Voluntary Carbon Standard
Project Description Template

19 November 2007

Date of VCS PDD : *31 August 2009*
Version: 02

Table of Contents

1.	Description of Project	Page 2
2.	VCS Methodology	Page 8
3.	Monitoring	Page 16
4.	GHG Emission Reductions	Page 27
5.	Environmental Impact	Page 32
6.	Stakeholders Comments	Page 33
7.	Schedule	Page 34
8.	Ownership	Page 34
	Annexure 1: *Procedure for calculating emission reduction*	
	Annexure 2: *Specification of WTG*	
	Annexure 3: *Stakeholdrers' Meeting*	

1 Description of Project:

1.1 Project title

6.25 MW Wind Power Generation project of Salora International Limited

1.2 Type/Category of the project

- *Renewable Energy Project using CDM approved methodology AMS-I.D Ver 13: Grid connected renewable electricity generation.*

The project activity is :-

- Is a installation and operation of 5 renewable energy generation units that use only wind energy to generate electricity that is supplied to the electricity distribution system state grid (NEWNE grid).
- Has a total rated generation capacity of the project activity is 6.25 MW that is less than 15MW as stipulated by the methodology AMS-I.D Ver 13: Grid connected renewable electricity generation.
- Is a new installation and not capacity addition in an existing renewable energy generation facility of the project proponent,
- Is not a combined heat and power (co-generation) generation facility.

Hence, application of approved small-scale methodology AMS-I.D Ver 13: Grid connected renewable electricity generation.
is justified for the project activity

- This project is not a grouped project

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

Year	Annual estimation of Emission Reductions (t CO2e)
01/08/2006 to 31/07/2007	9440
01/08/2007 to 31/07/2008	9440
01/08/2008 to 31/07/2009	9440
01/08/2009 to 31/07/2010	9440
01/08/2010 to 31/07/2011	9440
01/08/2011 to 31/07/2012	9440
01/08/2012 to 31/07/2013	9440
01/08/2013 to 31/07/2014	9440
01/08/2014 to 31/07/2015	9440
01/08/2015 to 31/07/2016	9440
Total estimated reductions (tonnes of CO2e)	94400

Total number of crediting years	10

The annual emission reduction from the project is more than 5000 tCO_2/year but less than 1000000 tCO_2/year, Hence as per VCS Standard 2007.1 it is in the category 'Project'.

1.4 A brief description of the project:

Salora International Limited (hereinafter referred to as "SIL"), the project proponent, had initiated the project activity based on renewable energy to partially displace the GHG emission that would have taken place had an equivalent quantity of power as generated in the project activity been met out of combustion of fossil fuels.

The project activity consists of renewable energy based power generation facility at Dhule districts in the state of Maharashtra in India. The project activity utilises the kinetic energy of wind to produce electrical power using five Wind Turbine Generators (WTGs), each with a rated capacity of 1.25 MW and total of 6.25MW(5*1.25MW).The power generated is sold to the Maharashtra State Electricity Distribution Company Limited (MSEDCL). The power generated is evacuated through HV transmission lines to the facility's switchyard and from the switchyard up to the state grid (NEWNE grid) Extra High Voltage (EHV) substation at Khori . The turbines had been manufactured, supplied and erected by M/s Suzlon Energy Limited (hereafter referred to as "SEL"). The capital expenditure in the project activity also includes civil and electrical infrastructure of the wind farm and the land purchased/leased for installation of the WTGs.

This project activity reduces the GHG emissions generated by the current energy mix in India's NEWNE Power Grid. This power grid is dominated by power generated from fossil fuel. The wind power project of SIL provides its entire generation to MSEDCL under a 13 year Power Purchase Agreement signed with the power distribution company i.e.MSEDCL (Maharashtra State Electricity Distribution Company Limited)

The contribution of the project towards sustainable development are as below:

- Reduction in the consumption of fossil fuels in the grid for generating additional electricity equivalent to that generated by the wind mills;
- Reduction of GHG emission through development of renewable energy based technology.
- The project has reduced air pollutants and environmental impacts due to increased share of electricity generation through wind power.
- Since the project uses renewable wind resources for power generation, it does not lead to any emissions in the environment.
- Generation of employment opportunities for the people during the construction phase of the project leading to improvement in living standards of the local population.
- The project has created business opportunity in the nearby area.
- The economic well being of the nation is improved by the project activity due to reduced dependence on fossil fuel in power generation.

The project boundary encompasses the physical, geographical site of the Wind Turbine Generators (WTGs) at Petle village. It includes the wind turbine installations, the common meters on the feeders through which power is evacuated to the NEWNE Grid and the NEWNE Grid

A pictoral depiction of the project boundary is given in the figure below:-

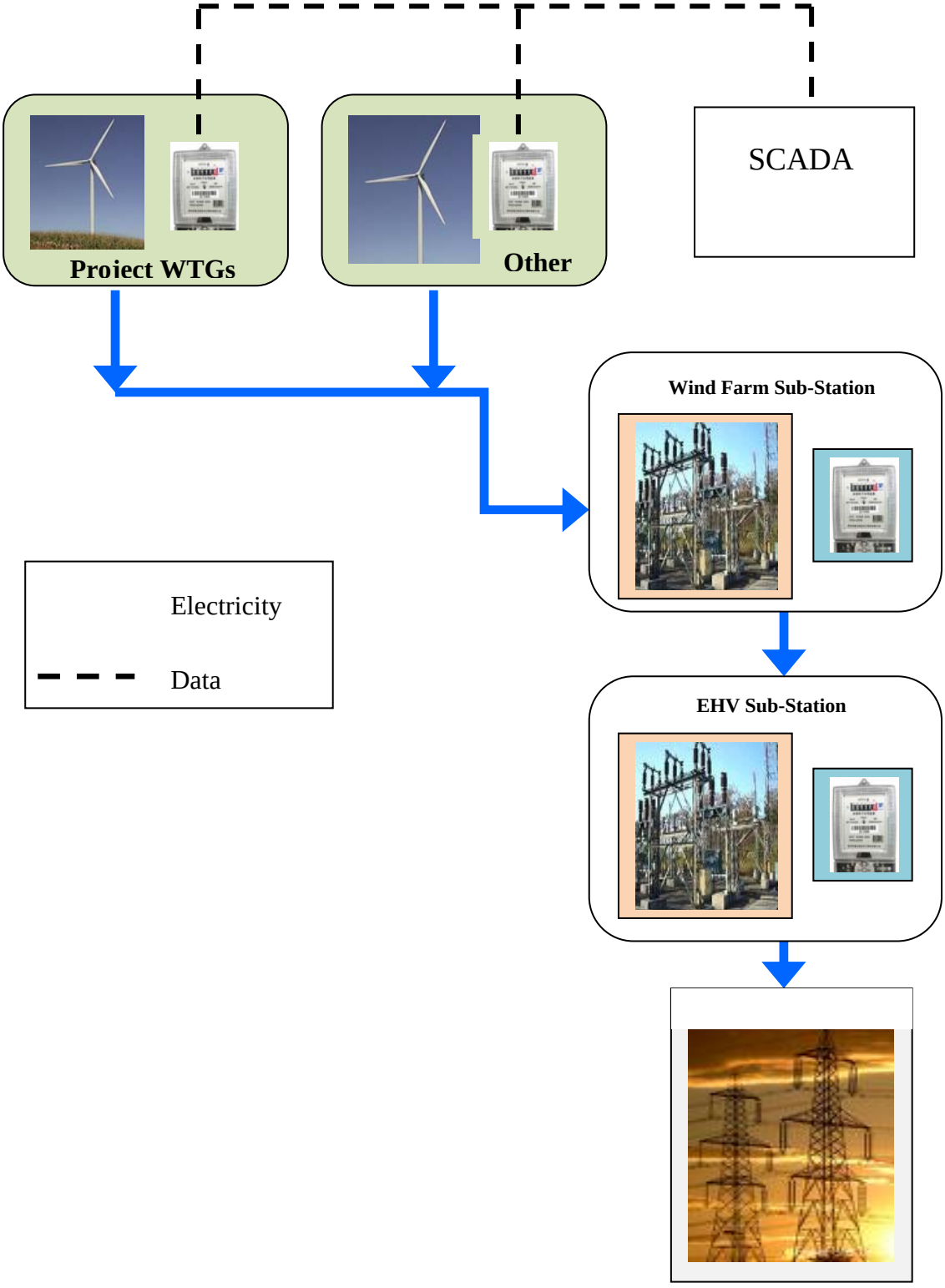
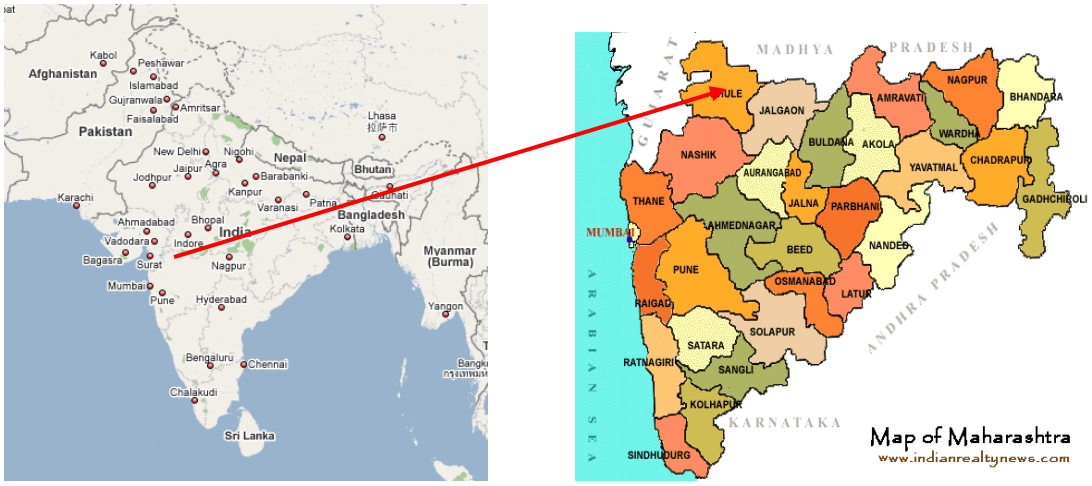


