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

CONTENTS

Annexes

SECTION A. General description of project activity

A.1. Title of the project activity:

>>
Chakala wind power project in Maharashtra
Date: 29/12/2012
Version no : 07

A.2. Description of the project activity:

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Prior to the project there was no equipment present at the project site, this is a complete new facility.

Bindu Vayu Urja Private Limited (BVUPL) is setting up a 39 MW Wind Power Plant in Chakala village in the state of Maharashtra in India. The project would be using 26 number Wind Turbine Generators of Suzlon (Model : S82). Each of these WTGs will have a capacity of 1.5 MW. The project would be generating around 77996.41 MWh of electricity per annum. The electricity would be exported to the Maharashtra State Electricity Distribution Company Limited (MSEDCL) which falls under the NEWNE grid. The clean electricity generated from the project would aid in sustainable development of that region. It would also help in reducing green house gas emissions by generating clean and green electricity. The amount of GHG reduced due to this project would be 74307 tCO_2 equivalent, which is equal to 74307 CERs.

The baseline scenario is exactly same as the scenario prevailing before the project activity.

Contribution towards Sustainable Development
Ministry of Environment and Forests, Govt. of India has specified the social well being, economic well being, environmental well being and technological well being as the four indicators for sustainable development in host country approval eligibility criteria for Clean Development Mechanism (CDM) projects.
Social Well Being
The project activity will generate many direct and indirect employment opportunities. During construction period, the skilled and unskilled labourers will be required. The operation of this plant also creates new employment opportunities for the region. It will increase income security of vulnerable sections of the rural communities in the vicinity of the project site through redistribution of benefits on account of the new direct and indirect employment opportunities associated with the project. The project activity will indirectly help in infrastructure development in the neighbouring villages like better roads, telecommunication etc.

BVUPL will use at a minimum, 2% of the revenues accrued from the sale of Certified Emission Reductions (CERs) on an annual basis for community related activities. These may include providing assistance for development of public amenities in the surrounding areas such as water distribution/sanitation facilities/building of School and Hospital/ free distribution of educational books and school uniforms/annual eye camps/health check up centers for villagers etc. However the exact activity would be discussed with Village Panchayat and would subsequently be finalized.

If the activity undertaken involves capital expenditure exceeding the minimum requirement of 2%, the additional expenditure made would be set off against the requirements for the subsequent years. Such expenditure would be made within one year after the realization of revenues from the sale of the CERs.

Environmental Well Being
The electricity generated by the project activity will be supplied to NEWNE grid, which otherwise would have been generated by fossil fuel fired power plants in the grid. The project activity will help in reduction of the greenhouse gas emissions and air pollutants (especially NOx and SO2).

The project activity also helps in conservation of depleting fossil fuels such as coal, oil, natural gas which at present are predominantly used for power generation. The project activity being wind power project will have minimum environmental impact.

Economic Well Being
The construction of the wind power project will create employment opportunities and may create opportunities for the allied sectors that supply services to the local population that is expected to increase once the project is operational. This will eventually raise the economic standards of the people residing near the project activity.

Technological Well Being
The project activity will be making use of the reliable and proven technology available locally to ensure that only an environmentally safe technology is being implemented in the proposed project activity. There would not be any technology transfer taking place.

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)
Government of India (host)	**Bindu Vayu Urja Private Limited (Private entity)**	**No**

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

>>
India

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

>>
Maharashtra

A.4.1.3. City/Town/Community etc.:

>>
Chakala village, Nandurbar District

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

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The project is located in Chakala village, Maharashtra state of India. A map of India with the project location is provided below.
The nearest major town is Nandurbar
Nearest airport is Aurangabad
Nearest sea port would be Mumbai.
The nearest railhead is Nandurbar

The project consists of 26 WTGs of 1.5 MW each. The latitude and longitude of each WTG is given in Appendix 1 of the PDD.

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

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The project activity category – Large Scale
The project activity Sectoral scope - Energy Industries – Renewable Sources[1]

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

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Pre project scenario:
The project is a Greenfield project. In absence of the project an equivalent amount of electricity would have been consumed from the NEWNE grid, which is connected to fossil fuel based power plants.

Technology employed in project scenario:
Power generation using wind is achieved by deploying 26 wind turbine generators (WTGs). S82-1.5 MW is designed for generating the optimal power output even at sites with a modest wind speed regime. The wind turbine concept is based on robust design with pitch regulated blade operation, a 3-stage gearbox with 1650 kW rating and flexible coupling to the asynchronous induction generator. The Suzlon Flexi-slip System provides efficient control of the load and power control. The turbine operation is efficiently controlled by the Suzlon controller. These technologies are all well-known in the wind power industry and have proven themselves. The S82-1.5 MW is designed to withstand extreme conditions and operate effectively with low maintenance cost. Wind power generation is an environmentally safe and sound technology that has no harmful emissions during its entire lifetime operations. The WTGs are supplied by Suzlon Energy Limited to the project participant. The components are manufactured in India and assembled at the project site. There is no transfer of technology from outside the host country for this project activity. The PLF estimated for this project is 22.83%.

Technical specifications of the WTGs are detailed below:

OPERATING DATA	
Rated power	1500 kW
Cut-in wind speed	4 m/s
Rated wind speed	14 m/s
Cut-off wind speed	20 m/s
Survival wind speed	52.5 m/s
Lifetime of the wind turbines	20 years
ROTOR DATA	
Type	3 Blades, Upwind / Horizontal axis
Diameter	82 m
Rotational speed at rated power	15.6 to 18.4 rpm
Rotor blade material	Epoxy bonded fibre glass
Swept area	5281 m2
Power regulation	Active pitch regulated with Suzlon Flexi Slip System
GEARBOX	

[1] http://cdm.unfccc.int/DOE/scopes.html

Type	1 planetary stage / 2 helical stages
Ratio	1 : 95.09
Nominal load	1650 kW
Type of cooling	Forced oil cooling lubrication system
GENERATOR	
Type	Single speed induction generator with slip rings, variable rotor resistance via Suzlon Flexi slip system
Speed at rated power	1511 rpm
Rated power	1500 kW
Rated voltage	690 V AC
Frequency	50 Hz
Insulation	Class H
Enclosure	IP 54 / IP 23 (slip ring unit)
Cooling system	Air cooled
TOWER	
Type	Tubular tower (corrosion proof painting on inner and outer surface) with welded steel plates.
Tower Height	76 m
Hub height (including foundation)	Approximately 78.5 m
BRAKING SYSTEM	
Aerodynamic braking	3 Independent systems with blade pitching
Mechanical braking	Hydraulic fail safe disk brake system
YAW SYSTEM	
Type	Active electrical yaw motor
Bearing	Polyamide Slide bearing with gear ring & automatic greasing system
Protection	Cable twist sensor, proximity sensor
PITCH SYSTEM	
Type	3 independent blade pitch control with battery backup for each blade
Operating range	-5 º to +90 º
Resolution	0.1 to 10 Deg

In the absence of the project activity, equivalent energy would be generated in power plants connected to the NEWNE Grid of India. Details on grid-connected power plants are given in the CEA CO2 baseline database (Version 7), based on which the combined margin emission factor is determined. The project will lead to a reduction of 74307 tCO2 equivalent.

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

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The PP has chosen a fixed ten year crediting period.

Years	Annual estimation of emission reductions in tonnes of CO2 e

2013 – 14[2]	74,307
2014 – 15	74,307
2015 – 16	74,307
2016 – 17	74,307
2017 – 18	74,307
2018 – 19	74,307
2019 – 20	74,307
2020 – 21	74,307
2021 – 22	74,307
2022 – 23	74,307
Total estimated reductions (tonnes of CO2 e)	**743,070**
Total number of crediting years	**10**
Annual average over the crediting period of estimated reductions (tonnes of CO2 e)	**74,307**

A.4.5. Public funding of the project activity:

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No public funding has been availed for this project.

[2] The first crediting period covers the time period between the dates of 02/01/2013 to 01/01/2014. The same cycle will be maintained for all subsequent crediting periods.

