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

CONTENTS

SECTION A. General description of project activity

A.1. Title of the project activity:

>>
Kaladonger wind power project in Rajasthan
Version 01
05/04/2012

A.2. Description of the project activity:

>>
Purpose

The project activity envisages implementation of a 75.6MW wind power project consisting of 36 Wind Electric Generators (WEGs) of individual capacity 2.1MW, at Kaladonger village in Rajasthan, India by Bindu Vayu Urja Private Limited (BVUPL).

The electricity generated by the project will be exported to the NEWNE electricity grid. The project activity will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The project proponent plans to avail CDM benefits for the project.

The project activity is in line with the sustainable development priorities of the country. The electricity generated from the wind farm will be exported to the NEWNE grid and sold to the state electricity utility, thereby marginally contributing to reducing the energy demand supply gap in the state of Rajasthan[1].

Technology
The project uses Suzlon's wind energy technology. The project activity implements S95_90 model 2100kW WTGs, specifications for which are provided in section A.4.3.

Emission Reductions from anthropogenic sources
The wind power generated from the project site will be displacing the electricity generated from thermal power stations feeding into NEWNE grid and will be replacing the usage of diesel generators for meeting the power demand during shortage periods. Since wind power is Green House Gas (GHG) emissions free, the power generated will prevent the anthropogenic green house gas (GHG) emissions generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas. The estimation of GHG reductions by this project is limited to carbon dioxide (CO_2) only. Thus the proposed project activity leads to an emission reduction of 126831t CO_2eper year over the chosen crediting period of ten years.

In view of the project participants on the contribution of the project activity to sustainable development,

[1] http://www.cea.nic.in/reports/yearly/annual_rep/2009-10/ar_09_10.pdf

Ministry of Environment and Forests, Govt. of India has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects:

A > Social well being –

- The proposed project activity contributes to alleviation of poverty in the region by establishing direct and indirect benefits through employment generation.
- The infrastructure in and around the project area has also improved due to project activity. This includes development of road network and improvement of electricity quality, frequency and availability as the electricity is fed into a deficit grid.
- The generated electricity will be fed into the NEWNE grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers & sub-urban habitants) which will provide new opportunities for industries and economic activities to be setup in the area, thereby resulting in greater local employment, ultimately leading to overall development.

B>Economic well being –

- The project will improve livelihood of people in the region by generating employment opportunities in the region
- The project creates business opportunities of the suppliers, financial institutions and other stakeholder who are directly or indirectly associated with the project.
- The project is a clean technology investment in the region, which would not have been taken place in the absence of the CDM benefits

C> Environmental well being -

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

D>Technological well being -

- The project activity leads to the promotion of Wind Electric Generators (WEGs) in the region demonstrating the success of wind based renewable electricity which is fed into the nearest sub-station (part of the NEWNE Grid), thus increasing energy availability and improving quality of power under the service area of the substation. Hence the project leads to technological well being.

A.3. Project participants:

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Name of party involved	Private and/or Public entity project participants	Kindly indicate if the party involved wishes to be considered as project participant (Yes/No)
India (Host country)	Bindu Vayu Urja Private Limited (BVUPL)	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.:

>>

Rajasthan

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

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District: Jaisalmer

Site: Kaladonger

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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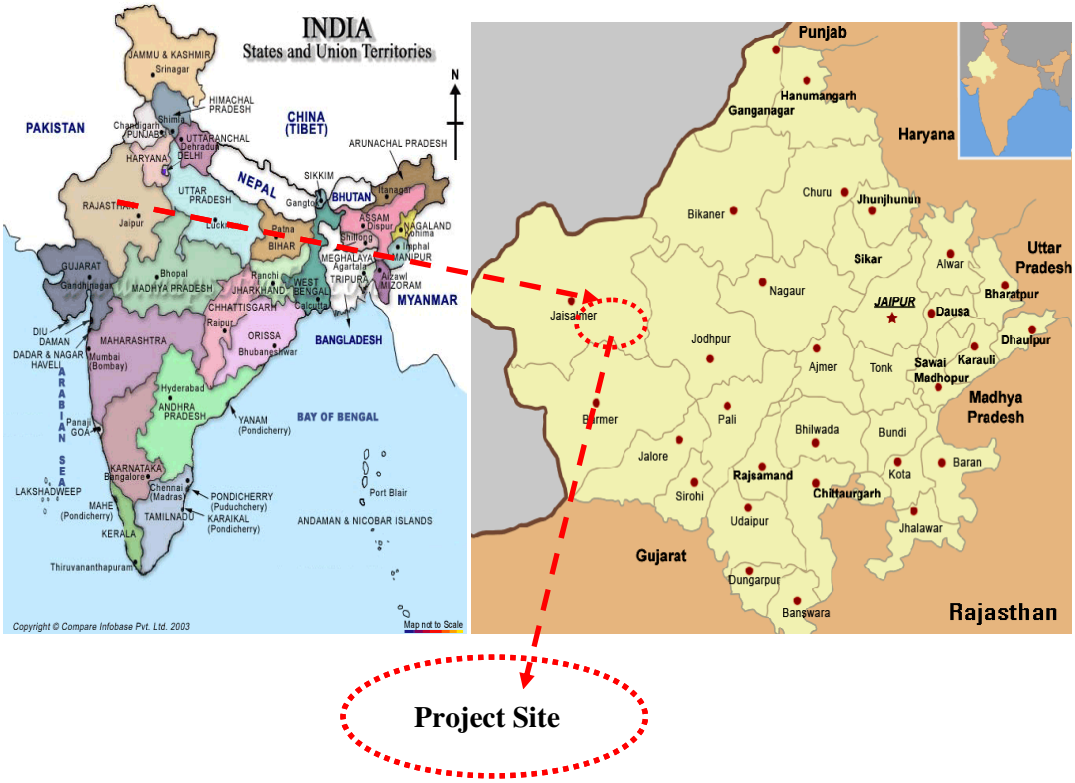
The project activity is located in Kaladonger, Rajasthan State, India.

The geo-coordinates of location of the project activity are as follows:



The geographical coordinates for the WTGs are mentioned below.

