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 small-scale project activity

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

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6.25 MW Small Scale Grid Connected Wind Farm Project at district Sangli in Maharashtra, India

Version 1

November 15th, 2007

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

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The Ajanta Group is a manufacturing company of several products with the credit of the being the largest manufacturer of clocks. After realising that the future of energy lies in renewable energy, the company has decided to further diversify their business through investment into power generation through renewable energy. It has set up a 6.25 MW wind based power project (the proposed CDM project activity) in Maharashtra with purpose of selling the electricity generated to state utility.

The project activity includes 5 Wind Turbine Generators (WTG's) of 1.25 MW capacities each adding upto 6.25 MW. The turbines use wind as the fuel to generate electricity and supply it to the grid. The electricity thus generated results in zero emission of Green House and other harmful gases thereby, to a certain extent, diluting the carbon intensive fuel mix that is otherwise used to supply the electricity to the grid.

View of project participant about the project activity's contribution to Sustainable Development

Ministry of Environment and Forests (MoEF), Government of India, has stipulated social well being, Economic well being, Environmental well being, Technological well being as the indicators for Sustainable Development in the interim approval guidelines for CDM projects. The project activity contributes to the above indicators in the following manner.

- ✓ The project activity leads to alleviation of poverty by establishing direct and indirect employment benefits without any disparity towards gender, social class etc., accruing out of ancillary units for manufacturing and erecting the WEGs and for maintenance during operation of the project activity.
- ✓ The project will provide basic civic facilities in and around the project area like roads, electricity etc.
- ✓ The project activity leads to an investment of about Rs. 375 millions (Approx.) to a developing region which otherwise would not have happened in the absence of the project activity.
- ✓ The project attracts new industries due to the availability of electricity and improvement in grid frequency and economic activities like cottage industries, shops, hotels etc. to be setup in the area thereby resulting in more local employment, ultimately leading to overall development.

- ✓ The project activity utilizes wind potential available for power generation, which otherwise is dominated by fossil fuels such as coal, lignite and gas. The project will not result in release or increase of GHG emissions and cause no negative impact on the environment. The project generates real, measurable and long-term emissions reductions.

- ✓ The CDM project activity leads to increase in utilization of available wind resources for power generation and contributes to the energy security in the country.

- ✓ The project activity leads to the promotion of 1.25 MW Wind Electric Generators (WEGs) into the region, demonstrating the success of wind turbines, which feed the generated power into the nearest sub-station, thus increasing energy availability and improving quality of power under the service area of the substation.

- ✓ The project helps in demonstration and attracting the investors to invest in wind energy which has a potential of 45,000 MW[1] in India.

In view of the above, the project activity contributes to the sustainable development of the host country.

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 participate (Yes/No)
India (Host)	**Private Entity: Ajanta Limited ***	No

* The contact information has been provided in Annex 1

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

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

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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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Sangli District

[1] Ministry of New & Renewable Energy, Govt. of India, http://mnes.nic.in/

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

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The project activity is spread over three villages in the district of Sangli, Maharashtra. The details of the exact location of each of the turbines have been mentioned in Annex 5 .The co-ordinates for Sangli are the following:

Latitude : 16°31' 12'' N
Longitude: 74° 21' 36'' E

Diagrammatic location of district Sangli a have shown in the maps below:

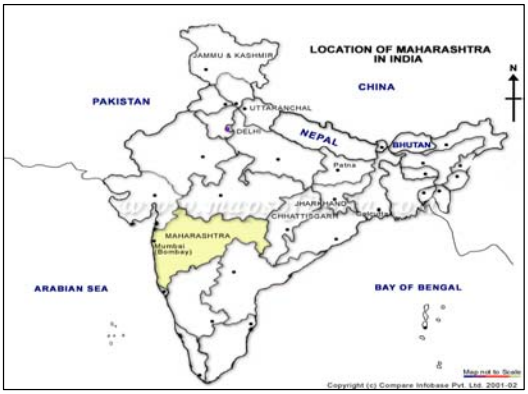

Figure A.1: Location of Maharashtra in India

Figure A.2: District Map of Maharashtra

Figure A.3: Sangli District Map

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

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Since, the capacity of the proposed bundled project is only 6.25 MW, which is less than the maximum qualifying capacity of 15MW, 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:

Sectoral Scope 1	Energy industries (renewable / non renewable sources)
Type – I	Renewable Energy Projects
Category I-D	Grid connected renewable electricity generation
Technology	

The project activity involves 5 No.s of 1.25 MW Suzlon make WTG's, with the help of which, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. Wind blowing at high speeds, has considerable amount of kinetic energy. When this kinetic energy passes through the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. Since the technology does not involve any fossil based fuel, it can be termed as a clean technology since there are no GHG emissions associated with the electricity generation.

The salient features of Suzlon make 1.25 MW WEGs is as follows:

1. Higher Efficiency - Designed to achieve increased efficiency and co-efficient of power (Cp)
2. Minimum Stress and Load - Well-balanced weight distribution ensures lower static & dynamic loads
3. Shock Load-free Operation - Advanced hydrodynamic fluid coupling absorbs peak loads and vibrations
4. Intelligent Control - Next Generation technologies applied by extensive operational experience maximizes yield
5. Maximum Power Factor - High-speed asynchronous generator with a multi-stage intelligent switching compensation system delivers power factor up to 0.99
6. Climatic Shield - Hermetically sheltered, advanced over-voltage and lightning protection system
7. Unique Micro-Pitching Control - Unmatched fine pitching with 0.1° resolution to extract every possible unit of power
8. Grid-friendly - Grid friendly design generates harmonics-free pure sinusoidal power
9. ISO-certified vendors confirm high quality components
10. Conforms to Quality Management System Standard: ISO 9001:2000 for Design, Development, Manufacture and Supply of Wind Turbines, Installation, Commissioning, Operation and Maintenance etc.
11. Conforms to the Environmental Management Standard: ISO 14001:2004
12. Type certification by Germanischer Lloyd, Germany
13. Approved by the Ministry of Non-Conventional Energy Sources (MNES)

Technical specification of the turbines have been given in Annex 6

There is no technology transfer takes place in this project activity.

