



Voluntary Carbon Standard Project Description Template

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[Table of Contents]

- 1. Description of project*
- 2. VCS Methodology*
- 3. Monitoring*
- 4. GHG Emission Reductions*
- 5. Environmental Impact*
- 6. Stakeholders Comments*
- 7. Schedule*
- 8. Ownership*

Annexure -1: Baseline Information

Annexure -2: Monitoring Information

*Annexure -3: List of wind power projects seeking CDM funds in the
state of Karnataka*

1 Description of Project:

1.1 Project title

51 MW Wind Power Project at Chitradurga

1.2 Type/Category of the project

Project category is a part of the VCS Board approved CDM GHG program¹. The project is a 'Consolidated methodology for grid-connected electricity generation from renewable sources' plant that falls under the Scope number-1 of sectoral scope: Energy Industries (renewable-non-renewable sources). The version 11 of ACM0002² is used for the project activity.

The project is not a grouped project.

1.3 Estimated amount of emission reductions over the crediting period including project size:

The project activity is a 51 MW Wind Power project with 28 number of 1.5 MW Wind Turbine Generators (WTG) of Regen Powertech and 4 number of 2.1 MW WTG of Suzlon.

The present project activity comes under 'Project' category (i.e. category of CO₂ emissions in between 5,000 tonnes and 1,000,000 tonnes) per annum.

1.4 A brief description of the project:

The project owner, Nuziveedu Seeds Limited (NSL, here after) of Hyderabad is a leading Agribitotech and Infrastructure company in India with strong presence in Hybrid Seeds Production and Marketing.

NSL is setting up a 51 MW Wind Power Project at Chitradurga, Karnataka. The project is one of the biggest in this area and proves the capability of NSL's project team in execution and commissioning of bigger size projects. NSL, with a view of being in line with sustainable development priorities of India, is promoting this project with a good green power through tapping of wind energy available in the existing barren land available in the state of Karnataka, which is deficit in power and peak energy requirements. To be competitive in the open market conditions of India, the NSL group is developing this

¹ <http://v-c-s.org/methodologies.html>

² <http://cdm.unfccc.int/methodologies/DB/TZFK7NUO5DYE5AI2PDMLG65BFIWMG5/view.html>

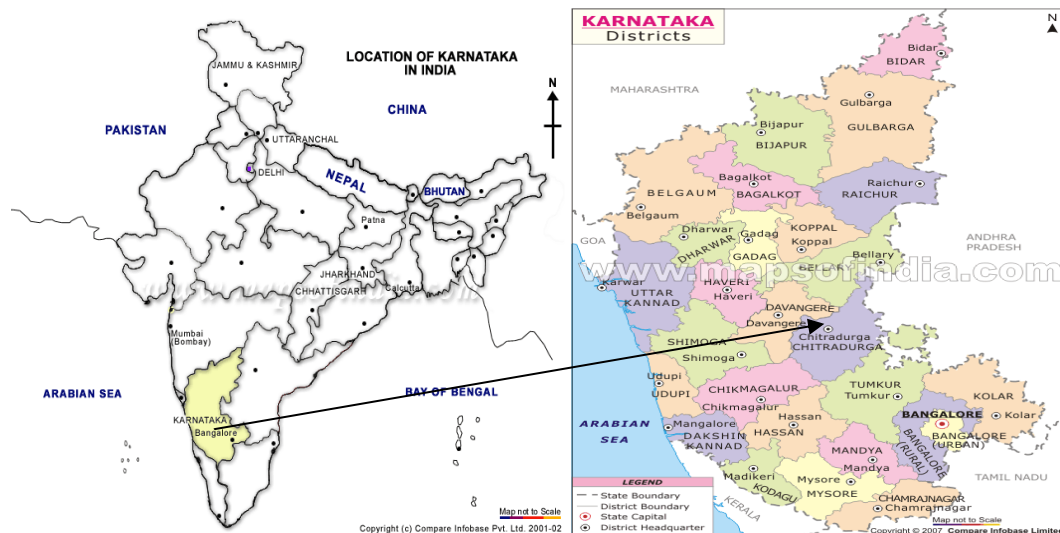
project under Voluntary Carbon Standard 2007.1, which would appropriately reduce the coal/other fossil fuel dominated power generation helping in significant reduction of GHG emissions and also responsible for sustainable economic growth and conservation of environment through use of wind as a renewable source.

Scenario existing prior to the start of the project activity:

The installed capacity of Southern Region at the end of financial year i.e. as on 31.03.2007 was 36823.32 MW³. The total installed capacity comprises Hydro-11011.71 MW (29.91 %), Thermal + Gas + Diesel 20698.12MW (56.20 %), Nuclear-880 MW (2.39 %) and Wind + R.E.S-4233.49 MW (11.50 %). From the data it is evident that the power generation scenario existing prior to the start of the project activity is dominated by the fossil fuel based power plants.

1.5 Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project:

The project site is located at Bhimasamudra, Chitradurga District of Karnataka in India. Chitradurga is approximately around 200 KM from Bangalore, capital of Karnataka state. The approximate latitude and longitude of the project activity is 14°14' N and 76° 26' E. The individual machine ID and GPS coordinates would be provided at the time of verification i.e. post implementation.



SI No	WTG Number	Location	District	State	Latitude	Longitude	Commissioning date
1	HK 1	Bhimasamudra	Chitradurga	Karnataka	N14°11'02.7"	E76°12'32.2"	29/09/2008
2	HK 2	Bhimasamudra	Chitradurga	Karnataka	N14°10'49.7"	E76°12'25.7"	01/07/2008
3	HK 3	Bhimasamudra	Chitradurga	Karnataka	N14°10'42.1"	E76°12'26.8"	06/06/2008
4	HK 4	Bhimasamudra	Chitradurga	Karnataka	N14°10'33.7"	E76°12'26.6"	09/09/2008
5	HK 5	Bhimasamudra	Chitradurga	Karnataka	N14°10'23.2"	E76°12'26.0"	09/09/2008
6	HK 6	Bhimasamudra	Chitradurga	Karnataka	N14°10'08.8"	E76°12'25.6"	29/09/2008
7	HK 7	Bhimasamudra	Chitradurga	Karnataka	N14°10'00.7"	E76°12'25.0"	18/12/2009
8	HK 8	Bhimasamudra	Chitradurga	Karnataka	N14°09'53.1"	E76°12'23.3"	18/12/2009
9	HK 9	Bhimasamudra	Chitradurga	Karnataka	N14°09'45.3"	E76°12'22.1"	18/12/2009
10	HK 10	Bhimasamudra	Chitradurga	Karnataka	N14°13'10.6"	E76°08'43.7"	15/12/2009
11	HK 11	Bhimasamudra	Chitradurga	Karnataka	N14°12'43.4"	E76°08'39.2"	15/12/2009
12	HK 12	Bhimasamudra	Chitradurga	Karnataka	N14°12'23.7"	E76°08'57.4"	21/01/2010
13	HK 13	Bhimasamudra	Chitradurga	Karnataka	N14°12'18.9"	E76°09'02.5"	15/12/2009
14	HK 14	Bhimasamudra	Chitradurga	Karnataka	N14°12'12.5"	E76°09'07.5"	21/01/2010
15	HK 15	Bhimasamudra	Chitradurga	Karnataka	N14°12'06.4"	E76°09'11.9"	15/12/2009
16	HK 16	Bhimasamudra	Chitradurga	Karnataka	N14°11'59.5"	E76°09'16.8"	Yet to be commissioned
17	HK 17	Bhimasamudra	Chitradurga	Karnataka	N14°11'37.0"	E76°09'38.3"	Yet to be commissioned
18	HK 18	Bhimasamudra	Chitradurga	Karnataka	N14°11'30.3"	E76°09'43.3"	Yet to be commissioned
19	HK 19	Bhimasamudra	Chitradurga	Karnataka	N14°11'24.4"	E76°09'48.0"	Yet to be commissioned
20	HK 20	Bhimasamudra	Chitradurga	Karnataka	N14°11'16.6"	E76°09'50.9"	Yet to be commissioned
21	HK 21	Bhimasamudra	Chitradurga	Karnataka	N14°11'10.9"	E76°09'56.4"	Yet to be commissioned
22	HK 22	Bhimasamudra	Chitradurga	Karnataka	N14°11'04.4"	E76°09'59.9"	21/01/2010
23	HK 23	Bhimasamudra	Chitradurga	Karnataka	N14°10'57.8"	E76°10'03.4"	21/01/2010
24	HK 24	Bhimasamudra	Chitradurga	Karnataka	N14°10'41.1"	E76°10'39.9"	Yet to be commissioned
25	HK 25	Bhimasamudra	Chitradurga	Karnataka	N14°10'34.0"	E76°10'44.3"	Yet to be commissioned
26	HK 26	Bhimasamudra	Chitradurga	Karnataka	N14°10'26.9"	E76°10'47.8"	Yet to be commissioned
27	HK 27	Bhimasamudra	Chitradurga	Karnataka	N14°10'19.8"	E76°10'51.3"	Yet to be commissioned
28	HK 29	Bhimasamudra	Chitradurga	Karnataka	N14°10'02.1"	E76°11'14.3"	Yet to be commissioned
29	HK 30	Bhimasamudra	Chitradurga	Karnataka	N14°09'55.0"	E76°11'18.0"	Yet to be commissioned

