CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

A. General description of project activity

B. Application of a baseline and monitoring methodology

C. Duration of the project activity / crediting period

D. Environmental impacts

E. Stakeholders' comments

Annexes

Annex 1: Contact information on participants in the project activity

Annex 2: Information regarding public funding

Annex 3: Baseline information

Annex 4: Monitoring plan

Appendix 1: Location Map

SECTION A. General description of project activity

A.1 Title of the project activity:

Title: Grid-connected electricity generation from 39 MW wind energy by GACL in Gujarat.

Version: 6.0
Date: 12/07/2012

A.2. Description of the project activity:

Gujarat Alkalies and Chemicals Limited is a public sector company owned by the Government of Gujarat. GACL has two units located at Vadodara and Dahej, both in the State of Gujarat. It has integrated manufacturing facilities for Caustic Soda, Chlorine, Hydrogen Gas, Hydrochloric Acid, Chloromethane, Hydrogen Peroxide, Phosphoric Acid, Potassium Hydroxide, Potassium Carbonate, Sodium Cyanide, Sodium Ferrocyanide, Calcium chloride, Anhydrous Aluminium chloride and Poly aluminium chloride.

Purpose

The proposed project activity is an initiative by GACL towards clean electricity generation utilizing renewable energy source i.e. wind. This is a part of the long-term strategy to reduce dependency on the state power as well as wheeled power and replace it by cleaner and environment friendly technologies; GACL has implemented the scheme of installing wind power generators.

The project consists of 26 Wind Turbine Generators of 1.5 MW totalling to 39 MW (Which converts to 77.57 Million kWh[1]) at Villages: Khedoi, Kumbhariya and Sinugra ,district Kachchh, Gujarat. This electricity is wheeled through the state electricity grid to their manufacturing unit at Vadodara for captive consumption. In absence of the project GACL would have purchased this power from state electricity board. Since the electricity grid is connected majorly with the fossil fuel based plants, the project activity will contribute significantly in displacing energy generation of grid and hence leading to Green House Gases emission reduction.

Contribution of the project activity to sustainable development

Ministry of Environment and Forests, Govt. of India has stipulated the social well being, economic well being, environmental well being and technological well being as the four indicators for sustainable development in the host country approval eligibility criteria for Clean Development Mechanism (CDM) projects[2]. GACL believes that the project activity will contribute positively to the 'Sustainable Development of India'. The four pillars of sustainable development have been addressed as follows:

[1] Based on PLF of 23% and considering wheeling and other losses.

[2] http://www.cdmindia.in/approval_process.php

Social well being

- This project activity has created direct and indirect employment opportunities.
- developing the local economy and create jobs and employment, particularly in rural areas, which is a priority concern for the Government of India;

Environmental well being

- CO_2 abatement and reduction of greenhouse gas emissions through development of renewable project activity;
- reducing the average emission intensity (SO_x, NO_x, PM, etc.), average effluent intensity and average solid waste intensity of power generation in the system;

Economic well being

- The project activity will generate the employment opportunities for the persons residing nearby the project activity.
- Due to the usage of the renewable energy, the import expenditure of the fossil fuels will be reduced which will lead to improved foreign exchange balances.

Technological well being

- The project activity demonstrates the usage of clean technology in the country.
- This will further demonstrate the use of technology in harnessing the renewable energy and promote the further percolation of the technology.

Action plan for sustainable development:

As a responsible corporate, GACL is committed to the welfare and development of the area and the people near the Project area. GACL will make a detailed program for developmental activities in consultation with the local and project affected people. The project proponent undertakes to spend an amount equal to 2% of the net realization from out of Carbon Credits on any one or more of the following and other sustainable development activities in consultation with the local community either directly or through CSR initiatives, which is involved in similar activities.

- Promoting primary and girl's education (e.g. 'Sarva Shiksha Abhiyan' and 'Kanya Kelvani Programmes' of Govt. of Gujarat) in surrounding rural areas.
- Providing vocational and on the job training to ITI pass outs.
- Infrastructure developmental programmes such as drinking water and irrigation facilities, electricity, roads etc. thus accelerating rural development.
- Undertaking relief operations in times of natural disasters such as floods and earthquake.
- Creating awareness about HIV/AIDS and organizing free distribution of condoms through vending units at convenient places targeting the local groups of labour, transport workers etc.

The CDM team of GACL will prepare a report after every year after issuance of CERs to monitor.

1. Total CDM revenue
2. Percentage of the CDM revenue spent for sustainable development
3. A break up of the expenditure to providing an account of expenditure on each initiative
4. A review of the activities.

This report will monitor the actions taken up by GACL for assessing the share of the CER revenue spent on sustainable development.

Designation	Responsibilities
CDM Cell operating officer	• Verification of the report • Supervision on the initiatives • Preparation of action plan by liasioning with CSR team & stakeholders in the project area
CDM Cell Manager	• Supervision of the report preparation • Will re check with financial department for the data • Preparation of report

Project proponent also gives an undertaking[3] that the monitoring of this sustainable development expenditure will be undertaken as per the requirement and the reports will be produced during the verification.

A.3. Project participants:

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Government of India (Host)	Gujarat Alkalies and Chemicals Limited (A public limited company)	No

The contact details of the entities are provided in Annex – 1.
GACL would be the sole owners of the CERs generated from the project.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party (ies):

The host party to the project activity is the Government of India.

A.4.1.2. Region/State/Province etc.:

Gujarat

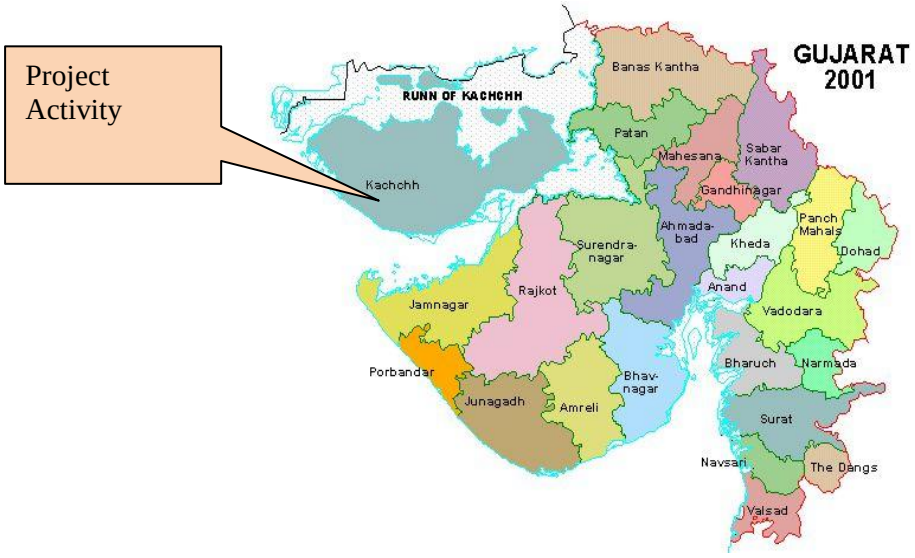
A.4.1.3. City/Town/Community etc:

Villages: Khedoi, Kumbhariya and Sinugra
District: Kachchh

[3] Proof of this undertaking is provided to the validators.

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

The Project activity carried out at Villages: Khedoi, Kumbhariya and Sinugra District Kachchh.



Details of Individual WTG

Sr. No.	WTG Location ID	Latitude			Longitude			Commissioning date	WTG ID
		Degree	Minutes	Second	Degree	Minutes	Second		
1	SG-001	23	01	38.0	69	56	57.8	12.1.09	SEL/1500/08-09/1365
2	SG-002	23	01	26.3	69	57	00.6	12.1.09	SEL/1500/08-09/1366
3	SG-003	23	01	55.3	69	57	39.4	12.1.09	SEL/1500/08-09/1367
4	SG-004	23	01	43.8	69	57	39.2	12.1.09	SEL/1500/08-09/1368
5	SG-006	23	02	18.1	69	57	52.2	12.1.09	SEL/1500/08-09/1369
6	SG-007	23	02	13.0	69	58	15.8	12.1.09	SEL/1500/08-09/1370
7	SG-008	23	01	13.5	69	57	11.6	12.1.09	SEL/1500/08-09/1371
8	SG-009	23	01	32.5	69	56	34.9	12.1.09	SEL/1500/08-09/1372
9	SG-035	23	02	50.4	69	53	45.1	28.2.09	SEL/1500/08-09/1400
10	SG-036	23	03	39.2	69	53	28.2	27.2.09	SEL/1500/08-

									09/1401
11	SG-037	23	03	30.9	69	53	39.6	27.2.09	SEL/1500/08-09/1402
12	SG-038	23	03	17.8	69	53	53.1	27.2.09	SEL/1500/08-09/1403
13	SG-039	23	03	11.3	69	54	7.0	28.2.09	SEL/1500/08-09/1404
14	SG-040	23	02	56.7	69	54	7.9	28.2.09	SEL/1500/08-09/1405
15	SG-042	23	03	46.2	69	53	53.6	27.2.09	SEL/1500/08-09/1406
16	SG-043	23	04	02.9	69	54	09.9	27.2.09	SEL/1500/08-09/1407
17	SG-044	23	03	52.6	69	54	20.7	27.2.09	SEL/1500/08-09/1408
18	SG-045	23	04	23.1	69	57	28.3	19.2.09	SEL/1500/08-09/1409
19	SG-056	23	04	56.3	69	57	53.4	19.2.09	SEL/1500/08-09/1410
20	SG-057	23	04	29.1	69	57	44.8	19.2.09	SEL/1500/08-09/1411
21	SG-058	23	05	7.5	69	58	2.4	27.2.09	SEL/1500/08-09/1412
22	SG-059	23	04	34.4	69	58	10.4	19.2.09	SEL/1500/08-09/1413
23	SG-060	23	05	01.1	69	58	24.2	27.2.09	SEL/1500/08-09/1414
24	SG-061	23	04	36.9	69	58	35.5	19.2.09	SEL/1500/08-09/1415
25	SG-062	23	05	21.1	69	58	17.8	27.2.09	SEL/1500/08-09/1416
26	SG-063	23	04	59.2	69	58	41.8	27.2.09	SEL/1500/08-09/1417

A.4.2. Category(ies) of project activity:

The project activity may principally be categorized in Scope Number 1, Sectoral Scope - Energy industries (renewable/ non-renewable sources).