SECTION B. Application of a baseline and monitoring methodology

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

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Title: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

Reference: Approved consolidated baseline methodology ACM0002 (Version 13.0.0, EB 67)

ACM0002 draws upon the following tools which have been used in the PDD:

- Tool to calculate the emission factor for an electricity system – Version 02.2.1 (EB 63 annex 19)[3]
- Tool for the demonstration and assessment of additionality – Version 6.0.0 (EB 65 annex 21)[4]

Further information with regards to the methodology / tools can be obtained at:
http://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L

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

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The project activity is wind based renewable energy source, zero emission power project connected to the Maharashtra state grid, which forms part of the NEWNE regional electricity grid. The project activity will displace fossil fuel based electricity generation that would have otherwise been provided by the operation and expansion of the fossil fuel based power plants in NEWNE electricity grid. The approved consolidated baseline and monitoring methodology ACM0002 Version 13.0.0 is the choice of the baseline and monitoring methodology and it is applicable because:

Serial number	Applicability condition of ACM0002	Applicability of project
1	This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	The project is grid-connected renewable power generation project activities that install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity. Therefore, confirms to point (a) of the applicability criteria
2	The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation	The project activity is grid connected renewable power generation from wind

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

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

	reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	
3	In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	Not applicable to the project as it is not a capacity addition or retrofit project.
4	In case of hydro power plants: • At least one of the following conditions must apply: ➢ The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or ➢ The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m2 after the implementation of the project activity; or ➢ The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m2 after the implementation of the project activity. In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m2 after the implementation of the project activity all of the following conditions must apply:	Not applicable to the project case as the project is not a hydro power project.

	The power density calculated for the entire project activity using equation 5 is greater than 4 W/m2; ➢ All reservoirs and hydro power plants are located at the same river and were designed together to function as an integrated project1 that collectively constitutes the generation capacity of the combined power plant; ➢ The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity; ➢ The total installed capacity of the power units, which are driven using water from the reservoirs with a power density lower than 4 W/m2, is lower than 15 MW; ➢ The total installed capacity of the power units, which are driven using water from reservoirs with a power density lower than 4 W/m2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.	
5	The methodology is not applicable to the following: ➢ Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site ➢ Biomass fired power plants; A hydro power plant that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the reservoir is less than 4 W/m2	The project is a wind power project hence the applicability of the methodology is not affected.
6	In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is the continuation of the current situation, i.e. to use the power	This is not applicable to the project as this is not a retrofit project.

	generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance. In addition, the applicability conditions included in the tools referred to above apply.	

The description provided in table above shows that the project activity satisfies the applicable conditions of the methodology, ACM0002.

This ACM 0002 also refers to the latest approved versions of the following tools:

1) Tool to calculate the emission factor for an electricity system", version 02.2.1:- This tool is used in line with ACM0002 requirement. This tool is used to determine the CO2 emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the combined margin emission factor (CM) of the electricity system. Since the project activity displaces the grid generation by renewable energy power, hence the tool is applicable for project activity and used to calculate emission reductions for the project activity. Further CEA database has also used the same tool to calculate the OM, BM & CM for the electricity system.

2) Project activity has applied "Tool for the demonstration and assessment of additionality", version 06.0.0, which is not mandatory for project participants when proposing new methodologies. Since project activity is using the established methodology ACM0002, project participant has used this toll to demonstrate the additionality of project activity. As per the tool project activities that apply this tool in context of approved consolidated methodology ACM0002, only need to identify that there is at least one credible and feasible alternative that would be more attractive than the proposed project activity. Justification on alternatives has been provided in details in section B.5 of PDD.

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

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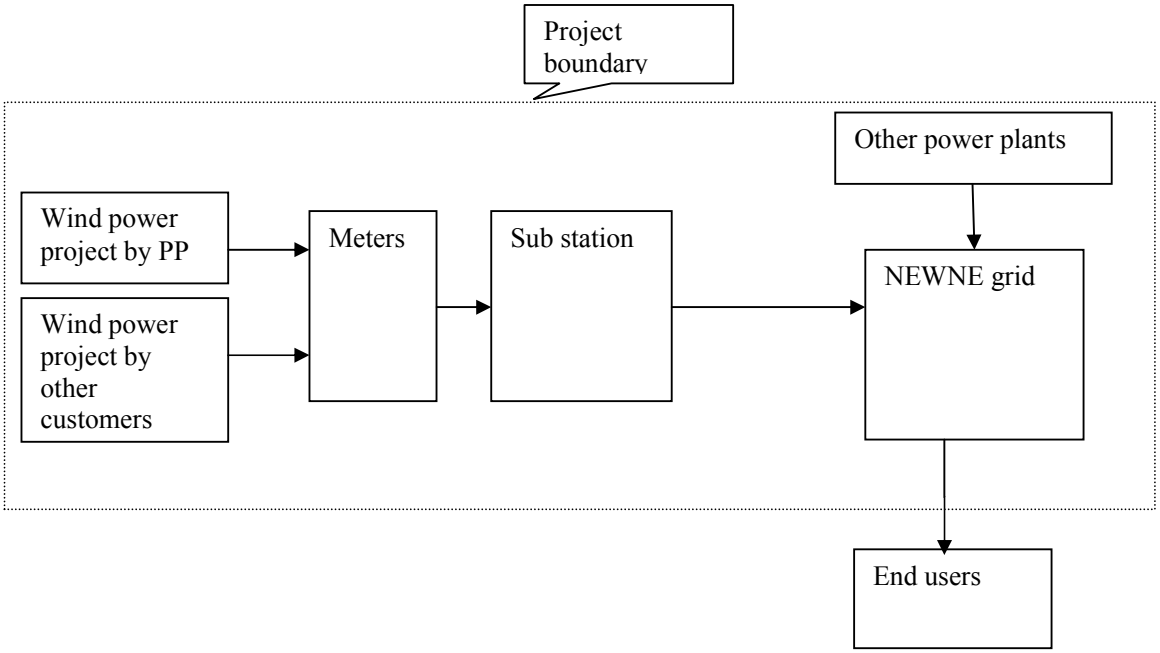
According to the applicable methodology, spatial extent of this project activity includes the project site and all the power plants connected physically to the electricity system that the CDM power project is connected to. The project activity is connected to the network of state transmission utility which falls in NEWNE grid. Thus the project boundary includes all the power plants physically connected to the NEWNE grid.

Schematic of Project Boundary is given below:



The baseline study of NEWNE grid shows that the main sources of GHG emissions in the baseline are CO2 emissions from the conventional power generating systems, the other emissions are that of CH4 and N2O but both emissions were conservative and are excluded for simplification of the project. The project activity is the emission free electricity generation from renewable sources and hence emits no gases in the atmosphere.

Following table indicates the sources and gases included in the project boundary:

Source		Gas	Included ?	Justification / Explanation
Baseline	Grid connected electricity generation	CO_2	Yes	In the baseline scenario the electricity would have been sourced from the NEWNE grid which in turn would be connected to fossil fuel fired power plants which emit CO2.
		CH_4	No	No methane generation is expected to be emitted.
		N_2O	No	No nitrous oxide generation is expected to be emitted.
Project activity	Greenfield wind energy conversion System	CO_2	No	The project activity does not emit any emissions.
		CH_4	No	No methane generation is expected to be emitted.
		N_2O	No	No nitrous oxide generation is expected to be emitted.

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

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According to the applied methodology ACM 0002, if the project activity is the installation of a new grid-connected renewable power plant/ unit, the baseline scenario is the following:
"Electricity delivered to the grid by the project would have otherwise been generated by the operation of Grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor of an electricity system".

The proposed project activity is the installation of 26 WEC's of Suzlon's make S82 of 1.5 MW each contributing 39 MW of power to the NEWNE grid; the project activity is the installation of a new grid connected power plant hence as per the applied methodology the baseline scenario is the emissions generated by the operation of grid-connected power plants and by the addition of new generation sources as reflected in the combined margin (CM) calculations described in Section B.6 of the PDD.
The Indian grid system is defined below:

Electricity Grid (Present)	Electricity Grid (Earlier)	Geographical Areas Covered
NEWNE Grid	Northern	Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan,

		Uttar Pradesh, Uttarakhand
	Western	Chhattisgarh, Gujarat, Daman & Diu, Dadar & Nagar Haveli, Madhya Pradesh, Maharashtra, Goa
	Eastern	Bihar, Jharkhand, Orissa, West Bengal, Sikkim, Andaman-Nicobar
	North-Eastern	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura
Southern Grid	Southern	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Pondicherry, Lakshadweep

Maharashtra state falls under NEWNE grid.
The installed electricity in India as on 31st August, 2011 is given below.[5]

SL. NO.	REGION	THERMAL				Nuclear	HYDRO (Renewable)	R.E.S.@ (MNRE)	TOTAL
		COAL	GAS	DSL	TOTAL				
1	Northern	24232.50	4134.76	12.99	28380.25	1620.00	14422.75	3509.56	47932.56
2	Western	33105.50	7903.81	17.48	41026.79	1840.00	7447.50	5937.60	56251.89
3	Southern	20982.50	4690.78	939.32	26612.60	1320.00	11338.03	10128.96	49399.59
4	Eastern	21122.88	190.00	17.20	21330.08	0.00	3882.12	356.42	25568.62
5	N. Eastern	60.00	787.00	142.74	989.74	0.00	1116.00	223.60	2329.34
6	Islands	0.00	0.00	70.02	70.02	0.00	0.00	6.10	76.12
7	All India	99503.38	17706.35	1199.75	118409.48	4780.00	38206.40	20162.24	181558.12

It is evident from the above table that the installed capacity in India is predominantly thermal power plants; thermal power generation is GHG intensive and is a major source of CO2 emissions. In the absence of the project activity equivalent amount of electricity would have been generated from the existing grid connected power plants and planned capacity additions which are also largely fossil fuel based. Thus generation from the project displaces the electricity generated from existing and planned power plant capacities in the NEWNE grid whose emission intensities are represented by the Combined Margin Emission Factor of the NEWNE Grid. The project activity would reduce 74307 amount of CO_2 equivalent annually.