30	HK 31	Bhimasamudra	Chitradurga	Karnataka	N14°09'48.9"	E76°11'23.0"	Yet to be commissioned
31	HK 32	Bhimasamudra	Chitradurga	Karnataka	N14°09'42.0"	E76°11'26.8"	Yet to be commissioned
32	HK 33	Bhimasamudra	Chitradurga	Karnataka	N14°09'35.0"	E76°11'30.4"	Yet to be commissioned

1.6 Duration of the project activity/crediting period:

As per the VCS guidelines, the start date of the project activity is the date on which the project has begun reducing GHG emissions.

The project will be commissioned in various phases and the lifetime of the project activity will be for 20 years. As per the VCS guidelines, the project is eligible to avail revenues from the commissioning date. The crediting period will be for 10 years and renewable for another 10 years. Hence the crediting period for the project activity would start from the date of commissioning of first WTG. The commissioning of the first WTG is on 06 June 2008. Hence the said date would be the start date of the project activity.

SI No.	WTG Number	Commissioning date
1	HK 1	29/09/2008
2	HK 2	01/07/2008
3	HK 3	06/06/2008
4	HK 4	09/09/2008
5	HK 5	09/09/2008
6	HK 6	29/09/2008
7	HK 7	18/12/2009
8	HK 8	18/12/2009
9	HK 9	18/12/2009
10	HK 10	15/12/2009
11	HK 11	15/12/2009
12	HK 12	21/01/2010
13	HK 13	15/12/2009
14	HK 14	21/01/2010
15	HK 15	15/12/2009
16	HK 16	Yet to be commissioned
17	HK 17	Yet to be commissioned
18	HK 18	Yet to be commissioned
19	HK 19	Yet to be commissioned
20	HK 20	Yet to be commissioned
21	HK 21	Yet to be commissioned
22	HK 22	21/01/2010
23	HK 23	21/01/2010
24	HK 24	Yet to be commissioned
25	HK 25	Yet to be commissioned
26	HK 26	Yet to be commissioned
27	HK 27	Yet to be commissioned
28	HK 29	Yet to be commissioned
29	HK 30	Yet to be commissioned
30	HK 31	Yet to be commissioned
31	HK 32	Yet to be commissioned

32	HK 33	Yet to be commissioned
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1.7 Conditions prior to project initiation:

The project is a greenfield project and there was no power generation by NSL at WTG locations before initiation of the project.

1.8 A description of how the project will achieve GHG emission reductions and/or removal enhancements:

NSL is promoting the project with a green power through tapping of wind energy available in the existing forest land available in the state of Karnataka. NSL is planning to set up 51 MW wind power project. The power generated would be exported to the regional electricity grid which is dominated by fossil fuel based power. Thus, the project activity will help reduce greenhouse gas emissions which otherwise would have occurred in the grid.

1.9 Project technologies, products, services and the expected level of activity:

The project activity is a 51 MW Wind Power project with 28 number of 1.5 MW Wind Turbine Generators (WTG) of Regen Powertech and 4 number of 2.1 MW WTG of Suzlon.

Technology description of Regen WEG: The technology to be employed for the generation of power is a Wind Electric Generator (WEG) of 1500 KW capacity (28 Numbers). The WEG is a Vensys 77 with hub height of 85 m. The WEG is of Regen Powertech make and is a gearless type construction technology coupled with synchronous generator with permanent magnet excitation. The salient features of V-77 are

Gearless Design

- Simple design with basic components
- Totally grid independent
- Slow & variable speed reduces wear and tear
- Reduces the cost of frequent replacement of bearings
- Significant reduction in fatigue loads
- Enhances lifetime and eliminates the unhidden maintenance costs

Variable speed operation

- Eliminates the necessity of grid frequency dependent operation/speed
- Maintains optimum tip speed ratio and thus optimum energy capture

- Use of permanent magnets for excitation needs no power from the grid to run the machine
- Generator Design
- The generator is variable speed and starts generating even at low speed and starts exporting power immediately with no import of power, resulting in higher concentrations
- The controller maintains nearly unity power factor and thus even weak grid is strengthened and stabilized
- REGEN WEG sustains against the weakest grid but also acts as a dynamic grid improviser by virtue of its electronic continuous active pitch regulation and double stage power converter.

Pitch Mechanism

- REGEN deploys three independent pitch mechanisms with AC electric motors for pitch regulation
- Close synchronism of blade angles results in uniform aero-lift forces for all the three blades
- Gain in productivity with REGEN pitch regulation may contribute to the tune of 8 to 10%
- Gain in dynamic stability
- Increased life of major components like blade, generator, tower etc.

Three Independent Braking Systems

- Adopts the Aerodynamic braking system
- System backed by ULTRA-Capacitors which are maintenance free

Lighting Protection for Blades

- REGEN has “Integrated Lighting Protection” system through the blades

Steel Tubular Towers

- Highly robust and also flexible reducing the stresses
- Safe operation and maintenance

The baseline scenario identified is same as the scenario existing prior to the project activity which is “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 within the Southern Grid, as reflected in the combined margin (CM)”.

The power generated by the Southern grid is mainly from Hydro, Thermal, Gas, Diesel, Nuclear and Wind +RES. The equipments that would have been used in the absence of the project activity are boiler furnace and steam drum, fuel preparation system, fuel firing system

and igniter system, turbine, condenser, feed water heater, id & fd fans etc.

Technology description of Suzlon WEG: The technical specifications of 4 numbers of 2.1MW WEG of Suzlon make are provided below.

