CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of project activity

A.1 Title of the project activity:

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Title: Wind power project at Gujarat by Powerica Limited
Version: 01.1
Date of Completion: 28/12/2009

A.2. Description of the project activity:

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Powerica Limited is the largest Genset manufacturer in India. Founded in 1980, it is the project proponent of the wind power project under the Clean Development Mechanism of Kyoto Protocol. Effective utilization of resources has been a guiding factor for Powerica towards conceptualization of a 14.85 MW wind power project. This project aims at providing electricity to the state electricity grid through effective utilization of renewable resource which, in the case of the project activity, is wind power.

The project activity involves a total installation of 9 Wind Turbine Generators (WTG) of total generating capacity of 14.85 MW (9 units of Vestas make V82 WTG). The WTG units will be installed in Kutch district of the state of Gujarat.

The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources and to contribute to climate change mitigation efforts. In the absence of the project activity, the electricity thus supplied would have been generated through fossil fuel based thermal power plants. The project activity thus contributes to reduction in specific emissions (emissions of pollutant) including GHG emissions. The project activity is also responsible for sustainable economic growth and conservation of environment through use of wind as a renewable source.

Views of the project participant on contribution of the project activity to sustainable development:
The Designated National Authority (DNA) for the Government of India (GoI) on the Ministry of Environment and Forestry (MoEF), called the National CDM Authority (NCDMA), has stipulated four indicators on sustainable development for Clean Development Mechanism (CDM) projects structured in India. The project participants' view on the contribution of this project activity towards sustainable development follows these four indicators as explained below:

Environment well being:

- **Reduction in the consumption of fossil fuels:** The installation of power plant generating electricity through utilization of renewable resource such as wind power, would lead to reduction in usage of fossil fuels such as coal.
- **Reduction in emission of GHG:** The reduction in usage of fossil fuels for electricity generation will result in reduction of the release of associated GHG emissions (CO_2 and CH_4 emissions).
- **Improvement of Air Quality:** The use of renewable energy for power generation will avoid the emission of air pollutants such as Suspended Particulate Matter (SPM), Sulphur Dioxide (SO_2) and Nitrogen Oxides (NO_x) thereby improvising the surrounding air quality
- **Conservation of Natural Resources:** Installation of wind power plant will result in conserving fast depleting natural resources such as coal, oil etc.

Economic well being:

- **Rural Development:** The installation of wind power project will result in rural and infrastructural development in the surrounding rural areas
- **Economic Development:** The generation of wind power will result in improvising the reliability of the NEWNE Grid and thereby enhance economic development in the region.

Social well being:

- **Generating Local Employment:** The installation of wind power project in rural areas will result in generating local employment opportunities and capacity building of the local employees.
- **Encouragement to entrepreneurs:** The project will provide encouragement to other entrepreneurs to invest into renewable energy sources.

Technological well being:

- The project activity involves the successful installation and operation of state-of-art wind turbine generators (WTGs) of Vestas make. The implementation of these new technologies will help in increasing reliability on efficient technology and large capacity wind mills.

Thus, it is ensured that the project activity meets all the criteria for Sustainable development.

A.3. 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)
India (Host)	Powerica Limited – Private Entity	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party (ies):

>>India

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

>> Gujarat

A.4.1.3. City/Town/Community etc:

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Village: Jangi/ Vandhiya
District: Kutch
State: Gujarat

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

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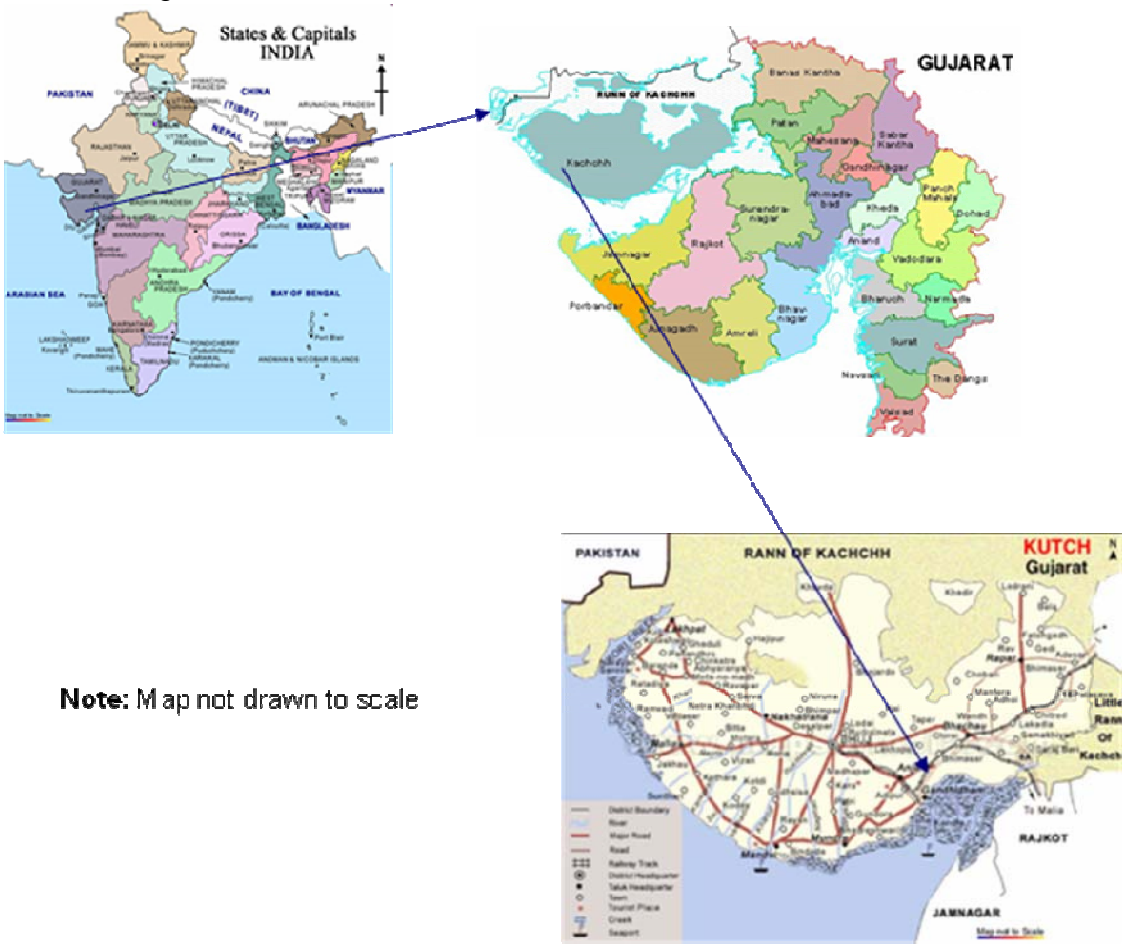
The project activity is located in Gujarat states of India. The project location and the wind map are attached in the figure below.