Fig.:- Project boundary

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

Sr.No.	WTG	Location	Latitude	Longitude
1	J104	R.S.No.59 & R.S.No.01 Village: Petle , Panhalipada, Isharde;Taluka Sakri; Dist Dhule; Maharashtra	N21 12 15.0	E74 19 22.9
2	J106		N21 13 25.7	E74 19 06.5
3	J107	R.S.No.138 , R.S.No.01 & R.S.No.16 ,Village: Petle ;Taluka Sakri; Dist Dhule; Maharashtra	N21 13 45.1	E74 19 06.8
4	J108		N21 13 16.3	E74 18 59.8
5	J109		N21 14 39.0	E74 18 55.7



1.6 Duration of the project activity/crediting period:

- *Project start date:*31/07/2006
  crediting start date:-: 31/07/ 2006

Sr. No.	*WTG*	*Date of financial commitment(PO)*	*Date of commissioning*
1	J104	16/12/2005	31/07/2006
2	J106	16/12/2005	03/08/2006
3	J107	16/12/2005	01/08/2006
4	J108	16/12/2005	01/08/2006
5	J109	16/12/2005	01/08/2006

1.7 Conditions prior to project initiation:

The Indian electricity system is divided into two regional grids, viz. NEWNE grid and the Southern grid. Each grid covers several states under its regional boundaries. The NEWNE Grid is supplied predominantly by fossil fuel based thermal power plants which comprises of 68.4% of the total power supplied by the grid. The additional power requirement is thus met by newly installed capacity according to business as usual, which means predominantly new fossil fuel based power plants.

Region	**Installed capacity**					**% of total**	
	Thermal	**Nuclear**	**Hydro**	**Other RES**	**Total**	**RES#**	**Thermal**
	MW	MW	MW	MW	MW	%	%
NEWNE Grid	**69617.7**	**3020**	**24562.58**	**4628.44**	**101828.7**	**4.5%**	**68.4%**

Source: Annual Report 2007-08: Ministry of Power (April'07 to Jan'08)

The project proponent has attempted to reduce GHG emission due to power generation from conventional fuel sources by implementing the renewable energy project based on wind energy and supplying the power generated there to the state power grid. Power generated by the WTGs in the project activity will be provided to MSEDCL under a 13 year Wind Energy Purchase Agreement (WEPA)

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

The project activity is a new facility for generating power from a renewable source of energy and evacuating this power to the NEWNE Grid.

In the baseline scenario, the fossil fuel dominated NEWNE Grid would have continued to meet the power demand from the existing generation sources. The project activity involves power generation from a renewable source with no emission. Thus the project activity achieves reduction in GHG emission that would

have otherwise occurred due to generation of equivalent power from fossil fuel sources.

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

The proposed project activity generates electricity by converting the kinetic energy of the wind into mechanical energy that is used to turn a generator for converting this mechanical energy into electrical energy. The power generated in the Wind Turbine Generator (WTG) is thereafter evacuated to the electrical grid.

The WTG has the main rotor shaft and electrical generator at the top of the tower. A wind sensor coupled with a servo motor allows the rotor to be always pointed in the direction of the wind. The main rotor shaft is coupled to a gearbox, which converts the slow rotation of the blades into a quicker rotation to drive the electrical generator. The specifications of the WTGs are given in Annexure 2.

The electrical power generated from the project activity is evacuated to the NEWNE Grid System through Extra High Voltage (EHV) sub-station. There are High Voltage (HV) transmission lines and complete installation of allied equipments for evacuation of the generated power to the NEWNE grid through the EHV substation.

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

There is no law or regulation in India that makes it mandatory for the project participant to put up a power generation facility of this capacity based on renewable (wind) energy, nor does any law or regulation prohibit the same.

The project was approved by the Maharashtra Energy Development Agency (MEDA), the Nodal Agency of the State Government of Maharashtra for promotion and popularization of Renewable Energy and Energy Conservation in the state of Maharashtra. Thus, the project activity is in line with prevailing laws and regulations of India.

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

The risks affecting GHG reduction due to the project activity are

Availability of wind
Wind is an infirm source of power. The project activity is entirely dependant on the availability of wind, wind velocity and direction to generate power and thereby reduce GHG emissions. Hence, as is normal in such circumstances, a change in the wind pattern will change the power generated and thereby the emission reduction due to the project activity.

Locational risk
The wind farms are located in remote areas. In case of a breakdown this results in delays in assembling resources required for the necessary maintenance activities. The resultant increase in breakdown hours causes reduction of GHG emissions possible from the project activity.

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 activity involves power generation from a renewable source and does not contribute in any way to GHG emissions. Hence, the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

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

The project has not created any other form of environmental credit.

However, if REC trading schemes are enforced in India, the project proponent will withdraw from the VCS Program from the date of enforcement of such schemes.

In the eventuality that there is an option available to the project participant, then the latter will provide a letter from the REC program operator that the credit has not been used and has been cancelled from the relevant program.

The project proponent will ensure that there is no double accounting of emission reduction with any other GHG program during the VCS crediting period.

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

The project has not applied for credit from any other GHG programme.

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

The project proponent is responsible for the operation and maintenance of the project activity. SIL has appointed SEL as the agency to operate and maintain the WTG, its auxiliaries and all monitoring equipment upto the point of evacuation of power on its behalf. SIL is also responsible for maintaining all documents required in monitoring and verification of the project activity.

The contact information of the project proponent is given below

Organization:	Salora international Ltd.
Street/P.O.Box:	110 020
Building:	D – 13/4, Okhla Industrial Area
City:	New Delhi
State/Region:	Delhi
Postfix/ZIP:	Phase – II
Country:	India
Telephone:	011 – 29207100 / 011 – 29207101
FAX:	011 – 26388581
E-Mail:	gkj@salora.com
URL:	www.salora.com
Represented by:	Gopal Sitaram Jiwarajka
Title:	Vice Chairman & Managing Director
Salutation:	
Last Name:	Jiwarajka
Middle Name:	Sitaram
First Name:	Gopal
Department:	Management
Mobile:	

Direct FAX:	011 – 26388581
Direct tel:	011 – 29207105
Personal E-Mail:	gkj@salora.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.):

In calculating the emission reduction due to the project activity, the Combined Margin emission factor for the electricity distribution grid has to be calculated using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1. Central Electricity Authority, the National Authority on electrical systems in India has calculated the emission factors using the same tool and has published their result in User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4[1]. The Combined Margin emission factor for wind energy systems has been calculated as per equation (13) on Pg 14 of 'Tools to calculate the emission factor for an electricity system' Ver 01.1 using the Simple Operating Margin emission factor and Build Margin emission factor as given in Table B Appendix C - Grid Emission Factors of User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4.

The contribution of the project towards sustainable development are as below:

- Reduction in the consumption of fossil fuels in the grid for generating additional electricity equivalent to that generated by the wind mills;
- Reduction of GHG emission through development of renewable energy based technology.
- The project has reduced air pollutants and environmental impacts due to increased share of electricity generation through wind power.
- Since the project uses renewable wind resources for power generation, it does not lead to any emissions in the environment.

[1] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf

- Generation of employment opportunities for the people during the construction phase of the project leading to improvement in living standards of the local population.
- The project has created business opportunity in the nearby area.
- The economic well being of the nation is improved by the project activity due to reduced dependence on fossil fuel in power generation.

1.17 List of commercially sensitive information (if applicable):

Not applicable

2 VCS Methodology:

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

Methodology applied: UNFCCC Clean Development Mechanism approved small scale methodology AMS-I.D Ver 13.