ROTOR

Diameter	:	88m
No.of Rotor Blade	:	3
Orientation	:	Upwind/Horizontal axis
Rotational Direction	:	Clockwise
Rotor Blade Material	:	GRP
Swept area	:	6082m ²
Hub Height	:	80m
Regulation	:	Pitch regulated

OPERATIONAL DATA

Cut in wind speed	:	4m/s
Rated wind speed	:	14m/s
Cut off wind speed	:	25m/s

GEAR BOX

Type	:	Integrated 3 stage 1 planetary & 2 helical
Gear ratio	:	1:98.8
Manufacturer	:	Winergy/Hansen
Nominal Power	:	2310KW

GENERATOR

Type	:	Asynchronous 4 pole
Rotation speed	:	1511 RPM
Rated output	:	2100KW
Rated voltage	:	690 V
Frequency	:	50 Hz
Insulation	:	Class "H"
Enclosure Class	:	IP 54
Cooling system	:	Air cooled
Slip control	:	Macro slip providing slip upto 16.7%

OPERATING BRAKES

Aerodynamic brake pitching	:	3 independent systems with blade
Mechanical brake	:	Hydraulic disc brakes

YAW DRIVE

Method of operation	:	Active electrical yaw motors
Bearing type	:	Polyamide slide

1.10 Compliance with relevant local laws and regulations related to the project:

The project activity is in compliance with the relevant local laws and regulations and is not prohibited by any of the national/state level sectoral policies.

1.11 Identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements:

The major risk that may substantially affect the project is the wind speeds which are variable. During periods of low wind, turbines cannot generate electricity and at extremely high speeds have to be shut down to prevent damage. This variable nature of wind results in low capacity utilization and reduces its attractiveness

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

The project is a new greenfield one and does not primarily create GHG emissions for the purpose of its subsequent removal. The project adds less GHG intensive power to the grid.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

The project does not possess any renewable energy certificates.

At the time of conceptualization and start date of the project activity, the project proponent had the option of going for the UNFCCC based Clean Development Mechanism (CDM) and the Voluntary Carbon Standard (VCS) credits. As mentioned below along with VCS, project proponent has applied for CDM benefits. However in order to avoid double counting, project proponent will have an undertaking stating that any one of the carbon benefits would be availed by the project proponent for a particular period during the crediting period. The same would be applicable to any other Carbon/Renewable credits applicable to the project activity.

1.14 Project rejected under other GHG programs (if applicable):

The project has not been rejected under any other GHG trading program.

The project has applied for CDM benefits. The project is currently in the validation stage.

In order to avoid the double counting of the project activity, NSL will have an undertaking stating that any one of the carbon benefits

would be availed by the project proponent during the crediting period. The same would be applicable to any other Carbon/Renewable credits applicable to the project activity.

The details of the CDM project is as given below

Name: 51MW Wind Power Project at Chitradurga.

Link:

<http://cdm.unfccc.int/Projects/Validation/DB/69J8TNRR5CNV4D9LWCAG623YGZQO3F/view.html>

1.15 Project proponents roles and responsibilities, including contact information of the project proponent, other project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Nuziveedu Seeds Ltd. (Private entity)	No

Contact Information:

Organization:	NSL
Street/P.O.Box:	Road No.12, Banjara Hills
Building:	NSL ICON, 4th Floor
City:	Hyderabad
State/Region:	Andhra Pradesh
Postcode/ZIP:	500 034
Country:	India
Telephone:	+91-40-23327939/49/59
FAX:	+91-40-23327919
E-Mail:	nuziveeduseeds@hotmail.com
URL:	
Represented by:	
Title:	DGM-Projects
Salutation:	Mr
Last name:	Murali
Middle name:	
First name:	S S
Department:	
Mobile:	
Direct FAX:	040 2332 7919
Direct tel:	040 3051 4444
Personal e-mail:	ssmnsi@gmail.com

1.16 Any information relevant for the eligibility of the project and quantification of emission reductions or removal enhancements, including legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and temporal information.):

The project primarily assists the state of Karnataka and India as a whole in stimulating and accelerating the commercialization of grid connected renewable energy technologies. In addition to this, wind power projects like this demonstrate the viability of grid connected wind farms, which improve energy security, air quality and local livelihoods, as well as assisting the development of a domestic sustainable renewable energy industry. The specific goals of the project are:

Social well being:

- Capacity building and empowerment of vulnerable sections of the rural communities dwelling in the project area
- Power generation from renewable energy sources paves way for energy security of future generations.
- Strengthening India's rural electrification coverage.

Environmental well being:

- Sustainable development through generation of eco-friendly power
- Essentially reducing GHG emissions compared to a business-as-usual scenario
- Reducing other pollutants resulting from other power generation industry
- Avoidance of air and water pollution

Technical well being:

- Demonstrate and help in stimulating the growth of the wind power industry in India
- Increasing the share of renewable energy power generation in the regional and national grid
- Providing national energy security, especially when fossil fuel reserves threaten the long term sustainability of the Indian economy
- Encourages clean, renewable and efficient technologies.

Economic well being:

- The project primarily assists the state of Karnataka and India as a whole in stimulating and accelerating the commercialization of grid connected renewable energy technologies
- The project activity will attract infrastructure investment in facilities such as roads and electrical transmission.

1.17 List of commercially sensitive information (if applicable):

None

2 VCS Methodology:

2.1 Title and reference of the VCS methodology applied to the project activity and explanation of methodology choices:

The project utilizes VCS approved CDM methodology, Version 11 of ACM0002:“Consolidated baseline methodology for grid connected electricity generation from renewable sources”

Tools referenced in this methodology:

- Version 05.2 of “ Tool for the demonstration and assessment of additionality⁴ ”
- Version 02 of “Tool to calculate the emission factor of an electricity system⁵ ”

2.2 Justification of the choice of the methodology and why it is applicable to the project activity:

The project activity involves 51 MW of grid connected power generation from a renewable source. The methodology is applicable as it comprises setting up of a renewable energy generation units (which in this case is wind based), that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit. Each applicability criteria as per the methodology is explained below

Sl. No	Applicability criteria	Justification
1	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 undertaken by NSL involves the installation of 32 new wind turbine generators (WTGs) of different capacities at Bhimasamudra site in Chitradurga district of Karnataka
2	In the case of capacity additions, retrofits or replacements (except for wind,	The project is a new installation and is not a capacity addition, retrofits

⁴ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf>

⁵ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf>

	solar, wave or tidal power capacity addition projects which use Option 2: on page 10 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	or replacements.
3	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 generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.	The project is a new installation and is not a capacity addition, retrofits or replacements.

2.3 Identifying GHG sources, sinks and reservoirs for the baseline scenario and for the project:

	Source	Gas	Included?	Justification / Explanation
Baseline	Electricity generation, grid	CO ₂	Included	Main Emission Source
		CH ₄	Excluded	Excluded for Simplification. This is conservative
		N ₂ O	Excluded	Excluded for Simplification. This is

				conservative
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Project activity	Source	Gas	Included?	Justification / Explanation
	Electricity generation at WTGs	CO ₂	Excluded	Excluded for Simplification. This is conservative
		CH ₄	Excluded	Excluded for Simplification. This is conservative
		N ₂ O	Excluded	Excluded for Simplification. This is conservative

2.4 Description of how the baseline scenario is identified and description of the identified baseline scenario:

As per the version 11 of ACM0002 methodology of CDM, for “Consolidated methodology for grid-connected electricity generation from renewable sources” the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh) calculated in a transparent and conservative manner as:

A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the “Tool to calculate the emission factor of an electricity system”.

Calculation of CM according to the Tool

The Indian power system is divided into two independent regional grids, namely NEWNE and Southern Grid. The state of Karnataka falls under the boundary of Southern grid.

Central Electricity Authority (CEA) under the Ministry of Power, Government of India, estimates the combined margin for the Southern grid, the details of which are available on the following website.

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

The procedure for estimation of the baseline emission factor is taken from the ‘Tool to calculate emission factor for an electricity system’. The detailed procedure is as given below.