The baseline emissions and emission reductions from the project activity are estimated by multiplying the amount of electricity exported by the project activity to the NEWNE grid with the emission factor of the NEWNE grid calculated as the combined margin (CM) of the operating margin (OM) and build margin (BM) emission factors.

Variable	**Data source**
$EG_{PJ,y}$	Records maintained by project proponents
Parameter	**Data Source**

[5] http://www.cea.nic.in/reports/monthly/executive_rep/aug11/8.pdf

$EF_{Grid, OM, y}$ = Operating Margin Emission Factor (tCO2/MWh)	CEA Database for CO2 emission factor, version 7[6]
$EF_{grid, BM, y}$ = Build Margin Emission Factor (tCO2/MWh)	CEA Database for CO2 emission factor, version 7[7]
$EF_{Grid,CM, y}$ – Grid Emission Factor	Calculated as the weighted average of the operating margin and build margin

[6] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

[7] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

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

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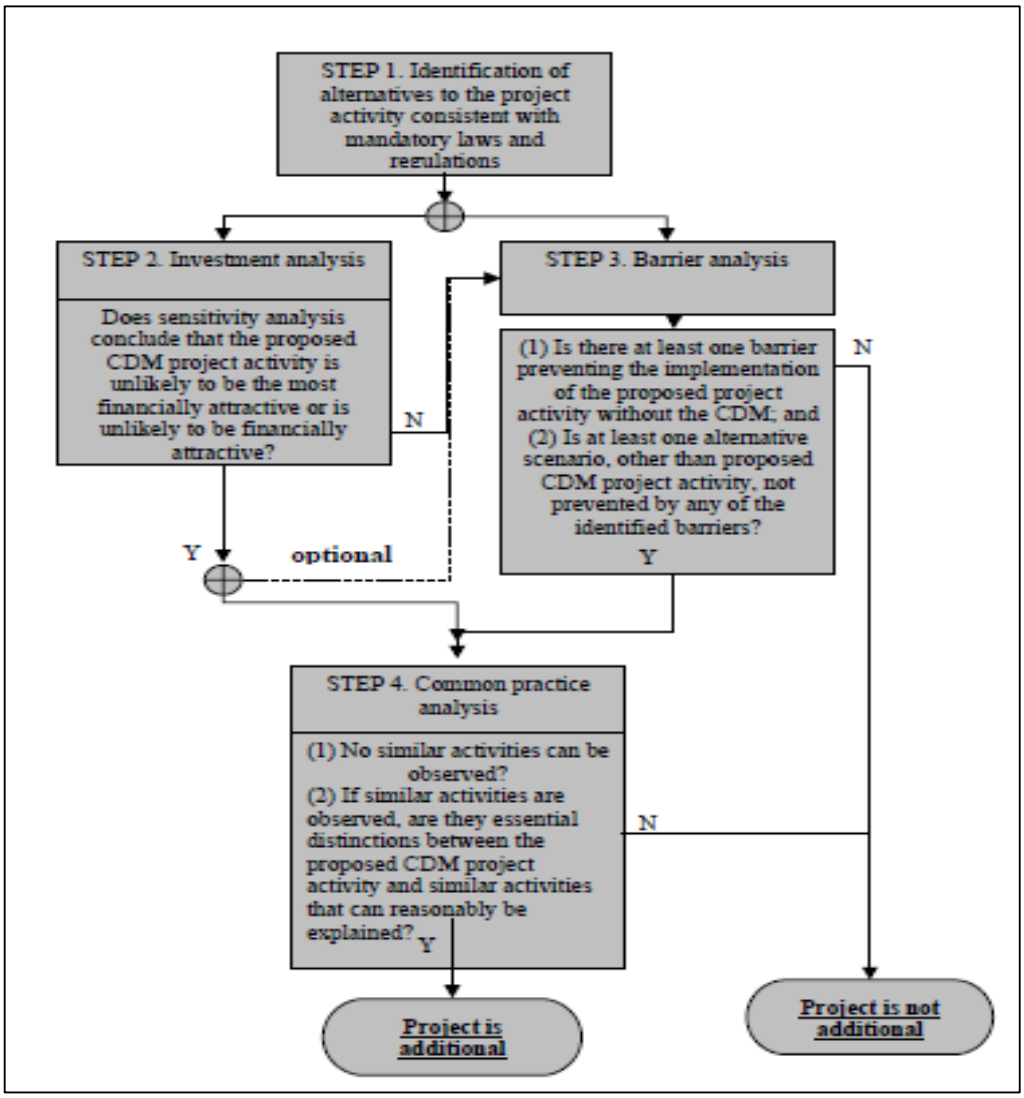
The project activity is said to be additional if the anthropogenic emissions of GHG by source are reduced below those that would have occurred in the absence of the registered CDM project activity. As per the applied methodology, "*the additionality of the project activity shall be demonstrated and assessed using the latest version of the Tool for the demonstration and assessment of additionality*".

The steps involved in demonstrating the additionality as per the latest version of the tool (Version 06.0.0 EB65) is as summarized below:



Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

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

The alternatives available to the proposed project activity are as follows:

a) The project activity being undertaken without taking in to consideration the CDM
In the absence of CDM, the project activity would have continued to generate electricity from wind and supply the same to the fossil fuel intensive regional grid. This is a realistic and credible alternative available to the project activity. However, without CDM revenues the project activity is not financially viable (explained in detail in step 2).

b) Project activity being setting up using other renewable energy and/or fossil fuel
Setting up of a fossil fuel based or other renewable energy (hydro, solar etc) based power plant is an alternative available to the project proponent. As per the tool, "*a coal-fired power station or hydropower may not be an alternative for an independent power producer investing in wind energy".* Therefore, this is not a realistic and credible alternative

c) Continuation of current scenario i.e., either no project activity or any other alternatives undertaken
The NEWNE grid faces an electricity deficit. Therefore, not having a project activity is not a realistic and credible option. Instead, the grid will continue to receive electricity from thermal power plants.

As per the applied methodology, "*If the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:*

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

Therefore, apart from continuation of the current scenario, the other alternative is the proposed project activity being undertaken without CDM

Sub-step 1b: Consistency with mandatory laws and regulations:

The Electricity Act 2003 was analysed during identification of the baseline. The Electricity Act 2003 says "Any generating company may establish, operate and maintain a generating station without obtaining a licence under this Act if it complies with the technical standards relating to connectivity with the grid referred to in clause (b) of section 73" and hence does not restrict the usage of any technology and fuel for electricity generation.
Hence, undertaking the proposed project activity without CDM as well as the grid being fed with power plants is in compliance with all the laws and regulations.

Step 2: Investment analysis

Sub-step 2a: Determine appropriate analysis method

In addition to the CDM revenue, the project activity generates revenue from the sale of electricity to the grid. Therefore, Simple Cost analysis is not an appropriate analysis method.

As per the Guidelines on the assessment of investment analysis[8], Version 05 EB62 guidance 19 states "*If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate".* The proposed project activity the baseline does not require investment, i.e., the project proponent can chose to invest or not to. Also continuing of current scenario is the supply of electricity from a grid. Therefore, benchmark analysis is the appropriate method.

The equity Internal Rate of Return (Equity IRR) has been chosen as the financial indicator for the investment analysis. While computing the equity IRR, only the portion of investment costs which is financed by equity should be considered as the net cash outflow. This is in conformance with guidance 10 of the Guidelines on the assessment of investment analysis.

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

As per guidance 12 of Guidelines on the assessment of investment analysis, "*Required/expected returns on equity are appropriate benchmarks for equity IRR"*. Therefore, the project proponent has chosen Cost of Equity as the benchmark to compare the equity IRR.

