CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

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>.

SECTION A. General description of the small-scale project activity

A.1. Title of the small-scale project activity:

>>

Priyata Intercontinental Wind Power Project, India
Version 01
Date: 08/12/06

A.2. Description of the small-scale project activity:

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Priyata Intercontinental and Om Intercontinental are two firms under the Sajjan group of companies and both the companies are involved in business of export of chemicals. The owners of the company decided to invest into renewable energy sector by setting up wind mills in year 2005. Priyata Intercontinental owns two towers of capacity 1.25 MW and Om Intercontinental own one tower of same capacity. Priyata Intercontinental has taken up the project activity as Clean Development Mechanism (CDM) project on behalf of Om Intercontinental and from now onwards Priyata Intercontinental will be addressed as project proponent. The details of the of the project participants is given below:

Name of project participant	No of Wind generators	Capacity (MW)
Priyata Intercontinental	2	2.5
Om Intercontinental	1	1.25

Purpose:

The purpose of the project is produce power from clean source and to reduce the dependence on fossil fuels for energy requirements. Project proponent has signed a power purchase agreement (PPA) with "The Maharashtra State Electricity Distribution Company Limited" and exports the electricity to the local grid. The project displaces electricity from the grid (Western grid, India) thereby helping in significant reduction of GHG emissions.

Project's contribution to sustainable development

The four pillars of sustainable development have been addressed as follows:

1. **Social Well-being:**

The project activity produces power from cleaner source i.e., wind energy. The project activity leads to employment of local people which provides boost to local economy. The project helps to reduce demand-

supply gap in electricity in the state. The project has led to rural upliftment and infrastructure development in the areas around the project such as improving the condition of roads connecting to the project site.

2. **Environmental Well being :**

The project utilizes wind energy for generating electricity which otherwise would have been generated through alternate fuels (most likely - fossil fuel) based power plants, contributing to reduction in emissions including GHG emissions. Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. Thus the project causes no negative impact on the surrounding environment contributing to environmental well-being.

3. **Economic Well-being**:

The project activity creates job opportunities for local people during construction and operation period. The project activity provides business opportunity for local stakeholders such as suppliers, manufacturers, contractors etc. There is demand-supply gap in the grid; the project helps in reducing the gap by pumping the electricity produced into the local grid.

4. **Technological Well Being:**

The project has demonstrated the success of large capacity wind electricity generators (WEGs) in the region and promotes state-of-art 1.25 MW WEGs.

A.3. Project participants:

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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)
India (Host)	Priyata Intercontinental (Private Entity) Om Intercontinental (Private Entity)	No

A.4. Technical description of the small-scale project activity:

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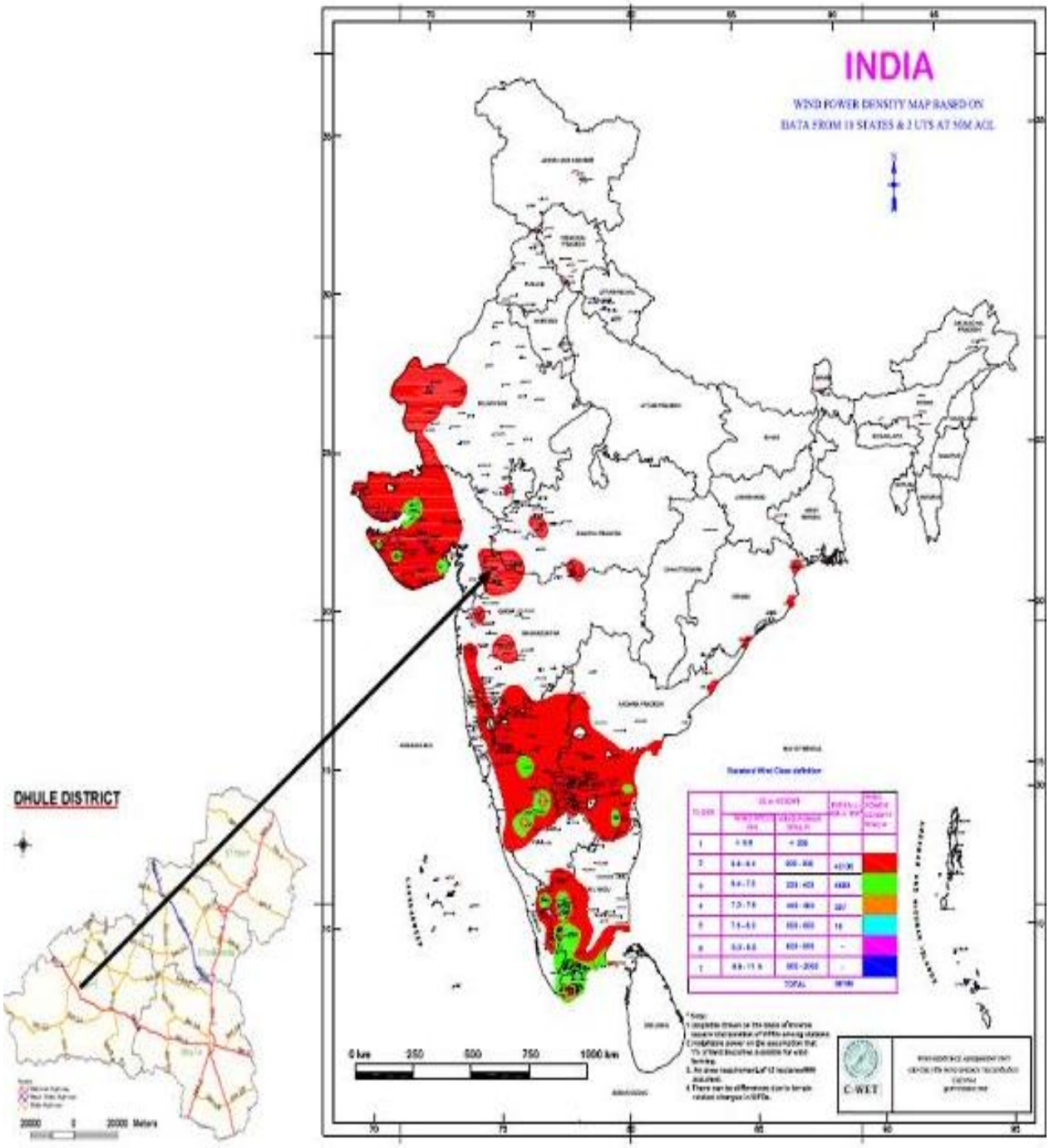
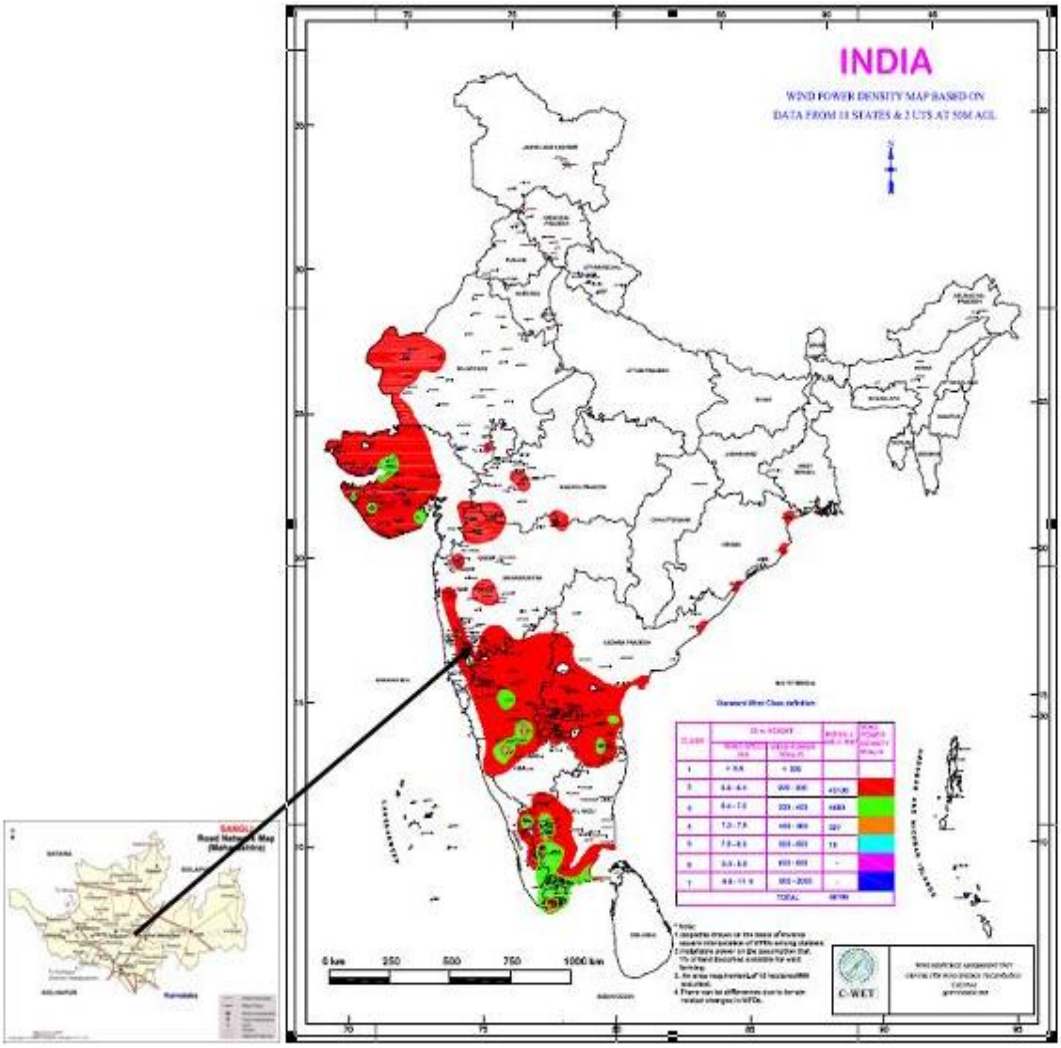
A.4.1. Location of the small-scale project activity:

>>

Location of project activity



Project Location at Dhule District



Project Location at Sangli District

A.4.1.1. Host Party(ies):

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India

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

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Maharashtra

A.4.1.3. City/Town/Community etc:

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Project Site A: 1.25 MW (Priyata Intercontinental)
Village: Birenwadi, Tal. Tasgaon
Location no.: G-357
Sangli, Maharashtra

Project Site B: 1.25 MW (Priyata Intercontinental)
Village: Korde, Tal. Sakri
Location no.: K -281
Dhule, Maharashtra

Project Site C: 1.25 MW (Om Intercontinental)
Village: Korde, Tal. Sakri
Location no.: K -279
Dhule, Maharashtra

A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity(ies):

>>

Sangli Site

The project activity is located at Birenwadi village which is situated in district of Sangli. The locational details of the site is Latitude: 16° 52' 0 N and Longitude: 74° 34' 0 E. The site is nearly 300 kms from Mumbai. The nearest railway station is Sangli which is 20 kms from the project site.
The nearest airport is Mumbai which is 300 kms from Sangli district.

Dhule Site

The project activity sites are located at Khorde village which are situated in district of Dhule, a part of Maharashtra approximately at 400 km from Mumbai. The project activity sites are located in Sakri taluka in Dhule district. The nearest highway is national highway No 6. The latitude and longitude for the district is 20.58 N and 74.47 E respectively. These sites have been identified as ideally suited for wind power generation based on the studies and data analysis carried out by the wind turbine manufacturer M/s Suzlon India Ltd.

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

>>

The project meets the applicability criteria of the small-scale CDM project activity category, Type-I: renewable energy projects (D. Grid connected renewable electricity generation) of the indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories.

Main Category: ***Type I - Renewable Energy Power project***

Sub Category: ***D – Grid connected renewable electricity generation -version no 09 (28th July 2006)***

As per the provisions of simplified modalities and procedures for small scale CDM project activities (version 09, 28 July, 2006), Type I. D "comprises renewable energy generation units, such as photovoltaics, 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. If the unit added has both renewable and non-renewable components (*e.g.* a wind/diesel unit), the eligibility limit of 15 MW 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 15 MW.

Project activity meets the applicability conditions of the methodology in following manner:

1. The project activity is a wind energy based power generation system supplying electricity to state electrical grid.

2. The capacity of power generation is 3.75 MW which is less than the limit of small scale category i.e. 15 MW.

The baseline and emission reduction calculations from the project would therefore be based on paragraph 9 of I.D. The monitoring methodology would be based on guidance provided in paragraph 13 of I.D.