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

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The following table indicates the annual emission reduction over a ten year crediting period starting from the date of registration of the project activity with CDM Executive Board (CDM EB).

Years	Estimated Annual Emission Reductions in tonnes of CO_2e
Year 1	9866
Year 2	9866
Year 3	9866
Year 4	9866
Year 5	9866
Year 6	9866
Year 7	9866
Year 8	9866
Year 9	9866
Year 10	9866
Total estimated reductions (tonnes of CO_2e)	98660
Total number of crediting years	**10**
Annual average over the crediting period of estimated reductions (tonnes of CO_2 e)	9866

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

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There is no public funding involved in this project activity.

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 1km 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 de-bundled 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 small-scale project activity:

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Project Type: I	Renewable energy project
Project Category: I D	Grid connected renewable electricity generation
Baseline and Monitoring methodology:	**AMS 1.D.**
Version:	13, EB 36

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

>>

As per the, *Simplified modalities and procedures for small-scale CDM project activities*, Type (1) projects are defined by the "renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts (or an appropriate equivalent)". While the Appendix B of *Simplified modalities and procedures for small-scale CDM project activities*, defines project category 1.D as projects having renewable electricity generation for a grid:

The present project activity is characterised by the following:

- Generates renewable energy (wind)
- Installed capacity is 10 MW (less than 15 MW)
- It is connected to the Western Regional Grid

Therefore, the project category falls under the project type 1 and category of 1.D. The project activity will remain under the limits of small scale project activity during every year of the crediting period.

B.3. Description of the project boundary:

>> The baseline methodology AMS 1.D. version 13 defines project boundary as, "The project boundary encompasses the physical, geographical site of the renewable generation source." Therefore, the project boundary encompasses the 5 WTGs, the substation, and the western regional grid as shown below in Figure A.4.

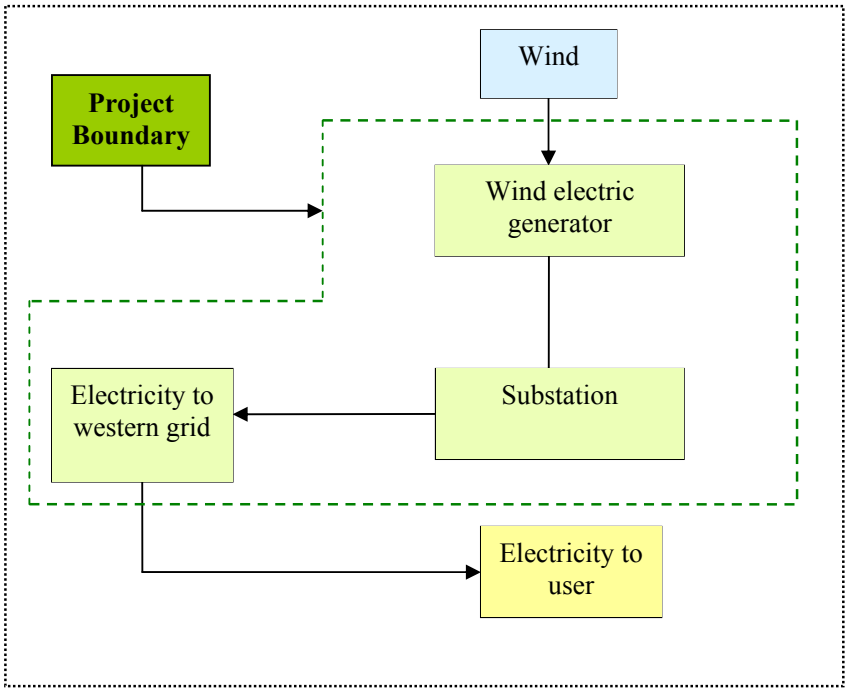

Figure A.4. Project Boundary

B.4. Description of baseline and its development:

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Considering the type and category of the project activity as per the Appendix B of *Simplified modalities and procedures for small-scale CDM project activities,* baseline has been calculated as per the approved baseline methodology AMS 1.D. version 13.

As per this, the baseline to be considered is kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2e/kWh) calculated in a transparent and conservative manner.

Thus, the **Baseline Emissions:**

Electricity supplied by the project activity (kWh) X Emission co-efficient of the Grid (kgCO2e/kWh)

The emission co-efficient will be calculated as per the process of combined margin (CM), consisting of the combination of operating margin(OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'.

Calculations will be based on the latest version (version3, 15th December) of CO_2 baseline database for the Indian Power Sector provided by the Central Electricity Authority, Ministry of Power. All assumptions and rationale have been mentioned in the user guide of the same. The links to these have been provided in Annex 3.

The baseline chosen for the project activity is the emissions from western regional grid (justification has been provided in section B.6.3) and can be described as per the following:

The Indian Power Sector is characterised by thermal power plants as the dominant source of energy. During the time the present project was envisaged, the composition of the power sector was as per the table below.