A.4.3. Technology to be employed by the project activity:

The Project involves 26 Wind Turbine Generators (WTGs) of Suzlon make (1.5 MW) with internal electrical lines connecting the Project with local evacuation facility. The WTGs generates 3-phase power at 690 V, 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 690 V ± 12.5%. The other salient features of the state-of-art-technology are:

- It is with Gearbox technology and having fixed speed.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times with the help of dynamic power factor compensation through capacitor bank.
- Minimum drawl (less than 2% of kWh generated) of Reactive Power from the grid.
- Operating range of the WTG with voltage fluctuation of -12.5 to +12.5%.
- Three Independent Aero Dynamic Braking System.
- Incorporates lightning protection system, which includes blades.
- Starts Generation of power at wind speed of 3 m/s.

Technical Specification of WTG and Metering of Wind farm

Operating Data

Rated power	1500 kW
Cut-in wind speed	4 m/s
Rated wind speed	14 m/s
Cut-off wind speed	20 m/s
Survival wind speed	52.5 m/s

ROTOR

Type	3 Blades, Upwind / Horizontal axis
Diameter	82 m
Rotational speed at rated power	15.6 to 18.4 rpm
Rotor blade material	Epoxy bonded fibre glass
Swept area	5281 m^2
Power regulation	Active pitch regulated with Suzlon Flexi Slip System

GEARBOX

Type	1 planetary stage / 2 helical stages
Ratio	1 : 95.09
Nominal load	1650 kW
Type of cooling	Forced oil cooling lubrication system

GENERATOR

Type	Single speed induction generator with slip rings, variable rotor resistance via Suzlon Flexi slip system
Speed at rated power	1511 rpm
Rated power	1500 kW
Rated voltage	690 V AC (phase to phase)
Frequency	50 Hz
Insulation	Class H
Enclosure	IP 54 / IP 23 (slip ring unit)
Cooling system	Air cooled

TOWER

Type	Tubular tower (corrosion proof painting on inner and outer surface) with welded steel plates

Tower height	76 m
Hub height (incl. foundation)	Approximately 78.5 m

BRAKING SYSTEM

Aerodynamic braking	3 Independent systems with blade pitching
Mechanical braking	Hydraulic fail safe disk brake system

YAW SYSTEM

Type	Active electrical yaw motor
Bearing	Polyamide Slide bearing with gear ring & automatic greasing system
Protection	Cable twist sensor, proximity sensor

PITCH SYSTEM

Type	3 independent blade pitch control with battery backup for each blade
Operating range	-5 º to +90 º
Resolution	0.1 to 10 Deg

CONTROLLER

Suzlon Control System with following salient features:
- Park slave
- Power output control / limitation
- Reactive power control
- Grid measurement
- Low voltage ride through (LVRT)
- Weather measurement
- Time synchronization
- Statistics

Wind Class III a
Certification & Standards GL (T-GL-009A-2007)
Quality System ISO 9001:2000

Wind energy is a renewable energy source and reduces greenhouse gas emissions by displacing fossil fuel based electricity generation. The technology know how is available in India.

The use of this wind technology for electricity generation is known to be environmentally safe and sound and well accepted over the country.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

Crediting Period for the Project: fixed for 10 years

Table 1: Estimated Emission reductions for the crediting period:

Years	Annual estimation of emission reductions in tonnes of CO_2e

2012-13*	71,566
2013-14	71,566
2014-15	71,566
2015-16	71,566
2016-17	71,566
2017-18	71,566
2018-19	71,566
2019-20	71,566
2020-21	71,566
2021-22	71,566
Total estimated reductions (tonnes of CO_2e)	7,15,660
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	71,566

*****Crediting period starts from September 2012.

A.4.5. Public funding of the project activity:

The project proponents hereby confirm that there is no diversion of Official Development Assistance into the project activity. Project participants also confirm that there is no funding from Annex 1 party(ies).

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity:

Title: **"Consolidated baseline methodology for grid-connected electricity generation from renewable sources[4]"**

Approved consolidated baseline methodology ACM0002 Version 12.3.0 (EB 66),
The methodology ACM0002 refers to the latest approved versions of the following tools:

- Tool to calculate the emission factor for an electricity system (Version 2.2.1)[5];
- Tool for the demonstration and assessment of additionality (Version 06)[6];
- Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion (Version 2.0)[7]

[4] http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT

[5] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf/history_view

[6] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf

[7] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf

However, the project activity uses the following tools:

- Tool to calculate the emission factor for an electricity system (Version 2.2.1);
- Tool for the demonstration and assessment of additionality (Version 6);

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

The project involves generation of wind based electricity generation entailing displacement of equal amount of electricity from the grid. Since ACM0002, version 12.3.0 is applicable to grid-connected renewable power generation project activities; we have chosen the use of this methodology to the project activity.

Further the conditions of the baseline methodology's applicability are discussed below. This methodology is applicable under the following conditions:

This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).

As the project activity is a grid-connected renewable power (wind energy) generation project activities that install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant), the condition matches to (a).

Table 2: Justification of selecting the baseline methodology:

Methodology requirement	Project Activity	Justification
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	Project activity involves installation and operation of electricity from wind sources with 39 MW capacity connected to the NEWNE grid of India	Since the project activity is installation of wind power plant, it suffices the methodology requirement.
In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	The project activity is a Greenfield project and does not involve any retrofits or replacements	Since the project activity is a Greenfield project, this condition is not applicable.

In case of hydro power plants: one of the following conditions must apply: • The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or • The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m^2 after the implementation of the project activity; or • The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m^2 after the implementation of the project activity.	Project activity involves generation of electricity from wind sources and no hydro sources are involved.	Since no hydro sources are involved hence this condition is not relevant
In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m^2 after the implementation of the project activity all of the following conditions must apply: • The power density calculated for the entire project activity using equation 5 is greater than 4 W/m^2; • All reservoirs and hydro power plants are located at the same river and were designed together to function as an integrated project1 that collectively constitutes the generation capacity of the combined power plant; • The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity; • The total installed capacity of the power units, which are driven using water from the reservoirs with a power density lower than 4 W/m^2, is lower than 15 MW; • The total installed capacity of the power units, which are driven using water from reservoirs with a power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.	Project activity involves generation of electricity from wind sources and no hydro sources are involved.	Since no hydro sources are involved hence this condition is not relevant

Further, the methodology does not apply to the following cases.

Condition	*Project Activity*	*Justification*
Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site	The project activity is Greenfield wind power generation project activity.	This condition is not applicable as the project is a Greenfield project
Biomass fired power plants	The project activity is Greenfield wind power generation project activity.	This condition is not applicable as the project activity is a wind based power generation.
A hydro power plant that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the reservoir is less than 4 W/m^2.	The project activity is Greenfield wind power generation project activity.	This condition is not applicable as the project activity is a wind based power generation.

Other requirements :

Methodology requirement	**Project Activity**	**Justification**
In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is .the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance.	The project activity is a Greenfield project and does not involve any retrofits or replacements or capacity additions.	Since the project activity is a Greenfield project, this condition is not applicable.

Since all the applicability conditions are sufficiently demonstrated, the methodology is applicable to the project activity.

B.3. Description of the sources and gases included in the project boundary

According to ACM0002 version 12.3.0, for the baseline emission factor, the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system[8]that the CDM project power plant is connected to.

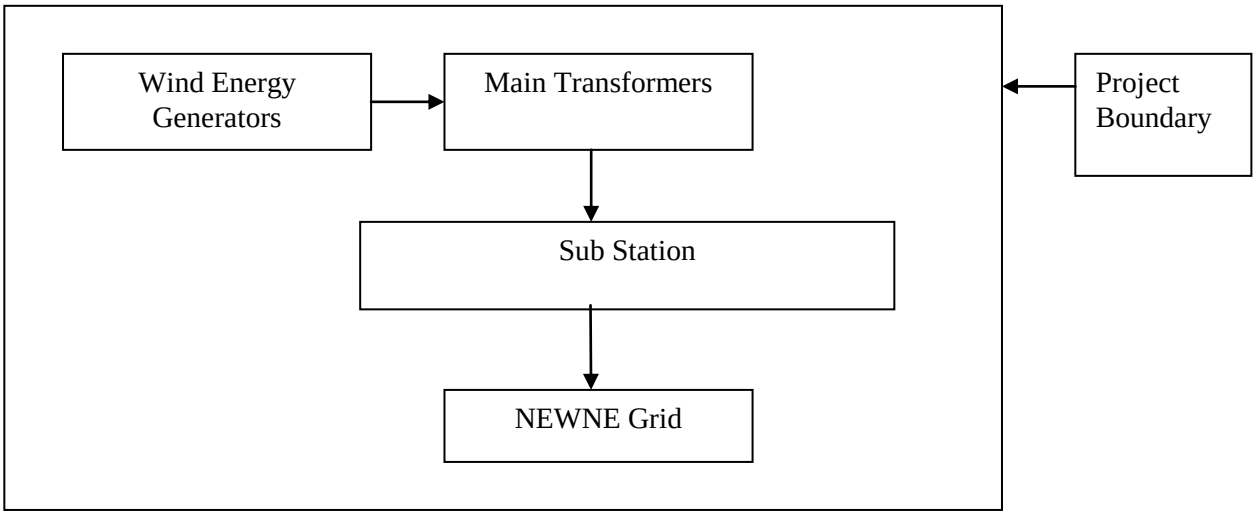
[8] Refer to the latest approved version of the .Tool to calculate the emission factor for an electricity system. For definition of an electricity system.