Project activity with technology details

Priyata Intercontinental has procured the Wind Energy Generators (WEGs) from M/S. Suzlon Ltd. There are three, 1250 kW each, capacity tower installed at the project site one of S 66 model and two of S 70 model. Table A.1 gives ownership details of different models. The technical details for both the models are given in Table A.2 & Table A.3 below:

Table A.1: Technical Concept & Specification of Suzlon S 70 (1250 kW) WTG

Sr No	Tower	Model	Commissioning Date
1.	G-357	S 66	25/03/2006
2.	K-281	S 70	23/03/2006

3.	K-279	S 70	17/03/2006

Table A.2: Technical Concept & Specification of Suzlon S 70 (1250 kW) WTG

Rotor Diameter	:	69.1 m
Hub height	:	74 m
Installed electrical output	:	1250 kW
Cut-in wind speed	:	3 m/s
Rated wind speed	:	12 m/s
Cut out wind speed	:	20 m/s
Rotor swept area	:	3750 m^2
Rotational speed	:	13.2 / 19.8
Rotor material	:	GRP
Regulation	:	Pitch
Generator	:	Asynchronous Generator, 4 / 6 poles
Rated output	:	250 / 1250 kW
Rotational speed	:	1010 / 1515 rpm
Operating voltage	:	690 V
Frequency	:	50 Hz
Protection	:	IP 56
Insulation class	:	H
Cooling system	:	Air cooled
Gear box	:	3 stage gear box, 1 planetary and 2 helical
Manufacturer	:	Winenenergy
Nominal load	:	1390 kW
Type of cooling	:	Oil cooling system
Yaw drive system	:	4 active electrical yaw motors
Yaw bearing	:	Polyamide slide bearing
Safety system	:	
Aerodynamic brake	:	3 times independent pitch regulation
Mechanical brake	:	Spring power disc brake, hydraulically released, fail safe
Control unit	:	Microprocessor controlled, indicating actual operating conditions, UPS back-up system
Tower	:	Tubular
Design standards	:	GL/IEC

Table A.3: Technical Concept & Specification of Suzlon S 66 (1250 kW) WTG

ROTOR		
Rotor Diameter	:	66 m
Hub height	:	74 m
Swept area	:	3421.19 m^2
Rotational speed	:	13.9 / 20.8
Rotor material	:	GRP
Regulation	:	Pitch-regulated
OPERATIONAL DATA		
Cut-in wind speed	:	3 m/s
Rated wind speed	:	14 m/s
Cut out wind speed	:	25 m/s
Survival wind speed	:	65 m/s
GENERATOR		
Type	:	Asynchronous Generator, 4 / 6 pole
Rated output	:	250 / 1250 kW
Rotational speed	:	1010 / 1515 rpm
Operating voltage	:	690 V
Frequency	:	50 Hz
Protection	:	IP 56
Insulation class	:	H
Cooling system	:	Air cooled
GEARBOX		
Type	:	Integrated 3 stage gear box, 1 planetary and 2 helical
Gear ratio	:	1:74.917
Nominal load	:	1390 kW
Type of cooling	:	Oil cooling system
YAW DRIVE		
Yaw drive system	:	4 active electrical yaw motors
Yaw bearing	:	Polyamide slide bearing
TOWER		
Tower	:	Tubular tower
Erection	:	With crane
Design standards	:	GL special class
Tower height	:	To suit hub height

Construction	:	Welded
Control unit	:	Microprocessor control with graphic backlit LCD display indicating operating conditions. Control includes thyristor switchgear watchdog for operation, monitoring, log with real time, local control and servicing interface. Optional remote monitoring and operation. UPS back-up system
Reactive current compensation		
Compensation	:	Dynamic and intelligent, with PF greater than 0.9
Safety systems		
1. Brake system	:	Automatic application by synchronous hydraulic control of blade pitching in case of: • Vibration or shock loading • Over temperature of the gear box or generator failure of the thyristors and control in case of wind speed in excess of 25 m/s • Variation in the rated voltage range • Variations in the frequency range • Asymmetric phasing • Line interruption with automatic reconnection
2. Brake system	:	Spring applied hydraulically released disk brake

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHGs) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

>>

The project activity involves production of electricity from wind energy which is non-polluting source of renewable energy. This project replaces grid electricity, which is dominated by fossil fuel generated electricity. If the same amount of electricity was to be produced from the fossil fuel based grid, it would have led to greenhouse gas emissions. Thus the project activity reduces equivalent amount of greenhouse gas emissions into the atmosphere.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

>>

The project activity would result into CO_2 emission reduction of 64,320 tons for 10 years crediting period.

Years	Annual estimation of emission reductions in tonnes of CO_2-e
2007	6432
2008	6432
2009	6432
2010	6432
2011	6432
2012	6432
2013	6432
2014	6432
2015	6432
2016	6432
Total estimated reductions (tonnes of CO_2 e)	6432
Total no of crediting years	10
Annual average over the crediting period of Estimated reductions (tonnes of CO_2 e)	64320

A.4.4. Public funding of the small-scale project activity:

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There was no public funding available or used for this project execution.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

>>

According to appendix C of simplified modalities & procedures for small-scale CDM project activities, '***debundling'*** is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities.

According to para 2 of appendix C[1]

A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small- scale activity at the closest point

According to above-mentioned points of de-bundling, proposed project activity is not a part of any of the above, so it should be considered as small scale CDM project activity.

[1] Appendix C to the simplified M&P for the small-scale CDM project activities, http://cdm.unfccc.int/Projects/pac/ssclistmeth.pdf

SECTION B. Application of a baseline methodology:

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

>>

The methodology used for this project is **I. D. – Grid connected renewable electricity generation** (version 09, dated 28th July, 2006) under the small scale methodologies **Type I – Renewable energy projects**.

B.2 Project category applicable to the small-scale project activity:

>>

As per Appendix B of the simplified M&P for small-scale CDM project activities of the UNFCCC CDM website the project falls under Category I.D – Renewable electricity generation for a grid.

Baseline methodology for this category has been detailed in paragraph 9 under Category I.D of this document. It states that the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in $kgCO_2/kWh$) calculated as under:

a) A combined margin (CM), consisting of the combination of operating margin (OM) and built margin (BM) are calculated according to the procedures prescribed in the approved methodology ACM0002 (version 06, 19-05-2006). Simple OM method is used to calculate operating margin.

The project activity would displace an equivalent amount of electricity that would have been drawn from the grid generation-mix. Since the displaced electricity generation is the element that is likely to affect both the operating margin in the short run and the build margin in the long run, electricity baselines should reflect a combination of these effects. Therefore the most appropriate approach for baseline methodology would be as described in paragraph 9 a under Category I.D of the simplified M&P for small-scale CDM project activities.

A complete analysis of western region electricity grid has been carried out along with the study of various related issues like technology scenario, policy matters, economic conditions, development of renewable energy projects etc. for preparation of baseline scenario and calculation of baseline emission factor of the grid.

B.3. 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:

>>

The project reduces anthropogenic emissions of greenhouse gases by sources below those that would have occurred in absence of the proposed CDM project activity.
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 proposed CDM project activity.

