http://cdm.unfccc.int/Projects/DB/RWTUV1196336030.26/view>.

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

This project activity has considered fixed crediting period of 10 years 0 Months. The start date of the crediting period is from the date of registration viz 07/02/2008.

Crediting Period 07 February 2008 - 06 February 2018 (Fixed)

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

Contact information of the person & entity responsible for completing the monitoring report form (CDM-MR) is as below.

Organization:	Alembic Limited.
Street/P.O.Box:	Alembic Road
Building / Location:	---
City:	Vododara
State/Region:	Gujarat
Postfix/ZIP:	390003
Country:	India
Telephone:	0091 – 0265 – 2280550
FAX:	0091 – 0265 – 2281508
E-Mail:	infoal@alembic.co.in
URL:	http://www.alembic-india.com
Represented by:	
Title:	Director & President
Salutation:	Mr.
Last Name:	Baheti
Middle Name:	K
First Name:	R

Department:	Finance
Direct FAX:	0091 –265 – 228 2506
Direct tel:	0091 – 265 – 228 5124
Personal E-Mail:	Rajkumar_baheti@alembic.co.in

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

1. Starting date of the operation of the project activity is 30th September 2003 which is the commissioning date of S-5, S-6,S-7 WTG,s and S-4 WTG is commissioned on 2nd October 2003.
2. The project activity consists of four number WTG's of 1.25 MW capacities totalling to 5 MW capacity and supplying the entire electricity to the state grid. There has been no major downtime of equipments, overhaul times or exchange of equipments in the project activity during the current monitoring period. There has been a change in meters during the current monitoring period. Availability Based Tariff Meter (ABT meter) came into use from April, 2010 onwards. Prior to that Tri Vector Meter was in use.
3. There are no situations of events that occurred during the current monitoring period which may impact the applicability of the applied methodology.

B.2. Revision of the monitoring plan

The monitoring plan has been revised by the PP for improving the accuracy and completeness of the monitoring system. The revised monitoring plan was approved by the CDM EB on 21st July 2011³.

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

Not applied for any deviation.

B.4. Notification or request of approval of changes

The PP has not raised a notification or request of changes from the project activity as described in the registered CDM PDD during the current monitoring period.

SECTION C. Description of the monitoring system

Monitoring of electricity supplied to Grid

Monitoring plan:

³ <http://cdm.unfccc.int/UserManagement/FileStorage/6G2BV378JKS0XOUNFLZMQ9EPDHCI1R>

The sole objective of having a monitoring system is to have a constant watch on the emission reductions.

Metering of net electricity supplied to grid performed at 66 kV Sub – Station, its aggregation and recording activity is done by GUVNL & its subsidiary companies / GEDA supported by OEM, its calculation activity is done by GEDA and its reporting is done by ⁴GEDA / SLDC.

Metering equipment have Electronic Tri Vector Meters (TVM) / ⁵Availability Based Tariff Meter (ABT meter). The metering equipment (TVM / ABT) maintained by GUVNL & its subsidiary companies. The monthly meter readings at the project sites and the receiving station recorded from TVM/ABT Meter.

At the conclusion of each meter reading, an appointed representative of GUVNL & its subsidiary companies / GEDA submit it to SLDC – Gujarat and GEDA/SLDC issues certificate for share of electricity generated by wind farm on periodic monthly basis.

Each meter shall be jointly tested & calibrated and sealed on behalf of GUVNL & its subsidiary companies / GEDA by its authorised representatives.