Table B. 1. Region-wise and Mode-wise break up of installed capacity (MW)[2]

Region	Mode-Wise Break up (MW)								
		Thermal				Nuclear			
	Hydro	Steam	Gas	Diesel	Total		Wind	RES(*)	Total
Northern	10775.57	16914.50	3213.20	14.99	20142.69	1180.00	284.80	125.19	32508.25
Western	5867.13	20916.50	5035.72	17.48	25969.70	760.00	738.70	78.03	33413.56
Southern	10672.24	13892.50	2720.40	939.32	17552.22	830.00	2570.30	619.79	32244.55
Eastern	2481.51	15737.38	190.00	17.20	15944.58	0.00	1.10	6.63	18433.82
Northeast	1133.93	330.00	750.50	142.74	1223.24	0.00	0.00	1.50	2358.67
Islands	5.25	0.00	0.00	70.02	70.02	0.00	0.00	0.17	75.44
All india total	**30935.63**	**67790.88**	**11909.82**	**1201.75**	**80902.45**	**2770.00**	**3594.90**	**831.31**	**119034.29**

It is clear the generation of electricity in India is indeed carbon intensive. The western regional grid, the baseline for the project, contributes the highest (32%) in the thermal power generation in the entire country.

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:

The present project will supply electricity to the western regional with help of wind power which is a zero emission source. However, the project was not part of the business as usual scenario and faced the following barriers. In the absence of the project, the grid would have continued emitting greenhouse gases resulting from the current sources of energy. (In accordance with Attachment A of Appendix B of the simplified modalities and procedures for small-scale CDM project activities):

(A) INVESTMENT BARRIER

To judge the financial viability of the project under consideration, an investment analysis has been carried out with equity IRR as the financial indicator. The assumption used to carry out the same are as per the following:

[2] Annual report, Ministry of Power, 2004-05

Table B. 2: Assumptions for investment analysis

Investment Analysis	
Project Details:	
Size of the Project(MW)	6.250
Location of the Project	Sangli, Maharashtra
No of WTGs	5
Project Cost/WTG:	
Total Cost(Rs. Lakhs)	3112.38
Recuring Cost:	
O&M Cost (Rs. Lakhs)	10.00
O&M Escalation(%)	5.00%
Insurance Cost(Rs. Lakhs)	3.243625
Depreciation Rates:	
Annual Depreciation as per companies act	5.28%
Depreciation as per IT Act	80.00%
Pre/Post September Installation(1/2)	2
Project Financials:	
Equity (Rs. Lakhs)	3112.38
Debt (Rs. Lakhs)	0.00
Tariff Details:	
Tariff (Rs./KWh)	3.50
Escalation (%)	0.15
Tax Components:	
MAT(%)	8.42%
Corporate Tax(%)	33.66%
CDM Components:	
CER Price (Rs./kWh)	0.38
Generation:	
CUF	20.00%
Working Days	365
Working Hours	24
Generation/WTG(Lac Units)	17.52

The equity IRR for the project was calculated to be 12.99%. This was much lower than industry's normative return of 16% (benchmark) as considered by MERC (Maharashtra Electricity Regulatory Commission) tariff order of 2003 (applicable to the project). The financial returns were seen as a big barrier to the project. It was also found that the returns improved to 14.16% with the help of CDM benefits.

Sensitivity Analysis based on variation in energy output:

A sensitivity analysis has also been carried out to strengthen the above financial calculations.

Table B. 3: Sensitivity Analysis based on generation

Variation in energy output	Equity IRR
5%	13.98
10%	14.95

As can be seen, the energy output was increased upto 10% of the generation estimated from the project activity to see the effect to its returns. It was found that even after a variation of 10% the returns to the project falls short of the benchmark. Thus, the project activity without CDM benefits is not a profitable venture for the project proponents.

(B) BARRIERS DUE TO PREVAILING PRACTICE

A renewable energy source like wind power generation till now has not been exploited to its fullest extent in India, while the total potential in the country is of approximately 45000 MW; the achievement has only been of 5340 MW[3]. Till the march of 2005 (the year of conception of this project) the total wind power installed capacity in India was only 3595.21 MW[4]. The graph below depicts the total contribution of wind power to the total installed capacity of in the country as against the other sources, during that period.

[3] Wind power directory, 2006

[4] Wind power directory, 2005

Figure B.1

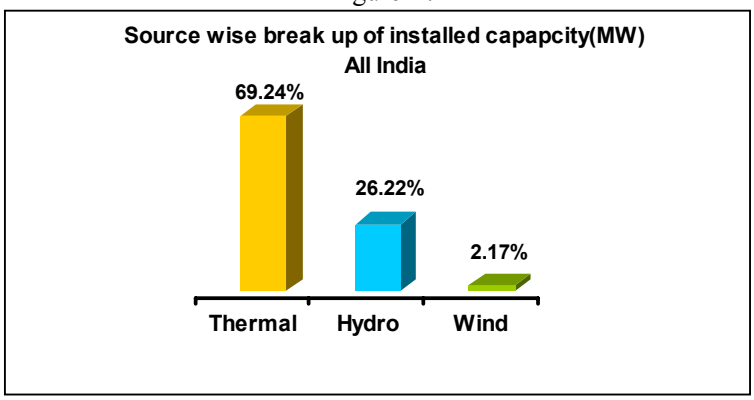
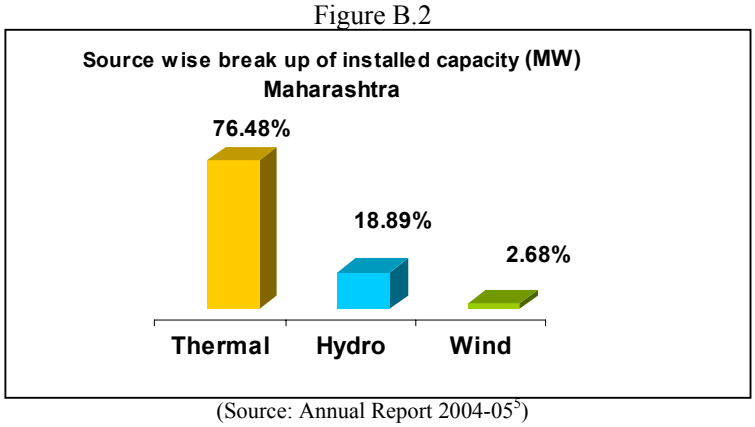


