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CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

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SECTION A. General description of small-scale project activity

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

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Bundled Wind Power Project in Tamilnadu
Version – 02
Date – 17/12/2007

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

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Purpose

The main purpose of the project activity is to generate clean electricity using wind energy. The project activity consists of bundle of 3 wind turbine generators (WTGs) for a total installed capacity of 3.75 MW, installed by two companies collectively referred to as Project Proponents (PPs), the contact details of which is provided in Annex 1. Approximately 9.34 Million Units (MU) of power generated from this clean energy source will be exported to the Tamilnadu grid per annum. The project activity is the installation, operation and generation of bundle of WTGs installed by the project proponents. The electricity generated from the WTGs is connected to the state electricity grid. All the WTGs are already commissioned. The capacity of each WTG is 1250 kW (1.25 MW).

Project's contribution to sustainable development

The project primarily assists the state of Tamilnadu 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 demonstrates 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:

- Sustainable development through generation of eco-friendly power
- Increasing the share of renewable energy power generation in the regional and national grid
- To bridge India's energy deficit in the business as usual scenario
- Providing national energy security, especially when global fossil fuel reserves threaten the long term sustainability of the Indian economy.
- Strengthening India's rural electrification coverage
- Essentially reducing GHG emissions compared to a business-as-usual scenario
- Reducing other pollutants (SOx, NOx, PM etc.,) resulting from power generation industry
- Contribute towards reducing power shortage especially in the state of Tamil Nadu, India;
- Demonstrate and help in stimulating the growth of the wind power industry in India;
- Enhancing local employment in the vicinity of the project, which is a rural area;
- Capacity building and empowerment of vulnerable sections of the rural communities dwelling in the project area;

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- Power generation from Renewable Energy sources paves way for energy security of future generations
- Conserving natural resources including land, forests, minerals, water and ecosystems;

The National strategy for sustainable development also aims at providing access to clean energy with the objective that increased availability of power in the rural areas will lead to industrial activity aimed at generating employment and reduce poverty. For these reasons, the wind power project is fully in line with the overall goals for sustainable development of the Government of India (GOI) and the requirement of Tamilnadu state.

A.3. Project participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	Creamline Dairy Products Limited (CDPL) and Om Sakthi Power Project Limited (OSWPPL) (Private entity. Project developers.)	No

See contact information in Annex-1 to this PDD

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

Project comprises of 3 (three) Wind Turbine Generators (WTGs) of Suzlon S64 with 1250 kW rating. The machines to be used are one of the most efficient machines currently available in the world. The electricity will be then transmitted through a transmission line to the nearest TNEB substation at Kottaikarunkulam and Koodankulam substations for CDPL and OSWPPL respectively. The turbines to be used are certified and manufactured according to International Standards and has the following characteristics:

- Power rating of 1250 KW
- Induction generator of 1010 / 1515 rpm
- 64 meter blade diameter
- 3 blade rotor made of Glass Reinforced Polyester (GRP)
- Total hub height is 65 meters

Suzlon S64 WTG is designed to give maximum generation under Indian wind conditions and is working successfully in the state of Tamilnadu and other states.

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

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A.4.1.1. Host Party(ies):

>>India

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

>>Tamil Nadu

A.4.1.3. City/Town/Community etc:

>>Udayathoor and Kumbikulam villages of Tirunelveli District

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

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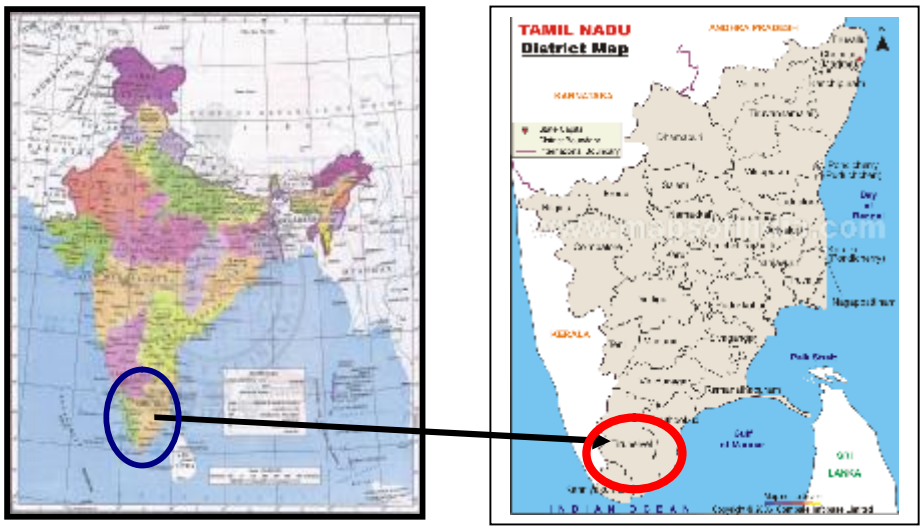
The WTGs are located at Udayathoor and Kumbikulam villages of Tirunelveli district of Tamil Nadu. The site has been identified as ideally suited for wind power generation based on the micro siting studies and data analysis based on annual wind speed and frequency distribution.