Calculation Procedure:

Operating Margin Emission Factor

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 Southern Grid, not including low-cost/must-run power plants/units. It has been calculated based on data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the Southern Grid.

The formula applied for the calculation of Simple Operating Margin is

$$EF_{grid,OMsimple,y} = \frac{\sum_{i,m} FC_{i,m,y} \cdot NCV_{i,y} \cdot EF_{CO_2,i,y}}{\sum_m EG_{m,y}}$$

Where:

$EF_{grid,OMsimple,y}$	=	Simple operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$FC_{i,m,y}$	=	Amount of fossil fuel type i consumed by power plant / unit m in year y (mass or volume unit)
$NCV_{i,y}$	=	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO_2,i,y}$	=	CO ₂ emission factor of fossil fuel type i in year y (tCO ₂ /GJ)
$EG_{m,y}$	=	Net electricity generated and delivered to the grid by power plant / unit m in year y (MWh)
M	=	All power plants / units serving the grid in year y except low-cost / must-run power plants / units
I	=	All fossil fuel types combusted in power plant / unit m in year y
Y	=	The three most recent years for which data is available.

The average simple operating margin of the past three years (2006-07 to 2008-09) thus calculated is 0.9876 and would be fixed for the entire crediting period.

$$OM = 0.9876$$

Build Margin Emission Factor

The build margin emissions factor is the generation-weighted average emission factor (tCO₂/MWh) of all power units m during the most recent year y for which power generation data is available.

The build margin BM is calculated by CEA and it is the generation weighted average emission factor of the most recent power plants consisting of the capacity additions that represent 20% of the system generation (in MWh) and that have been built most recently. This option is considered for calculation as it represents the larger sample. The data pertaining to the units thus identified are detailed in the Version 5.0 of the Baseline Carbon Dioxide Baseline database of the CEA.

The build margin emission factor is calculated as

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

Where:

$EF_{grid,BM,y}$	=	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EG_{m,y}$	=	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	=	CO ₂ emission factor of power unit m in year y (tCO ₂ /MWh)
M	=	Power units included in the build margin
Y	=	Most recent historical year for which power generation data is available

The Build Margin calculated is based on the most recent data available and the build margin thus calculated is 0.8179

Therefore,

$$BM = 0.8179$$

Calculation of Combined Margin emission factor

The combined margin will be calculated as follows:

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

Where,

$EF_{grid,BM,y}$	=	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,OM,y}$	=	Operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
w_{OM}	=	Weighting of operating margin emissions factor (%)

W_{BM} = Weighting of build margin emissions factor (%)

As per the Version 2 of “Tool to calculate the emission factor for an electricity system”, the default values to be used for wind power projects are

$$W_{OM} = 0.75$$

$$W_{BM} = 0.25$$

Hence, the Combined margin CO₂ Emission Factor is calculated as below:

$$\begin{aligned} EF_{Grid,CM} &= W_{OM} * OM + W_{BM} * BM \\ &= 0.75 * 0.9876 + 0.25 * 0.8179 \\ &= 0.9451 \text{ tCO}_2/\text{MWh} \end{aligned}$$

Therefore, the baseline emissions are the MWh produced by the project activity multiplied by 0.9451 tCO₂/MWh calculated in a transparent and conservative manner.

2.5 Description of how the emissions of GHG by source in baseline scenario are reduced below those that would have occurred in the absence of the project activity (assessment and demonstration of additionality):

A project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered project activity.

As per the selected methodology ACM0002 (version 11), the project proponent is required to establish that the GHG reductions due to project activity are additional to those that would have occurred in absence of the NSL project activity as per the version 5.2 of ‘Tool for the demonstration and assessment of additionality’.

NSL demonstrates the additionality of the project activity as follows:

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

In sub-step 1a, NSL is required to identify realistic and credible alternative(s) that were available to NSL or similar project developers that provide outputs or services comparable with the NSL project activity. In sub-step 1b, these alternatives are required to be in compliance with all applicable legal and regulatory requirements.

NSL identified the different potential alternative(s) to the project activity.

The following paragraphs illustrate the alternatives:

Implementation of the NSL project activity not undertaken as a carbon revenue activity;

In this alternative, NSL project activity is connected to the Southern grid and therefore it displaces an equivalent amount of electricity of the grid mix.

NSL may implement the project activity to generate and sell power to KPTCL. This alternative may be a part of the baseline. However, this alternative is not financially very feasible since the project IRR as compared to the weighted average cost of capital (WACC) is low.

Setting up of other NG or renewable based power plant:

It is not feasible for project proponent to set a large scale NG power plant as there is no sufficient natural gas available in the region.

The other alternatives to the project activity such as development of power from renewable energy sources are not credible alternatives for the below reasons

- there is no sufficient availability of biomass in the region to set up a biomass based power plant similar capacity.
- hydro based power plant is not a credible alternative as there is no resource availability to set-up a large scale hydro based power plant.
- solar based power plant is not a credible alternative as levelized cost of generation of power is more expensive than the project activity.

Hence due to the above mentioned reasons, setting up a natural gas based power or renewable based power plant can be ruled out as credible alternative.

No NSL project activity; Continuation of current situation

In this alternative of non implementation of NSL project activity results in the continued current grid mix. There is no displacement of electricity of the Southern grid mix.

In Alternative 2 i.e. in absence of NSL project activity, an equivalent amount of electricity would be generated by the power plants comprising the Southern grid. An equivalent amount of carbon dioxide would be generated at the thermal power generation end. This alternative is in compliance with all applicable legal and regulatory requirements and may be a part of the baseline. This scenario was the status quo of the existing facility before the project implementation.

As the alternatives are compliant with all mandatory applicable legal and regulatory requirements, the sub step 1b is also satisfied.

Outcome in Step 1: Thus, considering that the alternatives are in line with the applicable legal and regulatory requirements, the “no project option” i.e. continuation of the current practise where in the equivalent amount of energy would have been generated 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.

Step 2 Investment analysis

Determine whether the proposed project activity is economically or financially less attractive than at least one other alternative, identified in step 1, without the revenue from the sale of VERs.

Sub-step 2a: Determine appropriate analysis method

The project activity involves generation of power for sale to the grid. The Option I of carrying out the Simple Cost Analysis can be ruled out as the alternative identified, which is generation of power in the grid, can generate financial or economic benefit other than the CDM revenues. The Option II of carrying out the investment comparison analysis can be ruled as there is no suitable project activity to compare. Hence the project participant selected Option III: Benchmark analysis.

Sub-step 2b - Option III: Apply Benchmark analysis

The project proponent has chosen benchmark analysis to demonstrate additionality of the project. For this purpose project IRR has been selected as the financial indicator and Weighted Average Cost of Capital (WACC) has been chosen as the benchmark. The cost of equity used in the WACC has been calculated using the Capital Asset Pricing Model (CAPM) while the interest rate on term loan has been used as the cost of debt. The calculation procedure for WACC has been demonstrated below.

Capital Asset Pricing Model

The required return on equity investment is the return of a risk-free security plus suitable market risk premium. While considering a new project, CAPM can provide the required risk premium that the project needs to yield, taking into account the market premium and the volatility (risk) of the stock relative to the market (Beta). This required return on equity represents the cost of equity for the project.

The formula used for the calculation of the expected return on equity is

Expected Return = Risk free rate of Return + Beta x (Market returns – Risk free rate of return) (or)

$$r = R_f + \text{Beta} \times (R_M - R_f)$$

Where:

- r is the expected return rate on a security
- R_f is the rate of risk-free rate of return
- Beta is the Asset class volatility
- R_M is the return rate of the appropriate asset class.