S.No.	Loc.No.	LATITUDE			LONGITUDE		
		Deg	Min	Sec	Deg	Min	Sec
1	KD-001	27	5	35.33	76	59	59.01
2	KD-002	27	5	54.81	76	59	53.55
3	KD-003	27	6	16.73	76	59	54.37
4	KD-004	27	6	27.29	76	59	42.54
5	KD-005	27	6	38.67	76	59	30.83
6	KD-006	27	6	49.79	76	59	18.65
7	KD-007	27	7	1.66	76	59	4.34
8	KD-012	27	7	26.02	76	59	48.01
9	KD-013	27	7	14.01	76	59	59.09
10	KD-014	27	7	1.80	77	0	9.91
11	KD-024	27	7	9.41	77	2	4.53
12	KD-027	27	7	36.24	77	1	28.82
13	KD-028	27	7	41.47	77	1	13.04
14	KD-029	27	7	51.48	77	0	54.85
15	KD-030	27	7	54.46	77	0	33.26
16	KD-035	27	8	40.86	77	0	46.29
17	KD-036	27	8	34.11	77	1	3.82
18	KD-037	27	8	27.49	77	1	23.93
19	KD-038	27	8	17.51	77	1	39.76
20	KD-039	27	8	10.31	77	1	56.49
21	KD-040	27	7	59.80	77	2	4.87
22	KD-042	27	7	44.73	77	2	35.57
23	KD-054	27	8	22.40	77	2	59.28
24	KD-055	27	8	30.69	77	2	49.88
25	KD-056	27	8	38.19	77	2	38.83
26	KD-057	27	8	45.10	77	2	26.50
27	KD-058	27	8	52.83	77	2	6.33
28	KD-059	27	9	2.43	77	1	51.73
29	KD-060	27	9	10.98	77	1	31.25
30	KD-061	27	9	16.93	77	1	17.37
31	KD-067	27	9	21.38	77	2	54.07
32	KD-068	27	9	14.59	77	3	9.35
33	KD-076	27	8	23.44	77	4	55.47
34	KD-077	27	8	39.29	77	4	47.23
35	KD-078	27	8	48.26	77	4	31.92
36	KD-079	27	9	2.84	77	4	29.76

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

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The project activity has a capacity more than 15 MW and is considered under "Grid-connected electricity generation from renewable sources". As per the scope of the project activities enlisted in the latest version of the "List of Sectoral Scopes and related approved baseline and monitoring methodologies", the project activity can be categorized in:
Scope Number – 1
Sectoral Scope – Energy Industries (Renewable/ Non renewable sources)

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

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The project uses Suzlon's wind energy technology and implements 36 number of WTGs of S95_90 model with a capacity of 2100kW each. The technical details are shown below:

OPERATING DATA	
Rated power	2100 KW
Cut-in wind speed	3.5 m/s
Rated wind speed	11 m/s
Cut-out wind speed	25 m/s
Wind Class	IEC-IIA
ROTOR	
Diameter	95 m
Swept area	7085 m2
GENERATOR	
Type	Asynchronous 3 phase induction generator with slip rings operated with rotor circuit inverter system (DFIG)
Frequency	50 / 60 Hz
TOWER	
Type	Tubular steel tower
Hub heights	90m

The project activity doesn't involve any technology transfer. The baseline of the project activity is the emissions from electricity generation in fossil fuel power plants which would be displaced due to the project activity.

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

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Years	Annual Estimation of Emission Reduction in tons of CO_2e
2013 – 14	**126831**
2014 – 15	**126831**
2015 – 16	**126831**
2016 – 17	**126831**
2017 – 18	**126831**
2018 – 19	**126831**
2019 – 20	**126831**
2020 – 21	**126831**
2021 – 22	**126831**
2022 – 23	**126831**
Total Emission Reduction (tonnes of CO_2e)	**1268310**
Total Number of Crediting Years	**10**
Annual Average of the estimated reductions over the crediting period (tonnes of CO_2e)	**126831**

A.4.5. Public funding of the project activity:

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No public funding from parties included in Annex – I is involved in the project activity. Hence there is no ODA (Official Development Assistance) is flowing to the project activity.

SECTION B. Application of a baseline and monitoring methodology

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

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Title of the approved baseline and monitoring methodology:"Consolidated baseline methodology for grid-connected electricity generation from renewable sources".

Reference: ACM002, Version 12.3.0 (EB 66), Sectoral Scope: 1
The methodology has been referred from the list of approved methodologies for CDM project activities in the UNFCCC website (http://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L)

This methodology also draws upon Version 06.0.0 of the "Tool for demonstration and assessment of additionality"[2] and Version 02.2.1 of the "Tool to calculate the emission factor for an electricity system"[3].

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

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Applicability criteria	Applicability status
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 proposed project activity is a Greenfield, NEWNEgrid-connected renewable power plant. Therefore, it confirms to the said criteria
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit	The project activity is the installation of a new grid connected renewable wind power project. Thus, it meets the first applicability condition
In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity	The proposed project activity is the installation of a new wind

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

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

addition projects which use Option 2: on page 11 to calculate the parameter $EG_{PJ,y}$): 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 expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity	power plant/unit. Therefore, the said criteria is not applicable
In case of hydro power plants, one of the following conditions must apply: • *The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of 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 definitions given in the Project Emissions section, is greater than 4 W/m^2; or* • *The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.* *In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4 W/m2 all the following conditions must apply:* • *The power density calculated for the entire project activity using equation 5 is greater than 4W/m^2;* • *Multiple reservoirs and hydro power plants located at the same river and where are designed together to function as an integrated project1 that collectively constitute the generation capacity of the combined power plant;* • *Water flow between multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity;* • *Total installed capacity of the power units, which are driven using water from the reservoirs with power density lower than 4 W/m^2, is lower than 15MW;* • *Total installed capacity of the power units, which are driven using water from reservoirs with power density lower than 4 W/m^2, is less than 10% of the total installed capacity of the project activity from multiple reservoirs.*	The proposed project activity is the installation of a wind power plant/unit. Therefore, the said criteria is not applicable
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*	The proposed project activity is the installation of a wind power plant/unit. Therefore, the said

project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • *Biomass fired power plants;* • *Hydro power plant that result in new single reservoir or in the increase in existing single reservoir where the power density of the power plant is less than 4 W/m^2.*	criteria is not applicable

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

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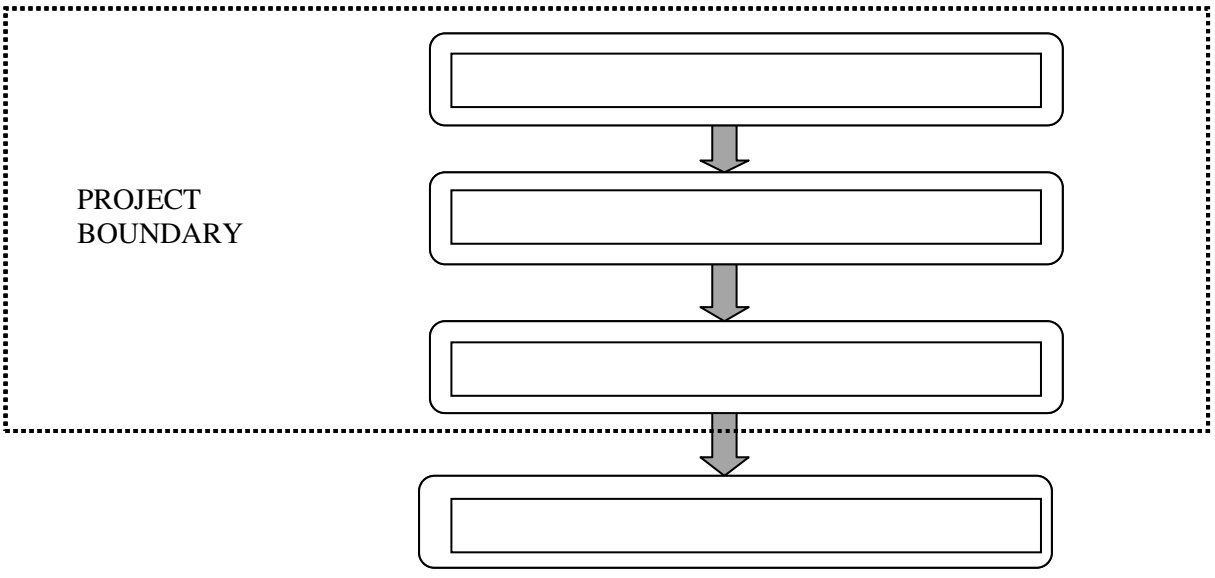
According to ACM0002, version 12.3.0, the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

The project shall be feeding electricity in the NEWNE Grid which has a pool of state and privately owned power generating plants.