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

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As per Clause 2 & 3 of Type I.D of Appendix B of **simplified modalities and procedures for small-scale CDM project activities (Version 13: 14th December 2007**), If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW. Combined heat and power (co-generation) systems are not eligible under this category. Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW. Therefore, as the project activity is less than 15 MW, the project activity can be defined under

Type I: Renewable Energy Project (Small Scale)

Category: "D", Grid connected Renewable Electricity Generation

Technology of the project

The technology adopted for the project activity is a standard and widely accepted practice for power generation using renewable sources. No technology transfer is involved for the project and know-how for the project technology is well established.

This project is a clear renewable energy project that uses wind energy for generation of electricity with available proper conversion technology. This meets the basic requirement of type I.D of Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

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

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Years (January to December)	Annual estimation of emission reductions in tonnes of CO_2e
2008	8659
2009	8659
2010	8659
2011	8659
2012	8659
2013	8659
2014	8659
2015	8659
2016	8659
2017	8659
Total estimated reductions (tones of CO2e)	**86591**
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2 e)	8659

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

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No Public funding. Project is implemented with equity of project proponent and long term debt.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

According to Appendix C of Simplified Modalities & Procedures for small scale CDM project activities, 'Debundling' is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities. A small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/measure;
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the small- scale activity at the closest point.

As per conditions in Paragraph – 2 of Appendix C, the project activity is not a debundled fragment of a larger activity and hence qualifies as a small scale activity.

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SECTION B. Application of a baseline and monitoring methodology

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

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Title:

Grid connected Renewable electricity generation

Reference:

The project activity meets the eligibility criteria to use the simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7.

Details of methodology for baseline calculations for CDM projects of capacity less than 15 MW are available in the "Appendix B of the simplified modalities and procedure for small scale CDM project activities". Reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

Renewable technologies that supply electricity to the grid are covered in category I.D. The category comprises renewable such as small hydro, wind, geothermal and renewable biomass 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 generation unit.

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

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The project activity is a 3.75 MW Wind Power Project which is less than the specified limit of 15 MW for Small Scale Project activities. The project proposes to export the power to the Tamil Nadu Grid. Hence, the small scale methodology applicable to the project activity is as follows:

Methodology:	AMS I. D **(**Version 13: 14th December 2007)
Type I:	Renewable Energy Project (Small Scale)
Category:	"D", Grid connected Renewable Electricity Generation

B.3. Description of the project boundary:

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As per the guidelines mentioned in Type I. D. of Annex B of the simplified modalities and procedures for small-scale CDM project activities, project boundary encompasses the physical and geographical site of the renewable generation source.

The project boundary includes the electricity generation from 3.75 MW (3 machines of 1250 kW each) wind farm of CDPL and OSWPPL located at Udayathoor and Kumbikulam Villages, Tirunelveli District, Tamilnadu State and the transport through the electricity grid. Hence, project boundary is considered with in these terminal points. However, for the purpose of calculation of baseline emission Southern regional Grid is also included in the project boundary.

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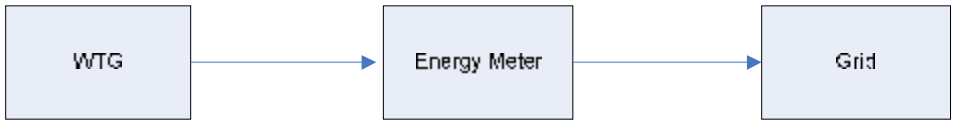

B.4. Description of baseline and its development:

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The baseline methodology has followed the one specified under Project category I.D in Appendix B of the Simplified M&P for small scale CDM project activities.

The Central Electricity Authority (CEA), under the Ministry of Power, Government of India, has estimated the Combined Margin for the Southern Grid, the details of which are available on the following website: http://www.cea.nic.in

As per the latest guidelines in I.D to estimate the baseline emissions, the emission factor is calculated as per the procedures laid in paragraph 9 (a) & (b). As this methodology suggested adopting the procedures laid in ACM0002, the same has been considered for calculations. The baseline emissions and the emission reductions from project activity are estimated based on the quantum of electricity to be exported by the project activity to the grid and the **Baseline Emission Factor (BEF)** of the southern regional grid calculated as a **combined margin (CM)**, consisting of the combination of **operating margin (OM)** and **built margin (BM)** factors. The detailed calculation procedures are provided in Annex 3.

For *ex ante calculation*, the methodology ACM0002 requires that the operating margin is calculated as the average of the three most recent years (here 2003-04 – 2005-06). Since wind is an intermittent energy source, the promoter is allowed to assign a weight of 75% to the operating margin, and 25% to the build margin. Therefore, the resulting combined margin is 0.93 t CO2/MWh for southern regional grid. These values are used for projecting the emission reductions in the PDD as well as for calculating the actual emission reductions.

$EF_{BL} = (0.75 \text{ X } EF_{OM}) + (0.25 \text{ X } EF_{BM})$

Where

EF_{BL} = Baseline Emission Factor (t CO_2/MWh)
EF_{OM} = Emission Factor – Operating Margin
EF_{BM} = Emission Factor – Built Margin

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The project activity meets the eligibility criteria to use simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7. As per the decision 17/cp.7 Para 43, a CDM 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 CDM project activity.