As per guidance 15 of Guidelines on the assessment of investment analysis, *"……. the cost of equity should be determined either by: (a) selecting the values provided in Appendix A; or by (b) calculating the cost of equity using best financial practices……".*

The project proponent has chosen option (a) to estimate the cost of equity. As per Appendix A, the project activity falls under Group 1 category of projects. The default value for the expected return on equity calculated after taxes is 11.75%. As per guidance 7 of Annex A, *project participants can convert the real term values provided in the table below to nominal values by adding the inflation rate. The inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period.*

Reserve Bank of India (RBI), the central bank of India, provides the inflation forecast over the next ten years. The inflation expected over the next ten years (duration of crediting period) is 5.5[9]%.

The cost of equity is = (1+11.75%)*(1+ 5.5%) - 1
= 17.90%

Therefore, the benchmark computed for the project activity is 17.90%.

[8] http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf

[9] http://rbi.org.in/scripts/PublicationsView.aspx?id=13360

The assumptions made to calculate the equity IRR are as follows:

Assumptions:	**Values**	**Data Source**
No of WEGs	26	Quotations received from Suzlon on 04/07/2011.
Capacity of each WTG	1.5 MW	Quotations received from Suzlon on 04/07/2011.
Project Size	39 MW	Quotations received from Suzlon on 04/07/2011.
Cost per WEG	INR 97.5 Million	Quotations received from Suzlon on 04/07/2011.
Total Project Cost in Million	**INR 2535**	
Means of Finance		
Debt	70%	Assumption
Equity	30%	Assumption
Opearating Parameters		
Plant Load Factor	22.83%	Third party report
Total Generation for the project at above PLF	77.99 Million KWh p.a	
Life of the Wind Turbine	20 years	Suzlon's offers
O & M cost		Quotations received from Suzlon on 04/07/2011.
O & M Cost (in Lacs) from 3rd Year of operation incl Ser. Tax	INR 16.49 Lakhs p.a	Quotations received from Suzlon on 04/07/2011.
Annual escalation from 3rd year	5%	Quotations received from Suzlon on 04/07/2011.
Financial Parameters		
Interest on Term Loan		
Rupee Loan	12.85 %	RBI Prime Lending rate. Conformance with guidance 6 of investment analysis guidelines.
Generation Based Incentive (GBI)	INR 0.50/Kwh	Operational Guidelines for Implementation of Generation Based Incentives for Grid Connected Wind Power Projects" of Ministry of New and Renewable Energy (MNRE) through Indian Renewable Energy Development Agency Ltd. (IREDA) http://www.inwea.org/others/OPERATIONAL_GUIDELINES.pdf Hence PP is not eligible to claim Accelerated Depreciation.
Tariff	INR 4.67/KWh	MAHARASHTRA ELECTRICITY REGULATORY COMMISSION Tariff order dated 29/04/2011
Tariff escalation	0%	
Depreciation Rate		
As per companies Act		
Plant and machinery – SLM	5.28%	Companies Act
As per Income Tax Act		
Depreciation rate- first year	15%	IT Act

Taxation		
Corporate Tax	32.45%	IT Act
MAT	20%	IT Act

As per "The Application Of E+/E- Policies In The Assessment Of Additionality" EB 52 Annex 3, "*The second form of policies are those which give comparative advantage to less emissions intensive technologies or fuels (E-). The impacts of these policies can be excluded in establishing a baseline scenario if they have been implemented since the adoption of the Marrakesh Accords A(11/11/2001)*". GBI is an incentive provided for wind power projects as there is no emissions associated with wind power generation and the same has been removed from the financial computation.
The equity IRR thus computed is 9.21% Compared to the benchmark of 17.90%, it is evident that the project activity is not financially viable.

Sub-step 2c: Calculation and comparison of financial indicators
All the input values, along with their source, used for the computation of equity IRR is provided in the table above in a transparent manner. The equity IRR computation worksheet is provided to the DOE for verification.

Sensitivity Analysis
As per guidance 20 of Guidelines on the assessment of investment analysis, "*Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation".* The parameters therefore subjected to sensitivity analysis are:

- Project cost
- O&M cost
- PLF
- Power tariff

The results of sensitivity analysis are presented in the table below:

Parameters	**10.00%**	**Base Case**	**-10%**
PLF	11.69%	9.21%	6.71%
O&M	8.88%	9.21	9.53%
Tariff	12.35%	9.21	5.89%
Project cost	7.04%	9.21	11.91%

A threshold analysis for each and every parameter has been provided below:

Project Cost:
The IRR crosses the benchmark only when the project cost goes down by 25.5%.
The Purchase Orders have been placed already. According to the Purchase Orders the actual project cost is INR 2200.71 Million, which makes the IRR 12.93% that is below the benchmark. . Therefore, in no probability can the project cost go below the actual cost and hence a 25.5% reduction is unlikely.

O&M Cost:
The IRR crosses the benchmark only when the Operation & Maintenance cost goes down by 317%.

The actual O&M contract has already been signed. As per the O&M Contract with Suzlon, the actual O&M cost is INR 15.3 Lacs per WTG, which makes the IRR 9.44% that is below the benchmark. Therefore, in no probability can the O&M cost go below the actual cost and hence a 317% reduction is unlikely.

PLF:

The IRR crosses the benchmark when the PLF increases by 33.9%.

The PLF has been procured from the third party report by Garrad Hassan. As per the third party report, the maximum PLF that the project activity can attain (i.e. Gross generation without any losses) is 26.7%. Even at this PLF the IRR becomes 13.45%, which is below the benchmark. Therefore, in no probability can the PLF go above 33.9%.

Power Tariff:

The IRR crosses the benchmark when the Tariff increases by 28.1%.

The tariff at the time of decision making has been considered from MERC Tariff Order. As per the tariff order the maximum possible tariff is INR 5.37/Unit. Even with the tariff as INR 5.37 , the Post Tax Equity IRR reaches 5.89% which is below the benchmark. Therefore, in no probability can the power tariff go above 28.1%.

From above, it is evident that in no event the project IRR crosses the benchmark

From above, it is evident that in no event the project IRR crosses the benchmark.

Step 4: Common practice analysis

Unless the proposed project type has demonstrated to be first-of-its kind (according to Sub-step 3a), and for measures different from those listed in paragraph 6 the above generic additionality tests shall be complemented with an analysis of the extent to which the proposed project type (e.g. technology or practice) has already diffused in the relevant sector and region.

The project activity is not first-of-its kind and also not a measure listed in paragraph 6 of the tool.

Step 4: Common practice analysis

Step 1: Applicable output range

The proposed project activity is of 39 MW capacity. Considering +/- 50% of the project activity capacity the output range to be considered for the common practice analysis is 19.5 MW to 58.5 MW

Step 2:

Step 2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

Step 2: *Identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:*

(a) The projects are located in the applicable geographical area;
(b) The projects apply the same measure as the proposed project activity;
(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

The Electricity Act 2003, which came into effect from June 10, 2003, replaced all the acts governing the Indian power sector. Since this Act is applicable to the project activity, all projects commissioned before 2003 have not been considered for the common practice analysis.

Every state in India has its own State Electricity Regulatory Commission. The policy / regulations for each SERC are unique and different from the other. For example parameters like tariff, regulatory frameworks and investment climate varies from state to state. Hence only the projects located in Maharashtra can be compared with the project. The proposed project activity is governed by the policy / regulations of Maharashtra Electricity Regulatory Commission. Wind projects in other states will follow their respective policy / regulations and will be different from that of the proposed project activity. In line with the aforesaid guidelines, the investment climate in the state of Maharashtra is different from that of other state in India. Therefore, the applicable geographical area for common practice analysis has been limited to the state of Maharashtra alone and for projects commissioned after 2003.