Measurement/ Recording Procedure:

- a) The project activity have 2 steps metering at 33 kV S/S & 66 kV S/S.
- b) Step -1: OEM facilitates recording of the electricity generated at 33 kV S/S by TVM/ABT meter.
- c) Step -2: The WTGs of a single customer (Alembic Ltd in this case) at a particular site are connected to 33kV S/S, which in-turn connected with 33/66 kV S/S, have TVM/ABT meter. The metering equipment (TVM / ABT) maintained by GUVNL & its subsidiary companies. Data monitoring takes place at the 33 kV meter of 33 kV S/S & 66 kV S/S meter of 33/66 kV S/S.
- d) The electricity metered at the 66 kV meter is proportionally divided among the customers. The emission reduction calculations are done on the basis of the 66kV meter reading (Net electricity substituted in the grid during the periodic year y) as mentioned in the share certificate issued by GEDA / SLDC on monthly basis. WTGs of various project promoters at the site, are connected with TVM/ ABT energy meter at the pooling sub-station installed by GUVNL & its subsidiary companies at 33/66 kV S/S. Meter reading at 66 kV meter is recorded by GUVNL & its subsidiary companies / GEDA, submit it to SLDC – Gujarat and GEDA/SLDC issues certificate for share of electricity generated by wind farm on periodic monthly basis.

Project Participant has no role in the entire procedure of Measurement / Recording.

The allocation of electricity is executed as per the following procedure:

1. Enter the value of electricity received from W/M at 33 KV S/S (kWh).
2. Enter the value of electricity supplied to W/M at 33 KV S/S (kWh).
3. Take the difference of electricity received and supplied to W/F at 33 KV S/S (kWh) [$EG_{\text{meter A}}$]

⁴ Reporting authority has changed from GEDA to SLDC. Thus, SLDC is now the reporting authority from April 2010 onwards. Prior to that GEDA was the reporting authority.

⁵ Availability Based Tariff Meter (ABT meter) came into use from April 2010 onwards. Prior to that Tri Vector Meters (TVM) was in use.

4. Take the difference of electricity as per the above steps 1 to 3 for each of the 33 kV S/S meters (i) connected to the 66 kV S/S metering point of Alembic Limited. $[EG_{\text{meter},i}]$ and take the total of these differences $[EG_{\text{meter A}} + \sum EG_{\text{meter},i}]$
5. Divide individual difference by total calculated as per step 4 and multiply by 100 to find %.

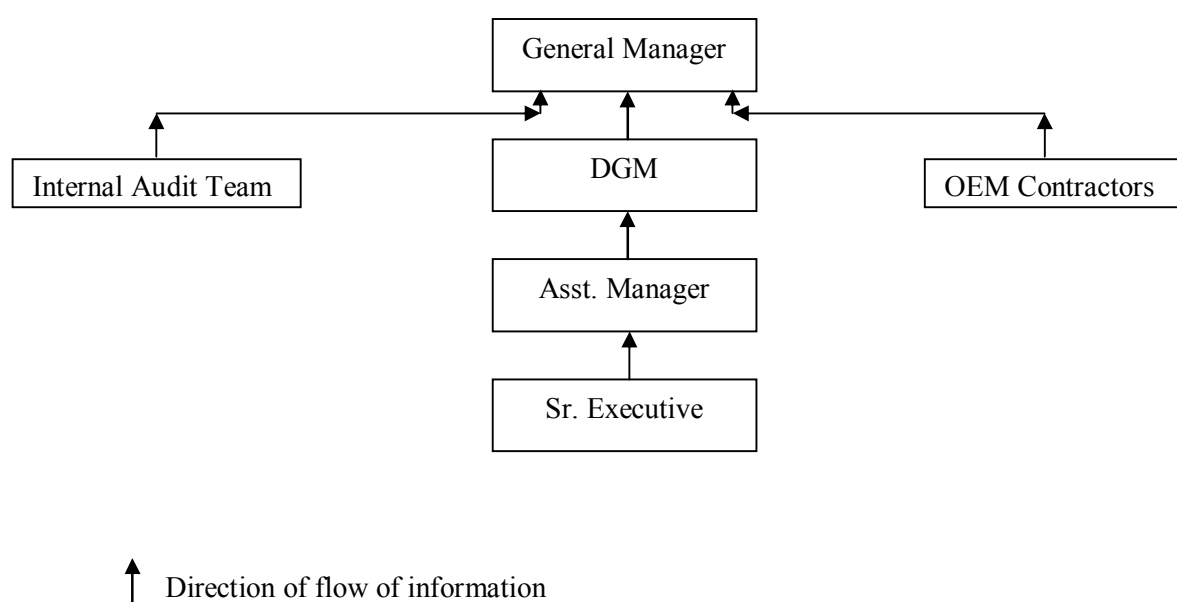
$$[EG_{\text{meter A}} / (EG_{\text{meter A}} + \sum EG_{\text{meter},i}) \times 100]$$
6. Enter the value of electricity received from W/M at 66 KV S/S (kWh).
7. Enter the value of electricity supplied to W/M at 66 KV S/S (kWh).
8. Take the difference of electricity received and supply to W/F at 66 KV S/S (kWh $[EG_{\text{meter},T}]$
9. Multiply the value calculated as per step 8 by % allocation calculated as per step 5 to calculate the net electricity export allocated to Alembic Limited.