Accordingly, the boundary of the proposed project includes the physical range and geographical range of the proposed project and all the power plants connected with the proposed project in the NEWNE Grid of India.

Table 3: Project boundary for various GHG gases:

	Source	Gas	Included	Justification/ Explanation
Baseline	Electricity generation in NEWNE grid that are displaced due to the project activity	CO_2	Included	Main emission source
		CH_4	Excluded	This source is not required to be estimated for wind energy projects under ACM0002 Ver. 12.3.0
		N_2O	Excluded	This source is not required to be estimated for wind energy projects under ACM0002 Ver. 12.3.0
Project Activity	Electricity generation from the Project	CO_2	Excluded	Wind energy generation does not have any direct GHG emissions.
		CH_4	Excluded	
		N_2O	Excluded	

Project Boundary[9]



B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

[9] Due to the expansion of the wind installation capacity in the region, the sub -station may change during the crediting period.

According to ACM0002,, If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:
:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system.

Since the project activity is the installation of a new grid-connected renewable (wind based) power plant, the baseline scenario is the emissions generated by the operation of grid-connected power plants and by the addition of new generation sources. This is estimated by multiplying the calculated combined margin (CM) with the amount of electricity delivered to the grid by the project activity.

As per "Tool to calculate the emission factor for an electricity system", version-2.2.1 the steps followed to calculate Combined margin of Northern, Eastern, Western and North-Eastern (NEWNE) regional grid are as follows:

Step 1: Identify the relevant electricity systems:

Historically, the Indian power system was divided into five independent regional grids, namely Northern, Eastern, Western, Southern, and North-Eastern. Each grid covered several states. Since August 2006, however, all regional grids except the Southern Grid have been integrated and are operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids will be treated as a single grid and is being named as NEWNE grid from FY 2007-08 onwards for the purpose of CO_2 Baseline Database.

Table- Geographical scope of the two electricity grid

NEWNE Grid				Southern Grid
Northern	**Eastern**	**Western**	**North-Eastern**	**Southern**
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Pondicherry
Punjab	Andaman-Nicobar	Maharashtra	Nagaland	Lakshadweep
Rajasthan		Goa	Tripura	
Uttar Pradesh				
Uttarakhand				

For the purpose of calculating the emission reductions achieved by any CDM project, the CDM Executive Board requires that the "project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints". This implies that the grid emission factors are most appropriately calculated at the level of the two regional grids.

The proposed project is located in the state of Gujarat and will be feeding the electricity in the NEWNE regional. Therefore the proposed project would have impact on all the generation facilities in this grid. Thus all the power generation facilities connected to this grid form the boundary for the purpose of baseline estimation. The NEWNE grid is also connected with other regional grids, however, the net exchange of energy within the regional grids is very small and negligible and hence other regional grids are not included in the boundary for estimation of baseline emissions.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional);

The project proponent wishes to include only grid power plants in the calculation, while off-grid plants will be excluded.

STEP 3.Select a method to determine the operating margin (OM);The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:

(a) Simple OM, or

(b) Simple adjusted OM, or

(c) Dispatch data analysis OM, or

(d) Average OM.

As per Tool to calculate emission factor of an electricity system, version-2.2.1 the simple operating margin (Simple OM) can be used only if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

From the available information published by CEA "CO_2 database for Indian Power sector", it can be seen from the table below that low cost/must run sources for NEWNE Grid accounts for less than 50% of the total generation in the Northern grid in the last five years. Hence the Simple OM method has been used to calculate the Operating Margin Emission factor applicable

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)					
	2004-05	2005-06	2006-07	2007-08	2008-09
NEWNE	25.4%	18.0%	18.5%	19.0%	17.3%
South	21.6%	27.0%	28.3%	27.1%	22.8%
India	18%	20.1%	20.9%	21.0%	18.6%

STEP 4. Calculate the operating margin emission factor according to the selected method;

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units, using the following equation:

$$EF_{OM,y} = [\sum_{i,j} F_{i,j,y} * COEF_{i,j}] / [\sum_j GEN_{j,y}] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where $F_{i,j,y}$ and $COEF_{i,j}$ are the fuel consumption and associated carbon coefficient of the fossil fuel *i* consumed by power plant *j* in the grid in year(s) *y*. $GEN_{j,y}$ is the electricity generation by power plant *j* connected to the grid excluding zero- or low-operating cost sources in year(s) *y*.

As per ACM0002 version 12.3.0, the OM emission factor can be calculated using *ex ante* generation-weighted average of the most recent 3 years for which data is available or using *ex post* generation data in the year in which the project generation occurs. The OM emission factor is calculated using *ex ante* generation-weighted average of the most recent 3 years (2006-07, 2007-08,2008-09) and hence does not require yearly monitoring of the OM emission factor.

The Central Electricity Authority, Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. The CO_2 Baseline Database provides information about the Combined Margin Emission Factors of all the regional electricity grids in India.

The operating margin is calculated as below,

Year	**OM (t CO2e/MWh)**
2006 – 07	1.0085
2007 – 08	0.9999
2008-09	**1.0066**

Net Electricity generation by NEWNE grid

Year	**OM (MWh)**
2006 – 07	**379,471**
2007 – 08	**401,642**
2008-09	**421,803**
Weighted average (From 2 tables above)	**1.0049**

STEP 5. Calculate the build margin(BM) emission factor;

The Build Margin emission factor $EF_{BM,y}$ is calculated ex-ante based on the most recent information available, calculated as follows:

$$\mathbf{EF_{grid,BM,y} = (\Sigma\ EG_{m,y}\ x\ EF_{EL,m},\ ) / \Sigma\ EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year 'y' (tCO_2/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit 'm' in year 'y' (MWh)
$EF_{EL,m,y}$ = CO_2 emission factor of power unit 'm' in year 'y' (tCO_2/MWh)
m = Power units included in the build margin
y = most recent historical year for which power generation data is available.

The CO2 emission factor of each power unit m ($EF_{EL,m,y}$) is determined as per the procedures given in step 3 (a) for the simple OM, using options B1 using for *y* the most recent historical year for which power generation data is available, and using for *m* the power units included in the build margin.

The Build Margin emission factor will be EF_{BM} is 0.6752 tCO_2/MWh of the year 2008-09 and this value has been fixed *ex-ante* for the entire crediting period for the project activity.

Source: Central Electricity Authority: CO_2 Baseline Database. Version:5
http://www.cea.nic.in/reports/planning/cdm_co2/database_publishing_ver5.zip

STEP 6. Calculate the combined margin (CM) emissions factor;
The combined margin emissions factor is calculated as follows:

$$\mathbf{EF_{grid,CM,y} = EF_{grid,OM,y} * w_{OM} + EF_{grid,BM,y} * w_{BM}}$$

Where:

$\mathbf{EF_{grid,BM,y}}$	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$\mathbf{EF_{grid,OM,y}}$	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
$\mathbf{w_{OM}}$	Weighting of operating margin emissions factor (%)
$\mathbf{w_{BM}}$	Weighting of build margin emissions factor (%)

For wind and solar projects, ACM0002 allows the usage of the default weights are as follows:
w_{OM} =0.75 and w_{BM} = 0.25.

Using the above values the combined margin emission factor is valued as –

$\mathbf{EF_y}$ = 1.0049*0.75+ 0.6752*0.25
=0.9225 tCO_2/MWh

Table 5: Data source for the variables and parameters used for baseline

Variable	**Data Source**
EG_y – Electricity generated	Records maintained by project proponent
Parameter	**Data Source**
$EF_{OM\ ,\ y}$ - Operating Margin Emission Factor (tCO_2/MWh)	CEA Data[10]
$EF_{BM\ ,\ y}$ = Build Margin Emission Factor (tCO_2/MWh)	CEA Data

[10] http://www.cea.nic.in/reports/planning/cdm_co2/database_publishing_ver5.zip

EF_y – Grid Emission Factor	Calculated as the weighted average of the operating margin and build margin

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):

The anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity is established through the "Tools for Demonstration and assessment of additionality Version 06. The major steps of the tools are as follows:

Sub-step 1a. Define alternatives to the project activity:

The project activity case is:

Alternative(s) available to the project participants or similar project developers include:

(a) The Project is not undertaken as a CDM project activity.

(b) The continuation of the present scenario where the electricity is imported from the regional grid for the captive consumption.

The baseline alternative for the project activity is pre-defined in ACM0002 as generation of equivalent amount of electricity by operation of grid-connected power plants and by addition of new generation sources. Accordingly, the realistic and credible alternatives to the project activity are:

(a) The Project is not undertaken as a CDM project activity.
(b) Equivalent amount of electricity being generated through operation of grid-connected power plants and addition of new generation sources

Sub-step 1b. Enforcement of applicable laws and regulations

The project case is:

There are no legal and regulatory requirements that prevent Alternatives (a) and (b) and (c) from occurring.