All power plants in the applicable output range of 19.5 MW to 58.5 MW MW operational in the state of Maharashtra are as mentioned below:

Thermal power plant: As per the publically available CEA CO_2 Baseline database Version 07[10], there are no thermal power plants in the state of Maharashtra in the output range of 19.5 MW to 58.5 MW MW
Hydro power plants: As per the publically available CEA CO_2 Baseline database Version 07, there is 1 Hydro power plants in the state of Maharashtra in the output range of 19.5 MW to 58.5 MW MW
Biomass power projects: As per details provided by Maharashtra Energy Development Agency, there is one[11] biomass plants in the state of Maharashtra in the output range of 19.5 MW to 58.5 MW MW. This project is a registered CDM project. Hence this project has not been considered for calculating $\mathbf{N_{all}}$
Solar power projects: As per details provided by Maharashtra Energy Development Agency, there are no[12] solar plants in the state of Maharashtra in the output range of 19.5 MW to 58.5 MW MW
Wind power project: The "Directory – Indian Wind power 2011", is an official compendium of wind power projects in India. The Wind Power Directory provides installation of wind turbines by a project owner along with information on WTG capacity, total installation, location & date of commissioning. This has been consulted to provide a list of wind project activities in Maharashtra state and the same is as provided below:

Sl. No	Project Proponent	Capacity (MW)	UNFCCC Link
1	Bajaj Auto Limited	20	http://cdm.unfccc.int/Projects/DB/BVQI1135775559.33/view
2	Enercon Wind Farms Sai Limited	20	http://cdm.unfccc.int/Projects/DB/DNV-CUK1279516994.31/view
3	Gujarat Flouroche	23.1	http://cdm.unfccc.int/Projects/DB/RWTUV1202913883.06/view

[10] CEA Database version 7 (http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver6.pdf)

[11] http://cdm.unfccc.int/Projects/DB/TUEV-SUED1256547738.62/view

[12] http://www.mahaurja.com/ and http://www.mahaurja.com/

Sl. No	Project Proponent	Capacity (MW)	UNFCCC Link
	micals Limited		
4	MSPL Limited	20	http://cdm.unfccc.int/Projects/DB/BVQI1296562330.58/view
5	REI Agro Limited	20.8	http://cdm.unfccc.int/Projects/DB/SIRIM1293499154.09/view
6	Shraddha Cons & PowerGen. P. Ltd	21.25	http://cdm.unfccc.int/Projects/Validation/DB/8A07E1ILQFSU987VE25G42BUJCJ90K/view.html
7	Shree Naman Developers Limited	29.25	http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1261573808.05/view
8	BP Energy India Private Limited	40	http://cdm.unfccc.int/filestorage/T/0/C/T0CJ85FSL1WN9VEXID67ZOBMQRGAPH/Revised%20PDD%20-%20Clean.pdf?t=cXR8bTRjd3ZxfDAp89o8dGxWPE-lxOkdE4Ln
9	Tata Power	50.4	http://cdm.unfccc.int/Projects/DB/DNV-CUK1249024361.28/view
10	NEG Micon (I) Private Ltd.	21	http://cdm.unfccc.int/Projects/DB/DNV-CUK1172467864.06/view
11	M/s Bajaj Auto Ltd.	20	http://cdm.unfccc.int/Projects/DB/BVQI1135775559.33/view
12	Jindal Steel and Power Limited	24	http://cdm.unfccc.int/Projects/DB/DNV-CUK1331028815.56/view
13	Reliance Innoventures Private Limited	45	http://cdm.unfccc.int/filestorage/D/5/9/D59AFLHK1U23OTNZ74S0ECVJMPQXBG/RINL%20PDD.pdf?t=TnF8bTl1ajk5fDCCyssCyjrb16FgXWo1pGnK

From above, it is evident that out of 13 wind projects in the output range of 19.5 to 58.5 MW all are under the CDM route.

Therefore, $\mathbf{N_{all} = 1}$

Step 3: *Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number* N_{all}.

Hence, the total numbers of projects identified after Step 2 that deliver same output or capacity viz. power generation and within the applicable output range of **26.25 MW – 58.5 MW** are identified to be 13 in number and all the projects are either registered or submitted for registration or the projects under validation. Hence $N_{all} = 1$

Step 4: *Within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}.*
Wind energy projects are sourced from Wind Power directory 2011[13] and there are 13 projects in the capacity range for analysis. Project participant has analyzed these all 13 projects for CDM status. It was observed that all the 13 projects have availed/applied for availing CDM benefits and hence $N_{diff} = 0$

Step 5: *Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.*
From the information in Step 2 and Step 3 –

N_{all}	1
N_{diff}	0
$N_{all} - N_{diff}$	0
$F = 1- N_{diff}/N_{all}$	**1**

As per para 10 of the guidance *the proposed project activity is a common practice within a sector in the applicable geographical area if:*

(a) the factor F is greater than 0.2, and

(b) N_{all}-N_{diff} is greater than 3.

N_{all}-N_{diff} is not greater than 3 and the Factor F is less than 0.2

Hence the project activity is not a common practice

Serious CDM consideration
The chronology of events mentioned below highlights the various steps taken up by PP to secure the CDM revenue:

Project implementation	Date	CDM activity	Date
Quotation/offer from Suzlon	04 July 2011		
		Board Resolution	22 Jul 2011
Purchase Order (start date)	03 August 2011		
		Prior Consideration	07 Nov 2011[14]
		Stakeholder Consultation	20 October 2011
		Appointment of DOE	23 February 2012

[13] Source : Indian Wind Power Directory

[14] http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html

The Prior consideration Form was sent to UNFCCC on 07/11/2012, which is within 6 months of placing of the Purchase Orders (considered as the major financial commitment). This is in conformance with Guidelines on the Demonstration And Assessment of Prior Consideration of the CDM, EB 62 Annexure 13

Hence from the above analysis it can be concluded that the project activity is additional and the financial viability and sustainable operation is possible only with the benefits of CDM.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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According to the approved methodology ACM0002 Emission Reductions are calculated as:-

$$ER_y = BE_y - PE_y$$

Where,

ER_y = Emission reductions in year *y* (t CO_2e)
BE_y = Baseline emissions in year *y* (t CO_2)
PE_y = Project emissions in year *y* (t CO_2e)

Baseline Emissions:

Baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$$

Where,

BE_y = Baseline emissions in year *y* (tCO_2)
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

Since the Project emissions and Leakages are zero, hence

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

Where,

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

The proposed project activity is in the state of Maharashtra which falls under NEWNE grid, baseline emission factor is calculated as combined margin, consisting of a combination of operating margin and build margin factors according to the procedures prescribed in the latest tool for calculating the emission factor for an electricity system. The steps of calculation are as follows:

STEP 1: Identifying the relevant electricity systems:

The Indian electricity system is divided into two regional grids, viz. (1) Northern, Eastern, Western, North-Eastern and (2) Southern grid. Each grid covers several states. As the regional grids are interconnected, there is inter-state and inter-regional exchange. A small power exchange also takes place with neighbouring countries like Bhutan and Nepal. Power generation and supply within the regional grid is managed by Regional Load Dispatch Centre (RLDC). The Regional Power Committees (RPCs)

provide a common platform for discussion and solution to the regional problems relating to the grid. Each state in a regional grid meets its demand with its own generation facilities and also with allocation from power plants owned by the Central Sector such as NTPC and NHPC etc. Specific quotas are allocated to each state from the Central Sector power plants. Depending on the demand and generation, there are electricity exports and imports between states in the regional grid. The regional grid thus represents the largest electricity grid where power plants can be dispatched without significant constraints and thus, represents the "project electricity system" for the project activity. As the project activity is connected to the NEWNE electricity grid, the NEWNE grid is the "project electricity system".

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)
There are two options available:
Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.
Option I is opted for the project activity i.e. only grid power plants are included in the calculation.

Step 3: Select a method to determine the operating margin (OM):
According to the tool, the calculation of the operating margin emission factor is based on one of the following methods:
The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:
(a) Simple OM; or
(b) Simple adjusted OM; or
(c) Dispatch data analysis OM; or
(d) Average OM.
The simple OM method (option a) can only be used if low cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production. The details low cost/must-run given in the table below.[15]

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	18.5%	19.0%	17.4%	15.9%	17.6%
South	28.3%	27.1%	22.8%	20.6%	21.0%
India	20.9%	21.0%	18.7%	17.1%	18.4%

The above data 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 NEWNE grid is less than 50 % of the total generation. Hence the Simple OM method can be used to calculate the Operating Margin Emission factor. The average operating margin method cannot be applied, as low cost/ must run resources in NEWNE grid constitute less than 50% of total grid generation.
The project proponents choose an ex ante option for calculation of the OM with a 3-year generation weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period.