The project activity is

a) installation and operation of four renewable energy generation units that use wind energy to generate electricity that is supplied to the electricity distribution system, i.e. the NEWNE Grid,
b) the total rated generation capacity of the project activity is 5.0 MW that is less than 15MW as stipulated by the methodology AMS-I.D Ver 13,
c) the generating units are also new installations and not capacity addition in an existing renewable energy generation facility of the project proponent,
d) there is no combined heat and power (co-generation) generation involved in the project activity.

Hence, application of approved small-scale methodology AMS-I.D Ver 13 is justified for the project activity..

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

The project activity comprises of renewable energy generation utilising wind energy. The electricity generated is supplied to the electricity distribution system, i.e. the NEWNE Grid. The total rated generation capacity of the project activity is 6.25 MW

that is less than 15 MW as stipulated by the methodology AMS-I.D Ver 13. The generating unit is also a new installation and not capacity addition in an existing renewable energy generation facility of the project proponent. Hence, application of approved small-scale methodology AMS-I.D Ver 13 is justified for the project activity.

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

The GHG sources and sinks for the baseline scenario and the project activity have been identified below:

	Sources	Gas	Included?	Justification / Explanation
Baseline	Electricity generation from power plants connected to the Western Grid	CO2	Yes	Main emission source
		CH4	No	Excluded for simplification. This is conservative.
		N2O	No	Excluded for simplification. This is conservative.
Project Activity	No emission from the Wind Turbine Generator	CO2	No	Wind energy generation does not have any direct GHG emissions.
		CH4	No	
		N2O	No	

In the baseline scenario, an equivalent amount of power would have otherwise been generated by operation of existing power plants in the NEWNE Grid and by addition of new fossil fuel based generation sources.

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

The project activity is a new installation for supplying electricity generated from renewable energy to the electricity distribution system, i.e. the NEWNE Grid. In the baseline scenario, the power demand on the NEWNE grid would have been met from the existing power plants supplying power to the NEWNE grid that is dominated by fossil fuel based power plants. The project activity involves power generation from a renewable source with no emission. Hence, the emission reduction due to the project activity is the baseline emission.

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):

In accordance with paragraph 28 of the simplified modalities and procedures for small scale CDM projects, a simplified baseline and monitoring methodology listed in Appendix B may be used if the project participant can demonstrate that project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in the Attachment A to Appendix B.

Project participant has chosen to demonstrate additionality of the project activity due to presence of investment barrier by means of benchmark analysis. The benchmark analysis shows that there are constraints in achieving the return on investment made in the project activity and the additional revenue from VCUs will assist the project participant in overcoming this constraint. The benchmark analysis has been done using the data that is specific to the project activity.

A benchmark analysis has been done with project IRR as the financial indicator and the existing commercial lending rate at the time of the investment decision serving as the benchmark for additionality check.

In case of the project activity, issues such as transmission unavailability, back-down of generation or part-load operations, which are beyond the control of the project proponent are likely to affect the project activity severely and therefore a higher rate of return is required to compensate for these additional risks.

Based on the above-mentioned benchmark, the calculation and benchmark analysis of financial indicators are carried out for the project activity.

The basic parameters for calculation of the financial indicators of the project activity are listed below in Table . The post-tax project IRR was calculated on the basis of the information presented below:

Table

Basis			Source
Plant Capacity	6.25	MW	Purchase order
CUF (also known as PLF)	20.00%	per annum	Section 2.2.2 of Maharashtra Electricity Regulatory Commission –Wind Tariff Order dated 24/11/2003
Line losses	5%		
Generation (annual)	9882	MWH	Calculated
Commercial Operation Date	3-August-06		Commissioning certificates
End of First year of Financial Operation	31-Mar-07		
Plant Life	20	Years	Equipment supply Agreement
Operation and Maintenance expenses			
O&M exp.	a)2500000 (for 3rd year of operation) b) 5000000 (from 4 th year with 5% escalation)		From O&M Agreement
O&M exp.	5.00%	escalation every year	From O&M Agreement
Insurance Cost(Rs.per annum)	235,869		Insurance Policy
MSEDCL's 1st Year Tariff	3.50	INR	MSERC's terrif policy /Power Purchase Agreement
Escalation in tariff/pa	0.15	INR For 13 years	Power Purchase Agreement
Depreciation Norms			
Depreciation life-Plant & Machinery	18	Years	Calculated as per Companies Act 1956
Maximum Depreciation Considered-Tariff	90%	of the project cost	MERC Tariff Regulations 2005 Para 34.4.1

Maximum Depreciation Allowed-Books	95%	of the project cost	As per I-T Act 1962
Maximum Depreciation Allowed-IT	100%	of the project cost	As per I-T Act 1962
Depreciation Rate-Books			
Plant and Machinery	5.28%		As per Companies Act 1956
Civil Works	3.34%		As per Companies Act 1956
Depreciaiton Rate (IT Act)-WDV	80.00%	of the depreciable project cost	As per I-T Act 1962
Salvage Value	5%	of the project cost	As per notification of Central Electricity Regulatory Commission
Tax			
Year of starting for 80IA benefit	1		As per I-T Act 1962
Duration of 80IA benefit	10	years	As per I-T Act 1962
Deduction Available under 80 IA	100%	of taxable profits	As per I-T Act 1962
Income Tax	33.99%	per annum	As per I-T Act 1962
Base Rate	*30.00%*	per annum	As per I-T Act 1962
Surcharge	*10.00%*	per annum	As per I-T Act 1962
Education Cess	*2.00%*	per annum	As per I-T Act 1962
MAT	8.42%	per annum	As per I-T Act 1962
Base Rate	*7.5%*	per annum	As per I-T Act 1962
Surcharge	*10.00%*	per annum	As per I-T Act 1962
Education Cess	*2.00%*	per annum	As per I-T Act 1962
Consider MAT Credit	yes		As per I-T Act 1962
MAT Credit availability Period	7	years	As per I-T Act 1962
Service Tax	10.2%	per annum	As per Finance Act 1994
MEDA charges			
Application fee @ Rs 3000/MW	18750.00	INR	As per norms of MEDA
Processing Fee @ Rs 500000/MW	3125000.00	INR	As per norms of MEDA
Refundable security deposit @ Rs 1500000/MW/WTG	9375000.00	INR	As per norms of MEDA
Annual maintenance charges for approach	93750.00	INR	As per norms of MEDA

road @ Rs 15000/MW/WTG			
MSEDCL charges			
Annual administrative charges @ Rs 9000/metering point	45000.00		As per norms of MSEDCL
Benchmark Prime Lending Rate (BPLR)			
BPLR	10.25%		Appendix Table 41: Interest Rate Structure of Scheduled Commercial Banks, RBI Annual Report 2006-07[2]

Table

	Without carbon credits
Post tax Project IRR	7.44%

As observed from the investment analysis above, the post tax project IRR is significantly less than benchmark prime lending rate of 10.25% published in Appendix Table 41 'Interest Rate Structure of Scheduled Commercial Banks' of Annual Report 2006-2007 of the Reserve Bank of India.

The purpose of the sensitivity analysis is to examine whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumption. The investment analysis provides a valid argument in favor of additionality if it consistently supports the conclusion that the project activity is unlikely to be the most financially attractive or is unlikely to be least financially attractive. As for the proposed project, the Plant Load Factor (PLF) is identified as the variable factor to conduct the sensitivity analysis.

Any variation in the PLF directly affects the earnings from the project activity as it affects the utilization of the installed capacity of the renewable power generation unit. It may be noted here that the average PLF as calculated from actual power generated in the project activity is 17.55%. In Maharashtra[3], where the project is located, the

[2] http://rbidocs.rbi.org.in/rdocs/AnnualReport/PDFs/79601.pdf

[3] http://www.indianwindpower.com/potential.html

typical achieved PLF ranges from 18% to 22%, as evidenced in the information available on the website of Indian Wind Turbine Manufacturers' Association[4].

Power generated in the project activity is sold to the state utility. In accordance with the Electricity Act, the tariff for the project is determined by the Maharashtra Electricity Regulatory Commission (MERC). MERC Order for determination of tariff from wind generation sources is based on information obtained from various stakeholders including wind farm developers and consultation agencies.Maharashtra Electricity Regulatory Commission, in its Tariff Order[5] dated 24/11/2003 ruled that for projects commissioned after April 2003, the PLF should be 20% and the same has been adopted for the benchmark analysis. The actual power generation from the WTGs as recorded and presented in Table Va and Table Vb below also demonstrates that the PLF so assumed for the analysis is conservative.

The sensitivity analysis clearly demonstrates the dependence of project IRR on PLF and also shows that a project IRR over the benchmark of 10.25% is only possible for PLF of 26% which is more than the PLF of 25.57% guaranteed by the equipment manufacturer for the first year of operation.