Barriers and Additionality

Referring to attachment A to appendix B document of "indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories", project participants are required to 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 removing barrier(s); The guidance provided herein has been used to establish project additionality. The barriers that were considered are listed below:

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

Investment barrier

The IRR for the project was coming around 13.38 % (enclosure 1) which was below the returns expected of 16 % for Independent Power Producer (IPP) as considering the extract below:

"*A question was put up in the Lok Sabha, as to whether rate of return on the investment on the private sector projects are higher and if yes, then why? Also, what is the mechanism to certify the expenditure incurred on the construction cost of such projects?*

The reply given on March 8, 2001 is given below;

The policy to encourage greater private sector participation in the power sector was announced in 1991 in the background of inability of mobilization of adequate financial resources by Government alone, given the highly capital intensive nature of the sector and the large incremental capacity addition requirements. In the initial years, projects were structured on the MoU route and the tariff determination was done by the tariff notification dated 30.3.92. Two part tariff notification dated 30.3.1992 defining factors in accordance with which the tariff for sale of electricity by the Generating companies to the Board shall be determined was issued.

This notification prescribed 16% return[2]*."*

The project proponent had no experience in the renewable power sector. The IRR of the project increases to 16.85 % after considering revenues from the sale of CERs which is above the return of 16 % expected for Independent Power Producers. The technology supplier has given generation guarantee for first two years of operation based on the wind profile of the region but lot of variations in generation has been observed in the first six months. There are instants when the generation has been well below the expected figure. The IRR falls to 10.15%, 6.92% and 5.29% respectively if we consider 90%, 80% and 75% of estimated generation.

Barriers due to prevailing practice

Priyata Intercontinental has got experience export of speciality chemicals and has no experience in executing projects into renewable power sector. The project proponent has ventured into wind power project for the first time and there still remains uncertainty in the power generation from wind energy. The project proponent has still gone ahead with the project taking into account the expected revenues from CDM.

The state of Maharashtra has estimated potential of 3650 MW in the wind power generation sector. The total installed capacity in the state of Maharashtra as on 31.05.2006 was 456.3 MW[3]. Only 13 % of the estimated potential has been explored.

Other barriers

The wind policy for the state of Maharashtra promotes projects under renewable energy based projects with soft loans and incentives (2004). Till date the project proponent has not received any form of incentives for the project the proponent have commissioned.

The incentives awarded to the project proponent are in form of depreciation which has been considered during the IRR calculations. According to the PPA agreement signed by the project proponent, certain portions of CDM revenues have to be shared with the government. These factors have not been included in IRR calculations and will reduce the effective IRR with CDM revenues of the project.

[2] Source: www.infraline.com/power/

[3] Source: www.indianwindpower.com/potentail

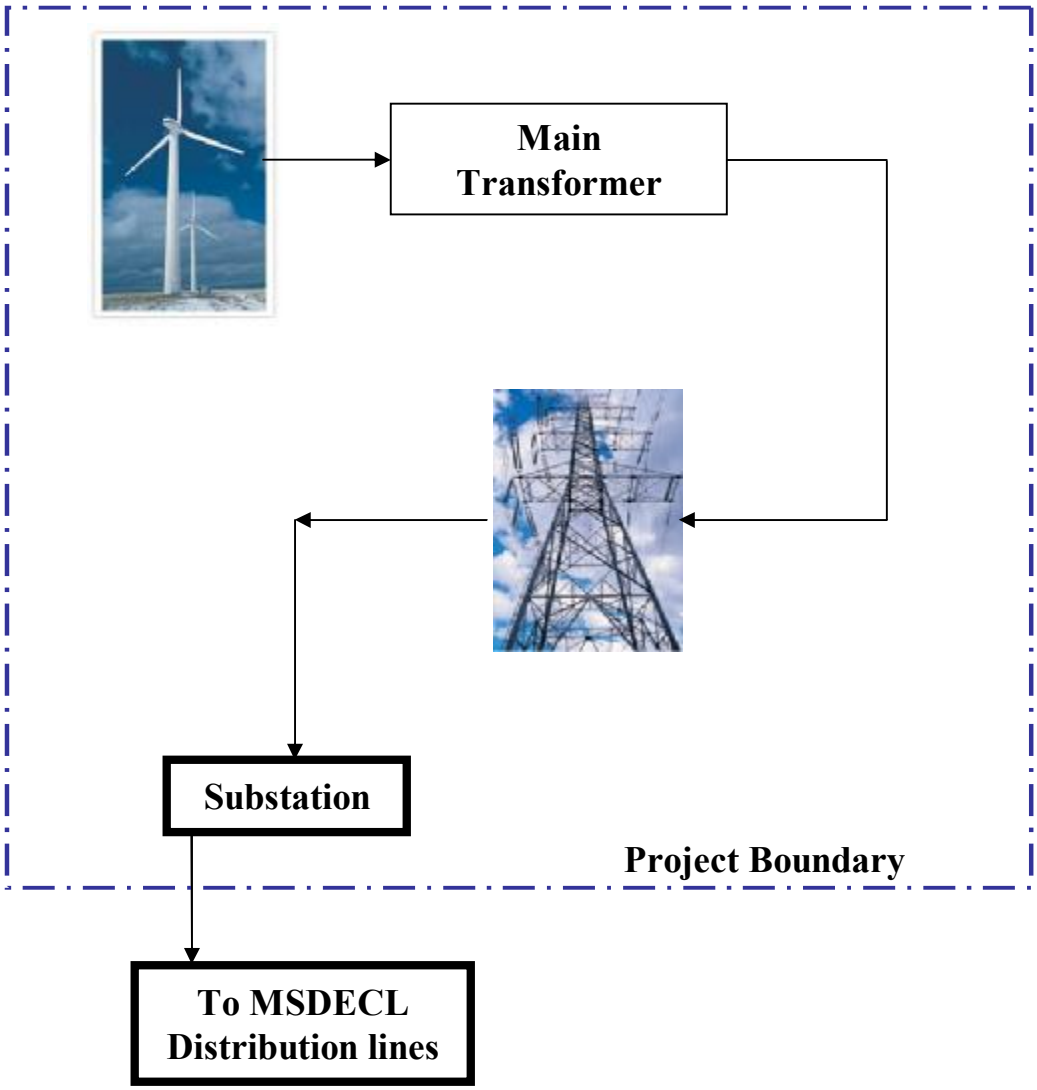
It is clear that the wind project is not attractive without the CDM funds and in the light of Government policy the post CDM IRR will also be reduced.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

>>

As per the methodology, *"the project boundary encompasses the physical, geographical site of the renewable generation source"*.

The project boundary is composed of the Wind Energy Generators and the metering equipment for each generator and substation, and the grid (Western grid) which is used to transmit the generated electricity.



B.5. Details of the baseline and 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.

All existing sources of power generation have been considered from various sources like the WREB web-site, CEA web-site and other power related websites. Percentage share of power generation from different fuel sources has been calculated. The IPCC emission factors for different sources of power generation have been considered.

The NET BASELINE EMISSION FACTOR as per COMBINED MARGIN (ACM002 Ver06)
(OM + BM)/2 = 0.89 kg CO_2/kWh

The baseline calculations are attached in annex 1.