[15] CEA Database version 7 (http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver6.pdf)

STEP 4: Calculate the operating margin emission factor according to the selected method:
The simple OM emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.
As per "Tool to calculate the emission factor for an electricity system" the following options are available to calculate simple OM.
Option A: Based on the net electricity generation and a CO2 emission factor of each power unit
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.
Option B can only be used if:
(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation (i.e. if Option I has been chosen in Step 2)

Option A ("Based on the net electricity generation and a CO2 emission factor of each power unit") is used to calculate simple OM emission factor. Where Option A is used, the simple OM emission factor is calculated based on the electricity generation of each power unit and an emission factor for each power unit, as follows:

$EF_{grid,OMsimple,y} = \Sigma (EG_{m,y} \times EF_{EL,m,y}) / \Sigma EG_{m,y}$

Where,

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO2 emission factor in year y (tCO2/MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	=	CO2 emission factor of power unit m in year y (tCO2/MWh)
m	=	All power units serving the grid in year y except low-cost / must-run power units
y	=	The relevant year as per the data vintage chosen in Step 3

The emission factor of each power unit m has been determined using Option A1.
$EF_{EL,m,y} = (\Sigma FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}) / EG_{m,y}$

Where,

$EF_{EL,m,y}$	=	CO2 emission factor of power unit *m* in year *y* (tCO2/MWh)
$FC_{i,m,y}$	=	Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$	=	CO2 emission factor of fossil fuel type i in year y (tCO2/GJ)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
M	=	All power units serving the grid in year y except low-cost/must-run power Units
I	=	All fossil fuel types combusted in power unit m in year y
y	=	The relevant year as per the data vintage chosen in Step 3

Value of Operating Margin (OM) as per CEA Database version 7 is given below:

Simple Operating Margin (tCO2/MWh) (incl. Imports)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	1.01	1.00	1.01	0.98	0.97
South	1.00	0.99	0.97	0.94	0.94
India	1.01	1.00	1.00	0.97	0.96

The average of most recent 3 years is 0.9851 tCO2/MWh

STEP 5: Calculate the build margin emission factor:
The build margin emissions factor is the generation-weighted average emission factor of all power units m during the most recent year y for which power generation data is available, calculated as follows:
$EF_{grid,BM,y} = (\sum EG_{m,y} \times EF_{EL,m,y}) / \sum EG_{m,y}$

Where,

$EF_{grid,BM,y}$	=	Build margin CO2 emission factor in year y (tCO2/MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	=	CO2 emission factor of power unit m in year y (tCO2/MWh)
M	=	Power units included in the build margin
Y	=	Most recent historical year for which power generation data is available

The CO2 emission factor of each power unit m ($EF_{EL,m,y}$) is determined as per the procedures given in step 4 (a) for the simple OM, using option A1 for y most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

The value of Build Margin (BM) is given below:

Build Margin (tCO2/MWh) (not adjusted for imports)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	0.63	0.60	0.68	0.81	0.86
South	0.70	0.71	0.82	0.76	0.73
India	0.65	0.63	0.71	0.80	0.83

The value for most recent year BM is 0.8587 tCO2/MWh

STEP 6: Calculate the combined margin emissions factor:

The emission factor EF_y of the grid is represented as a combination of the Operating Margin (OM) and the Build Margin (BM). Considering the emission factors for these two margins as $EF_{grid,OM,y}$ and $EF_{grid,\ BM,y}$, then the EF_y is given by:
$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,\ BM,y} \times w_{BM}$
Where,

$EF_{grid,CM,y}$	=	Combined margin emissions factor
$EF_{grid,OM,y}$	=	Operating margin CO2 emission factor in year y (tCO2/MWh)
$EF_{grid,\ BM,y}$	=	Build margin CO2 emission factor in year y (tCO2/MWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)
w_{BM}	=	Weighting of build margin emissions factor (%)

Where, $w_{OM} + w_{BM} = 1$

According to ACM0002 the weights for OM and BM are 0.75 and 0.25 respectively.
Using the values for operating and build margin emission factor provided in the CEA database and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 0.9527 tCO2/MWh.

Estimation of Project Emissions
The project activity involves harnessing of wind energy and its conversion to electricity. Hence according to ACM0002 there will be no project emissions in the project activity.

Estimation of Leakage Emissions
As per ACM0002 no leakage has been considered for the calculation of emission factor.

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

(Copy this table for each data and parameter)

Data / Parameter:	**$EF_{grid,OM,y}$**
Data unit:	tCO2e/MWh
Description:	Operating Margin Emission Factor of NEWNE Regional Electricity Grid

Source of data used:	"Last 3 years average from CO2 Baseline Database for Indian Power Sector", version 7 published by the Central Electricity Authority, Ministry of Power, Government of India.[16]
Value applied:	0.9851
Justification of the choice of data or description of measurement methods and procedures actually applied :	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002.
Any comment:	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data / Parameter:	**$EF_{grid, BM,y}$**
Data unit:	tCO2e/MWh
Description:	Build Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data used:	"The value for most recent year BM from CO2 Baseline Database for Indian Power Sector" version 7 published by the Central Electricity Authority, Ministry of Power, Government of India.[17]
Value applied:	0.8587
Justification of the choice of data or description of measurement methods and procedures actually applied :	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002
Any comment:	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data / Parameter:	**$EF_{grid,CM,y}$**
Data unit:	tCO2e/MWh
Description:	Combined Margin Emission Factor of NEWNE Regional Electricity Grid
Source of data used:	"CO2 Baseline Database for Indian Power Sector" version 7 published by the Central Electricity Authority, Ministry of Power, Government of India.
Value applied:	0.9527
Justification of the choice of data or description of measurement methods and procedures actually applied :	Combined Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with CDM methodology: ACM0002, and Tool to Calculate the emission Factor for an Electricity System.
Any comment:	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

[16] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

[17] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

B.6.3. Ex-ante calculation of emission reductions:

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As per the methodology,Baseline emissions are calculated as follows:

$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$

Where:

BE_y	Baseline emissions in year y (tCO2)
$EG_{PJ,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{grid,CM,y}$	Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system (tCO2/MWh)

Installed Capacity	=	39 MW
PLF	=	22.83 %
Net Generation	=	Installed Capacity *PLF
	=	77996.41MWH
Emission factor	=	0.9527
Baseline emissions	=	Net Generation * Emission factor
	=	74307tCO2
Project emissions	=	0
Leakage	=	0
Emission reduction per annum	=	74307tCO2

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

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Year	Estimation of project activity emissions (tonnes of CO2 e)	Estimation of baseline emissions (tonnes of CO2 e)	Estimation of leakage (tonnes of CO2 e)	Estimation of overall emission reductions (tonnes of CO2 e)
2013 – 14[18]	0	74,307	0	74,307
2014 – 15	0	74,307	0	74,307
2015 – 16	0	74,307	0	74,307
2016 – 17	0	74,307	0	74,307
2017 – 18	0	74,307	0	74,307
2018 – 19	0	74,307	0	74,307
2019 – 20	0	74,307	0	74,307
2020 – 21	0	74,307	0	74,307
2021 – 22	0	74,307	0	74,307
2022 – 23	0	74,307	0	74,307
Total (tonnes of CO2 e)	**0**	**743,070**	**0**	**743,070**

[18] The first crediting period covers the time period between the dates of 02/01/2013 to 01/01/2014. The same cycle will be maintained for all subsequent crediting periods

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

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B.7.1 Data and parameters monitored:

Data / Parameter:	EGpj,y
Data unit:	MWh/yr
Description:	Net Electricity exported to the grid by the project activity in the year y
Source of data to be used:	Monthly Joint Meter Readings
Value of data applied for the purpose of calculating expected emission reductions in section B.5	77996
Description of measurement methods and procedures to be applied:	Delivered/Net electricity supplied to the MSEDCL will be calculated based on the difference between measured values of "export" and "import" on the MSEDCL meter and the percentage transmission loss incurred in the transmission line between the project and the interconnection point (i.e. sub-station). The meter reading is taken by MSEDCL officials in presence of BVUPL officials. The measurement is done once a month. Refer to Annex 4 of the PDD for more details on apportioning and accounting of transmission loss percentage. All the meters will be trivector meters, capable of measuring both export and import of electricity. The meters will have an accuracy class of 0.2s
QA/QC procedures to be applied:	The quantity of net electricity supplied will be cross-verified from the invoices raised on MSEDCL by the project proponent and the readings available from the meter available at site. The meters will be calibrated annually as per the metering code by MSEDCL. The PP has no control over the calibration of the meters.
Any comment:	Date will be archived for crediting period plus two years after the end of Crediting period.

Data / Parameter:	$EG_{,exp,y}$
Data unit:	MWh/year
Description:	Electricity exported from each WEG of the project activity during the year y.
Source of data to be used:	Monthly Joint Meter Readings
Value of data	77996
Description of measurement methods and procedures to be applied:	Delivered/Net electricity supplied to the MSEDCL will be calculated based on the difference between measured values of "export" and "import" on the MSEDCL meter and the percentage transmission loss incurred in the transmission line between the project and the interconnection point (i.e. sub-

	station). The meter reading is taken by MSEDCL officials in presence of BVUPL officials. The measurement is done once a month. Refer to Annex 4 of the PDD for more details on apportioning and accounting of transmission loss percentage. All the meters will be trivector meters, capable of measuring both export and import of electricity. The meters will have an accuracy class of 0.2s Data Type: Continuous measuring and at least monthly recording
QA/QC procedures to be applied:	The quantity of net electricity supplied will be cross-verified from the invoices raised on MSEDCL by the project proponent and the readings available from the meter available at site. The meters will be calibrated annually as per the metering code by MSEDCL. The PP has no control over the calibration of the meters.
Any comment:	Date will be archived for crediting period plus two years after the end of Crediting period.