Conclusion of this step is:

The requirement of step 1 is met hence the analysis can Proceed to Step 2 (Investment analysis) or Step 3 (Barrier analysis) or both. Project participant opts for demonstration through Step 2 – Investment analysis only

2. (a) Additionality check: Investment Analysis
(b) Demonstration of additionality:

Sub-step 2a – Determine appropriate analysis method

The wind farm electricity is wheeled through the grid to the consuming point of GACL at their manufacturing units. In absence of the project GACL was purchasing power from grid.

To eliminate/reduce grid power consumption the alternative available to GACL was to expand fossil fuel based captive power plant and to continue with wheeling of power. Among the two methods – investment comparison analysis (Option II) and benchmark analysis (Option III), the project proponent has chosen benchmark analysis to demonstrate the additionality of the project, which is sought to be compared with the financial indicator, project Internal Rate of Return (IRR)

Justification for the choice of Benchmark analysis

The Benchmark analysis is chosen for the demonstration of additionality because, the level of the service provided by the project activity (Supply of the electricity for the captive purposes) were already available from the state grid without incurring the capital expenditure. Hence as stated in the sub step 1(a), the project activity was not the only choice but the electricity could have also been drawn from the state grid. Hence the selection of the Benchmark analysis is justified.

As per the tool, the requirement of this step is:

Sub-step 2b: Option III. Apply benchmark analysis

Since it is a predominant investment decision in non core business, the management was particularly interested in the return of the investment. Hence project IRR was selected as the financial indicator to assess the attractiveness of the project.

As per guidance on Assessment of Investment analysis, version 05, annex 5 of EB 62, it states that "*In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented."*

"When applying benchmark analysis, the financial/economic analysis shall be based on parameters that are standard in the market, considering the specific characteristics of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer. Only in the particular case where the project activity can be implemented by the project participant, the specific financial/economic situation of the company undertaking the project activity can be considered."

Project IRR, which is the return earned by the project, has to be compared with a benchmark or cut-off rate to determine the adequacy of the return. Weighted Average Costs of Capital WACC has been chosen as the benchmark. WACC alone represents the weighted average of the costs of various sources of financing in the financial structure of the project. In other words, WACC represents the minimum rate of return which the project should earn to merit consideration, as failure to earn the minimum rate of return is indicative of the erosion in the value of investment. Therefore, this appears to be the most appropriate benchmark for cases where project IRR is used to demonstrate the Additionality.

The WACC has been calculated as demonstrated below[11]:

WACC = CoE * {E/(E+D)} + CoD * {D/(E+D)}

[11] Report on Cost of Capital for Central Sector Utilities by Crisil Advisory services.

Where:

CoE – Cost of equity
CoD – Cost of Debt
E - Equity
D - Debt

CoE – Cost of Equity:
The cost of equity is the minimum rate of return that a business or organization must offer investors or owners to offset their wait for a return on investment and for assuming some level of risk. The Capital Asset Pricing Model (CAPM) approach is a generally accepted methodology for determining the Cost of Equity. CAPM is based on the portfolio theory of finance in which risks are classified into:

- Systematic risk - risk applicable to the market as a whole, such as inflation, tax rises, interest rates, etc.
- Specific risk - residual risk unique to an individual firm or a small group of companies that form a subset of the market.

The theory stipulates that specific risks can be eliminated through diversification and hence, only systematic risks determine the return expectation of investors. The basis of CAPM is the relationship between risk and return. Whilst there has been considerable debate on the strength of the risk/return relationship, evidence indicates that there is a strong linear and positive relationship over the long term, which can be expressed by the following formula[12]

$E(r_e) = r_f + \text{Equity Beta } (\beta) * [E(r_m) - r_f]$

Where:

$E(r_e)$ - the expected rate of return on equity (cost of equity)
r_f - the risk-free rate of return (e.g. return on government bonds)
$E(r_m)$ - the expected rate of return on a market portfolio
Equity Beta (β) - coefficient reflecting the volatility (risk) of the stock relative to the market, which measures the systematic risk of the stock

The ***Risk free rate (r_f)*** has been taken from the long term government bond rates at the time of the investment decision of the project activity in January 2008. The average interest rate on Central Government date Securities i.e. bond rate published during December 2007 is **8.21%.**

The ***Market Risk Premium ($E(r_m) - r_f$)***, as measured and applied in practice, is the premium above the risk-free rate of return that investors expect to earn on a well-diversified portfolio of equities.

The ***expected rate of return on a market portfolio ($E(r_m)$)*** has been calculated as the compounded annual growth rate of the market portfolio. In calculating market risk premium, it is usual to use an

[12] Cost of Capital for Central Sector Utilities by Crisil Advisory Services (http://www.cercind.gov.in/rep1304.pdf)

established stock market index as a proxy for the market portfolio. In India, the possible choices of indices are – BSE 30, BSE 100, S&P CNX 500, Nifty, BSE 500 etc.

BSE 500 has been considered for calculating the Expected market return at the time of taking decision of project activity. The Expected market return has been estimated prior to decision making is ***27.30%.*** The details analysis sheet has submitted to DOE.

Beta

As the project activity involves the wind power generation, so the beta has to be taken from the listed companies involved in the wind power generation. But as there is no listed companies whose core business is wind power generation apart from BF utilities, so the beta value has been considered for the listed companies who are involved in the similar business i.e. power generation. The following are listed companies whose beta value available at the time of investment decision (January 2008) is given in the below table. Since the consideration of the unlevered beta provides for the conservative beta estimate, the raw beta is adjusted for the leverage of the companies and the unlevered betas (Asset betas) are considered here[13].

S. No.	Power generating Company	Asset beta
		Available as on Jan - 2008
1	Tata Power	1.21
2	CESC	0.31
3	Reliance Infra	1.62
4	BFUL	1.08
5	GIPCL	1.29
6	NLC	1.40
7	LANCO	1.58
8	NTPC	0.52
	Average Beta value	**1.13**

The ***Cost of Debt*** has been considered as *Prime Lending Rate (PLR)* at the time of investment decision of the project activity. The PLR during available at the time of investment decision is prevailing between 12.75%- 13.25%. The minimum of 12.75% is taken for the investments decision.

The ***Debt Equity ratio*** as per the Wind Power policy norms has been considered as 70:30.

Calculation of WACC:

WACC = [CoE * {E/(E+D)}] + [CoD * {D/(E+D)}*{1- Tax rate}]

= [{r_f + *Equity Beta (β)* [E (r_m) – r_f]}** {E/(E+D)}] +[CoD * {D/(E+D)}*{1- Tax rate}]

[13] The details of the Beta calculations are submitted to the DOE.

= [{8.21%+1.13*(27.30% - 8.21%)}*{30% /100%}] + [{12.75% *{70%/100%}*{1- 33.99%}]
= 14.80%

Thus WACC as a benchmark has been calculated as ***14.80%***

The benchmark WACC for the project is **14.80%.** The detailed analysis of the benchmark calculations are provided in the worksheet submitted to the DOE.

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

The financial analysis for calculating the benchmark (post-tax project IRR) is carried out and key assumptions are set out below; these assumptions have been made on the basis of data available at the time of investment decision for the project.
In case of the project activity, PP was interested and conscious that the project activity should be in a position to repay the interest and the repayment of loans. Since the project also involves a considerable equity to be employed from the company's sources, the PPs expectation was to get prevailing market return for the equity employed. Hence the Project IRR was the indicator employed for the decision making.

Table 6: Key assumptions and parameters for Project IRR calculation of wind based power:

Owner: Gujarat Alkalies and Chemicals Limited Project: Grid-connected electricity generation from 39 MW wind energy by GACL in Gujarat Location : Gujarat

Assumptions for Financial Model

Project Capacity in MW	39	Offer letter dated 04/01/2008
Project Commissioning Date	12 Jan-09	As per Comissioning certificate dated 31-01-2009
Project Cost per MW (` Millions)	63.04	**Calculated**

Operations		Source
PLF	23%	GERC Tariff order dated 11/08/2006
Percentage of internal loss (From 33 kV to 66 kV)	1.27%	Actual observed internal loss from 33kV to 66 kV in year 2010-11

Wheeling loss , %	4%	GERC Order dated 11/08/2006
Operation & Maintenance Cost base year (` million)	41.47	Offer letter dated 19/12/2007 from M/s Suzlon Energy Ltd.
% of escalation per annum on O & M Charges	5.0%	Offer letter dated 19/12/2007 from M/s Suzlon Energy Ltd.
Tariff		
Base year Tariff - / kWh	4.74	As per Electricity bill of the month Dec 2007
Project Cost	` Million	
Land and Infrastructure, Generator & Electrical Equipments, Mechanical Equipments, Civil Works, Instrumentation & Control, Other Project Cost, Pre operative Expenses, etc.		
Total Project Cost	2458.54	As per purchase order
Means of Finance		
Own Source	424.59	As per the financing pattern
Debt	2033.95	Loan sanction letters dated 31/12/2008
Rate of interest (LIBOR+ 2.95%)	6.05%	Loan sanction letters dated 31/12/2008
Income Tax Depreciation Rate (Written Down Value basis)		
on Wind Energy Generators	80%	Income tax Rules
On Civil works	10%	Income tax Rules
On other machinery	15%	Income tax Rules
Book Depreciation Rate (Straight Line Method basis)		
On all assets	5.28%	Companies Act 1956
On Civil works	3.34%	Companies Act 1956
Book Depreciation up to (% of asset value)	100%	Companies Act 1956
Income Tax		
Income Tax rate	30%	As per Income tax Act
Minimum Alternate Tax	10%	As per Income tax Act
Surcharge	10%	As per Income tax Act
Cess	3%	As per Income tax Act

On the basis of above assumptions, the investments made by GACL were evaluated to determine the financial returns from the project activity.