Further referring to Appendix A to Annex B document of indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories, project participants shall provide a qualitative explanation to show that the project activity would not have occurred anyway, at least one of the listed elements should be identified in concrete terms to show that the activity is either beyond the regulatory and policy requirement or improves compliance to the requirement by removing barrier(s) ;

1. Other Barriers (Financial Resources)

The wind power development in the country and in the state of Tamilnadu has historically been supported by government policies like preferential tariff, etc. However even with this support the project proponents realized CDM funds would be needed to make the project an attractive investment due to the reasons as outlined below:

(a) Higher capital cost: The cost of setting up 1 MW of wind power project is more costly than setting up other renewable based power plants. This results in to lower rate of return on the investment. The investment for setting up of 3.75 MW project was INR 1862.6 Lakhs (INR 1257.6 of CDPL and INR 605 of OSWPPL).

Furthermore it is clear that the project is not the least cost option as it faces the considerable barrier from the abundance of large supplies of cheap coal and considerable new coal fired generation being constructed in India with correspondingly low generation tariffs. In addition to this, the share of hydro projects in Tamil Nadu is about 20% results in to cheaper power availability compared to power generation from wind based projects.

In absence of the project activity, an equivalent amount of electricity would be generated by the power plants comprising the TNEB grid and southern grid and both of which are predominantly thermal. An equivalent amount of carbon dioxide would be generated at the thermal power generation end.

(B) Rate of Return: The project activity has a high initial capital cost. An investment analysis of the project activity was conducted with the Internal Rate of Return as the financial indicator. 'Internal Rate of Return' is one of the known financial indicators used by banks, financial institutions and project developers for making investment decisions.

Since the project activity had to use several sources in order to raise the capital necessary to implement the project activity, and each of these sources expected different returns, the IRR was calculated as a weighted average of the different returns to be paid to these sources. The IRR on investment was based on the capital investment and the rate of return of each of the investors.

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The project proponents had considered a CUF of 32.88 % during the inception of the project activity which gave an IRR of 11.25% for CDPL and 9.37% for OSWPPL, which was less than 16% ROE[1] as per TNERC Order to make power projects financially viable and attract more private players in the to the sector. However, the project proponents had considered availing CDM benefits for the project activity as this would help reduce 80289 tCO_2e and considering that the emissions reductions would be traded at a rate of 10 Euros (1 Euro = INR 56), the project proponents expected the IRR to improve by 11.33% for CDPL and 9.48 % for OSWPPL.

Sensitivity Analysis

Wind speeds are variable leading to intermittent electricity generation. The variable nature of the wind speeds reduces the CUF and makes wind energy less attractive. The project proponents considered achieving 32.88 % CUF during the planning stage. However, variable wind speeds may result in change of CUF. The project proponents had carried out sensitivity analysis on the IRR calculation during the DPR stage based on the following scenarios:

- Reduction in annual generation – Annual generation may reduce due to change in wind patterns and any other unforeseen circumstances. It is very unlikely that the generation will increase considerably in future under prevailing wind patterns and operating conditions.
- Decrease in rate per kWh in power purchase agreement

CDPL

Change in CUF		**Decrease in Purchase Price (with CUF as 29%)**	
PLF (%)	**IRR (%)**	**Rs / kWh**	**IRR (%)**
32.88	11.25	2.96	9.72
29.00	5.98	2.70	5.98
25.00	0.82	2.50	3.20
23.00	-		
20.00	-		

OSWPPL

Change in CUF		**Decrease in Purchase Price (with CUF as 29%)**	
PLF (%)	**IRR (%)**	**Rs / kWh**	**IRR (%)**
32.88	9.37	2.96	8.43
29.00	5.95	2.70	5.95
25.00	2.19	2.50	3.97
23.00	0.17		
20.00	-		

[1] tnerc.tn.nic.in/orders/nces%20order%20-approved%20order%20host%20copy.pdf

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The sensitivity analysis clearly indicates that a 3% reduction in the CUF leads to more than 2% reduction in the ROE, which is much less than the 16% benchmark indicated by TNERC for ROE, making the project was financially not viable and the CDM revenue generated after sale of the emission reductions is very crucial to sustain the project activity.

The state government of Tamilnadu's limited financial support to the TNEB along with free power provided to the farmers has resulted in increase in subsidy burden every year on TNEB, thus undermining the commercial viability of the power sector in the state. The state government is still to adhere to the targets mandated by the Electricity Act, 2003, which had proposed reforms to encourage private sector participation in the power sector. Also, TNEB is facing high gearing, increase in accumulated losses, lower revenue cost coverage. As on 31st March 2005, TNEB had accumulated losses of Rs. 35.11 billion. In the year 2005, in incurred a net loss of Rs. 11.16 billion. The poor financial health of the company may adversely affect the cash flow of the project proponents, which is dependent solely on TNEB revenues. Delay in the receipt of revenues, coupled with a low rate of return can jeopardize the financial sustainability of the project.

Due to lack of experience in this field

The project promoters are in the business of manufacturing dairy products. Entering into the field of wind power generation was an entirely new activity for them, as they did not possess any knowledge or experience in this field. Hence, entering into this totally new and un-related field itself was a risky proposition for the project promoters.

In order to enter into this business, the project promoter had to upgrade the knowledge and skill not only at the Management level but also for the subordinates who would look after this project.