The project activity has a distinctive physical demarcated boundary (highlighted in dotted line):



As per Table.1 of ACM0002 version 12.3.0, the selection of gases to be included and excluded within the project activity is as follows:

	Source	Gas	Included	Explanation
Baseline Activity	CO_2 emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity	CO_2	Yes	Major emission source
		CH_4	No	Minor emission source
		NO_2	No	Minor emission source
Project Activity	Grid Connected wind power based electricity generation	CO_2	No	Electricity generation by using WTGs does not incur any emissions
		CH_4	No	
		NO_2	No	

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

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The step wise methodology followed for the selection of baseline scenario is detailed below:

Step 1: Identification of baseline scenario

As per ACM0002 version 12.3.0, 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", version 02.2.1 described step wise under B.6.

For full assessment on other alternatives available on the project activity, refer to Section B.5 under Step 1a of additionality determination as well as Annex III.

Step 2: Assumptions and process of calculating combined margin calculation:

The consolidated methodology ACM002 version 12.3.0 requires calculation of the combined margin CO_2emission factor for grid connected power generation using the version 02.2.1 of the "Tool to calculate the emission factor for an electricity system". This tool determines the combined margin CO_2 emission factor for the displacement of electricity generated by power plants in an electricity system, by calculating the "operating margin" (OM) and "build margin" (BM). The operating margin refers to group of power plants that reflect the existing power plants whose electricity generation would be affected by the proposed CDM project activity. The build margin refers to a group of power units that reflect the type of power units whose construction would be affected by the proposed CDM project activity.

Step 2.1: Choice of grid:

There is no generic guidance provided by Designated National Authority in India for selection of Grid and India being a largecountry with multiple states and regions; the regional grid definition is

taken as per Version 02.2.1of the "Tool to calculate the emission factor for an electricity system".

The version 02.2.1 of "Tool to calculate the emission factor for an electricity system" specifies that, "the project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints". So, the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to (i.e. NEWNE grid in our project case).

There are two independent grids in India: *NEWNE grid* i.e. Northern-Eastern-Western-North Eastern grid and *Southern grid*. The project activity is in the state of Rajasthan, which is connected to the NEWNEgrid, hence all power plants connected with the NEWNE grid have been considered within project grid boundary. Details on power generation in the NEWNE grid is provided in Annex III.

Grid emission factors are most appropriately calculated at the level of two regional grids as per CEA EF database's version7 released in January2012.

Step2.2 Choice of data vintage:

"Ex ante" option of data vintage has been chosen by the project proponent for the project activity.

At the time of finalization of pdd; data for the three most recent years (2008-09, 2009-10 and 2010-11) was available. This has been considered for the BM calculation. Details of variables, formulae for calculating OM and BM have been dealt with in section B.6 of the pdd.

Step 2.3: Combined Margin (CM) calculation:

The combined margin EF is calculated as the weighted average of the OM emission factor and the BM emission factor. OM and BM EFs are calculated using the power generation data published by Central Electricity Authority of India (CEA) in the "CO_2 Baseline Database for the Indian Power Sector" Version 7.0 published in January 2012. Since the project activity is a hydro electric power plant; the weightage factor of OM is taken as 0.75 and for BM is taken as 0.25 as per Version 02.2.1 of the "Tool to calculate the emission factor for an electricity system".

Step 3: Sources of data collection:

The Combined Margin has been calculated on basis of publicly available data from CEA (Central Electricity Authority of India), "CO_2 Baseline Database for the Indian Power Sector", Version 7, published in January 2012.

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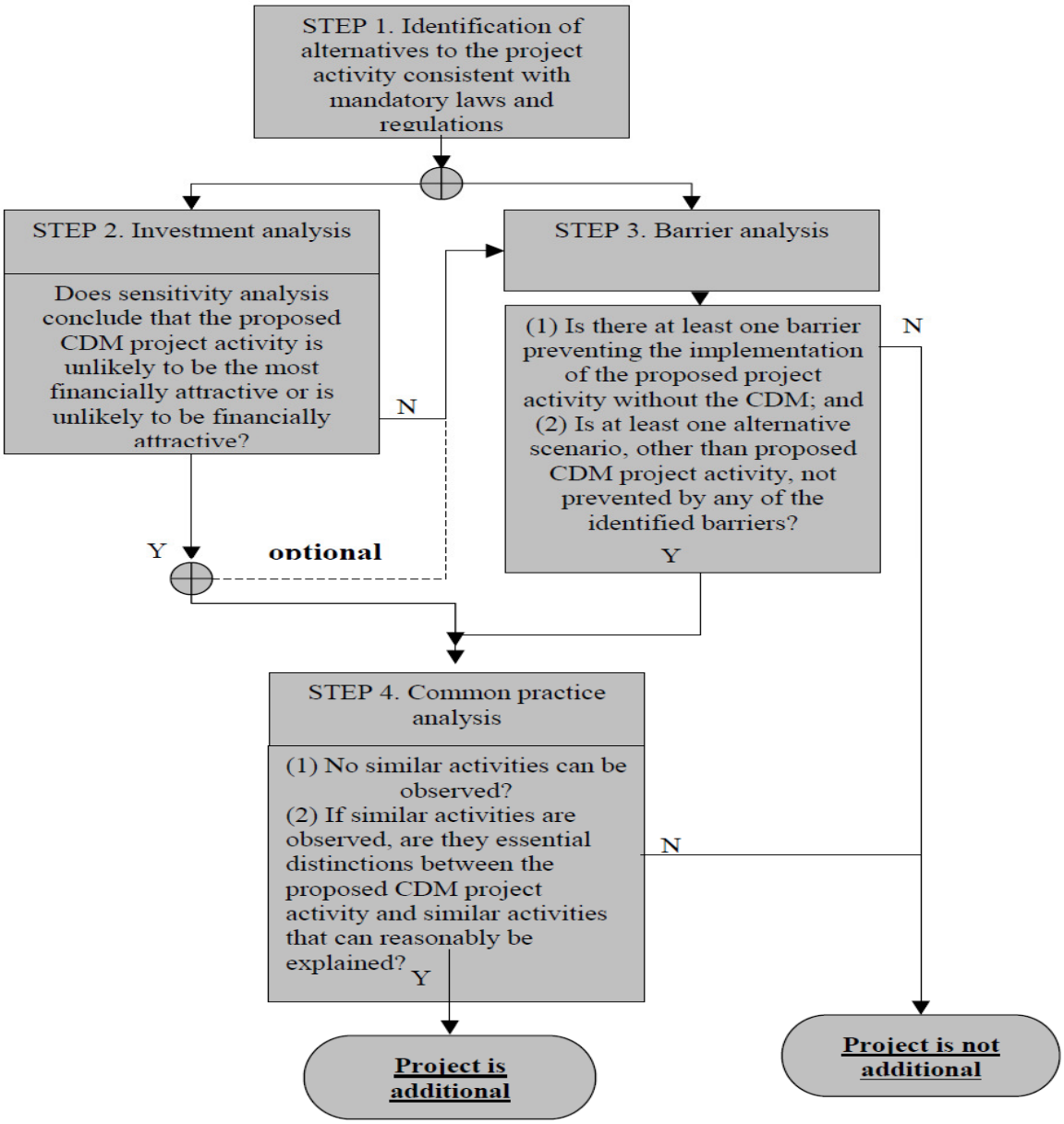
As per the decision 17/cp. 7, paragraph 43, a CDM project activity is additional if anthropogenic emissions of green house gases by sources are reduced below those that would have occurred in absence of registered CDM project activity.