Date of completing final draft of this baseline section:

27/11/2006

Name and person/entity determining the baseline:

Priyata Intercontinental and their CDM consultants.

SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

>>

C.1.1. Starting date of the small-scale project activity:

>>

15/12/2005

C.1.2. Expected operational lifetime of the small-scale project activity:

>>

20 years 0 months

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

>>

C.2.1. Renewable crediting period:

>>

Not applicable.

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

>>

Not applicable.

C.2.1.2. Length of the first crediting period:

>>

Not applicable.

C.2.2. Fixed crediting period:

>>

C.2.2.1. Starting date:

>>

Starting date (DD/MM/YY): Crediting period would start from the date of registration of the project

C.2.2.2. Length:

>>

10 years 0 months

SECTION D. Application of a monitoring methodology and plan:

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

>>

Title: Monitoring methodology for category Type I.D – renewable electricity generation for a grid

Reference: According to Appendix B of the simplified M&P for small-scale CDM project activities, the project has been identified to belong to Category I.D. Paragraph 13 under Category I.D of the same document specifies that for the said category of CDM project, 'Monitoring shall consist of metering the electricity generated by the renewable technology. In the case of co-fired plants, the amount of biomass and fossil fuel input shall be monitored'.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

>>

As per the provisions of paragraph 14 of Draft simplified modalities and procedures for small scale CDM project activities the *"Project participants may use the simplified baseline and monitoring methodologies specified in appendix B for their project category"* if they meet the applicability criteria of small scale CDM project activity.

Since the project activity is a small-scale CDM project of Type I.D. category, the monitoring methodology and plan has been developed in line with the guidance provided in paragraph 13 of category I.D. of Appendix B.

As per the methodology, monitoring shall consist of:

1. Metering of electricity generation.
2. Computation of transmission and distribution losses.

D.3 Data to be monitored:

>>

ID number	Data type	Data variable	Data unit	Measured, calculated or estimated	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
1. EG_y	Power	Total Electricity generated	kWh/yr	Measured	Hourly	100%	Electronic	Crediting period + 2 years	Measured by the site in charge at the wind mill site. The emission reduction will depend on the net unit exported to the grid.

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

>>

Data	Uncertainty level of data (High Medium/Low)	Are QA/QC procedures planned for these data?	Outline explanation why QA/QC procedures are or are not being planned.
1	Low	Yes	This data will be used for calculation of total electricity generation by the project activity.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

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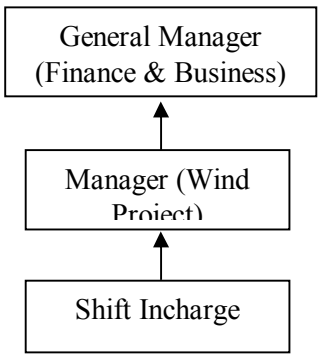

Roles and responsibilities:

General Manager (F&B): In the project management structure General Manager (F&B) is responsible for the project management. He is responsible to plan and allocate the annual budget for operation, estimation of the likely operating cost, electricity dispatch, organising third party contractors, revenue collection from MSEDCL etc.

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

Operation and maintenance of wind generators will be done by Suzlon energy Limited and they will be responsible to General Manager (F & B).

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

Shift In-charge: Shift in charge is responsible for recording the electricity meter reading in the MSEDCL meter and check meter.

Record Handling: OEM contractors are collecting daily report with all the related parameters. All the records are given to General Manager (F & B) on every month. The GM (F & B) has final responsibility for record keeping.

Internal Audits and performance review

These records are regularly audited and checked by the senior officials from Priyata Intercontinental during their visits to the site. The senior officials visit once in a month and audit the records. The officials will crosscheck the emissions reductions claimed in PDD with respect to actual emissions reduction.

For any deviation from the actual emission reduction values and reported values corrective action will be suggested by senior official to calculate the conservative emission reduction. All corrective actions will be recorded in the logbook.

Monitoring and Calibration

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

The delivered energy shall be metered by Suzlon and MSEDCL at the high voltage side of the step up transformers. Metering is done either for two /three / more wind mills depending on the location of wind mills and service connection number. Metering equipment is electronic trivector meters. The metering equipment is maintained in accordance with electricity standards and has the capability of recording hourly and monthly readings. Records of joint meter reading are maintained at site and a copy is maintained at the head office. All the meters shall be tested for accuracy every calendar year with reference to a portable standard meter. As the instruments are calibrated and marked at regular intervals, the accuracy of measurement can be assured at all times. Necessary records of calibration are maintained by both MSEDCL and project proponents.

D.6. Name of person/entity determining the monitoring methodology:

>>

Date of Completion: 27/11/2006.

Name of person/entity: Priyata Intercontinental and their associated consultants**.**

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

>>

E.1.1 Selected formulae as provided in appendix B:

>>

No formulae for GHG emission reduction have been specified in the Type – I: Renewable Energy Projects (D: Grid connected renewable electricity generation) of the "Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories"

E.1.2 Description of formulae when not provided in appendix B:

>>

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

>>

The project uses wind energy only for power generation which leads to zero net GHG on-site emissions. Hence there is no net emission within the project boundary.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

>>

An indirect GHG source is the consumption of energy and the emissions involved in the construction of WEG. Another source is the emissions of GHGs that are involved in the construction and erection of transmission lines from the nearest sub station, up to the point from where the project wheels the power. However considering the life cycle assessment of the total power generated and the emissions avoided there from the operation of the WEG, the secondary emissions from the above-mentioned source are negligible and hence not considered for further calculations.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

>>

Emissions due to the project activity are zero.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

>>

Electricity baseline emission factor of Western Regional Grid (EF_y) is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors according to the following three steps. Calculations for this combined margin are based on data from official sources (where available) which is publicly available.

STEP 1. Calculation of the Operating Margin emission factor

The Simple OM emission factor ($EF_{OM,simple,y}$) is calculated as the weighted average emissions (in tCO_2equ/MWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation.

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} . COEF_{i,j}}{\sum_{j} GEN_{j,y}}$$

where

- $F_{i,j,y}$ is the amount of fuel i (in a mass or volume unit) consumed by relevant power sources j in year(s) y,

- j refers to the power sources delivering electricity to the grid, not including low-operating cost and must run power plants, and including imports to the grid,

- $COEF_{i,j,y}$ is the CO_2 emission coefficient of fuel i (tCO_2 / mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources j and the percent oxidation of the fuel in year(s) y, and

- $GEN_{j,y}$ is the electricity (MWh) delivered to the grid by source j.

The CO_2 emission coefficient COEFi is obtained as

$$COEF_i = NCV_i \cdot EF_{CO2,i} \cdot OXID_i$$

where:

- NCV_i is the net calorific value (energy content) per mass or volume unit of a fuel i,

- $OXID_i$ is the oxidation factor of the fuel (see page 1.29 in the 1996 Revised IPCC Guidelines for default values),
- $EFCO_{2,i}$ is the CO_2 emission factor per unit of energy of the fuel i.

