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

## CONTENTS

**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.<br>• 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. |

## SECTION A. General description of small-scale project activity

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

**13.25 MW Wind Power Generation by RMTL, in Kutch, Gujarat**
Version: 1.1
Date: 07/08/2008

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

The purpose of the project activity is to generate clean and green energy to help combat greenhouse gas emissions from conventional sources of energy. The project activity entails installation of wind turbines having a total capacity of 13.25 MW. Eight wind turbines of 1.5MW each and one wind turbine of 1.25 MW are installed in this project activity. The electricity produced from the wind turbines is exported to the connected state grid barring the entire power generated by the 1.25 MW WTG and 70% of one of the 1.5MW WTG would be wheeled to the project proponent's unit. The project activity is a part of the Western Region (WR) grid. WR grid is predominantly fossil fuel dependent and has a grid emission of 0.898 tCO2e/ MWh[1]. The project activity reduces greenhouse gas (GHG) emission in power generation in the grid, which predominantly has fossil fuel based power stations. All the nine wind turbines have been installed in Kutch district in Gujarat state as shown in the table below:

| WTG ID Number | Capacity (MW) |
|---|---|
| SEL/1500/06-07/0358 | 1.50 |
| SEL/1500/06-07/0359 | 1.50 |
| SEL/1500/06-07/0360 | 1.50 |
| SEL/1500/06-07/0361 | 1.50 |
| SEL/1500/06-07/0382 | 1.50 |
| SEL/1500/06-07/0383 | 1.50 |
| SEL/1500/06-07/0384 | 1.50 |
| SEL/1500/06-07/0362 | 1.50 |
| SEL/1250/05-06/0139 | 1.25 |
| **Total** | **13.25** |

The project proponent, Ratnamani Metals and Tubes Ltd (RMTL), is a well known manufacturer of carbon steel and stainless steel tubes. It employs state-of-the-art technology and caters to the niche markets of almost all the emerging sectors like oil and gas, refineries, petrochemicals, process industries, power plants and water distribution.

The project meets the sustainable development aspects and also contributes its mite to the Government of India's target of meeting its 10% power requirements through renewable energy sources by 2012[2].

[1] Refer Annex 3 for details of grid emission factor estimation

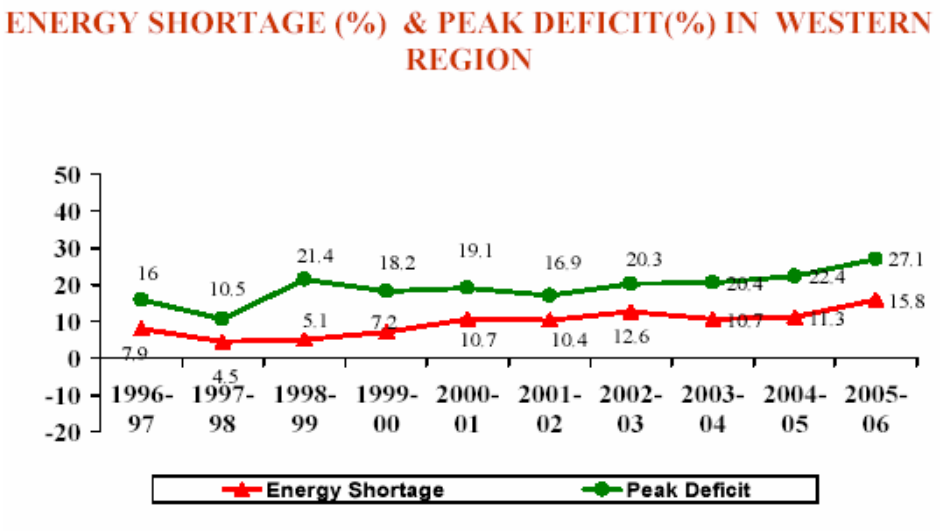
[2] www.nri.org/biomass/conference_papers/policy_material_section_3.pdf , page 1

Government of India has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects.

**Social well being:**

- The project activity being undertaken is in a rural area of the State of Gujarat. Majority of the population in Kutch district is rural (Census 2001, www.censusindia.gov.in ). Thus such an initiative in the region will promote development of the region as well as lead to improved well being of the society.
- The project activity will help in better connectivity to the wind farms and villages by enabling improved conditions of the roads.
- The project activity will improve economic activities by increasing the electricity generation and availability of power and hence lead to the betterment of the society.
- The project activity will generate employment opportunities for the people, both during construction and operation phases.