Figure B.2



(Source: Annual Report 2004-05[5])

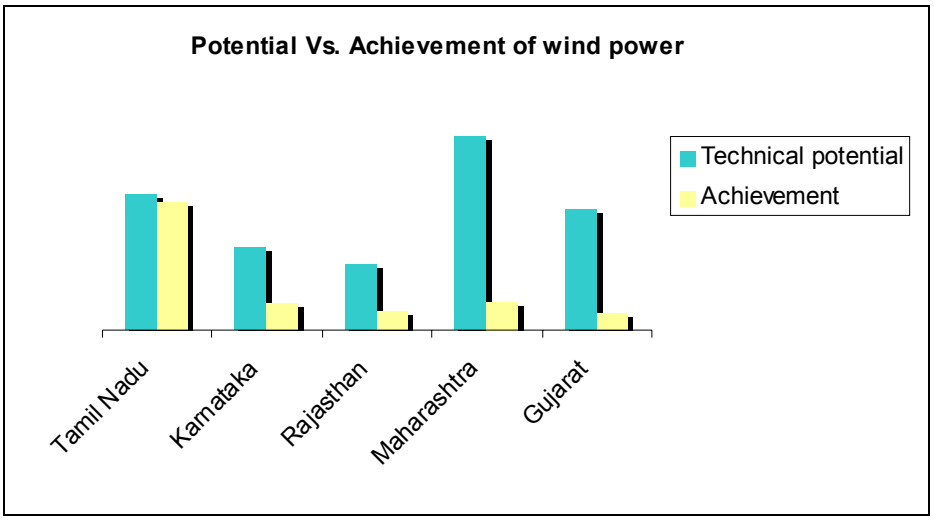
The contribution by wind is no better in case of Maharashtra. While wind constitutes only 2.68 % percent out of the total installed capacity from Maharashtra, thermal and hydro contribute approximately 76.48% and 18.89% respectively.

The graph below[6] states the technical potential of the top five states in terms of wind power potential and their corresponding achievement in terms of installation. Maharashtra, incidentally has the highest technical potential among all the wind potential states, however, the utilization of this potential has not been very high.

[5] http://powermin.nic.in/reports/pdf/ar04_05.pdf

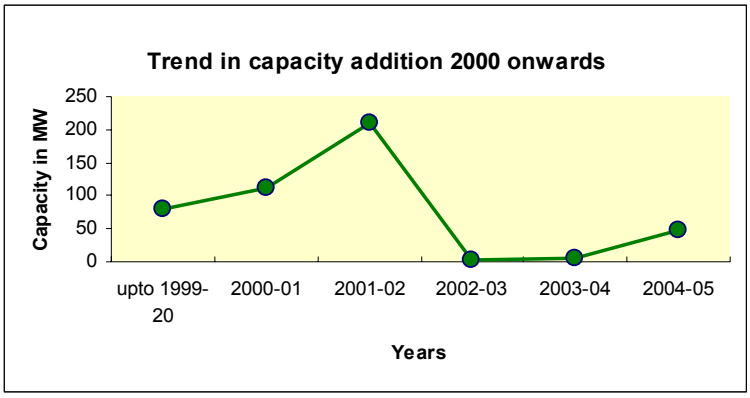
[6] Wind Power Directory 2005

Figure B.3



Moreover, the capacity addition of wind power projects in this state post 2001-02 has not been very encouraging either. The graph given below depicts the capacity addition trend in the state after the year 2000 till the March 2005.

Figure B.4



[7]

The trend of capacity addition[8] reflects the investment scenario in the state. The sudden drop in the capacity addition inspite of existing technical potential indicates that the investment decision of the private investors was getting affected due to existing circumstances.

[7] Data from Wind power Directory 2005

Thus, clearly, investment into wind power projects was not the prevailing practice in the year 2005 in Maharashtra. However, inspite of these circumstances the project promoters resolved to invest into wind power project with the help of CDM benefits.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

The methodology AMS 1.D. Version 13 is being used for this project as per the project type and category.

Emission Reductions:

The project activity mainly reduces carbon dioxide through substitution of grid electricity generation with fossil fuel fired power plants by renewable electricity. The emission reduction ER_y by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y), as follows:

$ER_y = BE_y - PE_y - L_y$

Since Project emissions and leakage do not take place in this project type and category,

$ER_y = BE_y$

Baseline Emissions

As per the Baseline Methodology AMS 1.D version 13 the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2e/kWh) calculated in a transparent and conservative manner:

Baseline Emissions = $EF_{grid, CM\ y}$ X Estimated Energy generated by the project activity (GWh)

For the calculation of this emission co-efficient, the methodology provides two options for calculating the baseline emissions for a Type I D project:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'
(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix.