Where available, local values of NCV_i and $EFCO_{2,i}$ should be used. If no such values are available, country-specific values (see e.g. IPCC Good Practice Guidance) are preferable to IPCC world-wide default values.

The Simple OM emission factor ($EF_{OM,simple,y}$) is calculated separately for the most recent three years (2002-03, 2003-04 and 2004-05) and an average value has been considered as the OM emission factor for the baseline ($EF_{OM,y}$).

$$EF_{OM,y} = \sum_{y} EF_{OM,simple,y} / 3$$

Where y represents the years

STEP 2. Calculation of the Build Margin emission factor

The Build Margin emission factor ($EF_{BM,y}$) has been calculated as the generation-weighted average emission factor (tCO_2/MWh) of a sample of power plants m of WREB. The sample group m consists of either

• the five power plants that have been built most recently, or
• the power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project proponent should use from these two options that sample group that comprises the larger annual generation. The calculation for Build Margin emission factor is furnished below:

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \otimes COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$

where

Fi,m,y, COEFi,m and GENm,y - Are analogous to the variables described for the simple OM method above for plants m.

STEP 3. Calculation of the Emission Factor of the Grid (EFGrid)

The electricity baseline emission factor of Western Regonal Grid, EFy is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

$$EF_y = w_{OM} \cdot EF_{OM,y} + w_{BM} \cdot EF_{BM,y}$$

where the weights w_{OM} and w_{BM}, by default, are 50% (i.e., $w_{OM} = w_{BM} = 0.5$), and $EF_{OM,y}$ and $EF_{BM,y}$ are calculated as described in Steps 1 and 2 above and are expressed in tCO_2/MWh.

Baseline Emission Calculations

The baseline emission is calculated as: $BE_y = EG_y * EF_y$

where,
BE_y = Baseline Emissions due to displacement of electricity during the year y (in tons of CO_2)
EG_y = Net units of electricity due to substituted in the grid during the year y (in MWh)
EF_y = Emission Factor of the grid (in tCO_2/ MWh) and y is any year within the crediting period of the project activity

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

>>

CO_2 emission reduction due to project activity = (Baseline emission) – (Project emissions)

E.2 Table providing values obtained when applying formulae above:

>>

Years	CO_2 emission reduction due to project activity
2007	6432
2008	6432
2009	6432
2010	6432
2011	6432
2012	6432
2013	6432
2014	6432
2015	6432

2016	6432
Total estimated reductions (tonnes of CO_2 e)	6432
Total no of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO_2 e)	64320

SECTION F.: Environmental impacts:

F.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

This project activity does not fall under the purview of Environmental Impact Assessment notification of the Ministry of Environment and Forests -Government of India, but due consideration has been given to environmental aspects. All environmental related issues were identified and necessary steps to mitigate them have been put in place.

The impacts are given as follows:

- The minor quantity of solid / liquid discharge, generated during the construction phase has no noticeable impact on soil use and the project proponent had made arrangements to dispose them in an environmentally acceptable manner.
- Wind Power plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation.
- The project site is a barren land and unproductive area with no application and habitat. There are no migratory birds / endangered species in the region of project activity. Therefore, no harm on the ecological environment is envisaged.
- Noise is generated due to the movement of rotor blades. It has no direct effect on the population, as the area is less populated and noise generated will be attenuated by ambient conditions.

The net impact under environmental pollution category would be positive as all necessary abatement measures would be adopted and periodically monitored. The project activity does not have any major adverse impacts on environment during its construction or operational phase.

SECTION G. Stakeholders' comments:

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

>>

Priyata Intercontinental has put up the 3.75 MW wind power project in the state of Maharashtra. The project proponent has communicated with the relevant stakeholders their plan to implement the 3.75 MW Wind Power Project.

The identified stakeholders are:

- Local government representatives.
- Designated National Authority, Government of India.
- Ministry of Non Conventional Energy Sources, Government of India.
- Maharashtra State Electricity Distribution Company Limited (MSEDCL)
- Technology supplier

A brief summary of the stakeholder comments is given in the next section.

G.2. Summary of the comments received:

>>

The local people are direct beneficiaries of the project. The construction and continuous operation of the mill constituted local manpower. The project does not require any major displacement of any local population. Also, the installation of transmission lines would not create any inconvenience to the local population. In summing up, the project activity has received complete support from the local populace.

The government of India, through Ministry of Non-conventional Energy Sources (MNES), has been promoting energy conservation, demand side management and renewable energy projects including wind, small hydro and hydro / bio-mass power.

The Ministry of Environment & Forests is the Designated National Authority in India. The government of India, through Ministry of Environment and Forests (MoEF) is encouraging project participants to take up such Climate Change initiatives.

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

>>

In summing up, the project has not received any negative or discouraging feedback from the stakeholders concerned. All the stakeholders have appreciated and encouraged the project proponent for taking up this project activity.

In view of various direct and indirect benefits (social, economical, environmental), all the stakeholders have supported the project activity, hence it is not required to take due account of the comments.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Priyata Intercontinental
Street/P.O.Box:	Senapati Bapat Marg, Lower Parel
Building:	Matulya Centre, #2 Ground Floor
City:	Mumbai
State/Region:	Maharashtra
Postcode/ZIP:	400 013
Country:	India
Telephone:	0091 – 022 – 24974400, 24974401
FAX:	0091 – 022 – 24950588, 24951098
E-Mail:	sil@sajjan.com
URL:	www.sajjan.com
Represented by:	
Title:	Vice President
Salutation:	Mr.
Last Name:	Todi
Middle Name:	-
First Name:	Vijaykumar
Department:	-
Mobile:	-
Direct FAX:	0091 –22-24950588
Direct tel:	0091 – 22 – 24974401
Personal E-Mail:	sajjan@bom2.vsnl.net.in

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Om Intercontinental
Street/P.O.Box:	Senapati Bapat Marg, Lower Parel
Building:	Matulya Centre, #2 Ground Floor
City:	Mumbai
State/Region:	Maharashtra
Postcode/ZIP:	400 013
Country:	India
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FAX:	0091 – 022 – 24950588, 24951098
E-Mail:	sil@sajjan.com
URL:	www.sajjan.com
Represented by:	
Title:	General Manager
Salutation:	Mr.
Last Name:	Gupta
Middle Name:	-
First Name:	Rakesh
Department:	Finance & Business
Mobile:	-
Direct FAX:	0091 –22-24951098
Direct tel:	0091 – 22 – 24974400 Ext 115
Personal E-Mail:	rakesh@sajjan.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is involved in project activity.