The sensitivity of project IRR towards change in PLF

Table

Case No.	Description	Project IRR without VER Revenue (Post Tax)	Project IRR with VER Revenue (Post Tax)
	Current Case	7.44%	7.44%
	Base Case	**7.44%**	**7.99%**
1	Reduction in PLF by 2%	6.04%	6.54%
2	Reduction in PLF by 4%	4.54%	4.99%
3	Reduction in PLF by 6%	2.79%	3.27%
4	Reduction in PLF by 8%	0.51%	0.94%
5	Reduction in PLF by 10%	-2.23%	-1.84%
6	Increase in PLF by 2%	8.77%	9.37%
7	Increase in PLF by 4%	10.10%	10.92%
8	Increase in PLF by 6%	11.55%	12.42%
9	Increase in PLF by 8%	12.94%	13.86%

[4] http://www.indianwindpower.com/potential.html

[5] http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf

10	Increase in PLF by 10%	14.28%	15.26%

The sensitivity of project IRR towards change in O&M

Table

Case No.	Description	Project IRR Without VER Revenue (Post Tax)	Project IRR With VER Revenue (Post Tax)
	Current Case	7.44%	7.44%
	Base Case	**7.44%**	**7.99%**
1	Reduction in O&M cost by 2%	7.46%	8.01%
2	Reduction in O&M cost by 4%	7.48%	8.03%
3	Reduction in O&M cost by 6%	7.50%	8.04%
4	Reduction in O&M cost by 8%	7.51%	8.06%
5	Reduction in O&M cost by 10%	7.53%	8.08%
6	Increase in O&M cost by 2%	7.42%	7.97%
7	Increase in O&M cost by 4%	7.40%	7.95%
8	Increase in O&M cost by 6%	7.38%	7.93%
9	Increase in O&M cost by 8%	7.36%	7.92%
10	Increase in O&M cost by 10%	7.34%	7.90%

The sensitivity of project IRR towards change in Project cost

Table

Case No.	Description	Project IRR (Post Tax)	Project IRR (Post Tax)
	Current Case	7.44%	7.44%
	Base Case	**7.44%**	**7.99%**
1	Increase in project cost by 5%	6.91%	7.45%
2	Increase in project cost by 10%	6.43%	6.94%
3	Decrease in project cost by 5%	8.00%	8.59%
4	Decrease in project cost by 10%	8.62%	9.23%

The sensitivity of project IRR towards change in Tariff

Case No.	Description	Project IRR Without VER Revenue (Post Tax)	Project IRR With VER Revenue (Post Tax)
	Current Case	0.00%	0.00%
	Base Case	**7.44%**	**7.99%**
1	Reduction in Tariff by 2%	7.40%	7.95%
2	Reduction in Tariff by 4%	7.44%	7.91%
3	Reduction in Tariff by 6%	7.32%	7.87%
4	Reduction in Tariff by 8%	7.27%	7.83%
5	Reduction in Tariff by 10%	7.23%	7.79%
6	Increase in Tariff by 2%	7.48%	8.03%
7	Increase in Tariff cost by 4%	7.52%	8.07%
8	Increase in Tariff by 6%	7.56%	8.11%
9	Increase in Tariff by 8%	7.60%	8.14%
10	Increase in Tariff by 10%	7.64%	8.18%

Table *Generation data for WEG –J-104*

Month	Power generation	No.of days	Gen capacity
	KWh	no.	Kwh
06-Aug	330336	31	930000
06-Sep	100595	30	900000
06-Oct	19302	31	930000
06-Nov	18326	30	900000
06-Dec	29392	31	930000
07-Jan	35741	31	930000
07-Feb	45091	28	840000
07-Mar	43663	31	930000
07-Apr	172865	30	900000
07-May	433088	31	930000
07-Jun	243866	30	900000
07-Jul	323895	31	930000
07-Aug	275390	31	930000
07-Sep	90365	30	900000
07-Oct	45546	31	930000
07-Nov	18114	30	900000
07-Dec	35147	31	930000
08-Jan	51618	31	930000
08-Feb	63218	28	840000
08-Mar	69845	31	930000
08-Apr	143934	30	900000
08-May	432084	31	930000
08-Jun	308922	30	900000
08-Jul	315949	31	930000

08-Aug	266060	31	930000
08-Sep	114583	30	900000
08-Oct	33999	31	930000
08-Nov	33035	30	900000
08-Dec	33192	31	930000
09-Jan	31232	31	930000
09-Feb	58952	28	840000
09-Mar	93419	31	930000
Total	4310764		29190000

Table *Generation data for WTG-J-106*

Month	Power generation	No.of days	Gen capacity
	KWh	no.	Kwh
06-Aug	317888	31	930000
06-Sep	104953	30	900000
06-Oct	32870	31	930000
06-Nov	12966	30	900000
06-Dec	28628	31	930000
07-Jan	31601	31	930000
07-Feb	47042	28	840000
07-Mar	45676	31	930000
07-Apr	62593	30	900000
07-May	0	31	930000
07-Jun	0	30	900000
07-Jul	0	31	930000
07-Aug	0	31	930000
07-Sep	75241	30	900000
07-Oct	41959	31	930000
07-Nov	13828	30	900000
07-Dec	29175	31	930000
08-Jan	44660	31	930000
08-Feb	55212	28	840000
08-Mar	69193	31	930000
08-Apr	130373	30	900000
08-May	412539	31	930000
08-Jun	279670	30	900000
08-Jul	274443	31	930000
08-Aug	248236	31	930000
08-Sep	104306	30	900000
08-Oct	30681	31	930000
08-Nov	29073	30	900000
08-Dec	28539	31	930000
09-Jan	27033	31	930000
09-Feb	48329	28	840000
09-Mar	82381	31	930000
Total	2709088		29190000

Table *Generation data for WTG-J-107*

Month	Power generation	No.of days	Gen capacity
	KWh	no.	Kwh
06-Aug	370899	31	930000
06-Sep	123861	30	900000
06-Oct	18908	31	930000
06-Nov	24066	30	900000
06-Dec	32495	31	930000
07-Jan	36705	31	930000
07-Feb	52483	28	840000
07-Mar	34254	31	930000
07-Apr	0	30	900000
07-May	0	31	930000
07-Jun	0	30	900000
07-Jul	0	31	930000
07-Aug	42866	31	930000
07-Sep	91207	30	900000
07-Oct	50169	31	930000
07-Nov	18525	30	900000
07-Dec	35889	31	930000
08-Jan	51157	31	930000
08-Feb	67193	28	840000
08-Mar	84836	31	930000
08-Apr	167187	30	900000
08-May	445020	31	930000
08-Jun	300759	30	900000
08-Jul	288322	31	930000
08-Aug	273139	31	930000
08-Sep	123679	30	900000
08-Oct	29482	31	930000
08-Nov	34135	30	900000
08-Dec	36413	31	930000
09-Jan	32615	31	930000
09-Feb	49887	28	840000
09-Mar	101959	31	930000
Total	3018110		29190000

Table *Generation data for WTG-J-108*

Month	Power generation	No.of days	Gen capacity
	KWh	no.	Kwh
06-Aug	370643	31	930000
06-Sep	113187	30	900000
06-Oct	35445	31	930000
06-Nov	20083	30	900000
06-Dec	30685	31	930000
07-Jan	39411	31	930000
07-Feb	51616	28	840000
07-Mar	34441	31	930000
07-Apr	64237	30	900000
07-May	0	31	930000
07-Jun	0	30	900000
07-Jul	70815	31	930000
07-Aug	260684	31	930000
07-Sep	82247	30	900000
07-Oct	41432	31	930000
07-Nov	15773	30	900000
07-Dec	29592	31	930000
08-Jan	45003	31	930000
08-Feb	56467	28	840000
08-Mar	68618	31	930000
08-Apr	143191	30	900000
08-May	299154	31	930000
08-Jun	304846	30	900000
08-Jul	290050	31	930000
08-Aug	256128	31	930000
08-Sep	111277	30	900000
08-Oct	31868	31	930000
08-Nov	31931	30	900000
08-Dec	30453	31	930000
09-Jan	29651	31	930000
09-Feb	49554	28	840000
09-Mar	83087	31	930000
Total	3091569		29190000

Table *Generation data for WTG-J-109*

Month	Power generation	No.of days	Gen capacity
	KWh	no.	Kwh
06-Aug	469149	31	930000
06-Sep	178973	30	900000
06-Oct	58484	31	930000
06-Nov	23357	30	900000
06-Dec	56572	31	930000
07-Jan	48066	31	930000
07-Feb	47909	28	840000
07-Mar	40180	31	930000
07-Apr	71990	30	900000
07-May	156417	31	930000
07-Jun	264090	30	900000
07-Jul	306765	31	930000
07-Aug	282886	31	930000
07-Sep	146857	30	900000
07-Oct	89401	31	930000
07-Nov	29122	30	900000
07-Dec	57005	31	930000
08-Jan	75896	31	930000
08-Feb	93758	28	840000
08-Mar	115329	31	930000
08-Apr	252217	30	900000
08-May	517242	31	930000
08-Jun	300066	30	900000
08-Jul	274212	31	930000
08-Aug	332911	31	930000
08-Sep	177955	30	900000
08-Oct	39731	31	930000
08-Nov	53526	30	900000
08-Dec	59906	31	930000
09-Jan	57254	31	930000
09-Feb	97001	28	840000
09-Mar	156763	31	930000
Total	4930990		29190000