Demonstration of Additionality for the project activity

As required in ACM 0002 Version 12.3.0, additionality has been demonstrated and assessed using the latest version of the "Tool for the demonstration and assessment of additionality", Version 06.0.0.



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

Sub-Step 1a: Define alternative scenarios to the proposed CDM project activity

The alternatives available with the project proponent which are realistic, credible and provide outputs comparable with the project activity are:

a. **Alternative1**: *Project activity not undertaken as a CDM project*
In the said alternative, BVUPL would have gone ahead with the implementation of this new renewable wind power project connected to the regional grid. There would be no emissions of greenhouse gases to the atmosphere. This alternative is in compliance with all applicable legal and regulatory requirements and may be a part of the baseline. However, the project activity is not a financially viable option as the return generated by the project activity is below the benchmark (explained in detail under step 2). Hence, in the absence of CDM funding, the project would not have been implemented and hence cannot be a part of the baseline scenario.

b. **Alternative 2:***Continuation of the current situation in the grid*
The project is a Greenfield activity. The project proponent would not have invested in wind power generation. In that scenario, the equivalent capacity additions in the NEWNE grid would have been continued by fossil fuel based power generation mix and the equivalent amount of GHG would have been emitted. Coal is the baseline fuel for power generation in the region since the economics of power generation favours coal based production (given India's abundant coal reserves)[4].

This is a likely baseline scenario, since the region is already receiving electricity from the NEWNE grid. This is the most likely and plausible baseline scenario in the absence of the project activity, and has been considered in this case.

Outcome of Step 1a: Amongst the identified alternatives identified to the project above, continuation of the current practice may be the baseline scenario.

Sub-step 1b: Consistency with mandatory applicable laws and regulations
The identified alternatives are in consistency with the mandatory applicable laws and regulations. As per the Electricity Act 2003, there is no restriction on the type of fuel to be used for electricity generation. Therefore, the alternatives are in compliance with the local laws of the land. There is no mandate that enforces proponents to implement a wind power project, therefore making the project activity a voluntary initiative.

Outcome of Step 1b:Thus considering that all the above alternatives are in line with the applicable legal and regulatory requirements, the "no project option"; i.e. continuation of current practise where in the equivalent amount of energy would have been produced by the project grid electricity system through its currently running power plants and by new capacity additions; is the chosen baseline scenario which would have happened in the absence of the proposed project activity. Please refer to Annex 3 for more information on the chosen baseline.The "Tool for demonstration and assessment of additionality", Version 06.0.0 states that project participants may choose to apply Step 2 (Investment analysis) OR Step 3 (Barrier analysis) to demonstrate additionality of the project. In the present case, Step 2 has been used to determine additionality.

[4] http://powermin.nic.in/indian_electricity_scenario/national_electricity_policy.htm

Step 2: Investment Analysis

Sub-step 2a: Determine appropriate analysis method

Simple cost analysis method (option I) cannot be applied to the proposed project activity since the electricity generated from it will be sold to the grid, leading to an revenue stream in addition to CDM revenue. This is in accordance to the "Tool for the demonstration and assessment of additionality", ver 06.0.0[5].

Guidelines on the assessment of investment analysis, ver 05, EB 62 provide guidance on choosing option II i.e. investment comparison analysis or option III i.e. benchmark analysis. The proposed project's alternative is supply of electricity from a grid; hence option II can't be used here. As per the guidelines on the assessment of investment analysis, ver 05, EB 62, return on equity (ROE) has been chosen as appropriate benchmark. Option III assesses if the project's returns are sufficient for investors to make the initial investment and further bear the associated costs of successfully operating the project activity over the crediting period of the project.

Sub-step 2b: (Option III) – Apply Benchmark analysis

The financial indicator chosen for the project activity is the equity Internal Rate of Return (IRR) of the project as per the latest version of the tool to demonstrate additionality. It has been calculated based on project cash outflows and cash inflows only, irrespective the source of financing. As mentioned in the ***sub-step 2a***, the return on equity (ROE) has been chosen as the benchmark for assessment against the equity IRR of the project.

As per paragraph 15 of Guidance on investment analysis, if the benchmark is based on parameters that are standard in the market, the cost of equity should be determined either by: (a) selecting the values provided in Appendix A of the guidelines; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors. The project participant has taken 11.75% as cost of equity as per the default values given in Appendix A of the guideline.

Further, as per the guidance in paragraph 7 " In situations where an investment analysis is carried out in nominal terms, 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. If this information is not available, the target inflation rate if the central bank shall be used. If the information is also not available, then the average forecasted inflation rate for the host country published by the International Monetary Fund World Economic Outlook (IMF) or the World Bank for the next five years after the start of the project activity shall be use."

The project participant has used the inflation forecast rate provided by the Reserve Bank of India (i.e. the Central bank of the host country) for the next ten years. The same has been used to adjust the default value of ROE, which is given in real terms.

Cost of Equity:

$$\text{Cost of equity}_{\text{Nominal}} = (1+ \text{cost of equity}_{\text{Real}}) * (\text{Inflation rate}_{\text{Host country}}) - 1$$
$$= (1+11.75\%)*(1+5.50\%) - 1$$
$$= 17.90\%$$

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

This is the benchmark considered for investment analysis i.e. Cost of equity =17.90%

The parameters and assumptions used for Equity IRR calculations have been mentioned below. A sensitivity analysis has also been done for the equity IRR with change in certain parameters, to show the robustness of the analysis.