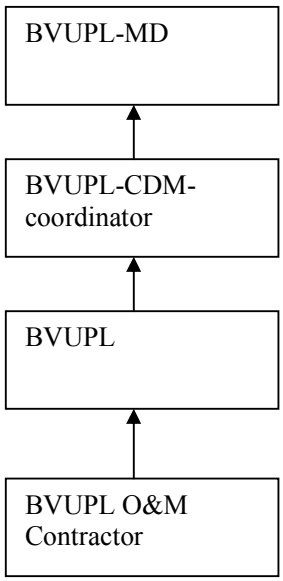
Data / Parameter:	$EG_{,imp,y}$
Data unit:	MWh/year
Description:	Electricity imported from the grid by the project activity during the year y.
Source of data to be used:	Monthly Joint Meter Readings
Value of data	0
Description of measurement methods and procedures to be applied:	The electricity imported from the grid. The meter reading is taken by MSEDCL officials in presence of BVUPL officials. The measurement is done once a month. Refer to Annex 4 of the PDD for more details on apportioning and accounting of transmission loss percentage. All the meters will be trivector meters, capable of measuring both export and import of electricity. The meters will have an accuracy class of 0.2s Data Type: Continuous measuring and at least monthly recording
QA/QC procedures to be applied:	The quantity of net electricity supplied will be cross-verified from the invoices raised on MSEDCL by the project proponent and the readings available from the meter available at site. The meters will be calibrated annually as per the metering code by MSEDCL. The PP has no control over the calibration of the meters.
Any comment:	Date will be archived for crediting period plus two years after the end of Crediting period.

Data / Parameter:	$E_{WTG,i,y}$
Data unit:	MWh
Description:	Quantity of Electricity generated by the individual WTGs of the PP in year y
Source of data to be used:	WTG Controller meter reading
Value of data applied for the purpose of calculating expected emission reductions in section B.5	77996
Description of measurement methods and procedures to be applied:	Each WTG of provided by Suzlon will be equipped with a controller that continuously measures the electricity generated by the WTG. These reading are recorded online by the technology supplier.. Refer to Annex 4 of the PDD for more details on the calculation procedure. All the data items monitored under the monitoring plan will be archived for entire crediting period or till the last issuance of CERs for this project activity whichever occurs later. Calibration Frequency: The WTG controller does not require calibration as per the specification provided by the technology supplier
QA/QC procedures to be applied:	The quantity of electricity generated by the individual WTG will be cross-checked with the online tracking system provided by the technology supplier
Any comment:	-

B.7.2. Description of the monitoring plan:

>>

The organisational structure of this CDM project activity is as follows:



The project proponent has entered into agreement with the WTG- Supplier – Suzlon Energy Limited for the operation and maintenance of WTGs. The WTG supplier has dedicated and technically well equipped O&M team for day to day Operation and maintenance of each WTG. O&M contractor will provide a monthly report, which includes wind data, generation data, major breakdown events and machine availability. Project Manager is responsible for recording of monthly Joint Meter Readings of export and import. Monthly power export and import data will be sent regularly to CDM coordinator of BVUPL.

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

>>

Date of completion of the application of baseline study and monitoring methodology: 05/04/2012.

Name of the responsible entity: Bindu Vayu Urja Private Limited (BVUPL)
The responsible entity is same as participant mentioned in Annex I to this document

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:

>>

03/08/2011 (Date of Purchase Order from Suzlon)

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

>>

20 years and 0 months

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

Fixed crediting period of 10 years and 0 months has been chosen.

C.2.1. Renewable crediting period:

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:

>>

02/01/2013. Date of commissioning or date of registration with UNFCCC whichever is later.

C.2.2.2. Length:

>>
10 years and 0 months.

SECTION D. Environmental impacts

>>

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

>>
As per the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated January 27, 1994 and EIA Notification (S.O 1533) dated 14th September 2006[19], a list of activities that require undertaking environmental impact assessment studies has been provided. EIA is not a regulatory requirement in India for wind energy projects and PP does not expect any adverse impacts of the proposed CDM project activity on the environment

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

>>
The project activity does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India. Hence, EIA is not required by the host party.

SECTION E. Stakeholders' comments

>>

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

>>
The Stakeholder meeting was conducted on 20th October, 2011 at the site office in Chakala. The invitations were sent out on 08/10/2011 (12 days) before the actual Stakeholder meeting was conducted. Mr Suhas Guruji explained the benefits of Wind Power generation to the local people. The stakeholders consisted of local farmers from nearby villages, O&M Contractors as they are the key stakeholders. The stakeholders were provided with a questionnaire which was translated by Mr.Suhas Guruji for the convenience of the local stakeholders.

E.2. Summary of the comments received:

>>
The comments were received in a questionnaire and the attendance was taken in an attendance sheet. A compilation of the comments are given below.

Name of Stakeholder	Comments
Ghanshyam Panpatil	What are the benefits of wind energy generation?
Ramesh Patil	What would be the impact of the project on the

[19] http://forest.and.nic.in/Guidelines-MoEF.pdf

	local agriculture?
Dinesh Patil	How the project would benefit the local villagers?
Sunil Ashok	Will there be any impact on the local climate?
Pawar Jitendar	What would be the environmental impact of the power plant?

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

>>

Clarifications to all the comments were given in the following manner

Name of Stakeholder	Comments	Responses
Ghanshyam Panpatil	What are the benefits of wind energy generation?	Wind energy uses wind energy to generate electricity. Thus electricity generation from wind does not lead to any harmful emissions into the atmosphere.
Ramesh Patil	What would be the impact of the project on the local agriculture?	As the project is not located on any agricultural field, the impact on local agriculture is minimum.
Dinesh Patil	How the project would benefit the local villagers?	There would be local employment generation and also electricity supply to the local villages
Pawar Jitendar	What would be the environmental impact of the power plant ?	Environmental impact due to wind energy is minimum as there is no harmful emissions of any gases.
Sunil Ashok	Will there be any impact on the local climate ?	As wind energy is a clean source of electricity, there would be no impact on the local climate.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Bindu Vayu Urja Private Limited(BVUPL)
Street/P.O.Box:	8001, Q-City, S.No:109 Nanakramguda, Gachibowli
Building:	
City:	Hyderabad
State/Region:	Andhra Pradesh
Postcode/ZIP:	500032
Country:	India
Telephone:	040 3376 0100
FAX:	040 3376 0101
E-Mail:	
URL:	
Represented by:	
Title:	The Managing Director
Salutation:	Mr.
Last name:	Kailas
Middle name:	
First name:	Vikram
Department:	
Mobile:	
Direct FAX:	040 3376 0101
Direct tel:	040 3376 0100
Personal e-mail:	vikram.kailas@mytrah.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding has been taken

Annex 3

BASELINE INFORMATION

The latest data available for the financial year 2009-10 has been used for the estimation of the baseline emissions. The Central Electricity Authority (CEA) under the Ministry of Power, Government of India, has estimated the Build Margin and the Simple Operating Margin for the NEWNE grid, the details of which is available on the following website and is detailed below as well:
http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Version 7.0 of the database has been used.

Gross Generation Total (GWh)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	499,380	531,539	548,956	586,311	622,447
South	161,897	167,379	167,587	180,638	185,257
India	661,277	698,918	716,543	766,950	807,704

Net Generation Total (GWh)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	465,361	496,119	510,693	544,915	579,181
South	152,206	157,247	157,336	169,765	173,925
India	617,567	653,366	668,029	714,680	753,106

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	18.5%	19.0%	17.4%	15.9%	17.6%
South	28.3%	27.1%	22.8%	20.6%	21.0%
India	20.9%	21.0%	18.7%	17.1%	18.4%

Net Generation in Operating Margin (GWh)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	379,471	401,642	421,803	458,043	476,987
South	109,116	114,634	121,471	134,717	137,387
India	488,587	516,275	543,274	592,760	614,374

20% of Net Generation (GWh)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	93,072	99,224	102,139	108,983	115,836
South	30,441	31,449	31,467	33,953	34,785
India	123,513	130,673	133,606	142,936	150,621

Net Generation in Build Margin (GWh)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	93,524	100,707	102,589	109,064	117,779
South	30,442	31,613	31,606	36,100	35,268
India	123,965	132,320	134,195	145,164	153,047

EMISSION DATA

Absolute Emissions Total (tCO2)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	385,692,794	406,861,785	430,502,442	453,067,520	468,438,871
South	109,020,456	113,586,133	117,880,640	126,786,215	129,093,636
India	494,713,250	520,447,919	548,383,082	579,853,735	597,532,507

Absolute Emissions OM (tCO2)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	385,692,794	406,861,785	430,502,442	453,067,520	468,438,871
South	109,020,456	113,586,133	117,880,640	126,786,215	129,093,636
India	494,713,250	520,447,919	548,383,082	579,853,735	597,532,507

Absolute Emissions BM (tCO2)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	59,042,467	60,193,616	69,297,387	88,593,337	101,146,601
South	21,348,182	22,550,310	25,851,338	27,558,555	25,882,886
India	80,390,649	82,743,926	95,148,726	116,151,892	127,029,488

EMISSION FACTORS

Simple Operating Margin (tCO2/MWh) (incl. Imports) (1) (2)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	1.01	1.00	1.01	0.98	0.97
South	1.00	0.99	0.97	0.94	0.94
India	1.01	1.00	1.00	0.97	0.96

Build Margin (tCO2/MWh) (not adjusted for imports)					
	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	0.63	0.60	0.68	0.81	0.86
South	0.70	0.71	0.82	0.76	0.73
India	0.65	0.63	0.71	0.80	0.83

Annex 4

MONITORING INFORMATION

Energy generated from the wind farm shall be recorded at the metering point at the HT end of the respective Pooling station. This reading shall be considered as the energy for billing purposes. The WTGs of other PPs will also be connected to the pooling station.