Risk free rate of return:

The yield rate offered on central government securities have been considered to represent the risk free rate of return as it is devoid of default risk. Monthly yield to maturity rate offered on the Central Government Securities for the year 2007-08, was 8.1887%⁶.

Beta:

The β in the CAPM equation helps to account for the systematic risk by quantifying the risk associated with an asset class. Beta represents the volatility of the asset class relative to the volatility of the market. The Beta value taken for this analysis is based on the beta values of the listed private companies engaged in business similar to the project activity (i.e. the power sector) before the start of the project activity. The beta values have been calculated using 5 years of data if available.

The beta value of companies which invest exclusively in wind power projects would best represent the risk of such an asset class. However, there is only one such private entity (BF Utilities) listed on the BSE. Investments in thermal power sector are relatively less risky as compared to those in non-conventional sector and also represent the baseline scenario. Hence the beta values of the various private companies with significant investments in thermal power sector were also considered for the calculation of the average beta.

The beta values for these companies have been provided in the table given below.

Company Name	Beta ⁷ (2002-2007)
NTPC Limited	0.714
Tata Power	1.126
Reliance Infrastructure	1.067
Neyveli Lignite	1.303
BF Utilities	2.325
Gujarat India Power	1.120

⁶ http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=8819

⁷ Screenshots from Bloomberg terminal have been submitted.

Company Limited	
CESC	1.289

The leveraged beta for NSL is arrived at 0.97.

Market Rate of Return (RM)

The returns generated by BSE-500⁸ since 1999 have been used for the calculation of the market returns as the BSE-500 represents a well diversified portfolio of actively traded stocks. The data used for the calculation of market returns has been used since 1999.

$$R_m = \left[\frac{\text{BSE index at the time of start of project}}{\text{BSE index at its start in 1999}} \right]^{(1/\text{no. of years from 1999 till start of project})} - 1$$

$$= \left[\frac{7865.98}{1015.7} \right]^{(1/8.67)} - 1$$

$$= 26.64\%$$

$$\text{Risk Free Rate of Return (Rf)} = 8.1887\%⁹$$

[Source for risk free rate is Reserve Bank of India]

$$\text{Market Risk Premium, } R_m - R_f = 26.64\% - 8.1887\% = 18.45\%$$

Rate of return on equity or cost of equity benchmark is $R_i = R_f + \beta (R_m - R_f)$

$$= 8.1887\% + 0.97 \times 18.45\%$$

$$= 26.07\%$$

Hence the Cost of equity of companies engaged in similar business as that of the project is calculated as 26.07%.

Calculation of Weighted Average Cost of Capital (WACC)

The weighted average cost of capital has been calculated using the following formula

$$C_c = (D \cdot C_D \cdot (1 - TR)) + (E \cdot C_E) / T$$

The following table gives a description of the parameters and the assumptions made for calculating WACC.

Parameter	Description	Value
CE	Cost of equity	26.07%
CD	Cost of Debt	13.75%
TR	Tax Rate	33.99%
D	Debt	INR 21602.38 Lakhs
E	Equity	INR 9258.16 Lakhs
T	Total Investment	INR 30860.54 Lakhs

⁸ <http://www.bseindia.com/histdata/hindices.asp>

⁹ http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=8819

Cc	Weighted Average Cost of Capital	14.17%
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The WACC for the project activity works out to be 14.17%, which is considered the benchmark for the project IRR.

Sub-step 2c – Calculation and comparison of financial indicators

The project IRR of NSL project activity calculated at the time of conceptualization, i.e. prior to issue of the purchase order for the project activity is much lower than the weighted average cost of capital

Parameters considered for project IRR

1. Assumption: PLF of Regen WTG 32.48 %
PLF of Suzlon WTG 22.83%
2. Operational days- 365 days
3. Auxiliary consumption of 0.5%.
Justification: KERC Order dated 18th January 2005
4. Rate per kWh as INR 3.40 with no escalation for 10 years and INR 3.40 thereon from 11th year.
Justification: KERC Order dated 18th January 2005 and preliminary discussions with KPTCL
5. O&M Cost of Regen WTG for the first two years is zero and for the third year is 10 Lakhs per WTG. Year on year Escalation of 5%.
6. O&M Cost of Suzlon WTG for the first two years is zero and for the third year is 18 Lakhs per WTG. Year on year Escalation of 4%.

All financial data used to arrive at the project IRR for the NSL project would be provided to the DOE in the process of Validation and the detailed calculations are attached separately in excel sheet along with the PDD.

Sub-step 2d – Sensitivity analysis

Wind speeds are variable and therefore wind is an intermittent source of electricity. During periods of low wind, turbines cannot generate electricity and at extremely high speeds have to be shut down to prevent damage. This variable nature of wind results in low capacity utilization and reduces its attractiveness for private sector players. However, the intermittent nature of the wind may result in lower realization.

The return on the project activity is sensitive to the CUF and therefore has the potential to adversely affect the returns. However, at the time of the project appraisal, the project proponent took into

account the Carbon benefits. The following table demonstrates the sensitivity of the project IRR to the change in CUF.

Increase in percentage of Capacity Utilization Factor	Project IRR (Without CDM) %
0%	8.94%
+10%	10.03%
-10%	7.80%

From the 10% variation of the capacity utilization factor taken, it is evident that the project IRR of the project activity still remains below the WACC. Also, the CUF required to attain the rate WACC has been calculated and it is found to be very high. The capacity utilization factor reaching so high is very unlikely as the CUF in the region has been very low as stated in the KERC order dated 18 January 2005 which gives a value of 26.5% for the wind power projects in the state of Karnataka.

The sensitivity has also been carried out for the tariff price. The details are as given below:

Increase in percentage of Tariff price	Project IRR (Without CDM) %
0%	8.94%
+10%	9.71%
-10%	8.21%

From the 10% variation of the tariff price taken, it is evident that the project IRR of the project activity still remains below the WACC. However the change in tariff price is not anticipated as the power purchase agreement has already been signed for a period of 10 years.

Step 3. Barrier Analysis

Apart from the above discussed financial barrier, the project does not face other barriers.

Step 4. Common Practice analysis

Sub-step 4a – Analyze other activities similar to the proposed project activity:

An analysis of the activities that are operational and similar to the proposed project activity is presented below. The criteria for identifying similar project activities include the location of the project activities, the scale of the project, broadly similar technology and whether they have been set up in a comparable environment with respect to regulatory environment and investment climate.