The input values in the financial analysis were valid at the time when the investment decision was made. The IRR has been calculated for a period of 20 years which is the expected operational lifetime of the project activity.

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

The equity internal rate of return (IRR) for the proposed project activity without the CDM revenues has been computed for a period of 20 years which is in accordance to the "Guidelines on the assessment of investment analysis" ver. 05, which states that '*a minimum period of 10 years and a maximum of 20 years will be appropriate* for the assessment.

The Equity IRR for the project found to be 8.21%which is lower than benchmark of 17.90%. The summary of the investment is as follows

Project	IRR without CDM	IRR with CDM
Kaladonger wind project in Rajasthan	8.21%	11.94%

Sub-step 2d: Sensitivity analysis

A sensitivity analysis has been carried out to further strengthen the financial additionality for this project. This was carried out as per the "Guidelines on the assessment of investment analysis" ver. 05, which state that "*Onlyvariables, including the initial investment cost, that constitute more than 20% of either project costs or total project revenues should be subjected to reasonable variation*". Accordingly, four scenarios have been identifies i.e. variation in PLF, tariff, project cost and operation and maintenance cost. A sensitivity of 10% increase and decrease on all of the above has been performed.

Results of Sensitivity Analysis	-10%	0%	+10%
PLF	4.93%	8.21%	11.93%
Tariff	4.16%	8.21%	12.70%
Project Cost	13.15%	8.21%	4.78%
O&M Cost	8.61%	8.21%	7.79%

The results of the sensitivity analysis clearly illustrate that even with variation in critical parameters of the project activity, the equity IRR remains lower than the benchmark return on equity i.e. 17.90%. Thus it can be concluded that the proposed project activity is financially unattractive and would not have been implemented without the benefits from the sale of revenues through CDM. Hence, the project activity is additional.

Step 4: Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:
Provide an analysis of any other activities that are operational and that are similar to the proposed project activity.

As per the approved methodological tool, common practice analysis includes:

"Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Other CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis".

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 Rajasthan state. For arriving at the exhaustive list of project activities, the following considerations were made to identify similar project activities occurring under similar conditions:

1. The project activity with an installation of at least 15MW

2. The wind power project set up by a single project proponent

3. The project activity located wholly in Rajasthan

4. The project should be commissioned after the Electricity Act, 2003. It should be noted that there was no uniform regulation for determination of tariff for generation & sale of power prior to the Electricity Act, 2003 and moreover, in India power sale tariff and power purchase agreements for all states are based upon the guidelines of this Act. Hence, all prospective project owners since 2003 have to include the effect of this Act (i.e., State-wise power sale tariff orders) during taking investment decision. This option was not available to project owners prior to 2003 and hence, in accordance to the approved methodological tool, projects installed after 2003 have a "similar regulatory frameworks and investment climate".

The Wind Power Directory provides date of commissioning of wind projects; however, it is not possible to determine from directory whether the project activity was any one of the following:

- Total capacity of more than 15 MW is a single project activity

- Total capacity of more than 15 MW are individual small scale project activities

Hence, as a conservative measure, all project owners having installation of more than 15 MW in Rajasthan have been taken in the purview of this analysis taking above four points into account.

Following are the project owners who have wind projects in Rajasthan with a cumulative capacity of more than 15 MW installed:

Project	Location, Rajasthan	Capacity (MW)	Year of Commissioning	CDM
Chamber Construction Pvt Ltd	Akal	19.5	March'11	Yes
Friends Salt Works & Allied Industries	Tejuva	25.2	March'11	No
Hindusthan Petroleum Corp Ltd	Akal	25.5	March'11	Yes
Hindustan Zinc Ltd.	Tejuva	35.7	March'11	Yes
IL& FS Energy Development	Pithodai ki Dhani	38.4	10-Sep	Yes
Indrani Patnaik	Akal	15	March'11	Yes
Tarini Minerals (P) Ltd.	Akal	15	March'11	Yes
Vish Wind Infrastructure	Pithodai ki Dhani/ Tiwari	29.6	March'11	Yes
Cepco Industries Ltd.	Jodha/Kitta/Tiwari	18	March'2010	Yes
Dhariwal Industries Ltd.	Akal/Tejwa	18.6	March'2010	No
DLF Home Developers Ltd	Osiyan	19.5	September'2008	Yes
Enercon Wind Farms	Asloi	24	September'2005	Yes
Enercon Windfarms Hindusthan	Bhu/Kita	60	March'2007	Yes
Gujarat Fluorochemicals Ltd	Osiyan	30	September'2009	Yes
Hindusthan Petroleum Corp Ltd	Soda Mada	21.25	March'2009	Yes
IDFC	Tiwari	20	September'2008	No
KS Oils Ltd.	Akal/ Tiwari/ Ratan ka baas	24.5	March'2010	Yes
Kohinoor Planet Construction Pvt Ltd	Kitta	24	March'2010	Yes
Modern Road Makers Pvt Ltd	Soda Mada	20	September'2009	Yes
Power Finance Corp.	Jaisalmer	24	March'2004	Yes
Rajasthan Renewable Energy Corporation Limited	Soda Mada	46.65	March'2010	Yes
Rajasthan State Mines & Mineral Ltd	Tejuva/ Soda Madad/ Pohra	98.8	March'2010	Yes
Ruchi Soya Industries Ltd.	Akal/ Osiyan	15	March'2010	Yes

From the above table, it is clear that 87% of the projects have for gone for CDM benefits. Hence it can be said that wind projects in the region without CDM benefits is not a common practice.

Step 4b: Discuss any similar options that are occurring:

From the Sub-step 4a, it is observed that similar and operational projects are not "widely observed and commonly carried out" in the region and majority of the projects have been undertaken considering CDM revenues.

Demonstration of Prior CDM Consideration:

BVUPL has decided to undertake an investment in wind power generation with dueconsideration of CDM revenue at conceptualization stage itself. Board resolution to this effect was passed on 22/07/2011. In order to commencethe CDM related activities, project proponent had appointed CDM consultant and the designated operational entity to ascertain the CDM process timely.

Following are the some of the major activities undertaken by the Project participant to demonstrate the serious consideration of CDM.

Chronology of events:

Project Implementation	Date	CDM events	Date
Quotation received for the project	04 July 2011		
		Board Resolution considering CDM benefits	22 July 2011
Purchase Order placement	29 July 2011		
		Prior CDM Consideration intimation sent to UNFCCC and Ministry of Environment and Forests (Host Country DNA)	12September 2011
		Local CDM Stakeholder consultation meeting	9December 2011

Demonstration of Prior CDM Consideration:
As per the*'Guidelines on the demonstration and assessment of prior consideration of the CDM, ver 04, EB 62'*[6], for project activities with a starting date on or after 2 August 2008, the project participant is supposed to inform a Host Party designated national authority (DNA) and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status, within six months of the project activity start date. BVUPL sent out the prior consideration form in the standardized format with the precise geographical location and a brief description of the proposed project activity on 12th September 2011, which is within six months of the start date of the project i.e. 29 July 2011, as indicated in the above table.