Without CDM Project IRR	WACC Benchmark	With CDM- Project IRR
11.97%	**14.80%**	**14.18%**

From the above table it is evident that the project IRR is below benchmark of WACC of 14.80% without CDM revenue and also after considering CDM revenue. This illustrates that additional revenue from CDM is required for the project financial viability.

Sub-step 2d: Sensitivity analysis (only applicable to Options II and III):

As per the guideline provided vide Annex 5, EB 62 the following are the factors that constitute more than 20% of either total project costs or total project revenues (Except O&M cost which constitutes less than 20% but included in the analysis).

- Plant load factor
- Project cost
- Power cost (Cost avoided per unit electricity in the concerned project activity)
- O&M cost

Given below is the analysis about the inclusion/exclusion of the factors for sensitivity analysis.

- Plant load factor – this depends upon the local wind conditions and hence is prone to variation. This is subjected to the sensitivity analysis in this section.
- Project cost – the project cost considered in the analysis is taken from the Purchase order and has been included in the analysis.
- Power cost – this is taken as the GEB electricity replacement cost. This has remained almost constant over the three preceding years of the project activity with minimum variations. This is also subjected to the sensitivity analysis.
- O&M cost – The cost is considered from the offer provided by the supplier. Hence this is subjected to sensitivity analysis.

PLF:

Since PLF varies according to the wind conditions and hence sensitivity analysis has been carried out at higher PLF to check the robustness of the financial model. The financial model has been developed on the basis of 23% PLF.

Sensitivity Analysis	
PLF	**Project IRR**
	Without CDM
Base case (23% PLF)	**11.97%**
Increase in PLF by 10 %	**14.02%**
Decrease in PLF by 10%	**9.73%**

In the above analysis the project IRR does not cross the benchmark even with increase in10% from the base PLF.

As per the estimate provided by the third party, the PLF corresponding to the windmill specification and the location characteristics is given as 22.24%. PP has conservatively taken a value of 23% as per the

GERC order 2006. PP has analysed the wind power generation in Gujarat from the "Indian wind power directory-2009". By increasing the PLF by 14% i.e. taking PLF as 26.22%, the IRR crosses the benchmark. But the possibility of the occurrence of such event is not possible based on the site wind conditions. The generation of four various locations in the state has been analyzed. The analysis of the four sites Dhak, kalyanpur, navadra and lamba shows that the maximum PLF attained in these sites is 14.5%[14].

The actual PLF attained by the WTGs in the Project activity during the year 2010 is also 23.95%[15]. Thus 23% considered for the analysis is appropriate and the analysis conducted is robust.

O&M cost:

Sensitivity Analysis	
O&M cost	**Project IRR**
	Without CDM
Base case (` 41.47 Million)	**11.97%**
Cost increased by 10%	**11.62%**
Cost decreased by 10 %	**12.31%**

From the above sensitivity analysis on the O&M cost, it is clear that the Project IRR does not cross the benchmark even after the decrease of 10% in the base case of the O&M. By decreasing the O&M by 92% i.e. taking O& M as 3.32 Mn, the IRR crosses the benchmark which is unrealistic. As the O&M agreement has already executed[16] , any decrease in the O&M cost is not possible. Hence the financial analysis is prudent for the variations in the cost incurred for the operations and maintenance.

Power cost:

Sensitivity Analysis	
Power cost	**Project IRR**
	Without CDM
Base case (` 4.74/kWh)	**11.97%**
Cost decreased by 10%	**9.73%**
Cost increased by 10 %	**14.02%**

The energy rate for captive consumption at the time of decision making is 4.74 INR/ kWh.

[14] The information and the relevant documents will be submitted to the DOE.

[15] The generation data is Provided to the DOE.

[16] Submitted to the DOE

In the sensitivity analysis the Project IRR does not cross the Benchmark even by the increase of the replacement cost by 10%. Moreover the change of such magnitude is unlikely. This can be justified based on the analysis of past 9 years HT tariff in the state of Gujarat.

The HT industrial consumer tariff for the period from 2002-03 to 2009-10 as per the tariff orders of GERC sourced from their official web site is stated below[17]:

- For the years 2002-03, 2003-04, 2004-05 and 2005-06: INR 4.10
- For the year 2006-07 and 2007-08: INR 4.05
- For the year 2008-09, 2009-10: INR 4.15

The IRR crosses the Benchmark by 14% increase in the tariff rates but the tariff trend in Gujarat over the period of 9 years from 2002-03 to 2009-10shows that the increase in tariff for the period is only nearly 1.5%. Since the industrial tariff in Gujarat is one of the highest in India[18] and a number of large scale power plants with better efficiency are due for commissioning in the near future, the tariff increase in future is expected to be small and no significant changes are expected. Hence increase in tariff by 10% is unlikely and this is in line with the requirements of 21 Annex 5, EB 62.

Project cost:

Sensitivity Analysis	
Project cost	**Project IRR**
	Without CDM
Base case (INR 2458.54 Million)	**11.97%**
Cost increased by 10%	**9.94%**
Cost decreased by 10 %	**14.49%**

From the above sensitivity analysis on the Project cost, it is clear that the Project IRR does not cross the benchmark even after the decrease of 10% in the base case of the Project cost. Hence the financial analysis is prudent for the variations in the cost incurred. The IRR touches the benchmark by decreasing the project cost by 11.1% i.e. taking project cost as 2,185.64 Mn (INR) which is unlikely as the project cost has been finalised based on the purchase order andis not subjected to changes. Hence the analysis provided is robust. Hence the sensitivity analysis holds good for all the possible combinations of the parameters discussed. From this it can be concluded that the financial analysis presented is robust for all the possible variations.

Conclusion of this step is:

[17] http://www.gercin.org/tariffordерpdf/en_1304750163.rar

http://www.gercin.org/tariffordерpdf/en_1303989290.zip

http://www.gercin.org/tariffordерpdf/en_1303987522.zip

http://www.gercin.org/tariffordерpdf/en_1303985603.pdf

[18] http://www.financialexpress.com/news/high-power-tariff-clamps-investment-in-gujarat/199109/1

As can be seen from above, the Project is not a financially attractive option (as per step 2c para 8b) we proceed to Step 4 (Common practice analysis).

Step 4. Common practice analysis

As per para 47 of EB 65, Annex 21, for the measures that are listed in paragraph 6 of the "Demonstration and assessment of Additionality" tool, common practice analysis test needs to be conducted using the following step wise procedure.

The applicable geographical area in case of this analysis is the entire host country. All the power plants of different technologies (Wind, Biomass, Hydro, Thermal etc.) that are connected to the grid are included in the analysis.

Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

Approach Followed: The project activity is the renewable wind energy based generation of electricity with the aggregated capacity of 39 MW. Hence in-line with the above guidance, PP has analysed the all the project activities in India (Applicable geographical area for this project) equal to the output range of +/-50% of the capacity of the proposed project activity. So the projects in India between the output range of **19.5 MW to 58.5 MW** is analyzed to perform the common practice analysis test for this project activity.

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and projects activities undergoing validation shall not be included in this step

Approach Followed: Applicable geographical area is India. In line with the above guideline, PP has analysed all the power projects in India with the applicable output range of **19.5 MW to 58.5 MW** based on the following two criteria

1. The power plants that have started operation before the starting date of the project activity i.e., before July 2008
2. The power plants that are based on the similar technology (i.e. project alike Wind) and different technology (technologies that are different than Wind technology).

It is found that total 455 projects are in operation within this range in India before July 2008[19].

The details of the projects in each sector is listed below

S. No	Sector/Technology	No. of Projects	Remarks
1	Wind	24	As per the Indian Wind Power Directory 2010[20]

[19] Analysis sheet submitted to the DOE

2	Biomass & Bagasse based Co-generation	71	As per the list of Cane Sugar Factories & Distilleries by The Sugar Technologists' Association of India., List of non-bagasse co-gen from ICI newsletter volume 22[21] and list of biomass based power plants in TN from - http://www.tangedco.gov.in/bio_mass.php
3	Thermal & Hydro Power projects	360	As per Central Electricity Authority (CEA) of India: CO_2 Baseline Database for Indian Power Sector[22].
Total		**455**	

As the registered CDM project activities and projects activities undergoing validation shall not be included to compute the $N_{all,}$ PP has removed those kinds of projects from above listed 455 projects. Here is the list of projects in CDM cycle.

S. No	Sector/Technology	No. of registered & undergoing validation Projects in CDM	Remarks[23]
1	Wind	10	As per CDM Pipeline database
2	Biomass & Bagasse based Co-generation	12	As per CDM Pipeline database
3	Thermal & Hydro Power projects	1	As per CDM Pipeline database
Total		**23**	

Hence, N_{all} shall be the difference between total numbers of projects in India within this range and projects in CDM cycle.

Thus, N_{all} arrived for this project activity is 455 - 23

N_{all} =432 Projects

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

Approach Followed: Different technology projects are the power plants which are running on coal, hydro, gas, diesel, biomass & bagasse based Cogeneration etc., and which are sourced from CEA database and other directories. Such projects are 408 and found out as follows.

N_{all} = 432 & No. of Wind Projects = 24

Therefore, N_{diff}= 432 – 24

[20] Extracts submitted to the DOE

[21] Extracts submitted to the DOE

[22] http://www.cea.nic.in/reports/planning/cdm_co2/database_publishing_ver5.zip

[23] Detailed analysis is provided to DOE

N_{diff}= 408 Projects

Step 4: Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

N_{all} = 432 and N_{diff}= 408

Based on the above values N_{all} - N_{diff} = 24

and, F = 1- 432/408= 0.056

Factor F – 0.056

The proposed project activity is a "common practice" within a sector in the applicable geographical area if both the following conditions are fulfilled:

(a) The factor F is greater than 0.2, and
(b) N_{all}-N_{diff} is greater than 3.