Table *Consolidated PLF*

Generation in J-104 (kWh)	4310764
Generation in J-106 (kWh)	2709088
Generation in J-107 (kWh)	3018110
Generation in J-108 (kWh)	3091569
Generation in J-109 (kWh)	4930990
Total generation (kWh)	**18060521**
Generation as per capacity of J-104 (kWh)	29190000
Generation as per capacity of J-106 (kWh)	29190000
Generation as per capacity of J-107 (kWh)	29190000
Generation as per capacity of J-108 (kWh)	29190000
Generation as per capacity of J-109 (kWh)	29190000
Total generation as per capacity (kWh)	**145950000**
PLF	**12.37%**

The sensitivity analysis clearly shows that financially the project activity is unattractive compared to the benchmark commercial lending rate of 10.25%,

In addition to the above, it is also evidenced from the clearance certificate received from Maharashtra Energy Development Agency (State Government of Maharashtra Undertaking) that the project activity would not be eligible for any benefits under Government of Maharashtra Wind Power Policy dated 26/02/2004.

In view of the above, it can be concluded that the project activity is not financially attractive when compared to the benchmark. Hence, the project activity is additional.

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:

AMS-I.D Ver 13: Grid connected renewable electricity generation.

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

The purpose of monitoring is to ensure

- the performance of the project activity as per the agreement concluded with the equipment supplier,

- data collected for calculation of reduction in GHG emission are accurate, adequate and consistent with the operation of the project activity
- the reduction in GHG emissions is accounted for in a manner that is credible and verifiable
- documents and sources of verifiable data are maintained such that they are easily traceable and archived for future reference

The type of data recorded, their source, monitoring frequency and data that are to be recorded are

Type of data	Unit of measurement	Source	Monitoring frequency	Data quality assurance
Net power exported to NEWNE Grid from the project activity	KWh	Monthly Joint Monitoring Report from MSEDCL	Monthly	Meters are calibrated annually as given in Article 11 of Wind Energy Purchase Agreement and readings are taken jointly by representatives from MSEDCL, O&M contractor and project proponent. On-board meters on the WTGs are integrated electronic meters and do not require calibration.
Simple Operating Margin (OM) emission factor of the NEWNE Grid	tCO2/MW	User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4 by Central Electricity Authority	Annual	calculated using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1. Central Electricity Authority, the National Authority on electrical systems in India
Build Margin emission factor of the NEWNE Grid	tCO2/MW	User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4 by Central Electricity	Annual	Calculated by Central Electricity Authority, the National Authority on electrical systems in India using the UNFCCC approved 'Tools to calculate the

		Authority		emission factor for an electricity system' Ver 01.1.
Weighting factors to be applied to SOM and BM	dimensionless	'Tools to calculate the emission factor for an electricity system' Ver 01.1. approved by UNFCCC	Not applicable	Approved by UNFCCC

The baseline emission considering only CO_2 from fossil fuel based power plants on the NEWNE Grid is given as

$$BE_y = EG_y * EF_{Grid,CM,y}$$

Following the direction given on paragraph 9a of AMS-I.D Ver 13, the Combined Margin emission factor for the electricity distribution grid has to be calculated using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1. Central Electricity Authority, the National Authority on electrical systems in India has calculated the emission factors using the same tool and has published their result in User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4[6]. The Combined Margin emission factor for wind energy systems has been calculated as per equation (13) on Pg 14 of 'Tool to calculate the emission factor for an electricity system' Ver 01.1 using ex-ante option for the Simple Operating Margin emission factor, and Option 1, i.e. ex-ante Build Margin emission factor as given in Table B Appendix C - Grid Emission Factors of User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4.

$$EF_{Grid,CM,y} = (EF_{Grid,OM,y} * w_{OM}) + (EF_{Grid,BM,y} * w_{BM}),$$

Where,

$EF_{Grid,CM,y}$	Combined Margin emission factor of NEWNE Grid, tCO2/MWh
$EF_{Grid,OM,y}$	Simple Operating Margin emission factor of NEWNe Grid, 1.01 tCO2/MWh
$EF_{Grid,BM,y}$	Build Margin emission factor of NEWNE Grid, 0.60 tCO2/MWh

[6] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf

w_{OM} Operating Margin weighting factor for wind power projects, 0.75
w_{BM} Build Margin weighting factor for wind power projects, 0.25

The calculation for emission reduction is given below.

Emission Reduction due to Power Supply from WTG to Grid				
Sr No.	**Description**	**UoM**	**Parameter/Equation**	**Value**
1.0	Rated power generation of WTG J-104,J-106,J-107, J-108 & J-109	KW	**$EG_{WTGi,rated}$**	6250
3.0	Power Load factor specified by supplier	%	**PLF** = EG_{WTG} / (8760 * 1250)	20.00
4.0	Line Loss	%	L_{loss}	5%
5.0	Net annual electricity supplied to grid from the project activity	MW	**EG_y = (** $EG_{WTGi,rated}$ * PLF * 8760 / 1000) * (1 - L_{loss})	9882375
	Calculation of Combined Margin emission factor			
6.0	Simple Operating Margin emission factor, ex-ante, for NEWNE grid *(Refer Table B Appendix C - Grid Emission Factors, CO2 Baseline Database for The Indian Power Sector Ver 4)*	tCO2/MWh	$EF_{Grid,OM,y}$	1.01
7.0	Build Margin emission factor, ex-ante, for NEWNE grid *(Refer Table B Appendix C - Grid Emission Factors, CO2 Baseline Database for The Indian Power Sector Ver 4)*	tCO2/MWh	$EF_{Grid,BM,y}$	0.6
8.0	Weighting factor for Simple Operating Margin emision factor *(Refer 'Tool to calculate the emission factor for an electricity system' Ver 01.1)*		w_{OM}	0.75
9.0	Weighting factor for Build Margin emision factor *(Refer 'Tool to calculate the emission factor for an electricity system' Ver 01.1)*		w_{BM}	0.25
10.0	Combined Margin emission factor for NEWNE Grid	tCO2/MWh	**$EF_{Grid,CM,y}$** = ($EF_{Grid,OM,y}$ * w_{OM}) + ($EF_{Grid,BM,y}$ * w_{BM})	0.9075
	Calculation for emission reduction due to project activity			
16.0	Baseline emission *(Refer Clause 9a of AMS-I.D Ver 13)*	tCO2/yr	**BE_y =** EG_y * $EF_{Grid,CM,y}$	9440.269
17.0	Project emission *(Refer Note 1)*	tCO2/yr	PE_y	0
18.0	Leakage emission *(Refer Note 2)*	tCO2/yr	LE_y	0
19.0	**Emission reduction**	tCO2/yr	**ER_y =** BE_y -PE_y - LEy	9440

Note 1: Project Emissions The project activity uses wind power to generate electricity and hence the emissions from the project activity are taken as nil.

Note 2: Leakage Leakage emissions on account of the project activity is considered as zero as neither the Wind Energy Generators are transferred from another activity nor any existing equipment of the project site would be transferred from the project site in accordance with the applied methodology.

Table

Simple Operating Margin (tCO2/MWh)				
GRID	**2005-06**	**2006-07**	**2007-08**	**Avg**
NEWNE	1.02	1.01	1.00	1.01
Build Margin (tCO2/MWh)				
GRID	**2007-08**			
NEWNE	0.6			
	Ex-ante Combined Margin Emission Factor (tCO2/MWh)			
NEWNE	0.9075 (See Note)			

Note: This factor will remain fixed throughout the crediting period

Roles and Responsibilities

The representative of SALORA will be responsible for:-

- Monitoring the project activity for smooth operation of the WTGs,
- Coordination with the O&M contractor to ensure highest possible availability of the WTGs for generation,
- Collection and updation of all data in the project monitoring worksheet,
- Generation and distribution of monthly reports to the Management of the Project Proponent accounting for
  - The actual emission reduction achieved
  - Any specific event affecting the performance of the project
- Periodic internal audit to verify the data
- Archiving all data from their respective sources for the purpose of verification for the entire crediting period and an additional period of two years after the end of the crediting period, or the last issuance of VCUs for the project, whichever occurs later.

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

Describe each data and parameter using this table.