Roles and responsibilities:

General Manager: In the project management structure General Manager is responsible for the project management. He is responsible to plan and allocate the annual budget for operation, estimation of the likely operating cost, electricity dispatch, organizing third party contractors, revenue collection etc.

General Manager will check the monthly electricity generated and annual emission reduction calculations. He is responsible for any leakage of emissions in the project boundary.

Operation and maintenance of wind generators will be done by OEM and they will be responsible to inform General Manager.



Deputy General Manager: DGM is assisting to General Manager for completing the task discussed above. He is responsible for the electricity generations at the individual wind turbine installations. He will crosscheck the log book regularly and report to General Manager for any abnormality.

Sr. Executive/Ass Manager: Sr. Executive/asst. manger is responsible for recording the electricity meter reading.

Record Handling: OEM contractors are collecting daily report obtained from hourly monitoring with all the related parameters. All the records are given to General Manager every month. The GM has final responsibility for record keeping.

Internal Audits and performance review

These records are regularly audited and checked by the senior officials from Alembic Limited during their visits to the site. The Alembic Ltd representative have visited the site and audited the records. The Alembic Ltd Representative has crosschecked the emissions reductions claimed in PDD with respect to actual emissions reduction. The audit records will be provided to DOE during verification.

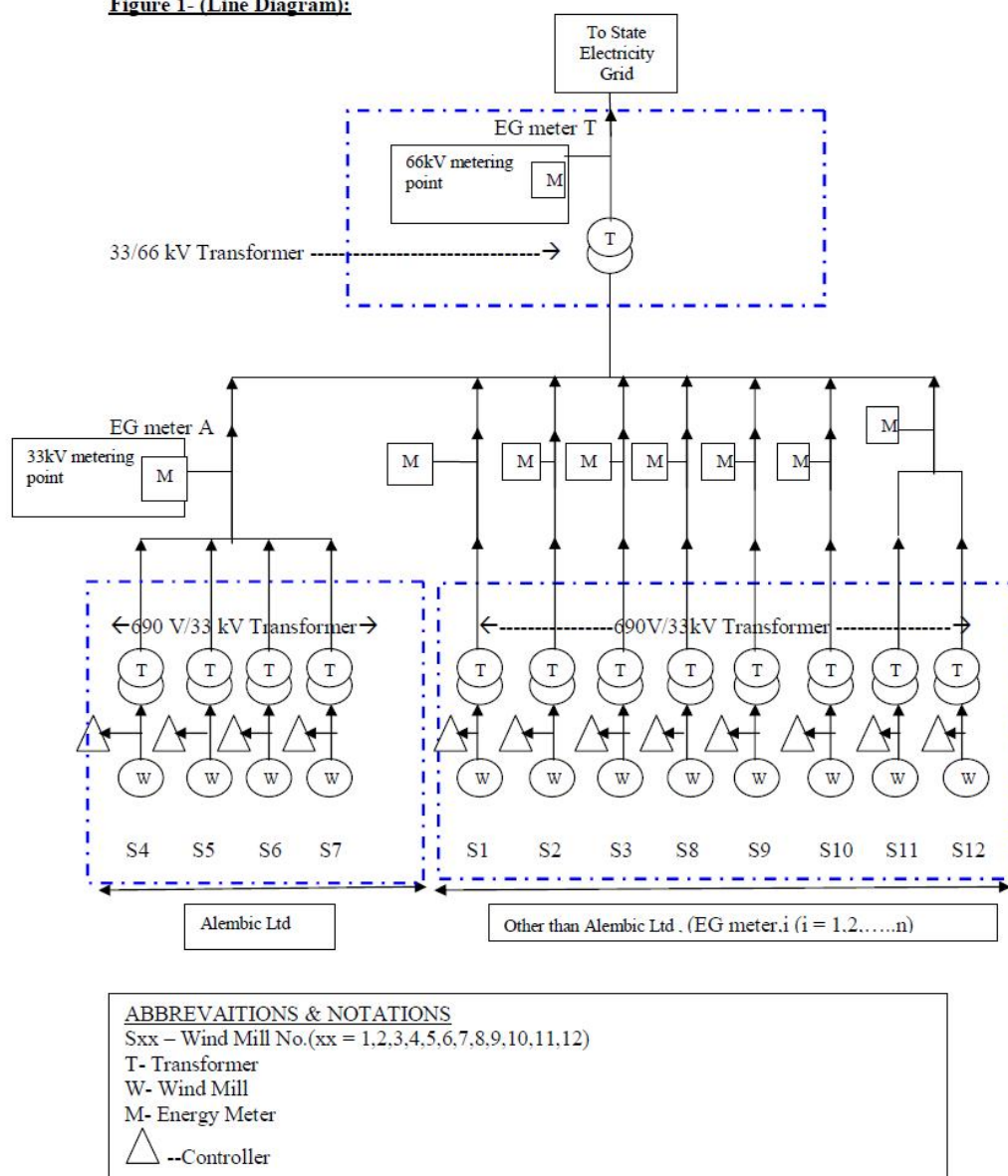
Monitoring and Calibration

As emission reductions from the project are determined by the number of units supplied to the grid, it is mandatory to have a monitoring system in place and ensure that the project activity produces and exports the rated power at the stipulated norms. The sole objective of having monitoring system is to have a constant watch on the emission reductions.

Necessary records of calibration are undertaken by GEDA/SLDC/ GUVNL & its subsidiary companies.

Project Participant has no role in the entire procedure.

Figure 1- (Line Diagram):



The number of non-CDM project activity WTG connected to 66 kV meter are 8. The list of these WTG along with name and capacity are provided in table below:

Sr No	Other WTG Details	Installed Capacity (MW)
1	Alembic Ltd, Vadodara- (S4,S5,S6,S7)	5
2	Samay Electronics Pvt Ltd, Morbi	1.25
3	Umedica Laboratories Ltd, Mumbai	0.7
4	Real Strips Ltd, Ahmedabad	1.25
5	Raajratna metal Ind, Ahmedabad	1.25
6	Intas Pharmaceuticals Ltd, Ahmedabad	1.25
7	Jaybharat Dying & printing Pvt. Ltd, Stuart	1.25
8	Ratnamani Metal & Tubes Ltd.,Ahmedabad	1.25

Note: PP would like to mention that the number of non-CDM project activity WTG connected to 66 kV meter is not in control of project participant. This authority only lies with GUVNL and its subsidiary companies and the combination could be change. The name of the WTG owners can also change in event of sale of WTG by existing customers. Such changes will directly be reported in monitoring report during periodic monitoring.