From the above investment analysis and chronology of events, it can be concluded that the project is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

Emission Reductions

The project activity reduces carbon dioxide by displacing thermal coal fired grid electricity generation with renewable energy based generation. The emission reduction ERy by the project activity during a given year y is the difference between baseline emissions (BE_y) and project emissions (PE_y) as per the consolidated methodology ACM002 version 12.3.0 as follows:

$$ER_y = BE_y - PE_y$$

[6] http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid04.pdf

As per ACM002 version 12.3.0, baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, 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)

The baseline emission factor ($EF_{grid,CM,y}$) is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors calculated according to version 02.2.0 of "Tool to calculate the emission factor for an electricity system", using the following six steps:

Step 1: Identify the relevant electricity systems
As explained in the section B.4 above, NEWNE grid has been identified as the relevant electric power system in this case.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)
Since majority of the power generated in India is fed in the regional grids, the project activity doesn't include off-grid power plants in the project electricity system.

Step 3: Select a method to determine the operating margin (OM)
Version 02.2.0 of the "Tool to calculate the emission factor for an electricity system" provides four options for calculating the operating margin emission factor ($EF_{grid,\ OM,\ y}$) and guidance for choosing the option for the corresponding project activity. The options are:

a) Simple OM, or
b) Simple adjusted OM, or
c) Dispatch Data Analysis OM, or
d) Average OM.

The tool states that any of the four above methods can be used. In the current project activity, simple OM method has been chosen to calculate the operating margin emission factor ($EF_{grid,\ OM,\ y}$).
According to the Version 02.2.0 of the "Tool to calculate the emission factor for an electricity system", 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

In the context of Version 02.2.0 of the "Tool to calculate the emission factor for an electricity system", low cost/must run resources are defined as power plants with low marginal generation costs or power plants that are dispatched independently of the daily or seasonal load of the grid. They typically include

hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is obviously used as must-run, it should also be included in this list, i.e. excluded from the set of plants.

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%

Ref: CO_2Baseline Database for the Indian Power sector – CEA, Version 7, January 2012

Percentage of total grid generation by low cost/ must run plants in the NEWNE grid (on basis of average of five most recent years) = 17.7%
The calculation above shows that the generation from low cost/ must run resources constitutes less than 50% of the total grid generation; hence usage of the Simple OM method for the project activity is justified.

In terms of data vintage, the Simple OM emission factor can be calculated using either of the two following data vintages for year(s) y:

- *Ex ante option: In this method, a 3-year generation-weighted average has to be calculated based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without the requirement to monitor and recalculate the emissions factor during the crediting period,*

Or

- *Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required for calculating the emission factor for year y is usually only available later than six months after the end of the year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1, y-2) should be used throughout all crediting periods.*

In this case, ex ante option has been chosen where in a three year generation weighted average based on the most recent data has been calculated and the same would be fixed for the crediting period.

Step 4: Calculate the operating margin emission factor according to the selected method
Amongst the four options identified in Step 3 above, the Simple Operating Margin is used for the project activity as justified above.
Simple OM: The simple OM emission factor ($EF_{grid,OMsimple,y}$) is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-operating cost and must-run power plants. It may be calculated:

- Based on the net electricity generation and a CO_2 emission factor of each power unit (Option A)

Or

- 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)

Option A is the preferred choice according to the "Tool to calculate the emission factor for an electricity system", Version 02.2.0. In India, the Central Electricity Authority (CEA) has estimated the baseline emission for the power sector. This data has also been endorsed by NCDMA (DNA of India) and is the most authentic information available on the public domain. The CEA has compiled the CO_2 emissions database, based on generation, fuel consumption and fuel calorific value data furnished by each power station. The simple OM emission factor has thus been calculated using option A1 i.e. based on fuel consumption and net electricity generation of each power plant/ unit. The details of the same can be found on CEA website at http://cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm.

According to option A, the simple OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:
$EF_{grid,OMsimple,y}$ = Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$ = CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m = 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

Determination of $EF_{EL,m,y}$
As per the "Tool for calculating the emission factor of an electricity system", version 02.2.0, $EF_{EL,m,y}$ has been calculated as per the **option A1**.

If for a power unit *m* data on fuel consumption and electricity generation is available, the emission factor ($EF_{EL,m,y}$)should be determined as follows:

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

Where:
$EF_{EL,m,y}$ = CO_2 emission factor of power unit *m* in year *y* (tCO_2/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)
$EF_{CO2,i,y}$ = CO_2 emission factor of fossil fuel type *i* in year *y* (tCO_2/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

Since Option 1 has been considered i.e. Only grid power plants were included in the calculation as per Step 2; according to the "Tool for calculating the emission factor for an electricity system" , version 02.2.0, $EG_{m,y}$ has been determined as per the provisions in the monitoring tables.

Since Ex-ante option has been selected for data vintage, the Simple OM emission factor ($EF_{grid,OMsimple,y}$)is taken for the most recent three years and an average value has been considered as the OM emission factor for the baseline ($EF_{grid,OM,y}$).

In India, the CEA (Central Electricity Authority) has estimated the baseline emission factor for the power sector. This data has also been endorsed by the NCDMA (Designated National Authority) and is the most authentic information available in the public domain. The details of same can be found on CEA website at http://cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm.

Operating Margin Estimation for NEWNE Grid (tCO_2/ MWh)	
OM, 2008 – 09	1.0065
OM, 2009 – 10	0.9777
OM, 2010– 11	0.9706
Average OM ($EF_{grid,OM,y}$)	**0.9842**

Step 5: Calculate the build margin (BM) emission factor

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

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

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

The emission factor ($EF_{EL,m,y}$)isdetermined as follows: Central Electricity Authority (CEA) has estimated the build margin emission factor $EF_{grid,BM,y}$ is based on the most recent information available on the plants already built for sample group *m* at the time of PDD submission. The sample group *m* consists of the power plant capacity additions in the electricity system that comprise 20% of the system generation and that have been built most recently. In this case, the CEA data has been used as:

Build Margin Estimation for NEWNE Grid (tCO_2/ MWh)	
BM ($EF_{grid,BM,y}$), 2010 - 11	**0.8587**

With regards to data vintage, the project participant wishes to use Option 1 i.e. calculating build margin emission factor *ex ante* based on the most recent information available on units already built for sample group *m* at the time of CDM-PDD submission to the DOE for validation, for the first crediting period. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Step 6: Calculate the combined margin (CM) emission factor

As per the "Tool to calculate the emission factor for an electricity system", version 02.2.0, Weighted average CM method is used. The combined margin emissions factor is calculated as the weighted average of the Operating margin emission factor ($EF_{grid, OM, y}$) and the build emission factor ($EF_{grid, BM, y}$):

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

Where,
$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2/MWh) …….. Calculated in step 5 above
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (tCO_2/MWh) …..Calculated in step 4 above
w_{OM} = Weighting of operating margin emissions factor (%)
w_{BM} = Weighting of build margin emissions factor (%)

For wind and solar powered projects the defaults weights are as follows: $W_{OM} = 0.75$ and $W_{BM} = 0.25$

Hence the baseline emission factor is calculated as follows.