The project proponent has chosen to use the method of CM for the calculation Emission factor for the baseline emissions as CM calculation represents a more accurate emission factor by accounting for the changes in the technology in the power sector.

The detailed calculation of CM as per the *Tool to Calculate Emission Factor for an Electricity System* has been given below in section B.6.3.

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

Data / Parameter:	**Operating Margin Emission Factor (**$EF_{grid, OM, y}$**)**
Data unit:	tCO2/GWh
Description:	Average CO_2 intensity of the existing stations in the grid except the low cost/ must run plants
Source of data used:	The "Operating Margin" emission factor has been adopted from the "CO_2 Baseline Database", Version 3, dated 15th, 2007 published by the CEA, Govt. of India. http://www.cea.nic.in/planning/c%20and%20e/Govertment%20of%20India%20website.htm
Value applied:	1003.43tCO2/GWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is calculated and published by the Central Electricity Authority under Ministry of Power, an official source. The calculations have been done as per the latest version of ACM0002, version 07. Further details of the same can be found in the URL given above It is part of the calculations of CM Emission factor of the grid as per the *Tool To Calculate Emission Factor For An Electricity System.*
Any comment:	Data item used for ex-ante calculation of operating margin emission factor. The years considered are 2004-05,2005-06, 2006-07

Data / Parameter:	**Build Margin Emission Factor** ($EF_{grid, BM, y}$)
Data unit:	tCO2/GWh
Description:	Average CO_2 intensity of newly built power stations that will be (partially) replaced by a CDM project.
Source of data used:	The "Build Margin" emission factor has been adopted from the "CO_2 Baseline Database", Version 3, dated 15th, 2007 published by the CEA, Govt. of India. http://www.cea.nic.in/planning/c%20and%20e/Govertment%20of%20India%20website.htm
Value applied:	593.7tCO2/GWh.
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data is calculated and published by the Central Electricity Authority under Ministry of Power, an official source. The calculations have been done as per the latest version of ACM0002, version 07. Further details of the same can be found in the URL given above It is part of the calculations of CM Emission factor of the grid as per the *Tool To Calculate Emission Factor For An Electricity System.*
Any comment:	Data item used for ex-ante calculation of build margin emission factor. The year indicated above corresponds to 2006-07

B.6.3 Ex-ante calculation of emission reductions:

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Baseline Emissions (BE_y) = $EF_{grid, CM\ y}$ X Estimated Energy generated by the project activity (GWh)

Calculation of $EF_{grid, CM\ y}$ through Combined Margin

The detailed calculation of CM as per the *Tool to Calculate Emission Factor for an Electricity System* has been explained below:

STEP 1: Identify the relevant electric power system – The tool defines the *electric power system* as 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. Keeping this into consideration, the Central Electricity Authority (CEA)[9], Government of India has divided the Indian Power Sector into five regional grids (see table below).

Table B. 4 Regional grids of India

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

Since the project supplies electricity to the Western grid, emissions generated due to the electricity generated by the western regional grid as per CM calculations will serve as the baseline for this project.

STEP 2. Select an operating margin (OM) method -The 'Tool to calculate the emission factor for an electricity system' gives the following options for calculating the Operating Margin.

[9] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf

(a) Simple OM, or

(b) Simple adjusted OM, or

(c) Dispatch data analysis OM, or

(d) Average OM.

The choice of other options for calculating the operating margin emission factor depend on the generation of electricity from low-cost/ must-run sources. In the context of the methodology low-cost/must-run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.

Table B.5: Share of Must-Run (% of Net Generation)[10]

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	25.9%	25.7%	26.1%	28.1%	26.8%	28.1%	27.1%
East	10.8%	13.4%	7.5%	10.3%	10.5%	7.2%	9.0%
South	28.1%	25.5%	18.3%	16.2%	21.6%	27.0%	28.3%
West	**8.2%**	**8.5%**	**8.2%**	**9.1%**	**8.8%**	**12.0%**	**13.9%**
North-East	42.2%	41.7%	45.8%	41.9%	55.5%	52.7%	44.1%
India	19.2%	18.9%	16.3%	17.1%	18.0%	20.1%	20.9%

The above table clearly shows that the percentage of total grid generation by low-cost/must-run plants (on the basis of average of five most recent years) for the western regional grid is only 9.32% which is much lesser than 50% of the total generation.

Hence, the Option (d), **Simple OM** has been used for the proposed CDM project activity because low-cost/must-run resources constitute less than 50% of total generation. The detailed calculation of Simple OM has been done with the help of Ex ante option in Step 3.

STEP 3. Calculate the operating margin emission factor ($EF_{grid, OM,y}$) according to the selected method.

The values of Simple OM have been taken from the Central Electricity Authority[11], Co2 Baseline Database, prepared as per ACM0002, version 07. All assumptions as per the guidelines has been provided in the same can be found in the link given later in this section. The values as given below:

Emision Factor (tCO2/GWh) - Including Imports	2004-05	2005-06	2006-07
Simple Operating Margin	1012.9	1003.8	993.6
Average Value			1003.43

[10] 'CO_2 Baseline Database', Version 3, 15th December, 2007, Central Electricity Authority, Govt. of India.