ABBREVAITIONS & NOTATIONS

Sxx – Wind Mill No.(xx = 1,2,3,4,5,6,7,8,9,10,11,12)

T- Transformer

W- Wind Mill

M- Energy Meter



--Controller

5 MW Wind Power Project of Alembic Ltd at Bhavnagar, Gujarat, India

SECTION D. Data and parameters

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

Data / Parameter:	EF _{west}
Data unit:	tCO ₂ / MWh
Description:	Emission Factor of western grid
Source of data used:	CEA data base
Value(s) :	0.906
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The data is used for calculating the baseline emissions.
Additional comment:	This data is fixed ex - ante for the entire crediting period. Reference: http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

D.2. Data and parameters monitored

Data / Parameter:	EG _y
Data unit:	MWh
Description:	Net electricity substituted in the grid during the periodic year y
Measured /Calculated /Default:	Import and Export values are measured and based on these values GEDA/SLDC/GUVNL and its subsidiary calculates the net electricity exported (EG _y)
Source of data:	CERTIFICATE FOR SHARE OF ELECTRICITY GENERATED BY WIND FARMS ISSUED BY GEDA/SLDC/ GUVNL & its subsidiary companies, which ever applicable.
Value(s) of monitored parameter:	18003.544
Indicate what the data are used for	Data is used for Baseline Emissions Calculation.

(Baseline/ Project/ Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The value is calculated and not monitored. Hence not applicable.
Measuring/ Reading/ Recording frequency:	Recording frequency –Periodic Monthly
Calculation method (if applicable):	<p>The allocation of electricity is executed as per the following procedure:</p> <ol style="list-style-type: none"> 1. Enter the value of electricity received from W/M at 33 KV S/S (kWh). 2. Enter the value of electricity supplied to W/M at 33 KV S/S (kWh). 3. Take the difference of electricity received and supplied to W/F at 33 KV S/S (kWh) [$EG_{\text{meter A}}$] 4. Take the difference of electricity as per the above steps 1 to 3 for each of the 33 kV S/S meters (i) connected to the 66 kV S/S metering point of Alembic Limited. [$EG_{\text{meter,i}}$] and take the total of these differences [$EG_{\text{meter A}} + \sum EG_{\text{meter,i}}$] 5. Divide individual difference by total calculated as per step 4 and multiply by 100 to find %. $[EG_{\text{meter A}} / (EG_{\text{meter A}} + \sum EG_{\text{meter,i}}) \times 100]$ 6. Enter the value of electricity received from W/M at 66 KV S/S (kWh). 7. Enter the value of electricity supplied to W/M at 66 KV S/S (kWh). 8. Take the difference of electricity received and supply to W/F at 66 KV S/S (kWh) [$EG_{\text{meter,T}}$] 9. Multiply the value calculated as per step 8 by % allocation calculated as per step 5 to calculate the net electricity export allocated to Alembic Limited.
QA/QC procedures applied:	<p>i) The net electricity supplied to the grid can be cross verified with the monthly bill issued by GUVNL & its subsidiary companies to Alembic Limited.</p> <p>ii) In case of malfunction of both 33kV & 66 kV meter PP will not claim emission reduction for period of malfunction. In the current monitoring period there is no instance of failure or malfunction of the meters. Hence not applicable.</p>

Data / Parameter:	$EG_{\text{meter A}}$
Data unit:	kWh
Description:	Net Electricity Supplied by WTG of Alembic Limited (33 kV S/S to 66 kV S/S point).
Measured /Calculated /Default:	Measured & Calculated
Source of data:	Electricity Bifurcation reading issued by OEM on periodic monthly