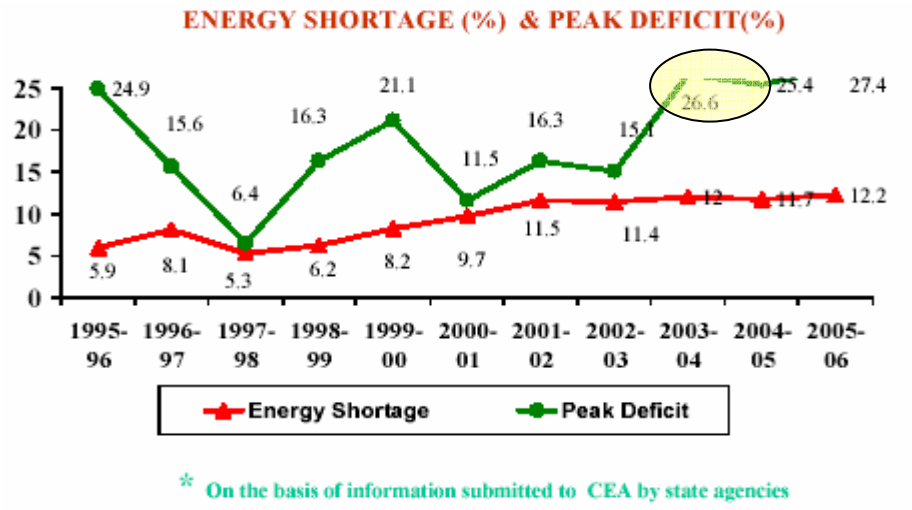
The WR grid in India faces power deficit which is approximately 27%[3]. This is a reflection of the fact that power demand is more than power supplied in the states.




A similar situation prevails in the state of Gujarat. It has a peak deficit of ~27% as can be seen from graphs below.

**Power Demand and Supply state in Gujarat**

[3] Power Sector Profile – Western Region grid




Source: http://powermin.nic.in

Power generation using wind-energy would help meet power shortage in the state. It will also contribute towards Government of India's plan of meeting 10% of total power demand in the country using renewable energy sources.

**Economical well being:**

- The project activity would create business opportunity for local stakeholders such as suppliers, manufacturers, contractors etc.
- This initiative would encourage other entrepreneurs from various sectors, to adopt this technology and invest in wind energy.

**Environmental well being:**

- The project activity is a step towards environmental sustainability by avoiding fossil fuels, such as coal, utilized for power generation.
- Since, the project would be using renewable wind resources for power generation; it would not lead to any GHG emissions in the environment.

**Technological well being:**

- The technology selected for the power project is Wind Turbine Generators, manufactured by Suzlon Energy Limited. The technology is latest and environmentally safe.

## A.3. Project participants:

| Name of Party involved (*) ((host) indicates a host Party) | Private and/or public entity(ies) project participants (*) (as applicable) | Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| Government of India (Host | Private entity - Ratnamani Metals | No |

| | | |
|---|---|---|
| Party) | and Tubes Ltd (RMTL) | |

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

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

**A.4.1.1. Host Party(ies):**

India

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

Gujarat

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

Village: Arikhana, Kamand, Suthri,
District: Kutch

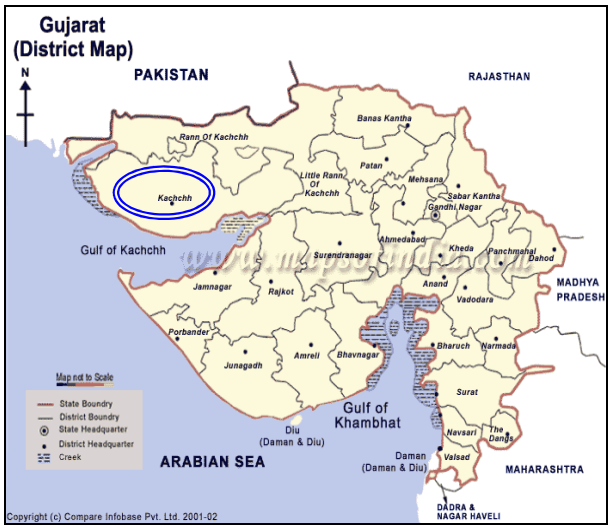
**A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :**

The project activity is located in three villages namely Arikhana, Suthri, Kamand in district, Kutch. Kutch is well connected by road (National Highway No. 15) and also has a domestic airport at Bhuj. It is also connected by railways and the nearest railway station is in Bhuj.

The latitude and longitude of the location of wind mills are given below:

| WTG ID number | Capacity (MW) | Village Location | Latitude | Longitude |
|---|---|---|---|---|
| SEL/1500/06-07/0358 | 1.50 | Suthri | 23 03 N | E68 52 |
| SEL/1500/06-07/0359 | 1.50 | Arikhana | 23 00 N | E68 55 |
| SEL/1500/06-07/0360 | 1.50 | Arikhana | 23 03 N | E68 52 |
| SEL/1500/06-07/0361 | 1.50 | Kamand | 23 03 N | E68 52 |
| SEL/1500/06-07/0382 | 1.50 | Suthri-old | 23 02 N | E68 53 |
| SEL/1500/06-07/0383 | 1.50 | Suthri | 23 02 N | E68 52 |
| SEL/1500/06-07/0384 | 1.50 | Suthri-old | 23 02 N | E68 52 |
| SEL/1500/06-07/0362 | 1.50 | Suthri | 23 02 N | E68 54 |
| SEL/1250/05-06/0139 | 1.25 | Vanku | 22 51N | E68 32 |
| **Total** | 13.25 | | | |

The map below shows the location of the district Kutch.