Due to natural calamities:

The generation of electricity from wind is, of necessity, an entirely an outdoor activity which is usually located in a remote location, beyond the control of project promoter. The wind generators and the grid are constantly subject to natural elements such as high winds and rain and a calamity such as a severe thunderstorm and lightning can damage the generators and/or the grid. Whereas the cost of repairing the generators or grid can be recovered by insuring them, the loss in revenue due to the turbine not generating electricity when it is damaged or the grid not functioning cannot be recovered as insurance companies normally do not provide liquidated damages in their insurance cover.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

Monitoring methodologies / guidelines mentioned in the UNFCCC document of "Annex B of the simplified modalities and procedures for small scale CDM project activities" for small scale projects (Type I: D) is considered as basis for monitoring methodology for the activity. The document states that the monitoring

shall consist of metering the electricity generated by the renewable technology. The project activity meets the eligibility criteria to use simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7.
Details of approved methodology for baseline calculations for CDM projects of capacity less than 15 MW are available in the "Appendix B of the simplified modalities and procedure for small scale CDM project activities". As the project activity is of 3.75 MW capacity, reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

Southern Regional grid is considered for baseline analysis and calculation of anthropogenic emissions by fossil fuels during power generation. It is observed that, in the southern regional grid generation mix, coal, diesel and gas based power projects are responsible for GHG emissions. The data published by Central Electricity Authority (CEA) has been used as the baseline emission factor. The baseline emission factor calculated based on the data published by CEA[2] for wind power projects as per methodology ACM0002 is 0.935.

The Ministry of Power intends to achieve 100% rural electrification by the year 2012. India is highly dependent on its coal reserves which provide a sense of energy security. Hence, coal has been identified as the main fuel source for electricity generation. Several ultra mega power projects have been planned and are being commissioned in India in a phased manner by 2012. Considering the above fact, it is evident that in the future, the grid electricity generation using fossil fuel is likely to increase in Southern Regional Grid. Hence, the baseline factor considered for the calculation of the emission reductions may be considered conservative.

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

(Copy this table for each data and parameter)

Data / Parameter	EF_y
Data Unit:	t_{CO2}/GWh
Description:	Baseline Emission Factor
Source of data used:	CEA, http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm
Value Applied:	SG : 0.93
Justification of the choice of data or description of measurement methods and procedures actually applied.	As in Methodology ACM0002, the weight-age for OM is 0.75 and for BM is 0.25 in case of Wind energy Projects.
Any Comments	Details of the calculation provided in Annex - 3

[2] Source: CEA, http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

B.6.3 Ex-ante calculation of emission reductions:

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Baseline Emissions (Emission Reductions due to displacement of electricity or $ER_{electricity,y}$)

The basic assumptions for calculating baseline emissions of the project activity are due to the displacement of grid electricity. Hence, the following formula is applied for estimation of baseline emissions.

$ER_{electricity,y} = EFy * EGy$
$EG_y = (E_{exp,grid} - E_{imp,grid})$

The anticipated electricity export from the project activity during the year *y*, multiplied with emission factor calculated for Wind Power using the data published by CEA for southern region grid.

Leakage

The project uses wind energy only for power generation, which leads to zero net GHG on-site emissions. Hence there is no net emission within the project boundary.

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

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Operating Years	Project Emissions (tonnes of CO_2)	Baseline Emissions (tonnes of CO_2)	Estimation of leakage (tonnes of CO_2)	Estimation of overall Emission Reductions (tonnes of CO_2)
2008	0	8659	0	8659
2009	0	8659	0	8659
2010	0	8659	0	8659
2011	0	8659	0	8659
2012	0	8659	0	8659
2013	0	8659	0	8659
2014	0	8659	0	8659
2015	0	8659	0	8659
2016	0	8659	0	8659
2017	0	8659	0	8659
Total (tonnes of CO_2e)	**0**	**86591**	**0**	**86591**

Therefore, a conventional energy equivalent of 93.36 Million kWh for a period of 10 years in TN would be saved by exporting power from the 3.75 MW wind energy based power project which in turn will reduce 86,591 tons of CO_2 emissions considering baseline calculations.

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

B.7.1 Data and parameters monitored:

Parameter	E_{Exp}
Unit:	kWh
Description:	Power Export
Source of Data:	Tri-vector Energy Meter
Value of Data:	9.34 million kWh per annum
Brief description of measurement methods and procedures to be applied:	The parameter is measured using a tri-vector energy meter available in the switch yard at TNEB sub-station. For billing purpose the meter reading will be taken monthly by TNEB in the presence of the project proponent and will be jointly certified.
QA/QC procedures to be applied (if any):	The data will be directly measured and monitored by TNEB. All relevant records will be checked to ensure consistency. The meters will be calibrated as per the standards.
Any Comments	A PLF of 29% and 8760 hours of working has been considered for calculation of ex-ante purpose.

Parameter	$E_{exp,site}$
Unit:	kWh
Description:	Electricity Export to the grid based on the energy meter at site
Source of Data:	Tri-vector Energy Meter installed in the site sub station
Value of Data:	-
Brief description of measurement methods and procedures to be applied:	The parameter is measured using an energy meter available in the site substation. This reading is only taken to compare with the final export meter taken in the TNEB sub station. This is also verified with the readings of the generation meters of individual wind mills installed in their control panel. The detailed procedures are described in the monitoring plan mentioned in Annex 4.
QA/QC procedures to be applied (if any):	All relevant records will be checked to ensure consistency. The main and check meters installed in the site substation are also calibrated as per the requirements. Please refer Annex 4 for details.
Any Comments	The meter readings will be compared electricity meters in TNEB substation to cross check the reading and T&D losses.