Data / Parameter:	EGy
Data unit:	MWh
Description:	Net annual electricity supplied to the grid by the Project
Source of data to be used:	Monthly Report / Joint Monitoring Report submitted by MSEDCL.
Value of data applied for the purpose of calculating expected emission reductions	Actual as obtained during monitoring of project activity as per the Monitoring Plan as given in Section 3.4 of this VCS-PD.
Description of measurement methods and procedures to be applied:	Net electricity supplied to the NEWNE grid will be calculated based on the difference between measured values of "export" and "import" on the MSEDCL

	meter. The joint reading is taken by representative of the project proponent or the Operation & Maintenance contractor employed by the project proponent on one hand, and MSEDCL officials on the other. Since this meter is common to project activity and other wind turbines that are not under this project activity, the apportioning of net electricity would be done based on electricity generated from individual wind turbines. Refer Annexure 1 below for the details of apportioning methodology followed and accepted by MSEDCL.
QA/QC procedures to be applied:	The quantity of net electricity supplied will be cross-verified from the invoice raised on MSEDCL by the project proponent and the readings available from the check meter available at site. Also refer Section 3.4 below.
Any comment:	The data will be archived for the entire crediting period and an additional period of two years after the crediting period is over or the last issuance of CERs for the project, whichever occurs later.

Data / Parameter:	**$EF_{Grid,BM,y}$**
Data unit:	tCO2e/MWh
Description:	Build Margin Emission Factor of NEWNE Grid
Source of data to be used:	"User's Guide - CO_2 Baseline Database for Indian Power Sector" Version 4.0 October 2008 published by the Central Electricity Authority, Ministry of Power, Government of India. The User's Guide CO_2 Baseline Database for Indian Power Sector" Version 4.0 dated October 2008 available at www.cea.nic.in
Value of data applied for the purpose of calculating expected emission reductions	0.60 tCO_2/MWh
Description of measurement methods and procedures to be applied:	Central Electricity Authority, the National Authority on electrical systems in India has calculated the emission factors using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1 and publishes their result in User's Guide of 'CO2 Baseline Database for The Indian Power Sector'
QA/QC procedures to be applied:	Not required
Any comment:	The ex-ante Build Margin Emission Factor, i.e. Option 1 as given on Pg 13 of Tool to calculate the emission factor for an electricity systemVer 01.1, has been considered for calculating the emission factor of the grid. This value will remain constant throughout the crediting period.

Data / Parameter:	**$EF_{Grid,OM,y}$**
Data unit:	tCO2e/MWh
Description:	Operating Margin Emission Factor of NEWNE Grid
Source of data to be used:	"User's Guide - CO_2 Baseline Database for Indian Power Sector" Version 4.0 October 2008 published by the Central Electricity Authority, Ministry of Power, Government of India. The User's Guide CO_2 Baseline Database for Indian Power Sector" Version 4.0 dated October2008 available at www.cea.nic.in
Value of data applied for the purpose of calculating expected emission reductions	1.01 tCO_2/MWh
Description of measurement methods and	Central Electricity Authority, the National Authority

procedures to be applied:	on electrical systems in India has calculated the emission factors using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1 and publishes their result in User's Guide of 'CO2 Baseline Database for The Indian Power Sector'
QA/QC procedures to be applied:	Not required
Any comment:	The ex-ante option for Simple Operating Margin as given on Pg 4 of Tool to calculate the emission factor for an electricity systemVer 01.1, has been chosen for calculating the emission factor of the grid. The calculation is provided in Section 3.2 of this VCS-PD. This value will remain constant throughout the crediting period.

Data / Parameter:	w_{BM}
Data unit:	Percentage
Description:	Weighting of Build Margin emission factor for wind power generation project activities
Source of data to be used:	'Tool to calculate the emission factor for an electricity system' Ver 01.1
Value of data applied for the purpose of calculating expected emission reductions	25%
Description of measurement methods and procedures to be applied:	Weighting factor to be used as per the guidelines of UNFCCC
QA/QC procedures to be applied:	Not required
Any comment:	This value will remain constant throughout the entire crediting period.

Data / Parameter:	w_{OM}
Data unit:	Percentage
Description:	Weighting of Operating Margin emission factor for wind power generation project activities
Source of data to be used:	'Tool to calculate the emission factor for an electricity system' Ver 01.1
Value of data applied for the purpose of calculating expected emission reductions	75%
Description of measurement methods and procedures to be applied:	Weighting factor to be used as per the guidelines of UNFCCC
QA/QC procedures to be applied:	Not required
Any comment:	This value will remain constant throughout the entire crediting period.

Data / Parameter:	$EF_{Grid,CM,y}$
Data unit:	tCO2e/MWh
Description:	Combined Margin Emission Factor of NEWNE Grid
Source of data to be used:	Calculated using values from "User's Guide - CO_2 Baseline Database for Indian Power Sector" Version 4.0 October 2008 published by the Central Electricity Authority, Ministry of Power, Government of India. The User's Guide CO_2 Baseline Database for Indian Power Sector" Version 4.0 dated October2008 available at www.cea.nic.in
Value of data applied for the purpose of calculating expected emission reductions	0.9075 tCO_2/MWh
Description of measurement methods and procedures to be applied:	Following the direction given on paragraph 9a of AMS-I.D Ver 13, the Combined Margin emission factor for the electricity distribution grid has to be calculated using the 'Tool to calculate the emission factor for an electricity system' Ver 01.1. Central Electricity Authority, the National Authority on

	electrical systems in India has calculated the emission factors using the same tool and has published their result in User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4[7]. The Combined Margin emission factor for wind energy systems has been calculated as per equation (13) on Pg 14 of 'Tool to calculate the emission factor for an electricity system' Ver 01.1 using ex-ante option for the Simple Operating Margin emission factor, and Option 1, i.e. ex-ante Build Margin emission factor as given in Table B Appendix C - Grid Emission Factors of User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4.
QA/QC procedures to be applied:	Not required
Any comment:	The ex-ante Combined Margin Emission Factor for NEWNE Grid will remain constant throughout the crediting period for the purpose of calculating the emission reduction due to the project activity.

3.4 Description of the monitoring plan

The Monitoring and Verification (M&V) procedures define a project-specific standard against which the project's performance (i.e. GHG reductions) and conformance with all relevant criteria will be monitored and verified. It includes

- suitable data collection, collation and archiving methods
- data interpretation with respect to its accuracy, adequacy and consistency

These provide for a clear, credible and accurate monitoring for arriving at the key performance indicator of the project activity, i.e. reduction in GHG emissions, which can be reviewed and verified.

The general monitoring principles are based on
- Frequency of monitoring
- Minimising uncertainty and improving performance reliability of the project
- Reporting, reviewing and archiving the data used for accounting of emission reduction due to the project activity

Frequency of monitoring

The applied small-scale methodology, AMS-I-D, requires monitoring of the electricity supplied to the grid.

[7] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf

The electricity generated by the WTGs is measured through a two step procedure wherein the first metering is carried out continuously at the controller of the machine with on-board meter. The monitoring of the WTGs is done from a common monitoring station as a part of central monitoring system. The system consists of a state-of-the-art controlling and monitoring system of O&M contractor,

Project proponent has appointed an 'Operation and Maintenance' contractor for ten years to operate the WTGs. The performance of the WTGs, safety in operation and scheduled /breakdown maintenance are organized and monitored by the O&M contractor. The O&M contractor appointed by SALORA will monitor the electrical power generation of the WTGs daily on regular basis and will maintain daily generation record for each WTG connected to the MSEDCL meters to which the WTGs are connected.

A long term (13 years) energy purchase agreement (EPA) has been signed with Maharashtra State Electricity Distribution Company Limited (MSEDCL). The meter readings at the Metering Point are undertaken jointly by the representatives of the State Grid/MSEDCL on one hand and the representative of M/s SEL and/or the appointed contractor for Operation & Maintenance of the WTG every month. Thereafter, MSEDCL submits a monthly report that among other things also contain the apportioned values of power supplied to and drawn from the NEWNE Grid by the individual WTGs. The method of apportioning is given in Annexure 1.These values of the measured parameters are thereafter entered in the project monitoring worksheet, a MS Excel based spreadsheet for calculation of emission reduction due to the project activity.

Uncertainties and Reliability

The amount of emission reduction is directly proportional to the amount of power generated in the project activity. The reliability of the monitoring system is dependant on the quality of the measurement devices. Hence all measuring instruments are calibrated and maintained as per the planned frequency as given in Section 3.2 for ensuring reliability of the data used for calculating emission reduction.

In case of failure or errors in any of the meters used for arriving at the final power generation figure, the officials of MSEDCL would immediately rectify the meter or replace it with a calibrated meter. The generation of wind power during the meter replacement would be considered from the back-up meters available and provided for such an eventuality. If in case both the meters, main and back-up, malfunctions, there will be no emission reduction accruing for the period.

In the event that any on-board meter on the WTGs, including those that are external to the project activity, fails, the average daily generation of the rest of the month will be taken to compute the total generation of the WTG in the period that the meter is down. The on-board meters are connected to the SCADA system and the power generation of each WTG can be monitored in real-time at the Central Monitoring Station (CMS) of the wind farm. The snapshot of generation for the month will be taken on the last day of every calendar month and will be kept as a record both in electronic as well as printed (paper) form.