Note: Map not drawn to scale

The unique location information of the WTG is provided in the table below. The WTG numbers indicated in the table below are unique identification number provided by the state utility.

Latitude & Longitude:

WTG	Village	Latitude (°N)	Longitude (°E)	Sub-station
SW4	Shikarpur	23°13'28"	70°41'40"	Surajbari
SW5		23°13'29"	70°41'57"	
SW6		23°13'13"	70°42'03"	
VW42	Lakhapar	23°11'14"	70°37'49"	Jangi
VW43		23°11'03"	70°37'33"	
VW44		23°11'22"	70°37'17"	

WTG	Village	Latitude (°N)	Longitude (°E)	Sub-station
VW45		23°11'28"	70°37'02"	
JW14	Jangi	23°10'42"	70°32'44"	
JW15		23°10'44"	70°32'29"	

A.4.2. Type and category (ies) and technology/measure of the small-scale project activity:

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Type & Category

Since, the capacity of the proposed project is 14.85 MW, which is less than the maximum qualifying capacity of 15 MW, the project activity has been considered as a small scale CDM project activity and UNFCCC indicative simplified modalities and procedures are applied. The project activity utilizes the wind potential for power generation and exports the generated electricity to the grid. According to small-scale CDM modalities the project activity falls under the following category:

Sectoral Scope	**:** 1	Energy industries (renewable / non renewable sources)
Type	**:** I	Renewable Energy Projects
Category	**:** I-D Version 15.0	Grid connected renewable electricity generation

Technology

It is to be noted that the project activity is a greenfield project for generation of electrical energy using wind which is a renewable source of energy. Thus, this project actually displaces the electricity grid which is essentially fossil-fuel based.

In wind energy generation, kinetic energy of the wind is converted into mechanical energy and subsequently into electrical energy. Wind turbines capture the wind's energy with three propeller-like blades, which are mounted on a rotor, to generate electricity. The turbines sit high atop towers, taking advantage of the stronger and less turbulent wind. As the wind blows through the blades of the windmill, a pocket of low-pressure air forms on the downwind side of the blade. The low-pressure air pocket then pulls the blade towards it, causing the rotor to spin. The rotor turns the shaft that further spins the connected generator. The spinning of this generator produces the required electricity. Since power is generated from wind energy, no emissions are attributed to the project emissions and emissions due to fossil-fuel based grid has been displaced due to the project activity. Detailed information of gases & emission sources in baseline & project activity have discussed in Section B.3 of this document.

Emission reductions will be claimed on the net electrical energy that is supplied to grid which will be metered using meters (Main & Check meters) located at the electrical yard of the respective WTGs. These electrical energy meters are essentially electronic tri-vector meters of accuracy class 0.5. Since these meters are not designed to measure high voltages and currents as generated in the WTG, the WTG output is connected to these meters via transformers (CT/PT) for stepping down the generated voltage and current to ranges which the meters can record. As such, these meters have a multiplying factor which when multiplied to the meter reading provides the actual amount of electricity generated. The technology providers for the project have additionally installed an LCS meter at the WTG controller. Details of monitoring of emission reductions and their calculation have been provided in Section B.6.1 & Section B.7.2 of this document.

For the project activity, the project proponent has procured the WTGs from Vestas Limited for supply of 9 units V82 1650 kW capacity.The salient features of the technology employed are:

V82_1.65 MW_50Hz

Parameter	Specification
Rated Power	1,650 kW
Rotor diameter	82 m
Swept area	5,281 m^2
No. of blades	3
Cut in wind speed	3.5 m/s
Cut out wind Speed	20 m/s
Rated wind speed	14.4 rpm
Regulation	Active Stall
Tower Height	78 m
Insulation	Class F/B

Generation of power through wind turbine has no sources of emission as discussed in detail in Section B.3 of this document. The electricity generated is monitored using electrical meters (Main & Check meters) which provide a measure of the actual electrical energy that would have been sourced from a fossil-fuel based grid had it not been generated using wind energy. Hence, the fossil-fuel power based grid shall form the baseline to the project activity which has been developed in Section B.4 of this document. Further to this, a detailed monitoring procedure is provided in Section B.7 of this document. Typical generation figures of the WTGs have been provided in Section B.5 of this document.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

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Years	Estimation of annual emission reductions in tones of CO_2 e
Year 1: 2010 - 2011	32,542
Year 2: 2011 - 2012	32,542
Year 3: 2012 - 2013	32,542
Year 4: 2013 - 2014	32,542
Year 5: 2014 - 2015	32,542
Year 6: 2015 - 2016	32,542
Year 7: 2016 - 2017	32,542
Total estimated reductions (tonnes of CO_2 e)	**227,794**
Total number of crediting years	7 years
Annual average of the estimated reductions over the crediting period (tCO_2 e)	32,542

A.4.4. Public funding of the project activity:

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There is no public funding involved in the project activity. The project activity has been developed on the basis of in-house resources of the proponent & loan from the bank.

A.4.5. Confirmation that the small scale project activity is not a debundled component of a Large Scale Project activity:

According to paragraph 2 of Appendix C to the Simplified Modalities and Procedures for Small-Scale CDM project activities (FCCC/CP/2002/7/Add.3), a small-scale project is considered a debundled component of a large project activity if there is a registered small-scale activity or an application to register another small-scale activity:

- With the same project participants
- In the same project category and technology
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small scale activity

The project promoters hereby confirm that there is no registered small scale project activity registered within the previous two years with them in the same project category and technology whose project boundary is within 1km of the project boundary of the proposed small scale activity. Thus the project is not a debundled component of any other large-scale project activity.

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:

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The methodology followed will be "AMS I.D Version 15 (Valid from 30 Oct 09 onward) Approved methodology for Small Scale Projects" under the sectoral scope "Grid connected renewable electricity generation" which is most appropriate for this Project and is listed as per the UNFCCC norms.