Parameter	$E_{gen,site,i}$
Unit:	kWh
Description:	Electricity generated by the WTG, i
Source of Data:	Energy Meter installed in the control panel of WTG, i
Value of Data:	-
Brief description of measurement methods and procedures to be applied:	The parameter is measured using an energy meter available in the control panel of the WTG at the site. These reading are compared with the meter readings of the main electricity meter at the site sub-station. The detailed procedures are described in the monitoring plan mentioned in Annex 4.
QA/QC procedures to be applied (if any):	No separate QA/QC procedures are required.
Any Comments	-

Parameter	$E_{imp,grid}$
Unit:	kWh
Description:	Electricity Import from the grid
Source of Data:	Tri-vector Energy Meter installed in the SEB sub station
Value of Data:	-
Brief description of measurement methods and procedures to be applied:	The parameter is measured using a tri-vector energy meter available in the switch yard at TNEB sub-station. For billing purpose the meter reading will be taken monthly by SEB in the presence of the project proponent and will be jointly certified.
QA/QC procedures to be applied (if any):	The data will be directly measured and monitored by TNEB. All relevant records will be checked to ensure consistency. The meters will be calibrated as per the standards.
Any Comments	-

B.7.2 Description of the monitoring plan:

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Project proponent implemented the following operational and management structure in order to monitor emission reductions and any leakage effects, generated by the project activity

Project proponent formed a CDM team/committee comprising of persons from relevant departments, which will be responsible for monitoring of all the parameters mentioned in this section. In the CDM team, a special group of operators will be formed who will be assigned responsibility of monitoring and record keeping. On daily basis, the monitoring reports will be checked and discussed. On monthly basis, these reports will be forwarded at the management level.

Details of the monitoring plan has been provided in Annexure – 4 of this document.

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

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Date of completing the final draft of this baseline section: ***DD/MM/YYYY***

17/12/2007

Name of person/entity determining the baseline:

Creamline Dairy Products Limited (CDPL) and Om Sakthi Power Private Limited (OSWPPL), who are also a project participant (as mentioned in Annex-I)

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SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>

25th January 2006 and is operational since March 2006

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

>>

Life time of the project: 20 years

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

C.2.1. Renewable crediting period

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

>>

Not applicable

C.2.1.2. Length of the first crediting period:

>>

Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

01/03/2008. The project participant will not commence the crediting period prior to the date of registration.

C.2.2.2. Length:

>>

10 years (10-y)

SECTION D. Environmental impacts

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

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The project being a renewable energy based power project it does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India. As per the government of India notification dated June 13, 2002 based on environment protection rule, 1986, public hearing and EIA is required for those industries/projects which are listed in the predefined list of ministry of environment and forest. Hence, it is not required by the host party.

The project activity does not have any significant environmental impacts. However, some of the impacts likely to be caused by the project activity has been discussed below:

During construction

Impact on air

Movement of construction material during construction will have some impact on the air. As the transportation is quite less for the project activity, the impacts will be negligible.

Impact on water

There was no waste water discharge during construction. However, proper sanitary arrangements were provided during construction phase.

Impact on Land use

The land on which the project activity takes place is barren and largely unfertile. Prior to the project activity the most of the land in Tirunelveli district had no beneficial use. The project proponents had bought 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. In fact the land value appreciated due to the project activity and other wind energy developers and the landowners benefited due to the project activity.

Impact due to noise

During the construction period the workers were made to use Personal Protective Equipments (PPEs) to mitigate any effects due to noise pollution. However, no impact on ambient noise level was envisaged. Taking into consideration the project life cycle, the magnitude of the impacts during the construction phase is negligible and is temporary which will remain till the end of construction phase. Therefore, it would not effect the environment considerably. The impacts on the environment due to construction activities of wind turbines are negligible

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Operation and Maintenance Phase

Impact on air
No impact on ambient air quality as WTGs are most eco-friendly source of energy and there is no use of any fossil fuel during the operation of the WTGs.

Impact on water
No waste water discharge during operation of wind turbine generators.

Impact on ecology
There are no known migratory birds/endangered species in the region of project activity. Therefore no harm on the ecological environment is envisaged.

Impact due to noise
Noise is generated due to the movement of rotor blades. The noise levels are below the regulatory norms. As the area where the project activity is located is not populated, there is no direct effect on the population, and noise generated will be attenuated by ambient conditions. The considering the overall impact of the project in reducing GHG's, creation of employment etc., makes this effect negligible.

Socio-Economic Impacts
The project activity has proven to have a positive impact on the socio-economic environment in the region. The locals have benefited economically through land sales. The project provided employment opportunities not only during the construction phase, but will provide during its operational lifetime. Moreover, the project generates eco-friendly, GHG free power which contributes to sustainable development of the region.

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

>>
Not Applicable

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SECTION E. Stakeholders' comments

>>

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

>>

The local stakeholder comment invitation and compilation process involved is as follows:
The local stakeholders are those who face the immediate effect due to the project activities which involves effect on the local environment, social life and economics. They can be within the boundaries of the village, district, state or nation.

On deciding above criteria for qualification of the stakeholders, the idea was to decide most appropriate representatives who are covering above. During interaction of the corporate headquarter and the plant management, the stakeholders were identified as:

- Office bearers of the neighbouring villages local bodies
- Customer (TNEB)

The project proponents have been constantly in touch with other identified stakeholders like licensing and regulatory authorities. Their views are reflected in the form of permissions granted for the project.