[11] Under Ministry of Power in India

STEP 4. Identify the cohort of power units to be included in the build margin (BM).

The values of BM have been taken from the Central Electricity Authority, Co2 Baseline Database, prepared as per ACM0002, version 07. All assumptions as per the guidelines has been provided in the same can be found in the link given later in this section. Ex Ante calculation of Build Margin Emission factor will be used.

STEP 5. Calculate the build margin emission factor.

The value of BM as calculated by the above mentioned Database by the CEA has been given below:

Emision Factor (tCO2/GWh) - Including Imports	2006-07
Build Margin	593.7

STEP 6. Calculate the combined margin (CM) emissions factor.

The combined margin emissions factor is calculated as follows

$EF_{grid, CM\ y} = EF_{grid, OM, y} X\ W_{OM} + EF_{grid, BM, y} X\ W_{BM}$

Where,

$EF_{grid, OM, y}$ = 1003.43tCO2/GWh
$EF_{grid, BM, y}$ = 593.7tCO2/GWh
W_{OM} = Weighting of Operating margin emissions factor (%) = 0.75[12]
W_{BM} = Weighting of Build Margin emissions factor (%) = 0.25

$EF_{grid, CM\ y}$ = 901.00tCO2/GWh

This Emission co-efficient as calculated above is then multiplied by the electricity generated by the project acticty to calculate the Baseline Emissions.

Baseline Emissions = $EF_{grid, CM\ y}$ X Estimated Energy generated by the project activity (GWh)

= 901.00tCO2/GWh X 110.95 GWh

= 9866 **tCO2eq[13].**

[12] Default values for W_{OM} and W_{BM} has been calculated as given in the "Tool to calculate the emission factor for an electricity system"

Emission Reductions:

$ER_y = BE_y$
Or
ER_y = 9866 **tco_2e**

All the methodological choices have been mentioned in section B6.
Spreadsheets containing transparent calculation will be provided along with this CDM PDD.

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

>>

Year	Estimation of baseline emissions (tonnes of CO_2e)	Estimation of project activity emission reductions (tonnes of CO_2e)	Estimation of Leakage (tonnes of CO_2e)	Estimation of emission reductions (tonnes of CO_2e)
Year 1	9866	0	0	9866
Year 2	9866	0	0	9866
Year 3	9866	0	0	9866
Year 4	9866	0	0	9866
Year 5	9866	0	0	9866
Year 6	9866	0	0	9866
Year 7	9866	0	0	9866
Year 8	9866	0	0	9866
Year 9	9866	0	0	9866
Year 10	9866	0	0	9866
Total (tonnes of CO_2e)	**986600**	**0**	**0**	**986600**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_y
Data unit:	GWh/MWh
Description:	Electricity supplied to the grid by the project
Source of data to be used:	JMR Sheets/measurement records of the EPC contractor.
Value of data	10.95 GWh
Description of measurement methods	- The electricity is measured with the help of electronic trivector meters of 0.2 accuracy class

and procedures to be applied:	- The data is recorded both by the operator and the grid representative on a monthly basis. - Calculated from the measured readings at the controller, in case of WEGs with common meters - 100% of the data is monitored - The data will be archived electronically - Complete details are given in the following section
QA/QC procedures to be applied:	Sales record to the grid and other records are used to cross check this data and hence ensure consistency. Moreover, the meters used to record the data are calibrated and tested annually.
Any comment:	Electricity is sold to the grid through the project activity. This is double checked by receipt of sales.

B.7.2 Description of the monitoring plan:

>>

The investors have entered into Operation & Maintenance Agreement with the EPC contractor M/s. Suzlon Energy Limited for carrying out the necessary maintenance of the installations during the designed life of the project. The O & M structure is furnished in Annexure 4. The agency will be responsible for the operation and maintenance activities that will be implemented in order to monitor emission reductions generated by the project activity and are described as under:

1 Routine Maintenance Services

Routine maintenance labour work involves making available suitable manpower for operation and maintenance of the equipment and covers periodic preventive maintenance, cleaning and upkeep of the equipment including -

a) Tower Torquing
b) Blade Cleaning
c) Nacelle Torquing and Cleaning
d) Transformer Oil Filtration
e) Control Panel & LT Panel Maintenance
f) Site and Transformer Yard Maintenance

2 Security Services

This service includes watch & ward and security of the wind farm and the equipment.

3 Management Services

a) Data logging in for power generation, grid availability, machine availability.
b) Preparation and submission of monthly performance report in agreed format.
c) Taking monthly meter reading jointly with SEB, of power generated at each wind farm and supplied to SEB grid from the meter/s maintained by SEB for the purpose and co-ordinate to obtain necessary power credit report/ certificate.

4 Technical Services

a) Visual inspection of the WTG and all parts thereof.

b) Technical assistance including checking of various technical, safety and operational parameters of the Equipment, trouble shooting and relevant technical services.

The responsibility of registration of the project has been assigned to

Mr. Anil. D. Maniar. Manager accounts, Ajanta Limited

He has also been assigned overall supervision of the project performance including the following:

- Performance review of the WEG installations.
- Arranging for annual verification of the installations for issuance of CERs

Leakage
The project activity essentially involves generation of electricity from wind, the employed WEGs convert wind energy into electrical energy and do not use any other input fuel for electricity generation. Thus no special ways and means are required to monitor leakage from the project activity.

Metering Equipment
The project activity essentially involves generation of electricity from wind, the employed WEG can only convert wind energy into electrical energy and cannot use any other input fuel for electricity generation. Thus no special ways and means are required to monitor leakage from the project activity.