	basis for “CERTIFICATE FOR SHARE OF ELECTRICITY GENERATED BY WIND FARMS”
Value(s) of monitored parameter:	18256282
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data is used for Baseline Emissions Calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<p><u>Monitoring Equipment Type:</u> TVM / ABT meter (only TVM meter was used in current monitoring period) Accuracy:0.2s Serial Number: GJB00131 GJU02843 GJB03550</p> <p><u>Calibration Frequency:</u> Once a Year ⁶ OR Once in a Three Years⁷. Date of Last calibration : Serial Number: GJB00131 – calibrated on 15.01.2009 GJU02843 – calibrated on 25.11.2009 GJB03550 – calibrated on 26.11.2010. <u>Validity: One Year (for TVM meter)</u></p>
Measuring/ Reading/ Recording frequency:	<p><u>Monitoring Frequency:</u> Continuous Recording: periodic monthly</p>
Calculation method (if applicable):	<p>The allocation of electricity is executed as per the following procedure:</p> <ol style="list-style-type: none"> 1. Enter the value of electricity received from W/M at 33 KV S/S (kWh). 2. Enter the value of electricity supplied to W/M at 33 KV S/S (kWh). 3. Take the difference of electricity received and supplied to W/F at 33 KV S/S (kWh) [$EG_{\text{meter A}}$]
QA/QC procedures applied:	<p>i) In case, 33 kV Meter fails or malfunction, it will be sent for repair / replacement by OEM. (a) In this case readings of Controller, installed on each WTG (All WTG connected with 33 kV & finally to 66 kV Meter) will be considered for calculation of electricity exported by project activity to grid. Calculation will be performed on the highest percentage loss considering the reading of “Generation at Controller” & 33 kV Meter reading from the historical verified values from previous verification (From start of crediting period to most recent JMR available at the start of verification). Furthermore the highest transmission losses between 33 kV and 66 kV S/S point will be considered from 33 kV and 66 kV meter value (From start of crediting period to most recent JMR available at the start of verification). (b) For the electricity import, following method is applicable. The 66 kV meter provides the electricity imported by the WTGs connected to the sub-station meter. Highest historical % allocation (From start of crediting period to most recent JMR available at the start of verification) will be considered while calculating electricity imported by the project activity from grid. (c) The net electricity exported to the grid will be difference</p>

⁶ FOR TVM METER :

⁷ FOR ABT METER IF IT INSTALLED IN FUTURE

	<p>of (a) and (b). It is also possible that GUVNL & its subsidiary companies may come up with their approach. Conservative value which will lead to conservative emission reduction will be selected by the PP in that case.</p> <p>ii) Calibration of Controller at WTG: MITA Controller WP 3000 is a micro-processor based intelligent controller which has been specially designed to control the wind turbines ,where control functions , data collection & storage , real time grid monitoring, storage & such other functions are integrated. In order to measure Electrical Energy & Grid Parameters, the controller uses an interface card WP 3090. The controller has three current inputs from CT and three voltage inputs from PT. The analog values of current/voltage are converted into digital signal internally using A/D Converters at very high sampling rate. A software program reads these values and displays instantaneous values of parameters such as voltage, current, frequency, power factor, kVA, kVAr and kW. These instantaneous values are then time integrated to display kVAh, kVARh,kWh & stored . WP 3000 being main controller for controlling entire turbine operation & is calculating energy generation with the basic signal of CT & PT connected to through I/O hence , not possible to calibrate.</p> <p>iii) It is also possible that GUVNL & its subsidiary companies may come up with their approach. Conservative value which will lead to conservative emission reduction will be selected by the PP in that case.</p> <p>In the current monitoring period there is no instant of failure or malfunction of the meters.Hence not applicable.</p>
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Data / Parameter:	$EG_{meter,i}$ ($i = 1,2,\dots,n$)
Data unit:	kWh
Description:	Net electricity supplied WTG of PP other than Alembic Limited (33 kV S/S to 66 kV S/S point).WTG i.
Measured /Calculated /Default:	Measured & Calculated
Source of data:	Electricity Bifurcation reading issued by OEM on periodic monthly basis for “CERTIFICATE FOR SHARE OF ELECTRICITY GENERATED BY WIND FARMS”
Value(s) of monitored parameter:	29346251
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data is used for Baseline Emissions Calculation.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Manager (OEM) is responsible to undertake regular calibration of the meter by GUVNL and its subsidiary. PP has no control on the calibration of meters of PP other than their own Meter.