The project proponents had conducted the stakeholder consultation process on 25th May 2007 at the site. Among the people present were the village representative, local villagers, O & M contractors and other stakeholders.

The project proponents had invited the stakeholders to provide their general feedback on the project activity and specifically asked the villagers and their representative to give them information on how the project has helped them improve their livelihood. They were also asked whether there has been any improvement on the power conditions and business opportunities in the area.

E.2. Summary of the comments received:

>>

As mentioned above, PPs has already received the approvals and clearances for their project from the following stakeholders:

- Power Purchase Agreement with TNEB;
- Clearance from the Gram Panchayat

Although, for this project, public participation at any stage of project implementation is not required, being a CDM activity, project proponent has invited the local stakeholders including Sarpanch (head) of village, representative of local population to express their views on the project by sending letters to the concerned offices/persons and arranging a meeting at the project site. The summary of the feedback received is presented as below.

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The Panchayat Office representative (Member of locally elected body) expressed his happiness about the implementation of project in his village since the project activity has improved the infrastructure in the area. He also said that since there were no adequate rainfall in the area, farmers were facing problems with the crops and there was no proper income from the agriculture. After the wind power projects started coming in, the land values have increased and many villagers voluntarily sold their land and are now able to take care of the family members. Many of them are also working in the wind farms and earning their bread. One of the local resident said that after the wind farms were setup the land value went up and also the infrastructure in the area improve a lot including villages.

The TNEB official present during the meeting said that wind power projects have come up in the area in the last few years and has improved the power scenario in the region as well as helped in development in the area especially infrastructure. The union counselor expressed her happiness for the project activity and appreciated the project proponents for setting up the wind power project in the region. She also appreciated the technology developers' help in running a mobile dispensary in the villages.

In summary, stakeholders present at the meeting expressed that the project activity is helping the socio-economic development of the village and nearby area without affecting the local environment adversely.

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

>>

Not applicable. All positive comments received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Creamline Dairy Products Limited
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URL:	www.creamlinedairy.com
Represented by:	
Title:	Technical Director
Salutation:	Mr.
Last Name:	Reddy
Middle Name:	-
First Name:	Chandra Shekher
Department:	Technical
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URL:	
Represented by:	
Title:	Director
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Last Name:	P.
Middle Name:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No Public Funding is available to the project.

Annex 3

BASELINE INFORMATION

Generation Data, Emission Data published by Central Electricity Authority, Government of India.
http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

GENERATION DATA

Gross Generation Total (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	144,292	151,185	155,385	165,735	168,438	179,751	191,104
East	58,936	64,048	66,257	75,374	85,776	93,902	101,959
South	129,035	131,902	136,916	138,517	144,086	147,355	161,897
West	162,329	165,805	177,399	172,682	183,955	188,606	199,346
North-East	5,319	5,332	5,808	5,867	7,883	7,778	6,970
India	499,911	518,272	541,764	558,175	590,138	617,392	661,277

Net Generation Total (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	135,230	141,415	144,743	155,043	157,291	168,206	179,223
East	53,350	58,097	59,841	68,428	77,968	86,014	93,818
South	121,158	123,630	127,789	128,373	134,676	138,329	152,206
West	150,412	153,125	164,448	159,780	170,726	176,003	185,493
North-East	5,195	5,213	5,671	5,752	7,762	7,655	6,828
India	465,345	481,479	502,492	517,376	548,423	576,206	617,567

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)

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

Net Generation in Operating Margin (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	100,189	105,076	106,942	111,450	115,151	120,869	130,597
East	47,570	50,308	55,377	61,378	69,746	79,863	85,375
South	87,114	92,103	104,449	107,603	105,568	100,978	109,116
West	138,071	140,173	150,889	145,264	155,731	154,918	159,681
North-East	3,002	3,039	3,074	3,343	3,456	3,621	3,819
India	375,947	390,700	420,730	429,040	449,653	460,249	488,587

20% of Net Generation (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	27,046	28,283	28,949	31,009	31,458	33,641	35,845
East	10,670	11,619	11,968	13,686	15,594	17,203	18,764

South	24,232	24,726	25,558	25,675	26,935	27,666	30,441
West	30,082	30,625	32,890	31,956	34,145	35,201	37,099
North-East	1,039	1,043	1,134	1,150	1,552	1,531	1,366
India	93,069	96,296	100,498	103,475	109,685	115,241	123,513

Net Generation in Build Margin (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North					32,064	34,340	36,511
East					15,818	17,567	18,907
South					28,513	28,228	30,442
West					35,257	35,425	38,242
North-East					2,055	1,793	1,437
India					113,707	117,353	125,538

EMISSION DATA

Absolute Emissions Total (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	97,866,565	102,743,113	106,808,582	109,996,544	112,212,597	120,102,148	129,554,682
East	58,026,488	61,427,499	66,593,200	75,512,010	83,956,860	92,517,515	96,360,317
South	89,019,263	92,178,116	105,239,700	108,123,211	105,603,624	101,760,966	109,251,806
West	135,192,153	141,597,621	148,557,341	144,127,175	157,781,065	153,933,199	157,722,686
North-East	2,207,396	2,159,969	2,285,724	2,462,796	2,468,463	2,532,819	2,645,856
India	382,311,864	400,106,317	429,484,546	440,221,736	462,022,608	470,846,647	495,535,347