1. The proposed CDM project activity requires evacuation facilities for sale to grid and the evacuation facility is essentially maintained by the state utility MSEDCL, which also requires electricity generation measurements.
2. The project activity has therefore envisaged two independent measurements of generated electricity from the wind turbines.
3. The primary recording of the electricity fed to the state utility grid will be carried out jointly at the incoming feeder of the state power utility, MSEB. The metering is carried out at the sub station via a common meter for a group of windmills that is inclusive of the WEGs not a part of this proposed CDM project activity.
4. The primary monitoring is done through main a meter which is located at the sub station. In case the main meter is not working, a backup (fail-safe measure) is provided which is done through Check meters.
5. Testing of the metering equipment for accuracy with a portable standard meter by the MSEDCL's Testing Division, at the cost of the seller. The MSEDCL will carry out the calibration, testing, sealing and maintenance of the meters in the presence of the authorised representative(s) of the project proponent. This shall be done annually..
6. Each WEG is equipped with an integrated electronic meter called controller meter (the secondary monitoring). This meter is connected to the Central Monitoring Station (CMS) of the wind farm maintained by Suzlon Energy Limited. The generation data of individual machine can be monitored as a real-time entity at CMS. The snapshot of generation on the last day of every calendar month will be kept as a record both in electronic as well as printed (paper) form.

7. JMRs are taken at the feeder level by the local electricity utility and the promoter representative against which the net electricity generation invoices are raised. This is done on a monthly basis.

8. The investors have entered into Operation & Maintenance Agreement with the EPC contractors M/s. Suzlon Infrastructure Services Limited (SISL), (then, Suzlon Wind Farm Services Limited) for carrying out the necessary maintenance of the installations during the designed life of the project. SISL will be responsible for collecting the necessary data in order to monitor emission reductions generated by the project activity.

9. SISL will do the operation and maintenance of the installations and measurement of generated electricity is done by state electricity utility. The EPC contractors are ISO certified organizations and follow designated procedures for the assigned tasks.

10. The monitoring data will be archived both electronically and on paper by the project proponent and the data will be archived for 10 + 2 years.

11. Wherever, more than one Power Producer(s) are injecting energy produced by them using the common evacuation/ injection system and through the common metering equipment with MSEB, the joint meter reading taken at common evacuation/ injection system shall be supported by meter readings of individual power producers using such common evacuation/injection system. Based on this break up limited to total energy injection, the power supplied from the individual power plant shall be regulated for the purpose of apportioning electricity exported to the grid

All the data monitored under the monitoring plan will be kept in electronic form and hard copy format for 2 years after the end of crediting period or the last issuance of CERs for this project activity whichever occurs later. The monitored data will be presented to the verification agency or DOE to whom verification of emission reductions is assigned.

Training:

On the job training is provided to the employees for operation and maintenance. Training is also provided associated with specific issues which arise as in when. Periodic training is also provided to the employees in corporate learning centre in which the training range from basics of wind energy to evacuation issues, grid associated problems and other trouble shootings which arise.

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

>>

09/05/2008

Name of the responsible Entity: **M/s. Senergy Global Limited, New Delhi**

The project proponent has appointed the above-mentioned as the CDM consultant and official contact entity and the same is not a project participant listed in the Annex 1 of the PDD.

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:

>>

16/11/2005 (as per the purchase order)

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

>>

20 years 0 months

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:

>>

NA

C.2.1.2. Length of the first crediting period:

>>

NA

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

1/08/2008(but not before the date of registration)

C.2.2.2. Length:

>>

10 years and 0 months

SECTION D. Environmental impacts

>>

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

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As per the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated 14th September 2006, 8 Categories of project activities are required to undertake environmental impact assessment studies. The details of these activities are available at:
http://envfor.nic.in/legis/eia/so1533.pdf

The proposed project doesn't fall under the list of activities requiring EIA as it will not involve any negative environmental impacts, as the WEGs installed for generation of power use wind (cleanest possible source of renewable energy), thus no EIA study was conducted.

Although an EIA is not required, the possible environmental impacts listed below were analysed:

- Energy generation and emission reduction
- Nature: presence of bird migration tracks, disturbance of breeding grounds (during construction and operation).
- Landscape: possible reflections, disturbance of the landscape
- Noise: acceptable noise levels for nearby living inhabitants, vulnerable nature areas, etc., by means of a global sound profile.
- Soil and water: possible emissions to soil and water, setting of the ground, hydrology

- Security/safety aspects
- Physical use of space of the wind farm, roads and transmission lines

The analysis concluded that there are no reasons and areas for concern. The wind park is located in a sparsely populated area with no vulnerable flora or fauna.

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:

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SECTION E. Stakeholders' comments

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

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- State Electricity Utility (Maharashtra State Electricity Distribution Company limited, MSEDCL)
- Maharashtra Energy Development Agency (MEDA)
- Local villagers

The local villagers will be taken into account with the help of stakeholder meeting.