In the event that the crediting period of the project activity falls in-between the billing cycle of MSEDCL, the same would be recorded and made available during verification of emission reduction due to the project activity. The following apportioning procedure will be followed to arrive at the generation of power in that crediting period:

Description	Unit	Calculation
Power generation at Controller of WTG for the specific part of the Month included in the crediting period(kWh)	kWh	EG_P
Total generation at Controller for the same month	kWh	EG_C
Generation as per MSEDCL generation report for the month	kWh	EG_M
Power generation used for calculating emission reduction for the specific part of the Month included in the crediting period(kWh)		$EG_M * (EG_P / EG_C)$

Reporting and Archiving

Verification is done on the basis of power export and import figures available from the monthly 'Certificate for Share of Electricity Generated by Wind Farm" submitted by MSEDCL on the basis of the Joint Meter Reading undertaken along with MSEDCL. Power generation in WTG J-104,J-106,J-107, J-108 & J-109. is demonstrated from data logged in SCADA.

Roles and Responsibilities

The representative of SIL will be responsible for

- Monitoring the project activity for smooth operation of the WTGs,
- Coordination with the O&M contractor to ensure highest possible availability of the WTGs for generation,
- Collection and updation of all data in the project monitoring worksheet,
- Generation and distribution of monthly reports to the Management of the Project Proponent accounting for
    - The actual emission reduction achieved
    - Any specific event affecting the performance of the project

- Periodic internal audit to verify the data
- Archiving all data from their respective sources for the purpose of verification for the entire crediting period and an additional period of two years after the end of the crediting period, or the last issuance of VCUs for the project, whichever occurs later.
- Annual internal audit to verify the data updated in the emission reduction calculation worksheet against the Monthly Joint Monitoring Report (JMR) as submitted by MSEDCL.

4 GHG Emission Reductions:

4.1 Explanation of methodological choice:

The calculation for baseline emissions, project emissions, leakage emissions and emission reductions are based on the equations for the same and relevant procedures given in AMS-I.D Ver 13.

The project activity is a new installation for supplying electricity generated from renewable energy to the electricity distribution system, i.e. the NEWNE Grid.

The baseline emission considering only CO_2 from fossil fuel based power plants on the NEWNE Grid is

$$BE_y = EG_y * EF_{Grid,CM,y}$$

Following the direction given on paragraph 9a of AMS-I.D Ver 13, the Combined Margin emission factor for the electricity distribution grid has to be calculated using the 'Tools to calculate the emission factor for an electricity system' Ver 01.1. Central Electricity Authority, the National Authority on electrical systems in India has calculated the emission factors using the same tool and has published their result in User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4[8]. The Combined Margin emission factor for wind energy systems has been calculated as per equation (13) on Pg 14 of 'Tool to calculate the emission factor for an electricity system' Ver 01.1 using ex-ante option for the Simple Operating Margin emission factor, and Option 1, i.e. ex-ante Build Margin emission factor as given in Table B Appendix C - Grid Emission Factors of User's Guide Ver 4 of 'CO2 Baseline Database for The Indian Power Sector' Ver 4.

$$EF_{Grid,CM,y} = (EF_{Grid,OM,y} * w_{OM}) + (EF_{Grid,BM,y} * w_{BM}),$$

Where,

$EF_{Grid,CM,y}$	Combined Margin emission factor of NEWNE Grid, tCO2/MWh
$EF_{Grid,OM,y}$	Simple Operating Margin emission factor of NEWNe Grid, 1.01 tCO2/MWh
$EF_{Grid,BM,y}$	Build Margin emission factor of NEWNE Grid, 0.60 tCO2/MWh
w_{OM}	Operating Margin weighting factor for wind power projects, 0.75
w_{BM}	Build Margin weighting factor for wind power projects, 0.25

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

The GHG emissions in the baseline scenario is given below:

Emission Reduction due to Power Supply from WTG to Grid				
Sr No.	**Description**	**UoM**	**Parameter/Equation**	**Value**
1.0	Rated power generation of WTG J-104,J-106,J-107, J-108 & J-109.	KW	**$EG_{WTGi,rated}$**	6250
2.0	Power Load factor specified by supplier	%	**PLF** = EG_{WTG} / (8760 * 1250)	20.00%
3.0	Line Loss	%	L_{loss}	5%

[8] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf

4.0	Net annual electricity supplied to grid from the project activity	MW	**EG_y = (** $EG_{WTGi,rated}$ * PLF * 8760 / 1000) * (1 - L_{loss})	10403
	Calculation of Combined Margin emission factor			
5.0	Simple Operating Margin emission factor for NEWNE grid *(Refer Table B Appendix C - Grid Emission Factors, CO2 Baseline Database for The Indian Power Sector Ver 4)*	tCO2/MWh	EFGrid,OM,y	1.01
6.0	BuildMargin emission factor for NEWNE grid *(Refer Table B Appendix C - Grid Emission Factors, CO2 Baseline Database for The Indian Power Sector Ver 4)*	tCO2/MWh	EFGrid,BM,y	0.6
7.0	Weighting factor for Simple Operating Margin emision factor *(Refer 'Tool to calculate the emission factor for an electricity system' Ver 01.1)*		w_{OM}	0.75
8.0	Weighting factor for Build Margin emision factor *(Refer 'Tool to calculate the emission factor for an electricity system' Ver 01.1)*		w_{BM}	0.25
9.0	Combined Margin emission factor for NEWNE Grid	tCO2/MWh	**$EF_{Grid,CM,y}$ = (** $EF_{Grid,OM,y}$ * w_{OM}) + ($EF_{Grid,BM,y}$ * w_{BM})	0.9075
	Calculation for baseline emission			
10.0	Baseline emission *(Refer Clause 9a of AMS-I.D Ver 13)*	tCO2/yr	**BE_y =** EG_y * $EF_{Grid,CM,y}$	9440

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

Project Emissions The project activity uses wind power to generate electricity and hence the emissions from the project activity are taken as nil.

Leakage Leakage emissions on account of the project activity is considered as zero as neither the Wind Energy Generators are transferred from another activity nor any existing equipment of the project site would be transferred from the project site in accordance with the applied methodology.

The net GHG emission reduction for the project activity is tabulated below

Emission Reduction due to Power Supply from WTG to Grid				
Sr No.	**Description**	**UoM**	**Parameter/Equation**	**Value**
1.0	Baseline emission *(Refer Clause 9a of AMS-I.D Ver 13)*	tCO2/yr	**BE_y =** EG_y * $EF_{Grid,CM,y}$	9440.269
2.0	Project emission *(Refer Note 1)*	tCO2/yr	PE_y	0
3.0	Leakage emission *(Refer Note 2)*	tCO2/yr	LE_y	0
4.0	**Emission reduction**	tCO2/yr	**ER_y =** BE_y -PE_y - LEy	9440

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

Procedure for calculating emission reduction due to the project activity:
Step 1: Net annual electricity generated and exported to grid by WTG

$$\mathbf{EG_y} = EG_{WTGi,exp} - EG_{WTGi,imp} \quad (1)$$

Step 2: Combined Margin emission factor of NEWNE Grid

$$\mathbf{EF_{CM,y}} = (EF_{BM,y} * w_{BM}) + (EF_{OM,y} * w_{OM}) \quad (2)$$

Step 3: Baseline emission reduction of the project activity

$$\mathbf{BE_y} = EG_y * EF_{CM,y} \quad (3)$$

Step 4: GHG emission due to the project activity

$$\mathbf{PE_y} = 0 \quad (4)$$

Step 5: GHG emission due to leakage as a result of the project activity

$$\mathbf{LE_y} = 0 \quad (5)$$

Step 6: GHG emission reduction due to the project activity

$$\mathbf{ER_y} = BE_y - PE_y - LE_y \quad (6)$$

where

$EG_{WTGi,exp}$	Electricity supplied to NEWNE Grid by WTG_i, MWh
$EG_{WTGi,imp}$	Electricity drawn from NEWNE Grid by WTG_i, MWh
EG_y	Net electricity supplied to the grid by the Project, MWh
$EF_{Grid,BMy}$	Ex-ante (Option 1) Build Margin emission factor of NEWNE Grid, tCO2/MWH
$EF_{Grid,OMy}$	Ex-ante Operation Margin emission factor of NEWNE Grid, tCO2/MWH
w_{BM}	Weighting factor for Build Margin emision factor, 25%
w_{OM}	Weighting factor for Operating Margin emission factor, 75%

The year-wise estimated GHG emission reduction for the project activity is provided in the table below:

Year	Estimation of Project Activity Emissions (tCO2e)	Estimation of Baseline Emissions (tCO2e)	Estimation of leakage (tCO2e)	Emission Reductions (tCO2e)
01/08/2006 to 31/07/2007	**0**	9440	**0**	9440

01/08/2007 to 31/07/2008	**0**	9440	**0**	9440
01/08/2008 to 31/07/2009	**0**	9440	**0**	9440
01/08/2009 to 31/07/2010	**0**	9440	**0**	9440
01/08/2010 to 31/07/2011	**0**	9440	**0**	9440
01/08/2011 to 31/07/2012	**0**	9440	**0**	9440
01/08/2012 to 31/07/2013	**0**	9440	**0**	9440
01/08/2013 to 31/07/2014	**0**	9440	**0**	9440
01/08/2014 to 31/07/2015	**0**	9440	**0**	9440
01/08/2015 to 31/07/2016	**0**	9440	**0**	9440
Total	**0**	**94400**	**0**	**94400**

Wind power is one of the cleanest sources of renewable energy, with no associated emissions and waste products. As per the Schedule 1 of Ministry of Environment and Forests (Government of India) notification[9] dated September 14, 2006, wind power projects do not require an Environmental Impact Assessment. However, certain foreseen impacts due to the project activity are discussed below:

Noise Pollution

Most of the wind turbines are in isolated areas or on designated wind zones and hence do not cause any concern to the residents of the area. In the same vein, construction activities also have not caused noise pollution due to the isolated nature of the area.