Conclusion: Since the factor F is **not** greater than 0.2; the project activity is **not** a common practice in the region.

From the above discussion it can be clearly derived that power generation using wind as a source of energy is additional and the carbon revenue generated due to the registration of the project as a CDM project would hasten the diffusion of this technology in and around the region.

The sequence of events presented below demonstrates that there were real and parallel action by the project proponent to avail CDM benefit for the project activity:

Chronology of CDM Activity_39 MW			
Date	**Project Activity**	**CDM Activity**	**Evidences**
15th Jun-07	-	Appointment of Consultant for CDM	Letter to M/s. CantorCO2e
18th Jan-08	302nd Board approval	Serious consideration of CDM	Extract of Board meeting
11th July-08	Issuance of Purchase Order	-	Copy of PO
23rd Oct -08	Loan sanctioned	-	Copy of loan sanction

			letter
29th Jan-09	-	Inquiry sent to DOE for validation	Copy of inquiry sent by courier
28th Feb-09	Commissioning of wind farm	-	Copy of commissioning certificates
13th Mar -09	-	Appointment of the DOE	Work order submitted to M/s TUV NoRD
5th June-09	-	Stake holder meeting	MoM of stakeholder meeting
17th Sep – 09	-	HCA Meeting	Letter of invitation from MoEF
17th Feb – 10	-	HCA approval granted	Coy of the HCA approval letter

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to the approved baseline methodology ACM0002, the emission reductions ***ERy*** by the project activity during a given year "*y*[1]" is

ERy = BEy – PEy ……..(1)

Where, BEy is baseline emission for the year y, PEy is project emission for the year y.

Baseline Emissions for the amount of electricity supplied by project activity, *BEy* is calculated as

$$BEy = EG_{PJ,y} * EF_{Grid,CM,y} \quad \text{……..(2)}$$

where $EG_{PJ,y}$ is the electricity supplied to the grid, *EFy* is the CO_2 emission factor of the grid as calculated below.

(a) Greenfield renewable energy power plants
If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

[1] Throughout the document, the suffix *y* denotes that such parameter is a function of the year y, thus to be monitored at least annually.

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh)

The emission factor *EFy* of the grid is represented as a combination of the Operating Margin (OM) and the Build Margin (BM). Considering the emission factors for these two margins as $EF_{OM,y}$ and $EF_{BM,y}$, then the *EFy* is given by:

$$EFy = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y} \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

with respective weight factors w_{OM} and w_{BM} (where $w_{OM} + w_{BM} = 1$).

The selection of method for the calculation of Operating Margin emission factor

In accordance with the step 3 of the "Tool to calculate emission factor" the following are the various approachs for the calculation of the Operating margin.
(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch data analysis OM, or
(d) Average OM.

Any of the four methods can be used, however, the simple OM method (option a) can only be used if low cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.
The percentage of total grid generation by low cost/must run plants for the NEWNE regional grid is less than 50 % of the total generation. Hence the Simple OM method can be used to calculate the Operating Margin Emission factor.

In accordance with the justification stated above and as described in the section B.4 the emission factor is calculated for this project activity.

Project Emissions:
The project activity uses wind power to generate electricity and hence the emissions from the project activity are taken as nil in accordance with the baseline methodology.
PEy = 0

Emission reductions:

The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity. The emission reduction *ERy* by the project activity during a given year y is the difference between baseline emissions (*BEy*), project emissions (*PEy*) as follows:

ERy =BEy −PEy

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO_2e/MWh
Description:	Operating Margin Emission Factor of NEWNE Electricity Grid
Source of data used:	"CO_2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO_2 Baseline Database for Indian Power Sector" (Version 5.0) is available at www.cea.nic.in
Value applied:	1.0049
Justification of the choice of data or description of measurement methods and procedures actually applied :	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002. Ver.12.3.0.

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO_2e/MWh
Description:	Build Margin Emission Factor of NEWNE Electricity Grid
Source of data used:	"CO_2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO_2 Baseline Database for Indian Power Sector" (Version 5.0) is available at www.cea.nic.in
Value applied:	0.6752
Justification of the choice of data or description of measurement methods and procedures actually applied :	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002, Ver.12.3.0.

Data / Parameter:	**EFy**
Data unit:	tCO_{2e}/MWh
Description:	Combine Margin CO_2 emission factor of NEWNE grid
Source of data used:	Estimated figure based on 75% of OM and 25% of BM values calculated using data obtained from CEA database on CO_2 baseline emission factor for Indian Power Sector.
Value applied:	0.9225
Justification of the	Calculated based on the available data from publicly available official site of

choice of data or description of measurement methods and procedures actually applied :	Central Electrical Authority of India
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>>

Ex-ante calculation of emission reductions is equal to ex-ante calculation of baseline emissions as project emissions and leakage are nil.

$BEy = EG_{PJ,y} * EF_{Grid, CM,y}$ (as defined in equation 2earlier)

$EG_{Facility}$ is estimated as:

$EG_{Facility}$ = Installed capacity (MW) * annual operating hours (h) * Plant load factor (%)

Annual operating hours = 24 * 365

Percentage of internal loss – 1.27%[45]

Therefore $EG_{facility}$ = 39 (MW) * 24* 365* 23%*(100%-1.27%) = 77,579 MWh/year

= 77,579 (MWh/year) * 0.9225(tCO2e/MWh) = 71,566tCO_2e/ year

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2012-13*	0	71,566	0	71,566
2013-14	0	71,566	0	71,566
2014-15	0	71,566	0	71,566
2015-16	0	71,566	0	71,566
2016-17	0	71,566	0	71,566
2017-18	0	71,566	0	71,566
2018-19	0	71,566	0	71,566
2019-20	0	71,566	0	71,566
2020-21	0	71,566	0	71,566

[45]This loss is accounted for the transformer losses incurred between the controller and the metering yard close to the WTG. The evidence pertaining to internal loss has been provided to the DOE.

Year	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of leakage (tonnes of CO_2e)	Estimation of overall emission reductions (tonnes of CO_2e)
2021-22	0	71,566	0	71,566
Total (tonnes of CO_2e)	0	7,15,660	0	7,15,660

*****Crediting period starts from September 2012.

B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

Data / Parameter:	$EG_{facility,y}$
Data unit:	MWh
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*
Source of data to be used:	Share of electricity certificate for the electricity issued by SLDC
Value of data applied for the purpose of calculating expected emission reductions in section B.5	77,579
Description of measurement methods and procedures to be applied:	This value is calculated based on the measured values at the electricity meters at 33kV and 66kV. Net electricity generated will be calculated directly by SLDC/GEDA based on the following two readings. 1. ABT Main meter (Meter at sub-station) reading which is connected to HV side of 33 KV/66 KV transformer. – This meter is of ABT type. There is another check meter along with the main meter for verification of the values. Both the meters are of accuracy class ±0.2s and are calibrated once in a three years. 2. VCB yard meter on 33 KV side near the WTGs of the customers (GACL in this case) at a particular site which in-turn connects to a feeder that ultimately leads to the ABT main meter through 33 KV/66 KV transformer at the substation maintained by Suzlon. This is an import-export meter and the meter is of ±0.2s accuracy class and is calibrated once in a

	year. Data monitoring takes place at the VCB yard meter (near the windmill 33 KV side) and at the ABT Main meter 66 KV at the substation. The electricity metered at the ABT Main meter (calculated by GEDA/ SLDC based on the export and import data (Not shared with PP by GEDA/SLDC)) is proportionally divided among the customers connected to this ABT main meter on the basis of the pro-rata generation taken from VCB yard meter at windmill end. The emission reduction calculations are done on the basis of the net generation mentioned in share certificate issued by issuing authority (Now SLDC) to PP on monthly basis. • The electricity measurements at VCB yard meter 33 KV side near windmill and ABT main meter 66 KV side near substation are continuous and recorded on monthly basis. 100% of the data is continuously monitored.
QA/QC procedures to be applied:	• This data will be directly used for calculation of emission reductions. • This will be cross checked with the electronic records maintained by suzlon in the CMS in electronic format. •
Any comment:	The data will be archived electronically for two years after the end of the last crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Data / Parameter:	EG_{WTGs}
Data unit:	MWh
Description:	Electricity generated by each WTG
Source of data to be used:	Calculated based on the measured values of VCB yard meter installed at 33 KV side near the WTG.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This data will not be used for the calculation of emission reductions but would be used to arrive at the net export of the windmills belonging to GACL.

Description of measurement methods and procedures to be applied:	Each WTG has a 690V/33kV step up transformer. The VCB Yard meter is located after the transformer (33 KV side) in which meter readings are taken every month and recorded in the MGR (Monthly generation report). The concerned parameter is calculated based on the export and the import data of the particular windmill. The meter is under the control of the state electricity board. The readings are taken jointly by the EB officials and the representative of the Suzlon
QA/QC procedures to be applied:	Annual calibration of all the meters will be undertaken at required intervals and faulty meters will be duly replaced immediately. Conformity with the national and the state level standards.http://www.cea.nic.in/reports/regulation/meter_reg.pdf(The CEA standards provides for calibration once in 5 years. The standards adopted in the project activity are more stringent as compared to the CEA standards)
Any comment:	The data will be archived electronically for two years after the end of the last crediting period or the last issuance of CERs for this project activity, whichever occurs later. The meters are of ±0.2s class.

B.7.2 Description of the monitoring plan:

Approved monitoring methodology ACM0002 / Version 12.3.0 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 electricity generation from the project activity

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.