Measuring/ Reading/ Recording frequency:	<u>Monitoring Frequency:</u> Continuous Recording: Periodic monthly
Calculation method (if applicable):	The allocation of electricity is executed as per the following procedure: 1. Enter the value of electricity received from W/M at 33 KV S/S (kWh). 2. Enter the value of electricity supplied to W/M at 33 KV S/S (kWh). 3. Take the difference of electricity received and supplied to W/F at 33 KV S/S (kWh) [$EG_{\text{meter A}}$]. 4. Take the difference of electricity as per the above steps 1 to 3 for each of the 33 kV S/S meters (i) connected to the 66 kV S/S Metering point of Alembic Limited. [$EG_{\text{meter,i}}$] and take the total of these differences [$EG_{\text{meter A}} + \sum EG_{\text{meter,i}}$] 5. Divide individual difference by total calculated as per step 4 and multiply by 100 to find %. $[EG_{\text{meter A}} / (EG_{\text{meter A}} + \sum EG_{\text{meter,i}}) \times 100]$
QA/QC procedures applied:	In case, 33 kV Meter fails or malfunction, it will be sent for repair / replacement by OEM.

Data / Parameter:	EG _{meter T}									
Data unit:	MWh									
Description:	Net electricity supplied at 66 kV Meter.									
Measured /Calculated /Default:	Measured & Calculated									
Source of data:	CERTIFICATE FOR SHARE OF ELECTRICITY GENERATED BY WIND FARMS ISSUED BY GEDA/SLDC/ GUVNL & its subsidiary companies, which ever applicable.									
Value(s) of monitored parameter:	46932.112									
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Data is used for Baseline Emissions Calculation.									
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<div>Monitoring Equipment Type: TVM / ABT meter will be used for monitoring.</div> <table><tr><th>Meter</th><th>Serial Number</th><th>Accuracy class</th></tr><tr><td>TVM</td><td>GJB0265</td><td>0.5s</td></tr><tr><td>ABT</td><td>GJ – 2129-A</td><td>0.2s</td></tr></table> <div>Calibration Frequency: Once a Year ⁸ OR Once in a Three Years⁹. Date of Last calibration :</div>	Meter	Serial Number	Accuracy class	TVM	GJB0265	0.5s	ABT	GJ – 2129-A	0.2s
Meter	Serial Number	Accuracy class								
TVM	GJB0265	0.5s								
ABT	GJ – 2129-A	0.2s								

⁸ FOR TVM METER :

⁹ FOR ABT METER IF IT INSTALLED IN FUTURE

	Serial Number: GJB0265 – calibrated on 19.12.2009 – TVM ¹⁰ meter GJB0265 – calibrated on 16.12.2010 – TVM meter GJ- 2129-A – calibrated on 10.07.2008 – ABT ¹¹ meter <u>Validity: One Year for TVM meter and Three Year for ABT meter.</u>
Measuring/ Reading/ Recording frequency:	<u>Monitoring Frequency:</u> Continuous Recording: Periodic monthly
Calculation method (if applicable):	1. Enter the value of electricity received from W/M at 66 KV S/S (kWh). 2. Enter the value of electricity supplied to W/M at 66 KV S/S (kWh). 3. Take the difference of electricity received and supply to W/F at 66 KV S/S (kWh)[EG _{meter,T}].
QA/QC procedures applied:	i) (a) In case, 66 kV Meter fails or malfunction, it will be sent for repair / replacement by GUVNL & its subsidiary. In this case readings of 33 kV meter installed at 33kV S/S of each PP (All WTG connected with 33 kV & finally to 66 kV Meter) will be considered for calculation. Calculation will be performed on the highest percentage loss considering the reading of transmission loss from 33 kV meter to 66 kV Meter reading from the historical verified values from previous verification (From start of crediting period to most recent JMR available at the start of verification). (b) The 33 kV meter will provide the electricity imported by the WTG's connected to the sub-station meter. Imported electricity will be calculated for 66 kV level with the application of highest historic transmission loss to arrive at electricity imported by WTG from grid at 66 kV level. (c) The net electricity exported to grid will be difference of (a) and (b). It is also possible that GUVNL & its subsidiary companies may come up with their approach. Conservative value which will lead to conservative emission reduction will be selected by the PP in that case. ii) In the current monitoring period there is no instant of failure or malfunction of the meters.Hence not applicable.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