Based on the above criteria similar project activity has been defined as a large scale wind power project (greater than or equal to 15MW)

set up in the state of Karnataka by private sector investors. The following projects were identified to be the large scale wind projects¹⁰ that were commissioned before the project activity:

S No	Project	Project Promoter
1	32.65 MW	Nuziveedu Seeds Limited
2	40.65MW	Ramgad Minerals & Mining Private Limited
3	30.00MW	VRL Logistics Limited
4	68.8MW	Enercon Windfarms (Hindustan) Private Limited
5	22.80MW	Enercon(India) Limited
6	15.00MW	Mineral Enterprises Limited
7	15.00MW	MMTC Limited
8	19.00MW	VSL Mining Company Private Limited
9	21.00MW	Enercon Windfarms (India) Private Limited
10	17.40 MW	Enercon Windfarms (Krishna) Limited
11	89.65MW	MSPL Limited
12	23.00MW	Hindustan Zinc Limited

To determine the penetration of similar project activities in Karnataka, CDM projects were to be excluded from the list of similar project activities. The following large scale projects from Karnataka were identified to be under CDM validation as on 31st December 2007 (web links of the projects were provided in Appendix 1):

S No	Project	Project Proponent
1	27.65 MW	Nuziveedu Seeds Limited
2	125.00MW	MSPL Limited (also includes 38.65MW project promoted by Ramgad Minerals & Mining Private Limited)
3	42.50MW	VRL Logistics Limited (includes 30.00MW project promoted by VRL Logistics Limited)
4	68.80MW	Enercon (India) Limited (includes 68.80MW project promoted by Enercon Windfarms (Hindustan) Private Limited)
5	22.80MW	Enercon(India) Limited
6	15.00MW	Mineral Enterprises Limited
7	15.00MW	MMTC Limited
8	27.50 MW	VSL Mining Company Private Limited
9	33.00MW	Enercon (India) Limited (includes 21.00MW project promoted by Enercon Windfarms (India) Private Limited)
10	73.60 MW	Enercon (India) Limited (includes 15.00 MW project promoted by Enercon Windfarms (Krishna) Limited)

¹⁰ <http://kredl.kar.nic.in/commissioned.xls>

11	30.40MW	Enercon wind farms (Chitradurga) Pvt Ltd.,(bundled project)
12	16.80MW	Enercon Windfarms (India) Pvt. Ltd (includes 8.4MW of Enercon India and 8.4MW of CEPCO Industries)
13	24.00MW	Bundled Wind Power Project
14	34.4MW	Hindustan Zinc Limited
15	29.7MW	Acciona Energy Private Limited (yet to be commissioned)

Exclusion of these CDM projects from the analysis indicated that similar project activities (large scale wind projects) have not penetrated in the region. It further strengthens NSL's claim that the proposed project was not viable in the absence of carbon credit revenue.

3 Monitoring:

3.1 Title and reference of the VCS methodology (which includes the monitoring requirements) applied to the project activity and explanation of methodology choices:

The project utilizes VCS approved CDM methodology, Version 11 of ACM0002: "Consolidated baseline methodology for grid connected electricity generation from renewable sources"

Tools referenced in this methodology:

- Version 05.2 of "Tool for the demonstration and assessment of additionality"¹¹
- Version 02 of "Tool to calculate the emission factor of an electricity system"¹²

The considered methodology is for projects that generate electricity from renewable sources like solar, wind, biomass etc and export the generated electricity to the regional electricity grid.

3.2 Monitoring, including estimation, modelling, measurement or calculation approaches:

The methodology followed by the project activity is ACM0002 (version 11) "Consolidated methodology for grid connected electricity generation from renewable energy sources".

Since the project activity is a grid connected renewable energy project, emission reduction quantity depends totally on the units exported to the grid. The methodology covers the monitoring of units wheeled along with the other parameters affecting the power export and CO₂ emissions. Hence, this is the most suitable monitoring methodology applicable for the project. The detailed monitoring plan is provided in Annexure 2.

3.3 Data and parameters monitored / Selecting relevant GHG sources, sinks and reservoirs for monitoring or estimating GHG emissions and removals:

Data / Parameter:	EGy
Data unit:	kWh
Description:	Electricity supplied by the plant to the grid
Source of data to be used:	Tariff invoices submitted to KPTCL for the electricity supplied to the grid

¹¹ <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v5.2.pdf>

¹² <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v2.pdf>

Value of data applied for the purpose of calculating expected emission reductions	287.7 million kWh in first year 1062.4 million kWh in second year 1350.8 million kWh per year from third year
Description of measurement methods and procedures to be applied:	Power supplied to the grid will be recorded at the plant using electronic tri vector meters installed at the project site. Details of the metering equipment and the procedure for measurement are detailed in Annexure-2.
QA/QC procedures to be applied:	Detailed in Annexure 2
Any comment:	The data will be archived for the crediting period plus two years in electronic or in paper form

Data / Parameter:	TEGy
Data unit:	kWh
Description:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y
Source of data to be used:	Plant energy meters
Value of data applied for the purpose of calculating expected emission reductions	289.1 million kWh in first year 1067.7 million kWh in second year 1357.6 million kWh per year from third year
Description of measurement methods and procedures to be applied:	Plant records and maintains the records of all the electricity generated.
QA/QC procedures to be applied:	Detailed in Annexure-2
Any comment:	The data will be archived for the crediting period plus two years in electronic or in paper form

3.4 Description of the monitoring plan

The detailed monitoring plan has been provided in Annexure 2.

4 GHG Emission Reductions:

4.1 Explanation of methodological choice:

The title of the VCS program approved CDM Methodology is Version 11 of Approved consolidated methodology, ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources”.

Tools referenced in this methodology:

- Version05.2 of “ Tool for the demonstration and assessment of additionality ”
- Version02 of “Tool to calculate the emission factor of an electricity system ”
- Version02 of “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion ”

This methodological tool determines the CO₂ 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) as well as the “combined margin” (CM).

The operating margin refers to a cohort of power plants that reflect the existing power plants whose electricity generation would be affected by the proposed project activity. The build margin refers to a cohort of power units that reflect the type of power units whose construction would be affected by the proposed project activity project activity.

This tool is used to determine the following parameters

Parameter	SI Unit	Description
EF _{grid,CM,y}	tCO ₂ /MWh	Combined margin CO ₂ emission factor for grid connected power generation in year y
EF _{grid,BM,y}	tCO ₂ /MWh	Build margin CO ₂ emission factor for grid connected power generation in year y
EF _{grid,OM,y}	tCO ₂ /MWh	Operating margin CO ₂ emission factor for grid connected power generation in year y

Baseline

The Baseline Emissions Factor, calculated as per the procedures laid out in the ‘Tool to calculate the Emission Factor for an Electricity System’, works out to 0.9451 kgCO₂/ KWh

The procedures followed, the choices made, the assumptions made and the source of data used for the calculation of the Baseline Emission Factor is detailed in Section 2.4

The NSL project activity reduces carbon dioxide through displacement of grid electricity generation with fossil fuel based power plants by renewable-wind electricity. The emission reduction ER_y due to NSL project activity during a given year y is calculated as the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (Ly) as per the formula given below:

$$ER_y = BE_y - PE_y - Ly$$

Where,

BE_y Baseline emissions

PE_y Project emissions;

$PE_y = 0$ for NSL project activity

Ly Emissions due to leakage;

$Ly = 0$ for NSL project activity, over crediting period (10 years)

$$\text{Baseline Emissions} = EG_y \times EF_{\text{grid,CM},y}$$

Where,

EG_y = Electricity supplied by the project activity to the grid

$EF_{\text{grid,CM},y}$ = Combined margin CO_2 emission factor

$$\begin{aligned} \text{Baseline Emissions} &= 135.08 \text{ Million kWh} \times 0.9451 \\ &= 127668 \text{ tCO}_2/\text{MWh} \end{aligned}$$

Emission Reductions

$$\begin{aligned} ER_y &= BE_y - PE_y - Ly \\ ER_y &= 127668 - 0 - 0 \\ &= 127668 \text{ tCO}_2/\text{MWh per annum} \end{aligned}$$

Therefore the anthropogenic emissions of the baseline are 1,148,943 tCO_2e over the crediting period of 10 years.

4.2 Quantifying GHG emissions and/or removals for the baseline scenario:

The below table quantifies the GHG emissions for the baseline scenario.

Year	Electricity Exported in project activity (MWh)	Combined Margin Emission Factor (tCO_2e/MWh)	Estimation of baseline emission reductions tCO_2e
2008	28772	0.9451	27192
2009	106240	0.9451	100407
2010	135084	0.9451	127668
2011	135084	0.9451	127668
2012	135084	0.9451	127668
2013	135084	0.9451	127668
2014	135084	0.9451	127668

2015	135084	0.9451	127668
2016	135084	0.9451	127668
2017	135084	0.9451	127668
Total	1215681		1148943

4.3 Quantifying GHG emissions and/or removals for the project:

The below table quantifies the GHG emissions for the project activity.