Project Type : I – Renewable energy project
Project category : D – Grid connected renewable electricity generation
(AMS I.D. Version 15 (Valid from 30 Oct 09 onward))
Methodology AMS I.D. also refers to:-
Tool to calculate the emission factor for an electrical system
EB 50, Version 02
Reference : Appendix B of simplified M&P for small scale project activities
(UNFCCC, Recent norms)

B.2 Justification of the choice of the project category:

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In accordance with Appendix B of the simplified modalities and procedures for small-scale CDM project activities, the project is categorized as Type – I.D.: Version 15, Scope 1, "Grid Connected renewable electricity generation". Category I.D is applicable to projects that use renewable energy technologies that supply electricity to a grid.

The CDM project is leading to reduction in the emission of GHG due to the use of renewable energy source, i.e., wind, for power generation.

Sr.	Technology/measure	Justification
1.	This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.	The project activity is the installation of windmills, which utilizes the renewable energy of wind to generate electricity connected to grid.
2.	If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.	The project activity involves the installation of 9 units of WTGs (4 units of 1650 kW capacity), which contributes to total of 14.85 MW and is less than the limiting capacity of 15 MW.
3.	Combined heat and power (co-generation) systems are not	The activity includes only wind

Sr.	Technology/measure	Justification
	eligible under this category.	mills of 14.85 MW capacities and does not include any co-generation process.
4.	In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	This is a new installation of 14.85 MW windmills and not any addition to existing units.
5.	Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	There is altogether a new installation of 14.85 MW wind mills and not any addition or modification to the existing unit.

In this project, total electricity generation capacity of all 4 windmills is 14.85 MW, which is less than the limit of 15 MW of maximum output capacity as specified in Annex-II "Simplified Modalities & Procedures for Small Scale CDM Project Activities" for Type (I) project activities: renewable energy project activities with a maximum output capacity equivalent to up to 15 MW (or an appropriate equivalent) (decision 17/CP.7, paragraph 6 (c) (i)). Thus, this project reduces anthropogenic emissions by sources and its maximum output capacity is less than 15 MW. Therefore it confirms to this category thereby qualifying as a small-scale project activity.

B.3. Description of the project boundary

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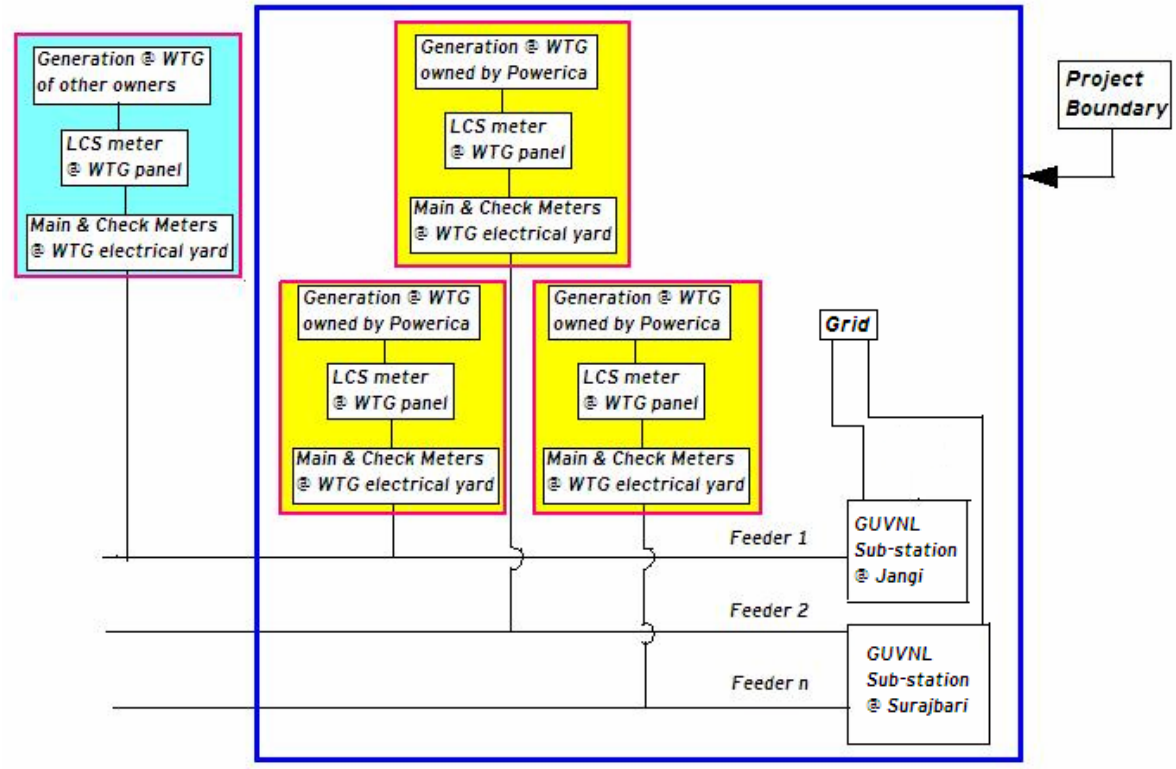
As per the guidelines mentioned in Type I. D. of Annex B of the simplified modalities and procedures for small-scale CDM project activities, project boundary encompasses the "*physical, geographical site of the renewable generation source delineates the project boundary."*

The project boundary includes the electricity generation equipment at the site and the transport through the electricity grid to the substation. Hence, project boundary is considered with in these terminal points. The project boundary, as per monitoring layouts involving the project activity, is portrayed as follows:



Gases and Sources considered in the project activity:

The table provided below shows the gases and sources considered in the project activity

	Source	Gas	Included	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam.	CO_2	No	The present project activity is a greenfield wind power project. Hence, not relevant
		CH_4	No	
		N_2O	No	
	CO_2 emissions from combustion of fossil	CO_2	No	The present project activity is a greenfield wind power project. Hence,

Source		Gas	Included	Justification/Explanation
		CH_4	No	
		N_2O	No	
	For hydro power plants, emissions of CH_4 from the reservoir.	CO_2	No	The present project activity is a greenfield wind power project. Hence, not relevant
		CH_4	No	
		N_2O	No	

B.4. Description of baseline & its development

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The baseline methodology has followed the one specified under Project category I.D in Appendix B of the Simplified M&P for small scale CDM project activities. As per the applied methodology, AMS ID, (Version 15), the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient which is to be measured in tCO_2e/MWh. For the estimation of the baseline the project proponent has chosen to calculate the combined margin, consisting of the combination of the operating margin (OM) and the build margin (BM) according to the procedures laid out in the 'Tool to calculate the Emission Factor for an electricity system'. The Central Electricity Authority (CEA) under the Ministry of Power, Government of India, has estimated the Combined Margin for the NEWNE grid, the details of which are available on the following website.

http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver5.zip

The latest version of the said tool, Version 02, has been used by the CEA for the calculation. The procedures followed, the assumptions made and the formulae applied by the CEA for the calculation of the OM and the BM is detailed in Section B.6.1 of this PDD.