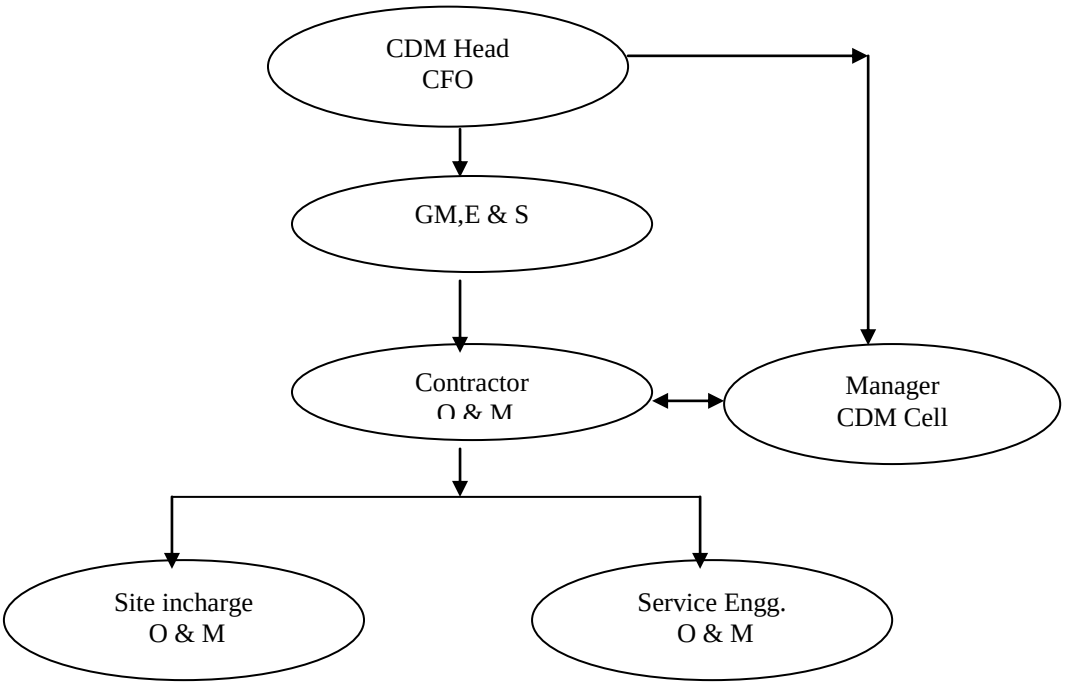
To ensure trouble free operations and efficient generations through all the wind turbines, GACL has entered into an Operation and Maintenance agreement with the manufactures of the turbines. The contractor, under the O&M contract with GACL would be responsible for the operation and maintenance of the project activity for the entire crediting period.

To ensure that the project activity leads to reduction in GHG emission into the atmosphere, the management decided to set up a CDM cell under the leadership of the Sr. Executive Director, (C).

The CDM Cell is responsible for overseeing the data collection process and its quality control for the proposed project activity. The recorded data generated at site is stored in the GACL Vadodara complex with the CDM cell in charge for easy retrieval. Along with data recording, quality assurance and data archiving, the cell is also responsible for successful execution of the CDM project cycle including documentation, validation and periodic verification for issuance of CERs.

The responsibility of monitoring different parameters and record keeping as per the set procedures would be undertaken by the O & M contractor along with the reviews on a regular basis by the CDM cell to ensure conformance with the standards as described.

The CDM Cell is as under:



Monitoring Procedure

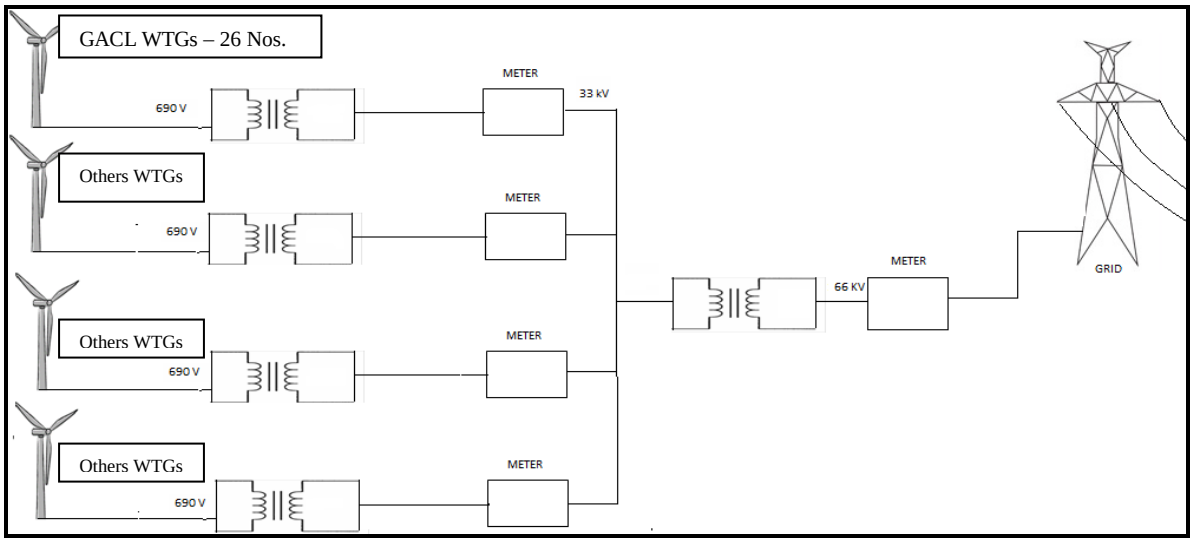
a. The electricity generation measurements are required by the utility and the investors to assess electricity sales revenue and / or wheeling charges.

b. Primary data- The Share of electricity generation is issued by issuing authority (Now SLDC) at the end of every month to the PP. This certificate is based on the JMR readings (readings from ABT main meter 66 KV side) and the readings observed at the VCB yard meter 33 kV side near windmill after adjusting the losses.

c. This readings can be cross checked with the windmill meter (33 KV VCB Meter) readings maintained in an electronic format at the CMS station..

Layout of the meters in the project activity site

As mentioned in the section B.7.1 above, two meters are used in recording the quantity of the electricity supplied by the project activity. The following is the schematic representation of the various meters.



Apportioning and other monitoring related Issues:

1. As the WTGs are owned by more than one investor at the site, the ABT Main meter at the pooling sub-station will be installed by GETCO at HV side of 33KV/66KV transformer. VCB yard meter shall be installed in the windmill metering yard near wind mill. At the end of the month, Certificate issuing authority (Now SLDC) will give in respect of GACL, a statement of active energy injection and reactive energy drawl of their WTGs .This statement refer as share of electricity generation certificate will be the final measurement of the energy supplied to the GETCO by the company for the preceding month.
2. Net electricity generated will be calculated based on the ABT main meter reading connected to the HV side of 33KV/66KV transformer and the VCB yard meter 33 KV side near the WTGs of a single customer (GACL in this case) . The VCB yard meter near the WTG in-turn connects to a feeder that ultimately leads to the ABT main meter through 33 KV/66 KV transformer at the substation maintained by Suzlon. Data monitoring takes place at the VCB yard meter 33 KV side near the WTG and ABT main meter 66 KV side at the substation. The electricity calculated at the ABT main meter is proportionally divided among the customers connected to the ABT main meter on the basis of the pro-rata readings taken by GEDA/SLDC at the windmill end. The emission reduction calculations are done on the net generation mentioned in share certificate issued by issuing authority (Now SLDC) to PP on monthly basis.
3. The apportioning is based on the pro rata electricity generation at VCB yard meter at 33 KV end near WTG. The apportioning will be carried out by GEDA/SLDC taking into account the cumulative generation at the windmill points (33 kV side VCB yard meters) and the reading at ABT main meter 66 KV side (the readings at 66 kV will give a lesser generation value compared to the cumulative windmills reading directed towards the particular feeder due to the T&D losses). The line and transformer losses will be distributed on pro rata electricity generation basis among the windmills and a net generation statement (share of electricity certificate) will be given by issuing authority (Now SLDC) to project proponent. The electricity generation at 33 KV (VCB yard meter) end of all individual WTGs are not shared with PP.

Only the net electricity generation data is available to the PP via share of electricity generation certificate issued by nodal agency (Now SLDC) at the end of each month.

For example:
Joint meter reading is taken at substation ABT main meter by representative of GETCO (Gujarat Energy Transmission Company, GEDA (Gujarat Energy Development Authority) and O&M service provider (on behalf of individual wind farm owners). Let us assume total generations recorded for particular month is 'X' units in sub-station meter.

Joint meter reading is taken at Local Meter-(VCB yard meter)) by representative of GEDA and O&M service provider (on behalf of individual wind farm owners). Let us assume total generation recorded for particular windmill in a month is 'Y_1' units.

Similarly joint meter reading for other wind mill owners is also taken. Let us assume generation of individual owner recorded for particular month are .....'Y_2, Y_3.....Y_n' units (Calculated based on the measured export and the import readings at 33kV (VCB yard meter).

SLDC distributes 'X' to individual wind farm owners based on GEDA report submitted to them using following formula and issues monthly certificates.

The Share of the PP (X_1)

$$\text{: Units generated } \text{'X x } \frac{\text{'Y1'}}{\text{'Y1+Y2+Y3....+Yn'}}$$

In other words, total 'X' units (Calculated based on the export and import values at 66 kV and VCB yard meter) are shared in proportion to generation by individual wind turbine / wind farms to get X_1,X_2,X_3 etc. Hence the apportioning is based on the calculated values based on the measured values at the two metering points viz. at 33 kV near WTG (VCB yard meter)and 66 kV (ABT main meter) near the substation.