Year	Electricity Imported in baseline scenario (MWh)	Combined Margin Emission Factor (tCO ₂ e/MWh)	Estimation of baseline emission reductions tCO ₂ e
2009	0	0.9451	0
2010	0	0.9451	0
2011	0	0.9451	0
2012	0	0.9451	0
2013	0	0.9451	0
2014	0	0.9451	0
2015	0	0.9451	0
2016	0	0.9451	0
2017	0	0.9451	0
2018	0	0.9451	0
Total	0		0

4.4 Quantifying GHG emission reductions and removal enhancements for the GHG project:

The below table quantifies the total GHG emission reductions occurring because of project activity.

Period	Baseline Emissions (tCO ₂)	Project Emissions (tCO ₂)	Leakage (tCO ₂)	Emission Reductions (tCO ₂)
2009	27192	0	0	27192
2010	100407	0	0	100407
2011	127668	0	0	127668
2012	127668	0	0	127668
2013	127668	0	0	127668
2014	127668	0	0	127668
2015	127668	0	0	127668
2016	127668	0	0	127668
2017	127668	0	0	127668
2018	127668	0	0	127668
Total	1148943	0	0	1148943

5 Environmental Impact:

Though this project activity does not fall under the purview of Environmental Impact Assessment notification of the Ministry of Environment and Forests – Government of India (GOI), due consideration has been given to environmental aspects. The GOI has adopted an encouraging policy for private wind farms in the country. NSL already has an Environment Management system in place. All the environmental related issues were identified and necessary steps to mitigate them have been put in place by the implementation of the Environmental Management System. As such no significant impact is anticipated on the environment front. However, certain foreseen impacts due to the project activity are described as under:

Construction Phase:

Impact on Land use

The land on which the project activity takes place is barren and unfertile. Prior to the project activity the land had no beneficial use. NSL has brought the land for a worthwhile application and obtained necessary approvals for installation of windmills. No dislocation of people is involved in the course of the project activity.

Impact on Soil use

The minor quantity of solid/liquid discharge, likely to be generated during the construction phase has no noticeable impact on soil use and the project proponent has made arrangements to dispose them in an environmentally acceptable manner.

Impact on Air Environment

Wind Power plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation. The source of emission that is anticipated is due to the exhaust released due to the running of the HEMV, during the movement of the construction material, which shall be properly maintained to minimize the smoke. The dust so generated during haulage shall be minimized by sprinkling water.

Impact on noise environment

Personal protective equipments are provided to workers involved in the construction activity to mitigate the effects of noise pollution, but they have no impact on ambient noise level.

The emissions involved in the construction of the wind power plant and the gridlines are negligible as a percentage of the total power generated. Taking into consideration the project life cycle, the magnitude of the impacts during the construction phase is negligible

and exists for a temporary period of time till the end of construction phase. Therefore, it would not affect the environment considerably.

Operation and Maintenance Phase:

NSL maintains highest level of safety standards. Systematic and scientific maintenance of all equipments has been undertaken to ensure the best safety standards.

Impact on Land use

The project site is a barren land and unproductive area with no application and habitat. There are no migratory birds/endangered species in the region of project activity. Therefore no harm on the ecological environment is envisaged.

Impact on Noise Environment

Noise is generated due to the movement of rotor blades. It has no direct effect on the population, as the area is less populated and noise generated will be attenuated by ambient conditions. Though noise is generated during the operation of wind turbine generators, the overall impact of the project in reducing GHG's, creation of employment etc., makes this effect negligible.

Socio-Economic Impacts

There is no inconvenience to the local community due to the transmission lines. The locals have benefited economically through land sales. The project activity helps the upliftment of skilled and unskilled manpower in the region. The project will be providing employment opportunities not only during the construction phase, but also during its operational lifetime. The project activity improves employment rate and livelihood of local populace in the vicinity of the project. Moreover, the project generates eco-friendly, GHG free power which contributes to sustainable development of the region.

Conclusion

The net impact under environmental pollution category would be positive as all necessary abatement measures would be adopted and periodically monitored. The project activity does not have any major adverse impacts on environment during its construction or operational phase. The human interest parameters would show positive impacts due to increased job opportunities at the facility as well as other ancillary units coming up.

6 Stakeholders comments:

NSL identified the following local stakeholders to be associated with the project activities, directly or indirectly.

The typical groups of the stakeholders identified are

- Karnataka State Pollution Control Board
- Employees of the KPTCL
- Local people
- Farmers
- WEG Contractors

The stakeholder meeting was conducted on 14 November 2008 at the project site located near Bhimasamudra in Chitradurga district, Karnataka. All the stakeholders were informed about the agenda, venue and date of the meeting through notices issued 15 days prior to the meeting. Further, a project concept note, which gives a clear idea on the project activity including the measures taken under the project and the benefits achieved by the project, was also issued along with the notices as information to the concern stakeholder.

The consultation meeting was conducted by NSL at the wind farm site office. The stakeholder consultation meeting was attended by participants representing various groups of the stakeholder (as mentioned above), details on the participants has been recorded. The meetings started with a brief presentation on Carbon mechanisms. There after it was explained to the stakeholder as how the wind farm project by NSL has led to significant reduction in emissions of greenhouse gases either directly or indirectly and hence how it helps in contributing to the global efforts towards combating global warming. NSL further explained the other sustainable development benefits associated with the project. The stakeholders viewed NSL as a reputed company contributing to local socio-economy. Overall there was unanimous agreement that the proposed project was a beneficial project from sustainability viewpoint.

Summary of comments:

Concerns and responses as recorded during the meeting at the sites of the wind farm area:

All the stakeholders were happy in knowing that the project activity in their locality is contributing to a global cause and they commended the NSL management for their initiatives in the areas of climate change and sustainable development. In particular, the stakeholders

lauded the project promoters for the environment friendly power generation using wind.

The stakeholder meeting was conducted at NSL's plant site and was attended by the residents of the nearby villages, the employees of NSL and representative of relevant ESCOM. Summary of the comments received from the stakeholders

Local Population: The villagers expressed their pleasure with the setting up of the power project as it had provided the rural population with permanent employment opportunities. Indirect employment generated as result of the project activity was highlighted by the villagers. The increase in the land prices subsequent to the setting up of the project was a welcome boon for the villagers.

Representative of KPTCL: Stated the setting up of the power project has helped in reducing the transmission & distribution losses.

Employees: The local population hired for the project activity are pleased with the employment opportunity available to them which was absent in the region prior to the commissioning of the plant.

7 Schedule:

S.NO	Date	Description
1	10th December 2007	Purchase Order for Supply, erection and commissioning and operation and maintenance services
2	26th March 2008	Pre-commissioning tests conducted by KPTCL for 13.5MW
3	25th April 2008	Approached Consultant for Carbon credits
4	17th June 2008	Appointment of Carbon consultant
5	27th June 2008	Clearance from Ministry of Environment and Forests (MOEF)

8 Ownership:

8.1 Proof of Title:

Provide evidence of proof of title through one of the following:

All the activities of the project are done in the name of Nuziveedu Seeds Limited (NSL). The purchase of equipment, power purchase agreement and all clearances have been done in the name of NSL, which will be provided as evidence of proof of title.