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 small-scale CDM project activity:

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The project activity meets the eligibility criteria to use simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7.

As per the decision 17/CP.7 Para 43, a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.

Further referring to Attachment A to Appendix B to Annex B document of indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories, project participants shall provide a qualitative explanation to show that the project activity would not have occurred anyway, at least one of the listed elements should be identified in concrete terms to show that the activity is either beyond the regulatory and policy requirement or improves compliance to the requirement by overcoming the following barrier(s) ;

a) Investment Barrier
b) Technological Barrier
c) Barrier due to prevailing practice
d) Other Barriers

National Policies relevant to the project activity

The Government of India enacted the Electricity Act in the year 2003 to harmonize and rationalize the provisions in the then existing laws in India. The Act consolidated the laws relating to generation, transmission, distribution, trading and use of electricity. With the Enactment of the act, the then existing laws viz, The Indian Electricity Act 1910, The Electricity Supply Act, 1948 and The Electricity Regulatory Commissions Act, 1998 were repealed. The Electricity Act 2003 was in force at the time of the completion of the baseline study for the PDD.

The Gujarat Electricity Development Agency (GEDA), had issued a comprehensive tariff order on Wind Energy on the 17th of June 2009 [1] wherein a tariff of Rs. 3.55/kWh has been suggested and which has been used in the analysis.

Investment Analysis

The project activity involves setting up of 14.85 MW of wind power in Gujarat which will be supplied to the state electricity grid. The benchmark analysis method has been selected to depict the investment analysis as the project activity has a revenue source other than CDM revenue.

This is one of the first steps being undertaken by Powerica with the motive of being an independent wind power producer exporting the generated electricity from its wind farm to the regional electricity system. Since the project involved 100% equity, Powerica consecutively sought an equity returns based benchmark applicable to independent power producers in the country implementing similar projects.

An investment analysis of the project activity was conducted with post tax equity Internal Rate of Return (IRR) as the financial indicator. IRR is one of the known financial indicators used by banks, lending institutions and project developers for decision making. The benchmark IRR for the project has been chosen as 14.76 %. The value has been arrived at following the Capital Asset Pricing Model.

$R_i = R_f + \beta * (R_m - R_f)$

where,

R_i	Market based returns on equity
R_f	Risk-free Return at the time of decision making
β	Minimum of Beta value among 7 power sector companies for 5 year period from 01/04/2004 - 01/03/2009
R_m	Risk Premium

For the present project activity, the Reserve Bank of India's average Government bond rate has been adopted as the risk-free rate of return which stood at 8.12 % during 2007-08.

[1] GEDA Order

The Beta value has been conservatively taken to be the minimum of the 5 year beta values of the following companies which are listed on the BSE - SENSEX:

1. Torrent Power
2. Tata Power
3. Reliance Power
4. BF Utilities
5. GVK Power
6. KSK Energy
7. Surya Chakra

The minimum Beta value for this period is attributed to BF Utilities at 0.5969. However, it must be noted that this had been a conservative approach taken by the project proponent as the average beta for all of the above mentioned companies was 0.8544 for the same period.

The risk premium value has been arrived at by calculating the Compound Annual Growth Rate for the BSE-SENSEX since its base year (1978-79) on a base value of 100. At the time of decision making, the SENSEX had a low of 16498.59. Hence, the risk premium value is

$= R_m = \{(16498.69/100) \text{ ^ } (1/29) - 1\} = 19.25\%$

wherein, 29 years has been the gap between the base year and project start date.

Hence, $R_i = 8.12 + 0.5969 * (19.25 - 8.12) = 14.76\%$

The following assumptions have been made for conducting the financial analysis:
(Note: 1 Lakh INR= 100,000 INR)

Parameter	Value	Source of Data
Capacity of the wind project	14.85 MW	
No. and capacity of machines	9 Nos. X 1.65 MW	
Gross Annual Generation	48 Lakh kWh/WTG	Quotes provided by WTG provider[2]
Transmission losses	2%	Quotes provided by WTG provider
Wind Correction factor	5%	Quotes provided by WTG provider
Machine Availability	95%	Quotes provided by WTG provider
Grid Availability	98%	Quotes provided by WTG provider
Modelling Error	5%	Quotes provided by WTG provider

[2] It must be noted here that as per "Guidelines for the reporting and validation of plant load factors" Version 01, a prior wind assessment study had been conducted by the project proponent, which states a generation value lower than that mentioned in the quote. However, for conservativeness, the quote figures have been taken into consideration during investment analysis.

Parameter	Value	Source of Data
Net Annual Generation incl. of above loss factors	36.89 Lakh kWh/WTG	Calculated
Annual O&M Costs (for 3rd year)	INR 20 Lakh/WTG	Quotes provided by WTG provider
% Escalation in O&M charges p.a. (from 4th year)	5%	Quotes provided by WTG provider
Power Tariff	INR 3.55/kWh	Power Purchase Agreement
Tax holiday u/s 80IA available for	15 years	Relevant Income Tax norms[3]
Total Project Cost	INR 9772.42 Lakh	Calculated
Fund	Equity 100 % Debt 0 %	

The Equity IRR works out to 7.06 % keeping the above data in consideration without CDM Revenues.

The project activity has been found sensitive to the following parameters for which the equity IRR without CDM revenues has been calculated:

Parameter Varied for IRR w/o CDM	Variation	
	10%	-10%
Generation	8.59%	5.44%
O&M	6.80%	7.32%
Tariff	8.59%	5.44%
Capital Cost	5.85%	8.50%

The purpose of the sensitivity analysis is to demonstrate the sensitivity of the return on project due to uncertainty in the plant load factor and project costs as well as the uncertainty in unit rate of power sale. As can be seen from the above analysis there is significant risk associated with the project activity that impacts the viability of the project activity. It is also evident that without CDM benefits, the project has no or very less financial viability.

In view of this, the 14.85 MW Wind project is additional and not the same as baseline scenario and would not have occurred without the CDM.