The option for considering the meter reading shall be Main meter in normal practice. In case of fault in the Main meter check Meter reading will be considered. The meter reading shall be taken jointly by MSETCL (representative of state grid)/ MSEDCL and the company/ its representative every month.
The Main meter reading **will be jointly certified** by the above entity.
Using the above meter reading MSEDCL will provide the credit note on generation through letter. The energy referred in the credit note shall be considered for raising invoice accordingly payment will be received from MSEDCL.
All the meters will be calibrated by MSEDCL once a year.

Working model for sharing of energy (considered by SLDC)

Following are the steps involved in this

1. Each WTG will have provisions of recording meter reading which will be referred as Controller reading of WTG. This shall be read by the representative of the company/Developer Suzlon Energy Limited alone. "The Controller is a micro processor based intelligent device which has been specially designed for the control of wind turbines. It uses a Woodward Multi function Reply that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current /voltage are converted to digital signal internally using AD convertors at very high sampling rates. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed/stored. Woodward rely does not have a display and needs special protocol to view energy readings as this rely communicates digital signal through special communication protocol hence, it is not possible to calibrate. Moreover, turbine cannot run without this relay hence it cannot be removed for calibration during operation."

2. All the individual WTGs are connected to a metering point referred as feeder meter/s reading where metering will be at Pooling SS of SEL. The meter at the substation will measure both export and import of electricity by the project activity. This meter reading will be jointly certified by STU and the company.

3. For measuring electricity Export the following procedure is followed:
   Let us assume the following parameters:
   The sum of the controller readings of all WTG = C
   The electricity export as recorded by the sub station meter = E
   The electricity generation reading at WTGn = Xn
   The electricity exported to grid by WTGn = (Xn/C) * E.
   The electricity exported by all WTGs can be calculated using the above formula.

The sum of electricity exported by all WTGs of a project proponent gives the electricity exported by that particular project proponent.

4. For measuring net electricity import the following procedure is followed:
Let us assume the following parameters:
The sum of the controller readings of all WTG = C
The electricity generation reading at WTGn = Xn
The electricity import as recorded by the substation meter = F
The electricity imported from the grid by WTGn = (Xn/C) * F
The electricity imported by all WTGs can be calculated using the above formula.
The sum of electricity imported by all WTGs of a project proponent gives the electricity imported by that particular project proponent.

Net electricity exported by project proponent = Electricity exported – Electricity imported

Emergency Preparedness Plans:

The operational staff's main task is to keep a close watch on a day to day basis on the functioning of the wind turbines. In the event of adverse grid condition of grid failure, the turbine would stop functioning and would restart automatically on resumption of healthy conditions. However there may be faults which will require pre-checking the machine condition before restarting. The operating staff would also document the downtime and operating hours for each turbine along with the reasons for the downtime. The operating staff would summarize the logbook data on a monthly basis and provide the same to the head office. Suzlon, the O&M service provider will deploy maintenance staff at the plant to ensure minimal breakdown of the machines. Additionally, it will ensure supply of sufficient quantity of critical and essential spares and consumables for the requirement of the machines. These critical and essential spares and consumables shall be stocked at the project site to reduce the machine repair downtime. A complete set of tools and tackles will be maintained at the site at the project site by the O&M service provider and will be provided to the project site staff. The site in-charge together with the staff would ensure that periodic maintenance checks are performed on all major components like gearbox, generator, rotor blades, control panels, transformers, control panels etc.

Calibration of WTG Controller:
The Controller is a micro processor based intelligent device which has been specially designed for the control of wind turbines. It uses a Woodward Multi function Reply that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current /voltage are converted to digital signal internally using AD convertors at very high sampling rates. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVAh, kVArh and kWh. These instantaneous values are then time integrated and displayed/stored. Woodward rely does not have a display and needs special protocol to view energy readings as this rely communicates digital signal through special communication protocol hence, it is not possible to calibrate.

Appendix 1

The project consists of 26 WTGs of 1.5 MW each. The latitude and longitude of each WTG is given below:

Sl.No	State	WTG numbers	Latitude	Longitude
1	Maharashtra	C-38	21° 15′ 30″	74° 19′ 48 ″
2	Maharashtra	C-39	21° 15′ 17.2″	74° 19′ 39.4 ″
3	Maharashtra	C-40	21° 15′ 13.6″	74° 19′ 19.7 ″
4	Maharashtra	C-41	21° 14′ 58.2″	74° 19′ 26.7 ″
5	Maharashtra	C-42	21° 15′ 48.2″	74° 19′ 15 ″
6	Maharashtra	C-43	21° 15′ 35.7″	74° 19′ 10.5 ″
7	Maharashtra	C-44	21° 15′ 23.9″	74° 19′ 3.2 ″
8	Maharashtra	C-45	21° 15′ 10.5″	74° 18′ 59.2 ″
9	Maharashtra	C-46	21° 14′ 57.1″	74° 19′ 0.1 ″
10	Maharashtra	C-47	21° 15′ 46.2″	74° 18′ 41.2 ″
11	Maharashtra	C-48	21° 15′ 33.2″	74° 18′ 37.7 ″
12	Maharashtra	C-49	21° 15′ 20″	74° 18′ 36.1 ″
13	Maharashtra	C-50	21° 15′ 6.6″	74° 18′ 38 ″
14	Maharashtra	C-51	21° 15′ 47.8″	74° 18′ 13.7 ″
15	Maharashtra	C-52	21° 15′ 33.4″	74° 18′ 10.2 ″
16	Maharashtra	C-53	21° 15′ 56.1″	74° 18′ 24.4 ″
17	Maharashtra	C-54	21° 14′ 43.8″	74° 18′ 30.9 ″
18	Maharashtra	C-55	21° 15′ 35.4″	74° 17′ 45.6 ″
19	Maharashtra	C-56	21° 15′ 23.3″	74° 17′ 52 ″
20	Maharashtra	C-57	21° 15′ 15.5″	74° 18′ 19 ″
21	Maharashtra	C-58	21° 15′ 1.1″	74° 18′ 9 ″
22	Maharashtra	C-59	21° 14′ 41.2″	74° 17′ 53.4 ″
23	Maharashtra	C-60	21° 14′ 29.6″	74° 18′ 6.5 ″
24	Maharashtra	C-63	21° 14′ 31″	74° 17′ 41.1 ″
25	Maharashtra	C-64	21° 14′ 23″	74° 17′ 48.3 ″
26	Maharashtra	C-66	21° 14′ 48.5″	74° 16′ 37.2 ″

Action Plan for expenditure incurred through 2% of CER revenues									
Financial Year (A)	**Activity (B)**	**Issued CERs (C)**	**CER Price (D)**	**Total CDM Amount (E=CxD)**	**Expenditure in Current year (F)**	**Expenditure Carried forward (G)**	**Net Expenditure for Current Year (H = F+G)**	**Expenditure as % of CDM amount for current year (I = H/E)**	**Reference Documentation (J)**
Indicates the year for which the assessment is being provided	*Provides details of the social/ community activities on which the expenditure has been incurred*	*Quantity of CERs issued for the assessment year*	*CER price at which the transaction has happened*	*Total amount CDM amount received*	*Expenditure made on the social/ community development activity in the current assessment year*	*Additional expenditure incurred on capital goods in the previous assessment years being carried forward to the current assessment yea*	*Net Expenditure on social/ community development activity for the current year*	*Indicates the % of the total CDM amount spent on social/community development activity*	*Indicates the documentation to be provided to the DOE during the verification to evidence the amount spent on social/community development activity*

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