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

=0.9842*0.75+0.8587*0.25
=0.9528 tCO_2/MWh

Thus the resulting combined emission factor is 0.9528tCO_2/MWh

As aforesaid, Central Electricity Authority (CEA) has calculated the baseline emission factors for the regional grids in India according to the formulas specified above. As this is the most authentic information available in the public domain, the baseline emission factor used in the calculation of baseline emissions for the proposed project activity is being referred from the latest version of the same[7].

Combined Margin Estimation for NEWNE Grid (tCO_2/ MWh)	
OM, 2008 - 09	1.0065
OM, 2009 - 10	0.9777

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

OM, 2010 - 11	0.9706
Average OM ($EF_{grid, OM, y}$)	**0.9842**
BM ($EF_{grid,BM,y}$)**, 2010 - 11**	**0.8587**
Combined Margin ($EF_{grid, CM, y}$)	**0.9528**

Project activity emissions
According to the chosen baseline methodology ACM002 Version 12.3.0, the project emissions are zero since it is a renewable power generation project.

Leakage
As per the consolidated methodology ACM002, version 12.3.0, No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport). These emissions sources are neglected.

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

(Copy this table for each data and parameter)

Data / Parameter:	$EF_{grid,OMsimple,y}$
Data unit:	tCO_2/MWh
Description:	operating margin CO_2 emission factor of NEWNE grid
Source of data used:	Central Electricity Authority:CO_2 Emission Database CEA CO_2 Baseline database Version 07[8]
Value applied:	0.9842
Justification of the choice of data or description of measurement methods and procedures actually applied :	The operating margin emission factor data has been deduced from CO_2 Database.
Any comment:	The operating margin emission factor is a 3-year generation-weighted average data, based on the most recent data available on CEA database at the time of submission of the CDM-PDD to the DOE for validation

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO_2/MWh
Description:	Build margin CO_2 emission factor of NEWNE grid
Source of data used:	Central Electricity Authority:CO2 Emission Database CEA CO_2Baseline database Version 07
Value applied:	0.8587
Justification of the choice of data or	The Build margin emission factor data has been deduced from CO_2 Database.

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

description of measurement methods and procedures actually applied :	
Any comment:	The build Margin would be calculated ex ante and fixed during the crediting period. For ex ante calculation the most recent data available has been used and the build margin thus calculated is 0.8587

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Combined margin CO_2 emission factor of NEWNE grid
Source of data used:	Central Electricity Authority:CO_2 Emission Database CEA CO_2 Baseline database Version 07
Value applied:	0.9528
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated as per the procedures in "Tool to calculate the emission factor for an electricity system" with data deduced from CEA
Any comment:	The Combined Margin would be calculated ex ante and fixed during the crediting period.

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

>>

According to the methodology, Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

As the project activity is wind power project, project emissions are zero and the resulting emission reduction is as follows.

$$ER_y = BE_y$$

As per Step 6 of the section B.6.1, $\mathbf{EF_{grid,CM,y}}$has been calculated as **0.9528**

$\mathbf{EG_{PJ,y}}$or the annualelectricity displaced by the project activity (EG_y) has been calculated as follows:

Annual net electricity supplied to the grid by the project activity
= Generation * PLF * 8760/1000
= 75600 * 23.50% * 8760/1000
= 155630MWh
Hence, **BEy = 155630 (MWh) * 0.9528 (tCO_2/ MWh) = 148284 tCO_2**

Since, $\mathbf{ER_y = BE_y}$
So, Emission reductions ($\mathbf{ER_y}$) from 2013 – 14 onwards = **148284tCO_2**

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

>>

Years	Annual Estimation of Emission Reduction in tons of CO_2e
2013 – 14	**126831**
2014 – 15	**126831**
2015 – 16	**126831**
2016 – 17	**126831**
2017 – 18	**126831**
2018 – 19	**126831**
2019 – 20	**126831**
2020 – 21	**126831**
2021 – 22	**126831**
2022 – 23	**126831**
Total Emission Reduction (tonnes of CO_2e)	**1268310**
Total Number of Crediting Years	**10**
Annual Average of the estimated reductions over the crediting period (tonnes of CO_2e)	**126831**

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

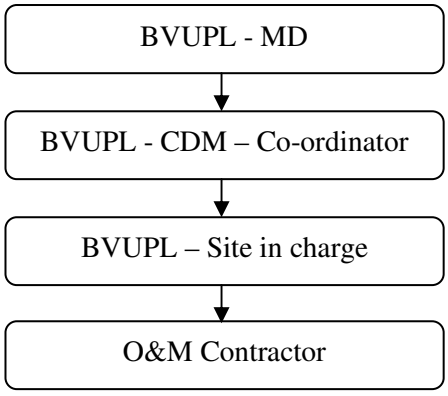
Data / Parameter:	$EG_{PJ,y}$
Data unit:	MWh
Description:	Quantity of Net Electricity exported to the grid during the year y.
Source of data to be used:	Monthly Meter Readings recorded by the representatives of BVUPL
Value of data applied for the purpose of calculating expected emission reductions in section B.5	133113
Description of measurement methods and procedures to be applied:	Measurement: Net quantity of electricity exported by the project is calculated as the net of sum of export from individual meters, sum of import from individual meters and line losses. Data Type: Calculated Archiving 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.

	Responsibility: Project Manager of BVUPL will be responsible for maintain the records. Calibration Frequency: Energy meters will be calibrated at least once in 3 years.
QA/QC procedures to be applied:	Electricity supplied can be recorded in the energy meter installed by JVVNL and the meters will be calibrated by the representatives of JVVNL at least once in 3 years. Net electricity supplied to the grid by the project activity will be cross checked with invoices submitted to JVVNL.
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 generation data, major breakdown events and machine availability. Project Manager is responsible for recording of monthly 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:

>>

As per Glossary of CDM terms[9], *"the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity"*. Complying with the above norms the start date considered for the project activity is 29 July 2011i.e., the date on which purchase orders has been placed with Suzlon Energy Limited.

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

>>

20 years.

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

C.2.1. Renewable crediting period:

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

>>
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:

>>
01/09/2012or Date of commissioning of the project or Date of registration of the project, whichever is later

C.2.2.2. Length:

>>
10 years, 0 months

[9] http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf

SECTION D. Environmental impacts

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

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As per the prevailing Ministry of Environment and Forest laws, (the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated September 14, 2006), 38 activities are required to undertake environmental impact assessment studies. Environmental Impact Assessment study is not required for wind mill project as there is no negative environmental impact due to the project activity and wind energy is one of the cleanest sources of energy.