The project development chronology is as follows:

Sl. No.	Event	Date
1.	Quotation from WTG supplier	12/08/2009
2.	Board Approval for project	17/09/2009
3.	Intimation to UNFCCC	09/11/2009
4.	Supply Agreement (Financial Closure[4])	10/12/2009

[3] IT Section 80 IA

5.	Appointment of DOE	24/12/2009
6.	Stakeholders' Consultation	24/12/2009
7.	All mandatory clearances	To be achieved
8.	Commissioning	To be achieved

As is evident from the chronology of events detailed above, the project proponent has taken continuous and real actions to secure CDM status for the project in parallel with its implementation.

B.6. Emission Reduction

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B.6. 1 Explanation of the Methodology choices

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Method of calculation of combined margin emission factor: *"Tool to calculate the emission factor for an electricity system", Version 02, EB 50 (Annex 12: Methodological Tool).*

The combined margin calculations estimate the baseline emission factor for grid. It consists of a combination of operation margin (OM) and build margin (BM) factors obtained from publication issued by Central Electricity Authority (CEA) of India- CO_2 Baseline Database for the Indian Power Sector, Version 05, dated November 1, 2009.

Calculation of the Baseline Emission Factor

Step 1: Identifying the relevant electric power system

A "project electricity system" is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints.

A "connected electricity system" is defined as an electricity system that is connected by transmission lines to the project electricity system. Power plants within the connected electricity system can be dispatched without significant transmission constraints but transmission to the project electricity system has significant transmission constraint. The tool requires the following considerations while determining whether significant transmission constraints exist or not:

- In case of electricity systems with spot markets for electricity: there are differences in electricity prices (without transmission and distribution costs) of more than 5% between the systems during 60% or more of the hours of the year.
- The transmission line is operated at 90% or more of its rated capacity during 90% percent or more of the hours of the year.

In the Indian context, as no well established spot markets exist, the first criterion is not applicable. Similarly, a transmission line fulfilling the second criteria is an exception in Indian Context. Hence the use of these criteria does not result in a clear grid boundary. In such a scenario, the use of a regional grid definition in case of large countries with layered dispatch systems (e.g. provincial, regional/national) is recommended. Further, it states that a provincial grid definition may in many cases be too narrow given significant electricity trade among provinces that might be affected, directly or indirectly, by a CDM project activity.

[4] Financial Closure refers to the event of signing of all major contracts pertaining to the project activity. Since the present project is an all-equity activity, the only major event is the signing of supply agreement.

Of the two regional grids of the Indian Electricity system, i.e., the North-East-West-North East (NEWNE) grid and the Southern grid, the latter covers four states and two Union Territories while the NEWNE grid covers the rest of India. The project is located in the state of Gujarat which is connected to NEWNE grid.

Each state in a regional grid meets its own demand with its own generation facilities and also with allocation from power plants owned by the central sector. Depending on the demand and generation, there are electricity exports and imports between states in the regional grid. The volume of the net transfers between the regions in India is relatively small and electricity is largely produced and consumed within the same states. Consequently, it is appropriate to assume that the impacts of the project activity will be confined to the regional grid in which it is located. Hence for the purpose of estimation of the baseline emission factor, the NEWNE Regional grid has been chosen as the relevant electricity system.

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: Selection of an Operating Margin method

The project proponent wishes to use the Simple Operating Margin (OM) method for the estimation of the Operating Margin Emission Factor. The use of the Simple OM method is justified as the share of the low cost/ must run resources constitute less than 50% of the total grid generation. The data pertaining to the total grid generation and the low/cost must run resources have been included in Annex 3. The Ex ante option has been chosen where in a three year generation weighted average based on the most recent data has been calculated ex ante and is fixed for the first crediting period. Hence, the parameters for the calculation of OM do not need to be monitored and the OM does not need to be calculated during the chosen first crediting period of seven years.

Step 4: Calculation of the Operating Margin Emission Factor according to the Simple OM 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. This may be calculated by any of the two options:

Option A: Based on the net electricity generation and a CO_2 emission factor of each power unit
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system. This option can only be used if:

a) The necessary data for Option A is not available; and
b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
c) Off-grid power plants are not included in the calculation (i.e., if Option I has been chosen in Step 2).

Net electricity generation and fuel consumption of each power plant is available through the data provided by the Central Electricity Authority (CEA), an official data source[5]. The same has been detailed in Annex 3. CEA database, Version 5, dated 1st November, 2009 is the latest version at the time of commencement of validation and hence, has been used.

[5] http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

Assumptions:
The following assumptions have been made in case of unavailability of data at station level:

- Net generation: In case of stations where only gross generation is available, CEA standard values for auxiliary consumption have been applied to calculate the net generation data.

- GCV: Default GCV values for some thermal power stations have been used for cases where station specific data was unavailable.

The following assumptions have been in case of unavailability of data at unit level:

Net generation: The data is not monitored at a unit level and hence the following assumptions have been made

1. The auxiliary consumption (in % of gross generation) of the unit was assumed to be equal to that of the respective stations in the following cases:
   a) All units of a station fall into the build margin; or
   b) All units of a station have the same installed capacity; or
   c) The units in the station have different capacities but do not differ with respect the applicable standard auxiliary consumption.
2. In all other cases, standard values for auxiliary consumption adopted by CEA were applied.

3. Fuel consumption and GCV: Fuel consumption and GCV are generally not measured at unit level. Instead, the specific CO_2 emissions of the relevant units were directly calculated based on heat rates.

Calculation Approach:
The Simple OM has been calculated using the following formula:

$$EF_{grid,OM,simple,y} = \frac{\sum_{i,m} FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}}{\sum_{m} EG_{m,y}}$$

Where:
$EF_{grid,OMsimple,y}$ = Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$FC_{i,m,y}$ = Amount of fossil fuel type "i" consumed by power plant / unit m in year y (mass or volume unit)
$NCV_{i,y}$ = Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EFCO_{2,i,y}$ = CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
$EG_{m,y}$ = Net electricity generated and delivered to the grid by power plant / unit m in year y (MWh)
m = All power plants / units serving the grid in year y except low-cost / must-run power plants / units
i = All fossil fuel types combusted in power plant / unit m in year y
y = The three most recent years for which data is available at the time of submission of the PDD to the DOE for validation (for ex ante option)

The three most recent years for which data was available at the time of submission to the DOE included 2006-07, 2007-08 and 2008-09 and the same is presented in Annex 3 of the PDD. The generation weighted average value for these three years works out to 1.0049 for the NEWNE grid.