Absolute Emissions OM (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	97,866,565	102,743,113	106,808,582	109,996,544	112,212,597	120,102,148	129,554,682
East	58,026,488	61,427,499	66,593,200	75,512,010	83,956,860	92,517,515	96,360,317
South	89,019,263	92,178,116	105,239,700	108,123,211	105,603,624	101,760,966	109,251,806
West	135,192,153	141,597,621	148,557,341	144,127,175	157,781,065	153,933,199	157,722,686
North-East	2,207,396	2,159,969	2,285,724	2,462,796	2,468,463	2,532,819	2,645,856
India	382,311,864	400,106,317	429,484,546	440,221,736	462,022,608	470,846,647	495,535,347

Absolute Emissions BM (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North					17,108,583	20,625,908	22,941,127
East					14,303,611	16,990,438	17,547,736
South					20,092,752	20,045,639	21,475,360
West					27,148,870	22,318,133	22,707,948
North-East					299,124	267,051	325,491
India					78,952,941	80,247,168	84,997,662

EMISSION FACTORS

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

2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07

North	0.72	0.73	0.74	0.71	0.71	0.71	0.72
East	1.09	1.06	1.11	1.10	1.08	1.08	1.03
South	0.73	0.75	0.82	0.84	0.78	0.74	0.72
West	0.90	0.92	0.90	0.90	0.92	0.87	0.85
North-East	0.42	0.41	0.40	0.43	0.32	0.33	0.39
India	0.82	0.83	0.85	0.85	0.84	0.82	0.80

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	0.98	0.98	1.00	0.99	0.97	0.99	0.99
East	1.22	1.22	1.20	1.23	1.20	1.16	1.13
South	1.02	1.00	1.01	1.00	1.00	1.01	1.00
West	0.98	1.01	0.98	0.99	1.01	0.99	0.99
North-East	0.74	0.71	0.74	0.74	0.71	0.70	0.69
India	1.02	1.02	1.02	1.03	1.03	1.02	1.01

Build Margin (tCO2/MWh) (excl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North					0.53	0.60	0.63
East					0.90	0.97	0.93
South					0.70	0.71	0.71
West					0.77	0.63	0.59
North-East					0.15	0.15	0.23
India					0.69	0.68	0.68

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	0.76	0.76	0.77	0.76	0.75	0.80	0.81
East	1.06	1.06	1.05	1.07	1.05	1.06	1.03
South	0.86	0.85	0.86	0.85	0.85	0.86	0.85
West	0.87	0.89	0.88	0.88	0.89	0.81	0.79
North-East	0.44	0.43	0.44	0.44	0.43	0.42	0.46
India	0.86	0.86	0.86	0.86	0.86	0.85	0.85

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Annex 4

MONITORING INFORMATION

The calibration of monitoring equipment is being maintained as per the requirement of TNEB and the same is being done regularly. Power Export is being recorded and the same is being verified by site in-charge. These records are being sent to Head Office for review by the Director and for corrective actions if necessary.

Further, Internal Auditors also verify the monitoring data. As per the advices of the Internal Audit team, corrective actions will be taken up for more accurate future monitoring and reporting system.

The real time performance of the system is being monitored by the Operation and Maintenance team at the Central Monitoring Station. In the event of any discrepancies in the above, corrective action will be taken up comparing readings from the various measuring and monitoring equipments.

The entire process of monitoring has been streamlined and will be made available in the required format during the verification process and for subsequent useful purposes.