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

Not Applicable

Annexure 1

BASELINE INFORMATION

As per the procedure for renewal of the crediting period, the baseline has been updated and the latest data available for the period 2006-07 to 2008-09 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 Southern grid, the details of which is available on the following website and is detailed below as well:

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

Version 5.0 of the Baseline carbon dioxide emission database has been used.

Simple Operating Margin (tCO₂/MWh)

	2005-06	2006-07	2007-08	2008-09
NEWNE	1.02	1.01	1.00	1.01
South	1.01	1.00	0.99	0.97
India	1.02	1.01	1.00	1.01

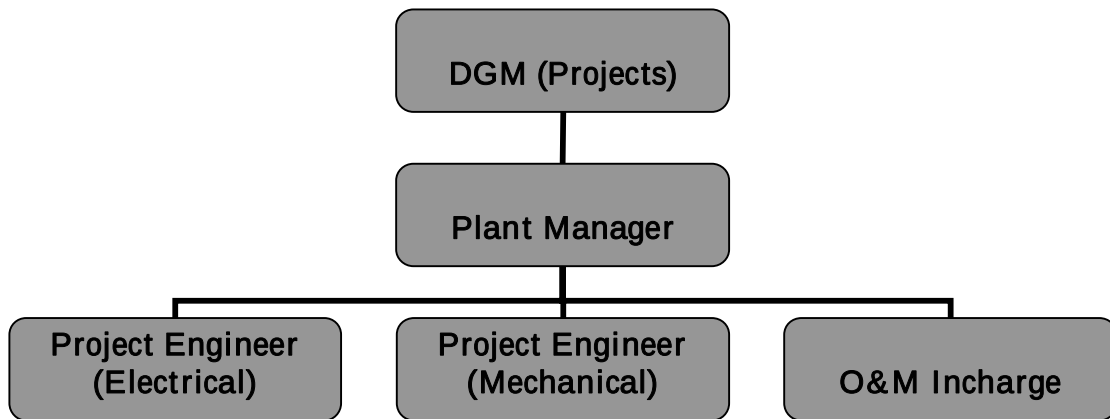
Build Margin (tCO₂/MWh)

	2005-06	2006-07	2007-08	2008-09
NEWNE	0.67	0.63	0.60	0.68
South	0.71	0.70	0.71	0.82
India	0.68	0.65	0.63	0.71

Annexure 2

MONITORING INFORMATION

The organization structure for monitoring is provided below



Responsibilities:

DGM (Projects): Responsible for overall implementation of the project activity. Coordinates with Plant Manager for installation and commissioning of the wind turbines. Coordinates with KPTCL authorities, Wind turbine supplier and other government authorities for obtaining all the required clearances of the project activity. Coordinates with plant manager for the operation of the project activity.

Plant Manager: Responsible for day to day operation of the project activity. Coordinates with project engineers and O&M incharge for the operation and maintenance of the project activity. Supervises the monitoring of electricity generation and export. Coordinates with KPTCL authorities for monthly recording of electricity exported and imported.

Project Engineers: Coordinate with plant manager on day to day operations of the plant. Coordinate with O&M Incharge on the operation and maintenance of the project.

O&M Incharge: Supervises the O&M activities of the wind turbines. Helps project engineers in addressing Operation and Maintenance issues at the plant.

Emergency Preparedness Plan

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. ReGen/Suzlon, the O&M service provider(s) 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 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.

Metering Equipment:

Metering equipment used in the project activity are electronic tri vector meters of accuracy class 0.2%. The metering equipment will be maintained in accordance with electricity standards.

For monitoring the export to the grid, a check meter and main meter have been installed at the project site.

Meter Readings:

For the estimation of Emission Reductions, the Invoices submitted to KPTCL by NSL would be used. The paragraph below details the procedure of taking the meter readings.

The monthly meter readings (both the check and the main meter) will be taken jointly by the parties. In case it is not possible to take the readings on the specified date, the readings will be taken the next day. From the WTG, the power generated will be exported to a sub-station located near the project site. The generation data (Joint meter reading) recorded at the sub-station will be cross checked with the meter readings (main & check) available at the WTG. At the conclusion of the each meter reading, an appointed representative of KPTCL and NSL will sign the document indicating the number of kilowatt hours indicated by the meter.

QA/QC procedure:

Inspection of the Energy meters by KPTCL:

Meter Test Checking:

All the main and check meters will be calibrated on an annual basis with reference to a portable sub-standard meter which will be of an accuracy class of 0.1%. The meters will be deemed as working satisfactorily if the errors are within specifications for meters of 0.2% accuracy class. The consumption registered by the main meter alone will hold good for the purpose of billing as long as the error in the main meter is within the permissible limits.

As per the Point 7.5 of Article 7 of PPA, at any point, if both the main and check meter fail, then meters will be immediately calibrated and the correction applied to the reading registered by the main meter to arrive at the correct reading of energy supplied for billing purposes for the period from the last month's meter reading up to the current test.

Meters for Power Generation

The meters used for monitoring of power generation shall also be calibrated on an annual basis.

Annexure 3

LIST OF WIND POWER PROJECTS SEEKING CDM FUNDS IN
THE STATE OF KARNATAKA

1. Enercon Wind Farms in Karnataka Bundled Project – 33 MW
<http://cdm.unfccc.int/Projects/DB/SGS-UKL1187708460.15/view>
2. Enercon Wind Farms in Karnataka Bundled Project – 30.40 MW
<http://cdm.unfccc.int/Projects/DB/SGS-UKL1187092432.51/view>
3. Enercon Wind Farms in Karnataka Bundled Project - 73.60 MW
<http://cdm.unfccc.int/Projects/DB/SGS-UKL1186566570.26/view>
4. Enercon Wind Farm (Hindustan) Ltd in Karnataka (68.8MW)
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1185356859.49/view>
5. NSL 27.65 MW Wind Power Project in Karnataka, India
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1173772302.89/view>
6. 125 MW Wind Power Project in Karnataka, India
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view>
7. Bundled wind power project in Chitradurga (Karnataka in India) managed by Enercon (India) Ltd. (16.8MW)
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1140782658.34/view>
8. 3 MW Wind Power Project at Chikkasiddavanahalli village, Chitradurga district, Karnataka
<http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1188180106.74/view>
9. 2.5 MW BEL grid-connected wind power project at Davanagere district, Karnataka, India
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1182504310.21/view>
10. 7.85 MW Bundled Wind Power Project in Southern India
<http://cdm.unfccc.int/Projects/DB/RWTUV1176371045.94/view>
11. 13.4 MW bundled wind power project in Chithradurga, Karnataka
<http://cdm.unfccc.int/Projects/DB/DNV-CUK1174882593.98/view>
12. Bundled 15 MW Wind Power Project in India (only 3.75MW in Karnataka)
<http://cdm.unfccc.int/Projects/DB/RWTUV1173341097.6/view>
13. Bharat Petroleum Corporation Limited (BPCL)'s Wind Power Project, India (5MW)

<http://cdm.unfccc.int/Projects/DB/DNV-CUK1218300485.48/view>

14. 15 MW Grid Connected Wind Turbine Project in Karnataka
<http://cdm.unfccc.int/Projects/DB/BVQI1207721413.19/view>
15. 15 MW grid-connected wind power project by MMTC in Karnataka
<http://cdm.unfccc.int/Projects/DB/RWTUV1207728922.94/view>
16. 8.5 MW wind power project in Chitradurga district in Karnataka by Jindal Aluminium Ltd.
<http://cdm.unfccc.int/Projects/DB/BVQI1194926678.18/view>
17. 7.2 MW Wind Project at Chitradurga, Karnataka
<http://cdm.unfccc.int/Projects/DB/RWTUV1189519091.84/view>