Thus,

$EF_{Grid,OM,y}$ = 1.0049 tCO_2/MWh

Step 5: Identification of the cohort of power units to be included in the Build Margin

The sample group of power units "m" selected for calculation of the build margin consists of the set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. The data pertaining to the units thus identified are detailed in the Version 5 of the Baseline Carbon Dioxide Emissions database of the CEA[6].
With regards to data vintage, the project participant wishes to use Option 1 viz., for the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group "m" at the time of CDM-PDD submission to the DOE for validation.

Step 6: Calculate the build margin emission factor
The build margin emissions factor is the generation-weighted average emission factor (tCO_2/MWh) of all power units m during the most recent year y for which power generation data is available and will be calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

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 Build Margin has been calculated ex ante during the crediting period. For ex ante calculation the most recent data available has been used and the build margin thus calculated is 0.6752 for the NEWNE grid. Therefore,

$EF_{Grid,BM,y}$ = 0.6752 tCO_2/MWh

Step 7: Calculation of the Combined Margin Emission Factor
The combined margin emission factor is calculated as follows:

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

Where,
$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2/MWh)

[6] http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

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

The default values to be used for Wind Power projects are

w_{OM}= 0.75 w_{BM}= 0.25

Hence, the Baseline Emission Factor is calculated as below:

$EF_{Grid,CM,y}$ = w_{OM} * $EF_{Grid,OM,y}$ + w_{BM} * $EF_{Grid,BM,y}$
= 0.75 * 1.0049+ 0.25 * 0.6752
= 0.9224 tCO_2/MWh

The Baseline Factor thus calculated is fixed during the first crediting period.

The net export expected from the project activity is on an annual basis is 35572 MWh. Hence the baseline emissions are calculated as below:
Baseline Emissions (BE_y) = 0.9224 x 35280
= 32542 tCO_2

Project Emission Calculations:
Project emissions are expected to arise due to the consumption of electricity exported from the grid. Project Emissions for ex ante calculations have been assumed as zero.
Hence, PE_y= 0.

Leakage Emission Calculation:
The project proponents have identified no anthropogenic greenhouse gases by sources outside the project boundary that are significant, measurable and attributable to the project activity. Hence, no leakage is considered from the project activity.
LE_y = 0

Emission Reduction Calculation:
ER = BE_y – PE_y – LE_y
= 32542 – 0 – 0
= 32542 tCO_2e

B.6.2. Data and Parameters that is available at Validation:

Data / Parameter:	**$EF_{Grid,CM,y}$**
Data unit:	tCO_2/MWh
Description:	Combined Margin Grid emission factor for NEWNE Grid
Source of data used:	[7]CEA website Version :05 (Valid from 1st November 2009)
Value applied:	0.9224
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value applied is taken from the plant from CEA reviews. The weights used for calculating combined margin emission factor are 0.75 and 0.25 for operating margin and built margin respectively.
Any comment:	Data will be kept for crediting period + 2 Years.

Data / Parameter:	**$EF_{Grid,OM,y}$**
Data unit:	tCO_2/MWh
Description:	Weighted average of 3 years (2006-07, 2007-08, 2008-09) CO_2 Operating Margin emission factor of the NEWNE grid
Source of data used:	[8]CEA website Version :05 (Valid from 1st November 2009)
Value applied:	1.0049
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value applied is taken from the plant from CEA reviews
Any comment:	Data will be kept for crediting period + 2 Years.

Data / Parameter:	**$EF_{Grid,BM,y}$**
Data unit:	tCO_2/MWh
Description:	CO_2 Built Margin emission factor of the NEWNE grid
Source of data used:	[9]CEA website Version :05 (Valid from 1st November 2009)
Value applied:	0.6752

7 http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm
8 http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm
9 http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

Justification of the choice of data or description of measurement methods and procedures actually applied :	The value applied is taken from the plant from CEA reviews
Any comment:	Data will be kept for crediting period + 2 Years.

Data / Parameter:	w_{OM}
Data unit:	Dimensionless
Description:	Weightage for Operating Margin
Source of data used:	Tool to calculate the emission factor for an electricity system. (Version 02)
Value applied:	0.75
Justification of the choice of data or description of measurement methods and procedures actually applied :	As required by the Tool to calculate the emission factor for an electricity system. (Version 02)
Any comment:	Data will be kept for crediting period + 2 years

Data / Parameter:	w_{BM}
Data unit:	Dimensionless
Description:	Weightage for Build Margin
Source of data used:	Tool to calculate the emission factor for an electricity system. (Version 02)
Value applied:	0.25
Justification of the choice of data or description of measurement methods and procedures actually applied :	As per the Tool to calculate the emission factor for an electricity system. (Version 02)
Any comment:	Data will be kept for crediting period + 2 years

B.6.3 Ex-ante calculation of emission reductions:

>>

Project: 9 Nos. of 1.65 MW

Net annual Generation Capacity of Project Activity supplied to grid = 35280 MWh[10]
Combined Emission Factor of CO_2 for NEWNE Region Grid = 0.92 tCO_2/MWh
Baseline Emissions = 35280 MWh x 0.92 tCO_2/MWh = 32542 tCO_2
Project Emissions = 0 tCO_2
Emission Reductions = Baseline Emissions – Project Emissions
= 32542– 0 **= 32542 tCO_2/year**

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

>>

Year	Estimation of project activity emissions (tCO2 e)	Estimation of baseline emissions (tCO2 e)	Estimation of leakage (tCO2 e)	Estimation of overall emission reductions (tCO2 e)
Year 1: 2010 - 2011	0	32,542	0	32,542
Year 2: 2011 - 2012	0	32,542	0	32,542
Year 3: 2012 - 2013	0	32,542	0	32,542
Year 4: 2013 - 2014	0	32,542	0	32,542
Year 5: 2014 - 2015	0	32,542	0	32,542
Year 6: 2015 - 2016	0	32,542	0	32,542
Year 7: 2016 - 2017	0	32,542	0	32,542
Total (tonnes of CO2)	**0**	**227,794**	**0**	**227,794**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**EG_y**
Data unit:	MWh/year
Description:	Electricity exported to grid
Source of data to be used:	Invoices for sale of power
Value of data applied for the purpose of calculating expected emission reductions in section B.5	35280

[10] It must be noted here that as per "Guidelines for the reporting and validation of plant load factors" Version 01, a prior wind assessment study had been conducted by the project proponent, which states a generation value lower than that mentioned in the quote by WTG supplier. For conservativeness, the lower PLF figures, as provided in the wind assessment study, have been taken into consideration for estimating annual emission reductions.