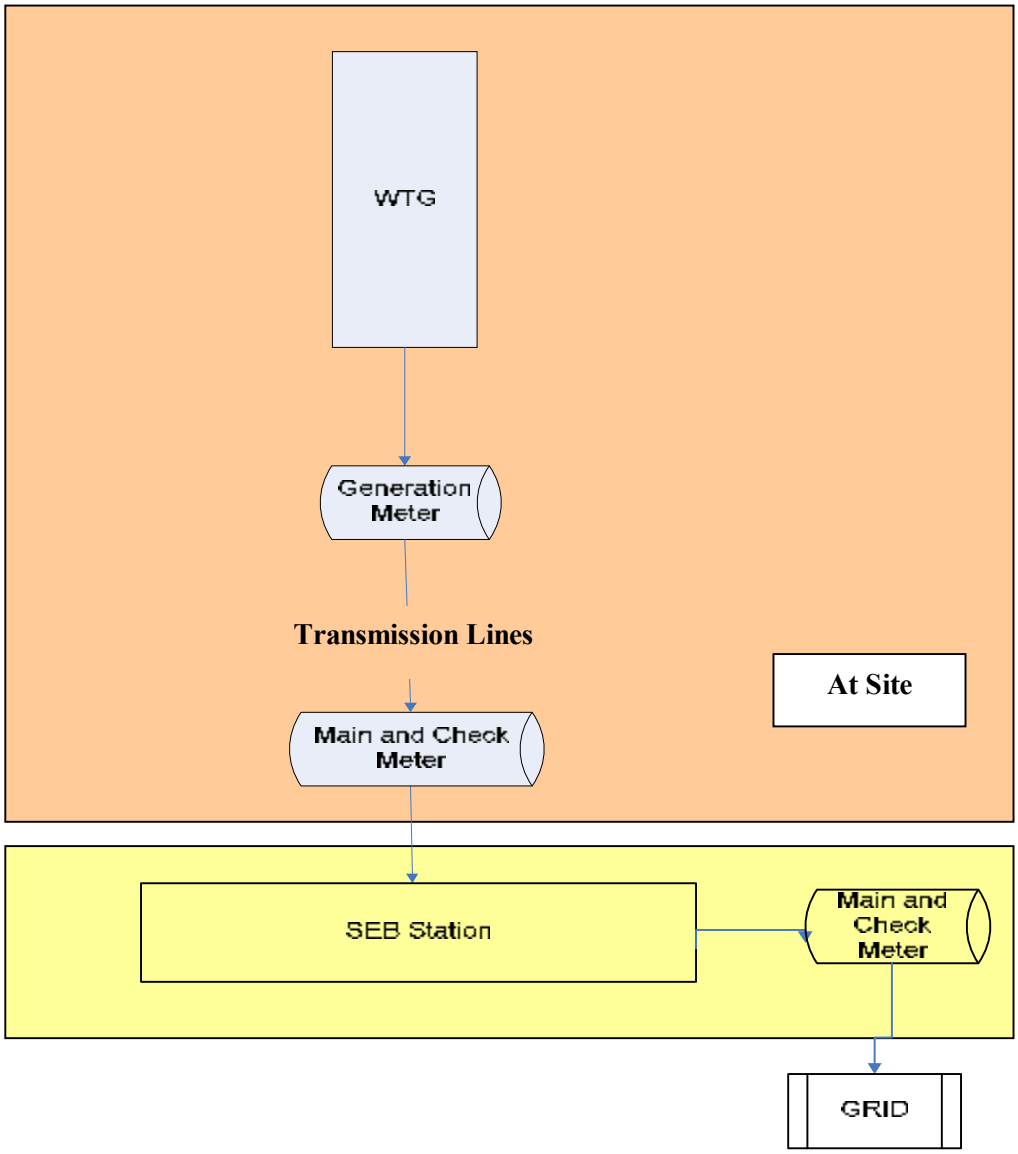
Each WTG has got individual generation meter installed in their control panels. All the electricity exported from WTGs will be recorded from the electricity meter installed at the substation near the site. The electricity from substation at site is supplied to the grid through TNEB sub station, which has got another set of electricity meters. The readings at these meters indicate the total electricity exported to the grid minus T&D losses. Plant monitors the electricity generation using generation meters of individual WTGs, exported to the grid using main and check meters at substation near site. TNEB monitors the electricity exported to the grid using their electricity meter installed in sub station. These readings will be cross checked with electricity meter installed at PP's substation near site. The same is shown schematically below:

If any of the meters is found to be registered inaccurately, the affected meter will be immediately replaced. If during the test checks both the meters are found beyond permissible limits of error, both the meters shall be immediately replaced and the correction applied to the consumption registered by the main meter to arrive at the correct energy exported for billing purposes for the period of one month up to the time of test check, computation of exported energy for the period thereafter till next monthly reading shall be as per the replaced meter. Corrections in exported energy shall be applicable to the period between the two previous monthly reading and the sate and time of test calibration in the current month when error is observed.

Power generation, export and import are being recorded at the plant from the installed meters. However, for applying monthly bill to TNEB the meter readings will be taken on 1st of every month by TNEB officials in presence of company representatives and readings will be jointly certified.

If both the both and check meters fail to record or if any of the PT fuses are blown out, the export energy will be computed on a mutually agreeable basis for the point of defect.

Monthly log sheets are being maintained for each WTG, export meters and readings are being recorded. These records are being sent to Head Office for review by the General Manager and for corrective actions if necessary. Further, Internal Auditors also verify the monitoring data. As per the advices of the Internal Audit team, corrective actions will be taken up for more accurate future monitoring and reporting system.


WTG
Generation Meter
Transmission Lines
At Site
Main and Check Meter
SEB Station
Main and Check Meter
GRID

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Appendix – A

CALCULATION OF BASELINE EMISSION FACTORS AND EMISSION REDUCTIONS DUE TO 3 x 1250 kW WIND BASED POWER PROJECT

Year of offer		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
On-Site Project Emission Reductions											
Generation capacity , KW		3750	3750	3750	3750	3750	3750	3750	3750	3750	3750
Plant load factor, %		29	29	29	29	29	29	29	29	29	29
No. of hours of plant operation per annum		8760	8760	8760	8760	8760	8760	8760	8760	8760	8760
No. of units generated in a year, millions		9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.5265
No. of units exported to grid, millions		9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53	9.53
T&D losses considered on exportable power		2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
No. of units replaced in the grid, millions units		9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34	9.34
Baseline emission factor considered, $kgCO_2/kWh$		0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Baseline emissions, tones		8659	8659	8659	8659	8659	8659	8659	8659	8659	8659
Project emissions, tones		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net greenhouse gas emissions, tones		8659	8659	8659	8659	8659	8659	8659	8659	8659	8659
Actual green power to grid, millions units											
Carbon emission reductions in a year		8659	8659	8659	8659	8659	8659	8659	8659	8659	8659
Commitment period	10										
No. of years of delivery of CERs											
Total number of CERs	**86591.12**										

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Baseline emissions	8659	8659	8659	8659	8659	8659	8659	8659	8659	8659	**86591**
Project emissions	0	0	0	0	0	0	0	0	0	0	**0**
Emission reductions	**8659**	**8659**	**8659**	**8659**	**8659**	**8659**	**8659**	**8659**	**8659**	**8659**	**86591**