E.2. Summary of the comments received:

>>

- MSEDCL as the purchaser of the electricity generated from the project. The Power Purchase Agreement has been signed with the organisation which takes into account the organisation's terms and conditions.
- MEDA (Maharashtra Energy Development Agency) as it is the organisation responsible for establishment of energy generation projects. No Objection Certificates have also been taken and their terms and conditions have been agreed upon.
- Details of the comments received will be submitted to the DOE

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

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No negative comments were received from MSEDCL and MEDA. In case of any comments from the villagers, details of how the account was taken will be provided to the DOE.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY\

Organization:	Ajanta Limited
Street/P.O.Box:	Rajkot highway
Building:	Orpat industrial Estate
City:	Morbi
State/Region:	Gujarat
Postfix/ZIP:	363641
Country:	India
Telephone:	02822- 231444, 231445, 231446
FAX:	02822- 230125
E-Mail:	account@orpatgroup.com
URL:	www.orpatgroup.com
Represented by:	Anil Kumar Dalpatram Maniar
Title:	Manager accounts
Salutation:	Mr
Last Name:	Maniar
Middle Name:	Dalpatram
First Name:	Anil Kumar
Department:	Accounts
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Direct FAX:	02822- 230125
Direct tel:	02822- 231444
Personal E-Mail:	account@orpatgroup.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project would not receive any public funding from the Official Development Assistance (ODA) or other funds provided by any Annex I countries

Annex 3

BASELINE INFORMATION

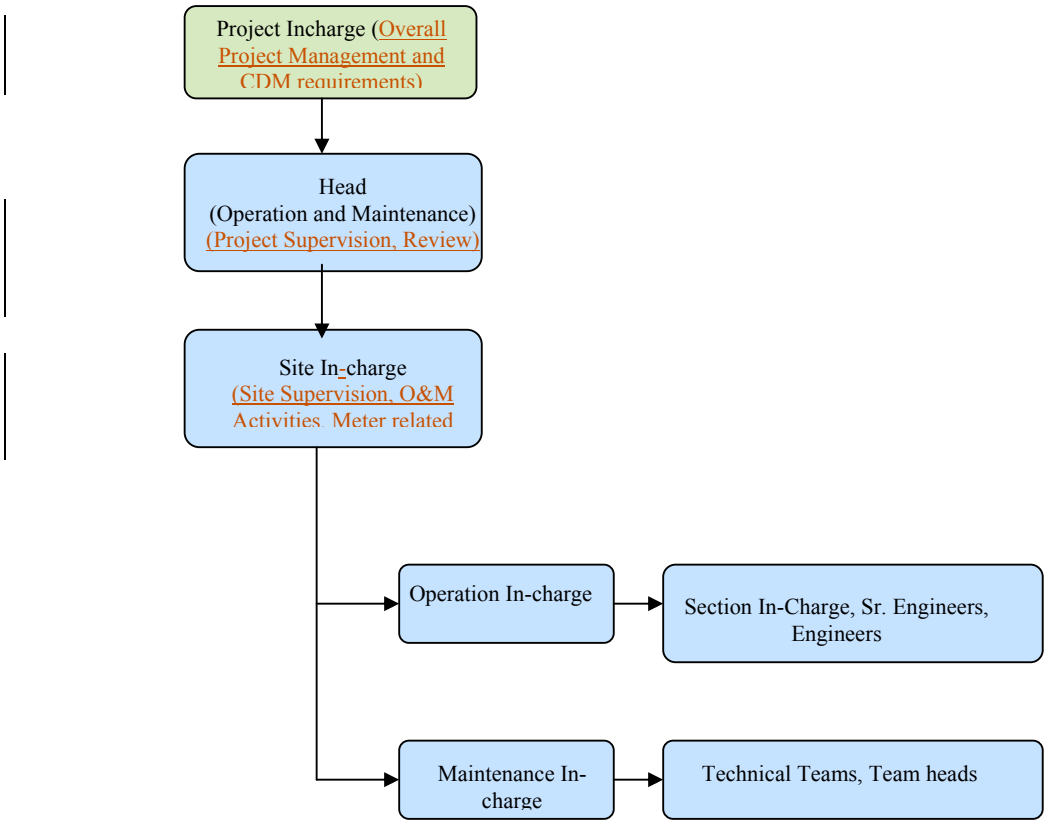
The detailed baseline information is furnished in section B of PDD.
The CEA based CO2 baseline database can be found from the following link:

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

Annex 4

MONITORING INFORMATION

(Operation and maintenance structure)



Annex 5

Unique identification of the turbines

Taluka	Village	Turbine Number	Installed Capacity (MW)	Land Survey Number
Tasgaon	Jarandi	G-317	1.25	470
Tasgaon	Jarandi	G-322	1.25	795
Tasgaon	Jarandi	G-323	1.25	699
Kawathe Mahankal	Tisangi	G321	1.25	358
Kawathe Mahankal	Tisangi	G-333	1.25	495

Annex 6

Technical specifications of Suzlon S70/1250 kW WTG

Parameter	Specifications
Operating Data	
Rotor diameter	69.1 m
Hub Height	75 m
Cut in Speed	3 m/s
Rated Speed	12 m/s
Cut out Speed	20 m/s
Type of Tower	Tubular
Rotor	
No. of Blades	3
Swept Area	3750 m^2
Rotational Speed	13.9 to 19.8 rpm
Regulation	Pitch Regulated
Generator	
Type	Asynchronous 4/6 Poles
Capacity of Each Turbine	1.25 MW
No. of Turbines	17
Generation Voltage	690 V
Frequency	50 Hz
RPM	1010 / 1515
Gear Box	
Type	Integrated (1 Planetary & 2 Helical)
Ratio	77.848
Yaw System	
Drive	4 Electrically driven yaw motors
Bearings	Polyamide slide bearings
Braking System	
Aerodynamic Brake	3 Independent Systems with Blade Pitching
Mechanical Brake	Spring powered disc brake, hydraulically released

Annex 7

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