Description of measurement methods and procedures to be applied:	Monitoring: Monitored through the main meter and check meter readings. Data type: Measured Archiving: Electronic Recording Frequency: Daily Responsibility: The plant management shall be responsible for the regular recording of data. Calibration Frequency: The meters shall be calibrated on an annual basis.
QA/QC procedures to be applied:	Meter calibration shall be conducted annually and internal audit system is in place as mentioned in Section B.7.2
Any comment:	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. In the case of the crediting period start & end dates of the project activity falls in – between the billing cycles, then for emission reduction calculations, the daily generation reports provided by the O&M service provider, shall be considered.

Data / Parameter:	$\mathbf{EC_y}$
Data unit:	MWh/year
Description:	Electricity imported from grid
Source of data to be used:	Invoices for sale of power
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Monitoring: Monitored through the main meter and check meter readings. Data type: Measured Archiving: Electronic Recording Frequency: Daily Responsibility: The plant management shall be responsible for the regular recording of data. Calibration Frequency: The meters shall be calibrated annually
QA/QC procedures to be applied:	Meter calibration shall be conducted annually and internal audit system is in place as mentioned in Section B.7.2
Any comment:	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. In the case of the crediting period start & end dates of the project activity falls in – between the billing cycles, then for emission reduction calculations, the daily generation reports provided by the O&M service provider, shall be considered.

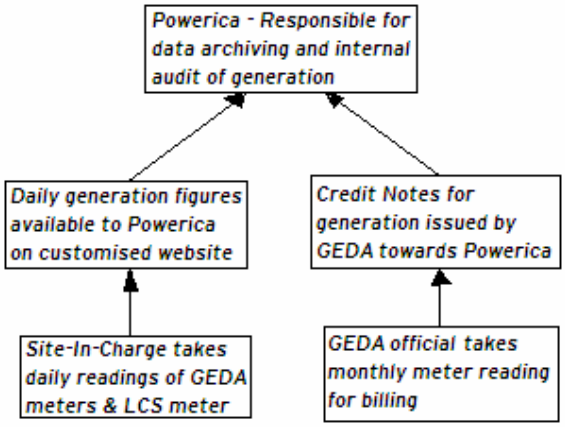
B.7.2 Description of the monitoring plan:

>>

The project activity is in accordance with approved small scale methodology AMS I.D, and therefore, can use the monitoring methodology for type I.D of 'Appendix B of the simplified M&P for small-scale CDM project activities-Version 15, - Grid connected renewable electricity generation.

The monitoring methodology specified in the methodology requires that the project-monitoring plan to consist of metering the electricity generated by the renewable technology. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to grid by the project activity multiplied by emission factor for regional grid, would form the baseline for the project activity.

Since the baseline methodology is based on ex-ante determination of the baseline, the monitoring of baseline emission factor is not required. The sole parameter for monitoring is the electricity exported to the grid. The Project is operated and managed by Vestas Wind Technology India Private Limited (Vestas). Vestas will have a designated Site-In-Charge (O&M) on site who will be responsible for monitoring the electricity exported from the project activity. The overall flow of information has been depicted using the following hierarchical structure:



Monitoring Process at Gujarat

Metering of wind power is done as under:

- Joint meter reading is taken at Jangi/Surajbari substation meter by representative of GEDA (Gujarat Energy Development Agency) and O&M service provider (on behalf of individual wind farm owners). Let the total generation recorded for particular month is 'X' units in sub-station meter.
- Joint meter reading is taken at Local Meter-(transformer yard meter of each WTG) by representative of GEDA (Gujarat Energy Development Agency) and O&M service provider (on behalf of individual wind farm owners). Let us assume total generation of Powerica recorded for particular month is 'Y_1' units.
- Similarly joint meter reading for other wind farm owners is also taken. Let the generation of individual owner recorded for particular month are 'Y_2, $Y_{3,}$.....Y_n' units.

- GEDA distributes 'X' to individual wind farm owners using following formula and issues monthly certificates.
- For Powerica, net units calculated for billing = $X * Y_1 / \Sigma Y_n$
- It must be noted here that the meter readings as mentioned above are calculated as the product of meter multiplication factor and the difference of the current and previous meter readings

Additionally, all the WTGs at the site are connected to a central monitoring system located at that site only. This system captures daily generation figures which are later made available to Powerica on the customized website of Vestas.

Emergency Preparedness
If both main mater and check meter are found faulty, energy generation is monitored in accordance with procedures described in PPA as follows.

"In case, both the main meters and check meter are found to be beyond permissible limit of error, both the meters shall be calibrated immediately and the correction applicable to main meter shall be applied to the energy registered by the 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:

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

In case of failure of the main meter, generation value would be taken from the check meter and the grid officials would immediately replace the faulty meter with a calibrated meter. The project promoters have contracted the technology supplier for providing O&M services for the power project. The service provider would be responsible for maintenance of the necessary spare parts and consumables for the maintenance of the WTGs such as anemometers, wind vanes and sensors, oil filters, batteries, auxiliary motors and pumps, WTG controllers, slip rings, limit switches and sensors, detergents & solvents etc. The service provider would also be responsible for supply of necessary main components of the WTG such as main gearboxes, blades, generators, towers, hubs, main shafts & bearings, ground and top controller and hydraulic systems. The service provider would also ensure that occupational health and safety procedures are adhered to during the operation & maintenance activities. Additionally, spare meters would also be kept available at the site for replacement in case of failure of any of the monitoring equipments.

Internal audits & Performance review
The records are regularly audited and checked by the senior officials from project proponent on an annual basis. The officials will monitor the actual emission reduction. The personnel responsible for taking readings at site are adequately trained.

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 completion: 28th December 2009
Person Responsible: Mr. Pradeep Gupta
Head of Wind Energy, Powerica Limited
Detailed contact address of the project participant is 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:

>>
10/12/2009 (Date of Purchase order)

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

>>
20 Years

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

>>

C.2.1. Renewable crediting period

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

>>
01/06/2010

(If the registration of the project is after 01/06/2010, the date of registration would be considered as the start date for the first crediting period. The project participants will not commence the crediting period prior to the date of registration.)