Baseline Emissions:

Formula for Baseline Emissions (BE_y):

Baseline emissions (ton CO₂) = Emission Factor * Net energy exported (kWh)

Emission Factor of the western grid = 0.906 (t CO₂/ MWh)

Net Electricity exported from the project activity = 18003544 kWh

Thus Baseline emissions (BE_y) = (0.906 * 18003544)/1000 = **16,311 tCO_{2e}**

¹⁰ Tri- Vector meter

¹¹ Availability Based Tariff meter

E.2. Project emissions calculation

Being a wind energy project, the project activity does not lead to any form of emission, hence project emission has not been considered in this case.

Project Emissions (PE_y): 0

E.3. Leakage calculation

As wind energy projects fall under clean energy sources for electricity generation, the emission from the project is taken as zero.

Leakage Emissions (LE_y): 0

(Since there is no transfer of equipments from or to the project activity, thus leakage emissions are considered as Zero).

E.4. Emission reductions calculation / table

Total emission reductions: Emission reduction calculation is done based on following formula:

Emission reduction (ER_y) = Baseline Emissions (BE_y) – Project Emissions (PE_y) – Leakage

Emissions (LE_y)

Total baseline emissions: **16,311 tCO₂e**

Total project emissions: 0

Total leakage: 0

$ER_y = 16,311 - 0 - 0$

$ER_y = 16,311 \text{ tCO}_2\text{e}$

ER sheet (Alembic Ltd)

Net electricity substituted in the grid during the year y		
		Net electricity substituted in the grid during the year y (KWh)
		S4,S5,S7,S6
Month - Year	Billing Cycle (S4,S5,S6,S7)	
Jan-09	25.12.2008 to 24.01.2009	696746
Feb-09	24.01.2009 to 24.02.2009	632474
Mar-09	24.02.2009 to 31.03.2009	542371
Apr-09	31.03.2009 to 24.04.2009	635,885
May-09	24.04.2009 to 24.05.2009	1,119,070
Jun-09	24.05.2009 to 24.06.2009	1,317,854
Jul-09	24.06.2009 to 24.07.2009	876,516
Aug-09	24.07.2009 to 24.08.2009	1,084,008

Sep-09	24.08.2009 to 30.09.2009	840,670
Oct-09	30.09.2009 to 24.10.2009	406,952
Nov-09	24.10.2009 to 24.11.2009	466,415
Dec-09	24.11.2009 to 24.12.2009	433,116
Jan-10	24.12.2009 to 24.01.2010	794,335
Feb-10	24.01.2010 to 24.02.2010	566,111
Mar-10	24.02.2010 to 31.03.2010	797,513
Apr-10	01.04.2010 to 24.04.2010	715,633
May-10	25.04.2010 to 31.05.2010	1,288,605
Jun-10	01.06.2010 to 30.06.2010	988,957
Jul-10	01.07.2010 to 31.07.2010	1,187,945
Aug-10	01.08.2010 to 31.08.2010	806,769
Sep-10	01.09.2010 to 30.09.2010	441,013
Oct-10	01.10.2010 to 31.10.2010	369,104
Nov-10	01.11.2010 to 30.11.2010	506,084
Dec-10	01.12.2010 to 31.12.2010	489,398
	EGy	18003544

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 (tCO₂e)	8969¹²	16,311

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

The values reached during the monitoring period are for 737 days. Thus for a period of 737 days as per the registered PDD estimated emission reduction is 18110 tCO₂e. Thus there is a decrease of 11.02% of the estimated CERs.

¹²

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		