Please note that this calculation is only for demonstration purpose. PP doesn't have any access to get electricity generation and apportioning data (at 33 KV end VCB yard meter data) of WTGs owned by other party. PP also doesn't have any access to gather data of export and import occurred at 66 KV end (ABT main meter side).

Billing and meter failure related issues:

a) The billing will be on monthly basis. The generation will be adjusted in the monthly electricity bill supplied to the GACL. GACL will also receive a share of electricity certificate based on their net injection of electricity into the NEWNE grid.
b) Billing for the failure period:
   i. In the event that ABT Main meter (Meter on 66 KV side) fails to register or upon being tested is found not to be accurate within ±0.2s of the energy injected in the grid, shall for the period be measured on the basis of the value registered by the corresponding check meter (Located in the sub-station yard on 66 KV side)at the feeder end.

ii. If both main meter and check meter are found faulty, energy generation is monitored in accordance with procedures described in wheeling agreement as follows.

In case, both the ABT main meters and check meter are found to be beyond permissible limit of error[46[1]], which is determined by GETCO, both the meters shall be calibrated immediately and the correction applicable to ABT main meter shall be applied to the energy registered by the ABT main meter at the correct energy for the purpose of energy account/billing for the actual period during which inaccurate measurements were made, if such period can be determined or, if not readily determinable, shall be the shorter of.

a. The period since the immediately preceding test of the relevant ABT main meter, (OR)
b. One hundred and eighty (180) days immediately preceding the test at which the relevant ABT Main meter was determined to be defective or inaccurate.

The wind mill supervisor has been allocated with the responsibility for safe operation of the wind farms and employees working in the farms and generation unit. The project team has been entrusted with the responsibility of storing, recording the data related to the project activity which is measured from the meters. The CDM Head is responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner based on the share of electricity certificates provided by the SLDC.

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Data Archiving: All the monitoring data is stored /will be recorded and kept under safe custody of the project head. Also any change within the project boundary, such as change in spare and or equipments will be recorded and any change in the emission reduction due to such alteration will also be studied and recorded.
The responsibility matrix for the project team looking after the various aspects related to it is presented in the table below:

Designation	**Responsibilities**
Project Head:	• CDM Registration • Project Execution, Internal Audit
Project Executer and Controller:	• Operation • Verification of data • Site visit whenever necessary to independently check the authenticity of data and take corrective actions wherever required. • Storage of data
Site Main Controller	• Operation, Monitoring and Verification of Data • Data Recording • Storage of data
Operation and Maintenance Contractor	• Operation and Maintenance • Storage of data • Data Recording

Data Apportioning:

During the crediting period, there will be instances when, the dates of the crediting period may not match with that of the dates of the share of electricity certificate provided by SLDC, For example, if the crediting period begins from 15th of the October and share certificate is provided for the period is from 1st of October to 31st of October, the partial days generation as per the crediting period needs to be determined.

In these instances PP undertakes that the crediting period will be considered in accordance with the dates of the share of electricity generation certificate. The excess period generation which is not covered in the share of electricity generation certificate will be foregone and will not be considered for the CER calculations. In the example stated above the period from 15th of October to 31st of October will not be considered and the generation for the CER calculations will be taken from 1st November onwards.

B.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

Date of Baseline Completion: 15/1/2010

Name of responsible person/entity:

GACL CDM cell
& their CDM Advisors General Carbon (www.general-carbon.com)

GACL is the project participant and contact details are given in Annex 1.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

11/07/2008 (date of Purchase Order of the wind turbines)

C.1.2. Expected operational lifetime of the project activity:

20 years 00 months

C.2 Choice of the crediting period and related information:

Fixed crediting period is chosen

C.2.1. Renewable crediting period

Not Applicable (NA)

C.2.1.1. Starting date of the first crediting period:

NA

C.2.1.2. Length of the first crediting period:

NA

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/09/2012 or from the date of registration of the Project activity, whichever is later.

C.2.2.2. Length:

10 Years 00 months

SECTION D. Environmental impacts

D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

As per the Ministry of Environment and Forests (Government of India) notification the project activity does not fall under the purview of the Environmental impact Assessment thus the project activity is exempted from the environmental clearances.[48]

Since EIA is not a regulatory requirement in India for wind energy projects, the project sponsors have taken up an in-house assessment to study if any irreversible and unacceptable impacts on the environment have resulted and would result from the project activity.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

The in-house impact assessment demonstrated that there is no major impact on the environment due to the installation and operation of the windmills. The ecology is not likely to get impacted by this type of

[48] http://envfor.nic.in/legis/eia/so-60(e).html

project activity. The local population confirmed that there is no noise or dust nuisance due to windmills. The assessment also ruled out any adverse impacts due to the project activity.

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

A local stakeholder consultation meeting had been conducted in order to identify the concerns of the people regarding the implementation of the project activity.

The stakeholders identified for the project were: the usual occupants of the villages around and the local communities, NGOs, state government, governmental agencies, employees, contractors and consultants/advisors, who they assumed would have an interest in the CDM project activity. Their views were sought to understand their opinion on the proposed CDM project activity. A Notice to hold the stakeholder consultation meeting was displayed in local news paper "Kachchh Mitra" dtd 21st May-09, informing all about the venue, time of the meeting, requesting their presence in form of attendance. The meeting was scheduled on 5th June-09, at 9:30 am to 11:30 am at wind park site, Anjar, dist- Kachchh.

The meeting begain with the welcome note by Mr. Dwijal Mamtora from M/s. Suzlon & Mr. Nikhil Patel, DGM from M/s. GACL to the stakeholder and prominent villagers. Mr. Nikhil Rao from M/s. CantorCO2e, consultant for CDM project remained present during the meeting.
The villagers further suggested to elect a chairman to conduct the meeting. Thus, proposed the name of Mr. Ghanshyamsinh Jadeja and Mr. Lakhabhai Rabari.

Mr. R P Patel, Sr. Manager of M/s. GACL gave a company introduction. The issue of global warming, climate change, its adverse effect and how to reduce those effect such as by employing renewable energy sources of power like wind were discussed in detail. Also the role of local stakeholder, environmental & social impact with respect to the project was also explained and discussed in detail.

Mr. Ravi Nair, Jr. Technical Officer of Gujarat Energy Development Authority (GEDA) was also present in the meeting and brief about the government steps towards development of Green energy.

Mr. Ghanshyamsinh Jadeja and Mr. Lakhabhai Rabari added further on this about the positive development of area due to installation of wind farm project.

The summary of the meeting was recorded and a copy of the same will be made available to Designated Operating Entity during validation process. The list of participants with their signature is kept for record and photographs of the event were also taken.

E.2. Summary of the comments received:

After a brief discussion regarding the consequences and impacts of this project activity the comment pertaining to project activity were received and answered in the meeting. The stakeholders viewed Project proponents as a reputed group of companies contributing to the local economy. The participants sought clarifications on Kyoto Protocol and Clean Development Mechanism processes. The stakeholders concerns during the meeting were focussed towards, short term and long term impacts that this wind farm

project would pose on the environment. Questions regarding the any health hazards, lifetime of the machine, effect on rainfall etc. were also raised by the stakeholders, which was sufficed positively by the project proponent. Thus, overall there was agreement that the proposed project is a beneficial project.

E.3. Report on how due account was taken of any comments received:

The stakeholders were given clarification on the issues raised as above to their satisfaction by providing relevant evidence of the project claims.

Overall there was unanimous agreement that the project activity was a good initiative undertaken by the Project proponents which contributes, to the sustainable development of the areas and world.

As a part of continuing commitment on the part of PP to strive towards the sustainable development of the communities and to satisfy the requirements of the NCDMA, the following action plan has been envisaged to spend an amount equal to 2% of the net realization from out of Carbon Credits on any one or more of the following and other sustainable development activities in consultation with the local community either directly or through CSR initiatives, which is involved in similar activities.

- Promoting primary and girl's education (e.g. 'Sarva Shiksha Abhiyan' and 'Kanya Kelvani Programmes' of Govt. of Gujarat) in surrounding rural areas.
- Providing vocational and on the job training to ITI pass outs.
- Infrastructure developmental programmes such as drinking water and irrigation facilities, electricity, roads etc. thus accelerating rural development.
- Undertaking relief operations in times of natural disasters such as floods and earthquake.
- Creating awareness about HIV/AIDS and organizing free distribution of condoms through vending units at convenient places targeting the local groups of labour, transport workers etc.

The manner in which the spending will be monitored is included in the section A.2 of the PDD.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Gujarat Alkalies and Chemicals Limited
Street/P.O.Box:	P.O-Petrochemicals – 391346
Building:	----------
City:	Vadodara
State/Region:	Gujarat
Postfix/ZIP:	391346
Country:	India
Telephone:	+91-265-2232156
FAX:	+91-265-2230991
E-Mail:	*hasmukh.patel@gacl.co.in*
URL:	www.gujaratalkalies.com
Represented by:	Chief Finance Officer
Title:	-
Salutation:	Mr.
Last Name:	Patel
Middle Name:	Baldevbhai
First Name:	Hasmukhbhai
Department:	-
Mobile:	-
Direct FAX:	+91-265-2230991
Direct tel:	+91-265-2232156
Personal E-Mail:	*hasmukh.patel@gacl.co.in*

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No ODA funding has been sought for this project.

Annex 3
Baseline Information
Included in the section B.4

Annex 4

MONITORING INFORMATION

Included in the section B.7.2

Appendix 1 – Location Map

LOCATION MAP: PROJECT ACTIVITY SITE, DISTRICT KACHCHH