ENCLOSURE 1: INTERNAL RATE OF RETURN CALCULATIONS

IRR Calculation without CDM revenues

(Rs. In Lacs)

Yr.	S.P. P.U.	Inflows					Outflows						Net Rev. Inflow	Loan Repay.	Net inflow	Outflow	Net
		Sale Amt.	CC	IC Refund	Int.on tax	Total	O&M	Ins.	L. Rent	Int.	Tax	Total					
															-	562.00	(562.00)
1	3.50000	244.61	-	-	-	244.61	-	4.20	-	112.63	-	116.83	127.78	-	127.78	-	127.78
2	3.65000	255.10	-	11.25	-	266.35	-	4.20	-	104.95	-	109.15	157.20	240.91	(83.71)	-	(83.71)
3	3.80000	265.58	-	11.25	-	276.83	40.00	4.20	-	84.47	-	128.67	148.16	240.91	(92.75)	-	(92.75)
4	3.95000	276.06	-	11.25	-	287.31	42.00	4.20	-	63.99	-	110.19	177.12	240.91	(63.79)	-	(63.79)
5	4.10000	286.55	-	11.25	-	297.80	44.10	4.20	-	43.51	-	91.81	205.99	240.91	(34.92)	-	(34.92)
6	4.25000	297.03	-	11.25	-	308.28	46.31	4.20	-	23.04	-	73.55	234.73	240.91	(6.18)	-	(6.18)
7	4.40000	307.51	-	-	-	307.51	48.63	4.20	-	6.40	-	59.23	248.28	120.45	127.83	-	127.83
8	4.55000	318.00	-	-	-	318.00	51.06	4.20	-	-	-	55.26	262.74	-	262.74	-	262.74
9	4.70000	328.48	-	-	-	328.48	53.61	4.20	-	-	-	57.81	270.67	-	270.67	-	270.67
10	4.85000	338.96	-	-	-	338.96	56.29	4.20	-	-	-	60.49	278.47	-	278.47	-	278.47
11	5.00000	349.45	-	-	-	349.45	59.10	4.20	-	-	-	63.30	286.15	-	286.15	-	286.15
12	5.15000	359.93	-	-	-	359.93	62.06	4.20	-	-	-	66.26	293.67	-	293.67	-	293.67
13	5.30000	370.41	-	-	-	370.41	65.16	4.20	-	-	-	69.36	301.05	-	301.05	-	301.05
14	3.50000	244.61	-	-	-	244.61	68.42	4.20	-	-	-	72.62	171.99	-	171.99	-	171.99
15	3.50000	244.61	-	-	-	244.61	71.84	4.20	-	-	-	76.04	168.57	-	168.57	-	168.57
16	3.50000	244.61	-	-	-	244.61	75.43	4.20	-	-	55.53	135.16	109.45	-	109.45	-	109.45
17	3.50000	244.61	-	-	-	244.61	79.20	4.20	-	-	54.26	137.66	106.95	-	106.95	-	106.95
18	3.50000	244.61	-	-	-	244.61	83.16	4.20	-	-	52.93	140.29	104.32	-	104.32	-	104.32
19	3.50000	244.61	-	-	-	244.61	87.32	4.20	-	-	51.53	143.05	101.56	-	101.56	-	101.56

20	3.50000	244.61 -	-	-	-	244.61 -	91.69 -	4.20 -	-	-	50.06 -	145.95 -	98.66 -	-	98.66 -	-	287.36 -
Total		5,709.94	-	56.25	-	5,766.19	1,125.38	84.00	-	438.99	264.31	1,912.68	3,853.51	1,325.00	2,528.51	562.00	2,155.21
																IRR	**13.38%**

IRR Calculation with CDM Benefits

(Rs. In Lacs)

Yr.	S.P. P.U.	Inflows					Outflows						Net Rev. Inflow	Loan Repay.	Net inflow	CDM Revenue	Outflow	Net
		Sale Amt.	CC	IC Refund	Int.on tax	Total	O&M	Ins.	L. Rent	Int.	Tax	Total						
															-		562.00	(562.00)
1	3.50	244.61	-	-	-	244.61	-	4.20	-	112.63	-	116.83	127.78	-	127.78	35.75	-	163.53
2	3.65	255.10	-	11.25	-	266.35	-	4.20	-	104.95	-	109.15	157.20	240.91	(83.71)	35.75	-	(47.96)
3	3.80	265.58	-	11.25	-	276.83	40.00	4.20	-	84.47	-	128.67	148.16	240.91	(92.75)	35.75	-	(57.00)
4	3.95	276.06	-	11.25	-	287.31	42.00	4.20	-	63.99	-	110.19	177.12	240.91	(63.79)	35.75	-	(28.04)
5	4.10	286.55	-	11.25	-	297.80	44.10	4.20	-	43.51	-	91.81	205.99	240.91	(34.92)	35.75	-	0.83
6	4.25	297.03	-	11.25	-	308.28	46.31	4.20	-	23.04	-	73.55	234.73	240.91	(6.18)	35.75	-	29.57
7	4.40	307.51	-	-	-	307.51	48.63	4.20	-	6.40	-	59.23	248.28	120.45	127.83	35.75	-	163.58
8	4.55	318.00	-	-	-	318.00	51.06	4.20	-	-	-	55.26	262.74	-	262.74	35.75	-	298.49
9	4.70	328.48	-	-	-	328.48	53.61	4.20	-	-	-	57.81	270.67	-	270.67	35.75	-	306.42
10	4.85	338.96	-	-	-	338.96	56.29	4.20	-	-	-	60.49	278.47	-	278.47	35.75	-	314.22
11	5.00	349.45	-	-	-	349.45	59.10	4.20	-	-	-	63.30	286.15	-	286.15		-	286.15
12	5.15	359.93	-	-	-	359.93	62.06	4.20	-	-	-	66.26	293.67	-	293.67		-	293.67
13	5.30	370.41	-	-	-	370.41	65.16	4.20	-	-	-	69.36	301.05	-	301.05		-	301.05
14	3.50	244.61	-	-	-	244.61	68.42	4.20	-	-	-	72.62	171.99	-	171.99		-	171.99
15	3.50	244.61	-	-	-	244.61	71.84	4.20	-	-	-	76.04	168.57	-	168.57		-	168.57

16	3.50	244.61	-	-	-	244.61	75.43	4.20	-	-	55.53	135.16	109.45	-	109.45	-	109.45
17	3.50	244.61	-	-	-	244.61	79.20	4.20	-	-	54.26	137.66	106.95	-	106.95	-	106.95
18	3.50	244.61	-	-	-	244.61	83.16	4.20	-	-	52.93	140.29	104.32	-	104.32	-	104.32
19	3.50	244.61	-	-	-	244.61	87.32	4.20	-	-	51.53	143.05	101.56	-	101.56	-	101.56
Total		5,709.94	-	56.25	-	5,766.19	1,125.38	84.00	-	438.99	264.31	1,912.68	3,853.51	1,325.00	2,528.51	562.00	2,512.71