Water Pollution

There is no gaseous, liquid or solid effluent from the Wind Turbine Generators. Hence there is no contamination of water bodies due to operation of Wind Turbine Generators.

[9] Source: http://envfor.nic.in/legis/eia/eianot.pdf

Air Pollution

Minimal air pollution might have occurred during the construction of the Project due to transportation. However, these were not found to affect the surrounding persons nor the environment in any significant manner. Wind energy plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation.

Hence it can be concluded that there are no negative impacts associated with the mentioned Project.

5 Environmental Impact:

The project activity is a clean energy project using renewable source of energy, wind, to generate power. It has already been approved by the Ministry of Environment & Forests, Government of India and has received permission from Maharashtra Energy Development Agency (MEDA) which is a department of the State Government of Maharashtra.

The project activity is exempted from carrying out any EIA as per the notification S.O.1533 dated 14/09/2006 of Ministry of Environment and Forests, Government of India.

6 Stakeholders comments:

A special stakeholder consultation meeting was organized at each of the sites of this project activity. A stakeholder consultation meeting was organized at Dhulia on 10/06/2009. Invitations to stakeholders were sent out through advertisement in newspaper and through public notice and perdonal invitataion letter dated 26.05.2009. Before that no formal meeting had been held, though informal consultation with the local residents had taken place before the meeting. It should be noted that the residents in the neighbourhood where the wind park is located are

very familiar with the wind parks due to the other wind parks constructed in the nearby area.

Generally the stakeholder comments are invited at the initial stage of the project. Wind energy being an environment friendly process of electricity generation, the project proponent did not envisage any adverse effect on the local stakeholders, instead it was expected to improve the rural infrastructure and bring in socio-economic development in the locality. This impression was also supported by the feedback of the suppliers of this technology, who already existed in this locality. Hence, the project participant decided to conduct a meeting to collect feedback and suggestions for further improvement after operating the mills.

Representatives of a wide cross section of the society of the local inhabitants were present to express their views. The supplier of the wind mill, who also operates and maintains them, alongwith the representatives of the project proponent, were present to clarify their queries and receive their feedback on the project activity. The local village Panchayat was contacted and was instrumental in gathering persons for the purpose. The issues that were discussed centred on an introduction to the Project, the potential costs and benefits involved for the community and the local area, which was followed by an interactive session.

The local populace welcomed wind power projects and the associated benefits like creation of employment, improvement of basic infrastructure and improvement of electricity supply. The members concluded that the economic condition has improved and they will encourage more such projects so that more local people get employment and business opportunities can be created.

There were no specific negative comments. Since there were no negative comments, there were no changes to the Project.

The copy of attendance sheet and summary of comments of the stakeholders'meeting is attached at Annexure 3.

Maharashtra Energy Development Agency (State Government of Maharashtra Undertaking) has also given their infrastructure clearance for setting up the project activity.

7 Schedule:

Sr No.	Event	Date
1	Proposal for WTGs from equipment supplier	13-Dec -2005
2	Purchase order released for J-104,J-106,J-107,J-108,J-109	16-Dec-2005
3	Commissioning of J-104	31-July-2006
4	Commissioning of J-106	03-August-2006
5	Commissioning of J-107	01-August-2006
6	Commissioning of J-108	01-August-2006
7	Commissioning of J-109	01-August-2006
8	Frequency of monitoring generation and supply to grid	Monthly
9	Calibration of meters	Annual
10	Verification of emission reduction	Bi-annual

8 Ownership:

8.1 Proof of Title:

The proof of title is established through ownership of the WTG that is responsible for emission reduction. Salora International Ltd. is the rightful owner of the WTGs used for power generation using wind energy.

All documents, viz. purchase and work orders, establishing ownership rights are available with the project proponent for validation and verification.

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

Not Applicable

Annexure 1

Procedure for apportioning and calculating emission reduction due to the project activity:

Step 1: Net annual electricity generated and exported to grid by WTG

$$\mathbf{EG_{WTGi,\,exp}} = (EG_{WTGi} / EG_{Fj}) * EG_{Fj,exp} \quad (1)$$

$$\mathbf{EG_{WTGi,imp}} = (EG_{WTGi} / EG_{Fj}) * EG_{Fj,imp} \quad (2)$$

$$\mathbf{EG_y} = EG_{WTGi,exp} - EG_{WTGi,imp} \quad (3)$$

Step 2: Combined Margin emission factor of NEWNE Grid

$$\mathbf{EF_{CM,y}} = (EF_{BM,y} * w_{BM}) + (EF_{OM,y} * w_{OM}) \quad (4)$$

Step 3: Baseline emission reduction of the project activity

$$\mathbf{BE_y} = EG_y * EF_{CM,y} \quad (5)$$

Step 4: GHG emission due to the project activity

$$\mathbf{PE_y} = 0 \quad (6)$$

Step 5: GHG emission due to leakage as a result of the project activity

$$\mathbf{LE_y} = 0 \quad (7)$$

Step 6: GHG emission reduction due to the project activity

$$\mathbf{ER_y} = BE_y – PE_y - LE_y \quad (8)$$

where

$EG_{WTGi,exp}$	Electricity supplied to NEWNE Grid by WTG_i, MWh
$EG_{WTGi,imp}$	Electricity drawn from NEWNE Grid by WTG_i, MWh
EG_{WTGi}	Power generation from WTGi, KwH
EG_{Fj}	Total power generated and supplied from wind farm through Feeder-j, Kwh
$EG_{Fj,exp}$	Power exported to NEWNE Grid through Feeder j and metered as import at meter in HV substation, Kwh

$EG_{Fj,imp}$	Power exported by NEWNE Grid through Feeder j and metered at HV substation, Kwh
EG_y	Net electricity supplied to the grid by the Project, MWh
EF_{BMy}	Build Margin emission factor of NEWNE Grid, tCO2/MWH
EF_{OMy}	Operation Margin emission factor of NEWNE Grid, tCO2/MWH
w_{BM}	Weighting factor for Build Margin emision factor, 25%
w_{OM}	Weighting factor for Operating Margin emission factor, 75%

Annexure 2

Table *Technical Specifications of S-70 (1250 KW) WTG*

ROTOR	
Rotor diameter	69.1 m
Hub height	74 m
Rotor swept area	3750 m^2
Rotational speed	13.2/19.8 rpm
Rotor material	GRP
Regulation	Pitch
OPERATIONAL DATA	
Cut-in wind speed	3 m/s
Rated wind speed	12 m/s
Cut-out wind speed	20 m/s
GENERATOR	
Type	Asynchronous generator, 4/6 poles
Rated output	250/1250 kW
Rotational speed	1010/1515 rpm
Operating voltage	690 V
Frequency	50 Hz
Protection	IP 56
Insulation glass	"H"
Cooling system	Air Cooled
GEARBOX	
Type	3 stage gear box, 1 planetary 2 helical
Manufacturer	Winergy
Gear ratio	1:77.848
Nominal load	1390 kW
Type of cooling	Oil cooling system
YAW DRIVE	
Yaw drive system	4 active electrical yaw motors
Yaw bearing	Polyamide slide bearing
TOWER	
Type	Tubular tower
Erection	With crane
Design standards	GL /IEC
Tower height	To suit hub height
Construction	Welded
CONTROL UNIT	
Control unit	Microprocessor control, with graphic backlight LCD display indicating operation conditions. Control includes thyristor switchgear watchdog for operation, monitoring, log with real time, local control and servicing

	interface. Optional remote monitoring and operation. UPS back-up system.
SAFETY SYSTEM	
Brake System 1	3 times independent pitch regulation
Brake System 2	Spring applied, hydraulically released disc brake

Annexure 3

Stakeholders' Meeting

Details are attached