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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Since the project activity is a renewable energy project, there will be no negative impact out of the project.

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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The stakeholders identified for the project were the occupants of the villages around and the local communities, NGOs, governmental agencies, BVUPL employees and contractors. Local population is considered to be a major stakeholder with respect to the project activity.

The meeting started with the welcome address by the representative of BVUPL. He further explained about the wind project taken up by the company.Representative of BVUPL further explained the purpose of the meeting and detailed each questions in the questionnaire. He then explained about the advantages of the wind energy generation with respect to it being a renewable source of power in the region.

The villagers wished to know the impact of WTGs on the environment in the region. Further to the discussion, the representative of Suzlon Energy Limited explained that wind power generation isan eco-friendly technology which will have no harmful effect on the environment. Finally the comments were received from the stakeholder, which has been briefed in section E-2.

E.2. Summary of the comments received:

>>

According to the feedback received from the stakeholders which included farmers, laborers etc., due to the erection of wind farms, the socio-economic situation in the area and the village people's living standard has been improved.

It was emphasized by the stakeholders that the project has not only provided employment but also significantly contributed to the infrastructure development likes puccha roads.

The stakeholders also expressed satisfaction that the project would help alleviating the power deficit currently being faced by the region.

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

>>

All comments were positive. No negative comments were received from stakeholders.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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URL:	
Represented by:	
Title:	The Managing Director
Salutation:	Mr.
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding is available for the project.

Annex 3

BASELINE INFORMATION

Grid scenario in India

As evident from Table 1, the grid electricity in India today is clearly dominated by thermal generation, predominantly coal.

Table 1: Region wise generating installed capacity (MW) as on 31.08.2011

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

Captive Genrating capacity connected to the Grid (MW) = 19509

RES -Renewable Energy Sources includes Small Hydro Project(SHP), Biomass Gas(BG), Biomass Power(BP), Urban & Industrial waste Power(U&I), and Wind Energy.

As per the procedure for renewal of the crediting period, the baseline has been updated and the latest data available for the period 2008-09 to 2010-11 has been used for estimation of the baseline emissions. CEA (Central Electricity Authority) under Ministry of Power, India has estimated the Build Margin and Simple Operating Margin for the Southern Grid, details of which are available on the following website and are detailed below as well:

http://www.cea.nic.in/reports/planning/cdm_co2/database_7.zip

Version 7.0 of the baseline CO2 database has been used.

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE

VERSION	**7.0**
DATE	**Jan-12**
BASELINE METHODOLOGY	**ACM0002 / Ver 12.2.0 and "Tool to Calculate the Emission Factor for an Electricity System", Version 2.2.1**

EMISSION FACTORS

Weighted Average Emission Rate (tCO2/MWh) (excl. Imports)

	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	0.83	0.82	0.84	0.83	0.81
South	0.72	0.72	0.75	0.75	0.74
India	0.80	0.80	0.82	0.81	0.79

Weighted Average Emission Rate (tCO2/MWh) (incl. Imports) (2)

	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	0.82	0.81	0.83	0.82	0.80
South	0.72	0.72	0.76	0.75	0.75
India	0.80	0.79	0.81	0.81	0.79

Simple Operating Margin (tCO2/MWh) (excl. Imports) (1)

	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	1.02	1.01	1.02	0.99	0.98
South	1.00	0.99	0.97	0.94	0.94
India	1.01	1.01	1.01	0.98	0.97

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) (excl. 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

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

Combined Margin (tCO2/MWh) (excl. Imports) (1)

	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	0.82	0.81	0.85	0.90	0.92
South	0.85	0.85	0.89	0.85	0.84
India	0.83	0.82	0.86	0.89	0.90

(1) Operating margin is based on the data for the same year. This corresponds to the *ex post option* given in "Tool to Calculate the Emission Factor for an Electricity System", Ver. 2.2.1 (p.6)

Combined Margin in tCO2/MWh (incl. Imports) (1) (2)

	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	0.82	0.80	0.84	0.90	0.91
South	0.85	0.85	0.90	0.85	0.84
India	0.83	0.81	0.85	0.88	0.90

(1) Operating margin is based on the data for the same year. This corresponds to the *ex post option* given in "Tool to Calculate the Emission Factor for an Electricity System", Ver. 2.2.1 (p.6)

(2) Adjustments for imports from other Indian grids are based on operating margin of exporting grid. For imports from other countries, an emission factor of zero is used. See "Tool to Calculate the Emission Factor for an Electricity System", Ver. 2.2.1 (p.4), option b

GENERATION DATA

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

IMPORT DATA

Net Imports (GWh) - Net exporting grids are set to zero

	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	5,126	8,193	0	4,284	0
South	0	0	6,326	1,057	7,689

Share of Net Imports (% of Net Generation)

	2006-07	2007-08	2008-09	2009-10	2010-11
NEWNE	1.1%	1.7%	0.0%	0.8%	0.0%
South	0.0%	0.0%	4.0%	0.6%	4.4%

Annex 4

MONITORING INFORMATION

The Operation & Maintenance of the project will be done by Suzlon Energy Limited. As per the monitoring plan, the electricity exported to the grid through the project activity and the electricity imported from the JVVNL grid will be monitored. The metering system shall comprise of a main and check meter at each WTG that measure export and import of electricity. The energy meters will be sealed in the presence of the representatives of the power producer and the state electricity board. The O&M personnel will be responsible for recording the generation data from each WTG on daily basis at the site. This is done through a Central Monitoring System (CMS) available at the project site. Monthly readings of energy meters are recorded by the officials from JVVNL - in the presence of representatives from the project proponent.

Export and Import readings recorded at main meter are considered for billing purpose and estimation of emission reductions. In case of failure of main meter, readings of check meter are used. A bulk meter consisting of main meter and check meter are installed at the nearby substation to measure total quantity of electricity exported and imported for the project activity. The difference between the sum of individual meters reading and the bulk meter reading will be the basis for the calculation of line loss. Net quantity of electricity exported by the project is calculated as the net of sum of export from individual meters, sum of import from individual meters and line losses. These readings are further used for billing purposes and the same will be used for the calculation of the emission reductions.

The energy meter will be tested and calibrated at least once in three years. The testing and calibration of the meter will be jointly conducted by authorised representatives of BVUPL and JVVNL and the results and correction so arrived at mutually will be applicable and binding on both the parties. During the test calibration, if there are errors beyond permissible limit, the bills shall be revised for the previous three months or for the exact period if known and agreed upon by both the parties, by applying correction as determined by the meter testing wing of the state transmission utility / distribution licensee to the consumption registered by the meters with lesser error.

All the data items monitored under the monitoring plan will be kept for 2 years after the end of crediting period or till the last issuance of CERs for this project activity whichever occurs later.

Monitoring plan for 2% CER revenues:
The project proponent will contribute 2% of net revenue realised from sale of CERs towards sustainable development initiatives. The details of such expenditure made would be included in the monitoring report for the period following the transaction and the format is as follows:

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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