IRR **16.85%**

Enclosure 2: BASELINE INFORMATION[4]

Weighted Average Emission Rate (tCO2/MWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	0.71	0.73	0.74	0.71	0.72
East	1.10	1.04	1.09	1.07	1.06
South	0.75	0.75	0.83	0.84	0.78
West	0.93	1.02	0.94	0.90	0.92
North-East	0.37	0.37	0.34	0.36	0.45
India	0.83	0.86	0.87	0.85	0.84
Simple Operating Margin (tCO2/MWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	0.95	0.98	1.00	0.99	0.98
East	1.23	1.19	1.18	1.19	1.18
South	1.03	1.01	1.02	1.01	1.00
West	1.02	1.12	1.03	0.99	1.01
North-East	0.66	0.65	0.65	0.61	0.79
India	1.02	1.06	1.04	1.02	1.02
Build Margin (tCO2/MWh) (not adjusted for imports)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North					0.54
East					0.86
South					0.73
West					0.77
North-East					0.09
India					0.70
Combined Margin in tCO2/MWh (incl. Imports)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	0.74	0.76	0.77	0.76	0.76
East	1.05	1.03	1.02	1.03	1.02
South	0.88	0.87	0.88	0.87	0.86
West	0.90	0.94	0.90	0.88	0.89
North-East	0.38	0.37	0.37	0.35	0.44
India	0.86	0.88	0.87	0.86	0.86

Gross Generation Total (GWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	144,290	151,190	155,331	165,717	168,735
East	58,327	63,583	65,332	75,249	85,435
South	128,805	131,747	134,231	138,371	143,932
West	159,865	165,500	173,402	172,480	183,755
North-East	5,206	5,243	5,486	5,879	7,904
India	496,493	517,262	533,780	557,696	589,761

[4] Source:www.cea.nic.in (CDM Draft Carbon Dioxide Baseline Database

20% of Gross Generation (GWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	28,858	30,238	31,066	33,143	33,747
East	11,665	12,717	13,066	15,050	17,087
South	25,761	26,349	26,846	27,674	28,786
West	31,973	33,100	34,680	34,496	36,751
North-East	1,041	1,049	1,097	1,176	1,581
Net Generation Total (GWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	135,254	141,420	144,676	155,017	157,269
East	52,797	57,654	58,988	68,317	77,967
South	121,040	123,473	125,268	128,225	134,552
West	148,067	152,789	160,615	159,638	170,580
North-East	5,085	5,126	5,372	5,758	7,776
India	462,243	480,463	494,918	516,956	548,144
20% of Net Generation (GWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	27,051	28,284	28,935	31,003	31,454
East	10,559	11,531	11,798	13,663	15,593
South	24,208	24,695	25,054	25,645	26,910
West	29,613	30,558	32,123	31,928	34,116
North-East	1,017	1,025	1,074	1,152	1,555
Share of Must-Run (Hydro/Nuclear) (%)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	25.9%	25.7%	26.1%	28.1%	26.8%
East	10.9%	13.5%	7.6%	10.3%	10.5%
South	28.1%	25.5%	18.6%	16.2%	21.6%
West	8.3%	8.5%	8.4%	9.1%	8.8%
North-East	43.1%	42.4%	48.4%	41.8%	55.4%
Net Generation OM (GWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	100,214	105,082	106,875	111,424	115,129
East	47,017	49,865	54,523	61,267	69,745
South	86,996	91,946	101,928	107,456	105,445
West	135,726	139,838	147,056	145,122	155,586
North-East	2,892	2,952	2,774	3,350	3,469
India	372,845	389,683	413,156	428,619	449,374

IMPORT DATA					
Net Imports (GWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	0	0	0	0	3,616
East	489	555	357	1,689	0
South	1,162	1,357	518	0	0
West	321	0	797	962	285
North-East	0	0	0	0	2,099
Share of Net Imports (%)					

	2000/01	2001/02	2002/03	2003/04	2004/05
North	0.0%	0.0%	0.0%	0.0%	2.3%
East	0.9%	1.0%	0.6%	2.5%	0.0%
South	1.0%	1.1%	0.4%	0.0%	0.0%
West	0.2%	0.0%	0.5%	0.6%	0.2%
North-East	0.0%	0.0%	0.0%	0.0%	27.0%

Gross Generation BM (GWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North					34,283
East					17,394
South					30,091
West					40,286
North-East					2,067
India					124,121
Net Generation BM (GWh)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North					32,293
East					16,042
South					28,165
West					37,837
North-East					2,052
India					116,389

EMISSION DATA					
Absolute Emissions Total (tCO2)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	95,563,002	102,909,475	106,874,884	110,045,815	112,109,909
East	57,830,162	61,238,587	66,085,166	74,919,620	84,395,050
South	89,079,903	92,464,571	104,399,643	108,265,267	105,090,651
West	138,485,626	156,449,139	151,385,665	144,340,246	157,882,622
North-East	1,899,897	1,914,716	1,815,717	2,056,883	2,255,262
India	382,858,591	414,976,488	430,561,074	439,627,831	461,733,493
Absolute Emissions OM (tCO2)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North	95,563,002	102,909,475	106,874,884	110,045,815	112,109,909
East	57,830,162	61,238,587	66,085,166	74,919,620	84,395,050
South	89,079,903	92,464,571	104,399,643	108,265,267	105,090,651
West	138,485,626	156,449,139	151,385,665	144,340,246	157,882,622
North-East	1,899,897	1,914,716	1,815,717	2,056,883	2,255,262
India	382,858,591	414,976,488	430,561,074	439,627,831	461,733,493
Absolute Emissions BM (tCO2)					
	2000/01	2001/02	2002/03	2003/04	2004/05
North					17,287,345
East					13,828,319
South					20,491,417
West					29,193,210
North-East					191,174
India					80,991,465

ENCLOSURE 3: Emission Reduction Calculations

Emission reduction calculations for Sajjan 3.75 MW wind power project

Credit Period	Installed capacity (MW)	Plant load factor (%)	Expected unit generated (MU)	Western grid emission factor (tCO2/MU)	Emission reduction (CO2)
2007	3.75	22	7.227	890	6432
2008	3.75	22	7.227	890	6432
2009	3.75	22	7.227	890	6432
2010	3.75	22	7.227	890	6432
2011	3.75	22	7.227	890	6432
2012	3.75	22	7.227	890	6432
2013	3.75	22	7.227	890	6432
2014	3.75	22	7.227	890	6432
2015	3.75	22	7.227	890	6432
2016	3.75	22	7.227	890	6432
Total CERS	**37.500**		**72.270**		**64320**