C.2.1.2. Length of the first crediting period:

>>
7 years and 0 months

C.2.2. Fixed crediting period:

>>
Not Applicable

C.2.2.1. Starting date:

>>

C.2.2.2. Length:

>>

SECTION D. Environmental impacts

>>

D.1. If required by the host party documentation on the analysis of the Environmental Impact

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In the applicable EIA notification i.e. S.O. 1533[11], dated 14th September 2006, Ministry of Environment & Forests (MoEF), Govt. of India, the wind projects are not included in the list of projects that has to get Prior Environmental Clearance (EC) either from State or Central Govt. authorities and hence no EIA study was conducted.

The project does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India. However due weightage has been given to environmental aspects.

Some of the significant impacts taken into consideration during the construction and operation of the wind farm are as follows:

1. Land Use: Due consideration has been taken in order to ensure that the land available for the setting up of the wind farm has no alternative use. Furthermore, no forest land was used for the purpose. Stringent measures were followed in order to prevent any soil erosion during the construction phase.

2. Noise Pollution: Typically, the wind farms are located in isolated areas and thereby the noise impacts on the neighbouring population are reduced. Also during the construction phase, suitable noise prevention and reduction measures were employed in order to reduce the ill-effects of noise pollution on the construction labourers.

3. Water Pollution: No water bodies exist in the area of the project activity. Suitable measures were adopted in order to prevent the contamination of water bodies during the construction phase, e.g. soak pits were provided for the colony of construction workers.

4. Air Pollution: The implementation of the project activity will reduce the dependence on fossil fuel generated power and thereby lead to the improvement in air quality during the operational phase. Regular wetting of approach roads was undertaken during the construction phase. This reduced the re-suspension of dust during the vehicle transits.

5. Visual Impact: As gathered in the stakeholder analysis, the wind mills do not have a negative impact on the surrounding villagers in terms of visual intrusion/impact.

6. Local Flora and Fauna: The land used for the purpose of setting up the wind farm was a barren land and therefore did not require any destruction of local flora. The only vegetation in the vicinity was shrubs and weeds. Bird hit is not a frequent phenomenon in this region. This wind farm is not located along the path of migratory birds.

Hence it can be concluded that the proposed project activity does not have any major negative impacts.

[11] Page No: 10, S. O. 1533, Ministry of Environment & Forests (MoEF), Govt. of India, http://envfor.nic.in/legis/eia/so1533.pdf

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 environmental impacts of the project activity are not considered to be significant by the project participant or the host party.

SECTION E. Stakeholders' comments

>>

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

>>

Powerica identified the following local stakeholders to be associated with the project activities, directly or indirectly:

1. Vestas Employees
2. Local Villagers
3. Government officials (District Magistrate, etc.)

In order to address and incorporate the concerns of the local stake-holders, Powerica sent out invitation letters to the identified stake-holders 4-5 days in advance. The letter contained information of the date & site of the meeting along with a clear picture of the agenda of the meeting along with a broad description of the project activity. Additionally, intimation of the meeting was published in the local newspaper.

The stakeholder meeting was conducted on 24/12/2009.

E.2. Summary of the comments received:

>>

Powerica Limited is in process of receiving all necessary approvals / clearances / permissions from various local bodies which represent the local stakeholders. The stake holders meetings was conducted at the respective project sites and was attended by the office bearers and residents of the nearby villages and those employed in the project activity. The local villagers and the office bearers expressed their happiness with the setting up of an environment friendly power project in their village as it had resulted in generation of direct and indirect employment opportunities both for literate and illiterate people. Development of infrastructure in the locality was highly appreciated. The employees hired for the project activity from the local area stated that the project activity has provided them with a means of livelihood in their own village and will help them in getting equipped with technical skills.

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

>>

Powerica Limited has taken care of all the conditions stipulated in the relevant clearances and no adverse comment has been raised.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Powerica Limited
Street/P.O.Box:	Sector – 11, CBD Belapur
Building:	601, Dakshina Building
City:	Mumbai
State/Region:	Maharashtra
Postfix/ZIP:	400 016
Country:	India
Telephone:	+91 22 6656 2525
FAX:	+91 22 4001 2692
E-Mail:	powerica@powericaltd.com
URL:	www.powericaltd.com
Represented by:	
Title:	Head of Wind Energy
Salutation:	Mr.
Last Name:	Gupta
Middle Name:	
First Name:	Pradeep
Department:	
Mobile:	+91 98922 91240
Direct FAX:	+91 22 2204 3782
Direct tel:	+91 22 6656 2590
Personal E-Mail:	pradeep.gupta@powericaltd.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding for this project activity including any funding form ANNEX 1 countries. Thus the project participant hereby confirms that no diversion of Official Development Assistance is caused due to the project activity.

Annex 3
BASELINE INFORMATION

The latest data available has been used for the estimation of the baseline emissions. The Central Electricity Authority (CEA) under the Ministry of Power, Government of India, has estimated the Build Margin and the Simple Operating Margin for the NEWNE grid, the details of which is available on the following website and is detailed below as well:

http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

Version 5.0 of the database has been used.

Gross Generation Total (GWh)

Grid	2006-07	2007-08	2008-09
NEWNE	499,380	531,539	548,029

Net Generation Total (GWh)

Grid	2006-07	2007-08	2008-09
NEWNE	465,361	496,119	509,776

20% of Net Generation (GWh)

Grid	2006-07	2007-08	2008-09
NEWNE	93,072	99,224	101,955

Net Generation in Operating Margin (GWh)

Grid	2006-07	2007-08	2008-09
NEWNE	379,471	401,642	421,803

Net Generation in Build Margin (GWh)

Grid	2006-07	2007-08	2008-09
NEWNE	93,524	100,707	102,589

Emission Data

Absolute Emissions Total (tCO_2)

Grid	2006-07	2007-08	2008-09
NEWNE	385,692,794	406,861,785	430,423,184

Absolute Emissions OM (tCO_2)

Grid	2006-07	2007-08	2008-09
NEWNE	385,692,794	406,861,785	430,502,442

Absolute Emissions BM (tCO_2)

Grid	2006-07	2007-08	2008-09
NEWNE	59,042,467	60,193,616	69,297,387

Emission Factor

Simple Operating Margin (tCO_2/MWh) (incl. Imports)

Grid	2006-07	2007-08	2008-09
NEWNE	1.0084	0.9999	1.0065

Build Margin (tCO_2/MWh) (not adjusted for imports)

Grid	2006-07	2007-08	2008-09
NEWNE	0.6313	0.5977	0.6751

Annex 4

MONITORING INFORMATION

The monitoring information has already been provided in section B.7 above.

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