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

The project is a small scale CDM project activity and is based on Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The project activity conforms to the following category -

**Project Type:** I– Renewable Energy Projects

**Project Category:** AMS ID. 'Grid connected renewable electricity generation' Version 13, Scope 1, EB 36

The project is a Renewable Energy project with maximum output capacity of 13.25 MW (<15 MW, the maximum output for small scale project); hence, this comes under the Appendix B of the simplified modalities & procedures for small-scale CDM-project activities.

**Technology:**

Technical specifications of Suzlon 1500 kW WTG is given below:

| **Wind Turbine Generator Type** | **1.5 MW** |
|---|---|
| Make | Suzlon |
| **Rotor** | |
| Rotor Diameter | 82.0 m |
| Cut-in wind speed | 4m/s |
| Rated wind speed | 14m/s |
| Rotor swept area | 5281 $m^2$ |
| Rotational Speed | 16.30 rpm |
| Rotor material | GRP |
| Regulation | Pitch |
| **Gear Box** | |
| Type | 3 Stage gear box, 1 planetary & 2 helical |
| Manufacturer | Winergy |
| Nominal load | 1650 kW |

| | |
|---|---|
| Type of cooling | Oil cooling system |
| Gear ratio | 95.09 |
| **Generator** | |
| Type | Asynchronous generator 4 pole |
| Rotational Speed | 1511 rpm |
| Rated output | 1500 kW |
| Operational Voltage | 690 V |
| Frequency | 50 Hz |
| Insulation class | Class "H" |
| Protection | IP 54 |
| Cooling system | Air cooled |
| **Safety system** | |
| Aerodynamic brake | 3 times Independent systems pitch regulation |
| Mechanical brake | Spring powered disc brakes, hydraulically released, fail safe |
| Control unit | Microprocessor controlled, indicating actual operating conditions, UPS back up system |
| **Yaw Drive System** | 4 active electrical yaw motors |
| Yaw bearing | Polyamide slide bearing |

Technical specifications of Suzlon 1250 kW WTG is given below.

| **Wind Turbine Generator Type** | **1.25 MW** |
|---|---|
| Make | Suzlon, S.64 |
| **Rotor** | |
| Rotor Diameter | 64 m |
| Cut-in wind speed | 3 m/s |
| Rated wind speed | 14 m/s |
| Rotor blades | 3 no. |
| Rotor swept area | 3217 $m^2$ |
| Rotational Speed | 13.9 rpm |
| Rotor material | GRP |
| Regulation | Pitch regulated |
| **Gear Box** | |
| Type | 3 Stage gear box, 1 planetary & 2 helical |
| Manufacturer | Winergy |
| Nominal load | 1390 kW |
| Type of cooling | Oil cooling system |
| Gear ratio | 74.917:1 |
| **Generator** | |
| Type | Asynchronous generator 4 pole |
| Rotational Speed | 1006/ 1506 rpm |
| Rated output | 250/1250 kW |
| Rated Voltage | 690 V |
| Frequency | 50 Hz |
| Insulation class | Class "H" |
| Protection | IP 56 |
| Cooling system | Air cooled |

| | |
|---|---|
| **Safety system** | |
| Aerodynamic brake | 3 Independent systems with blade pitch |
| Mechanical brake | Spring powered disc brakes, hydraulically released, fail safe |
| Control unit | Microprocessor controlled, indicating actual operating conditions, UPS back up system |
| **Yaw Drive System** | 4 active electrical yaw motors |
| Yaw bearing | Polyamide slide bearing |

The technology used in the project activity is environmentally safe and sound.

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

| Year | Estimation of annual emission reduction in tonnes of CO2e |
|---|---|
| 2008-09* | 23960 |
| 2009-10 | 23960 |
| 2010-11 | 23960 |
| 2011-12 | 23960 |
| 2012-13 | 23960 |
| 2013-14 | 23960 |
| 2014-15 | 23960 |
| 2015-16 | 23960 |
| 2016-17 | 23960 |
| 2017-18 | 23960 |
| **Total estimated reductions** (tonnes of CO2e) | 239600 |
| **Total number of crediting years** | 10 years for fixed crediting period |
| **Annual average of estimated reductions over the crediting period** (tonnes of CO2e) | 23960 |

*Period: December – November every year

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

No Public Funding for the project activity or funding from Annex 1 or ODA is envisaged for the project activity.

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

There is no registered small-scale CDM project activity or an application to register another small-scale project activity:

- by the same project participants;
- in the same project category and technology/measure; and
- registered within the previous 2 years; and

- whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point

It therefore satisfies all conditions listed in "Appendix C" of the simplified M&P for the small-scale CDM project activities for guidance on how to determine whether the proposed project activity is not a de-bundled component of a larger project activity"

## SECTION B. Application of a baseline and monitoring methodology

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

**Methodology: AMS ID 'Grid connected renewable electricity generation' Scope 1**
Version 13, EB 36

**Methodology: ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"**
Version 07, Sectoral Scope: 01, EB 36

**"Tool to calculate the emission factor for an electricity system"**
Version 01, EB 35

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

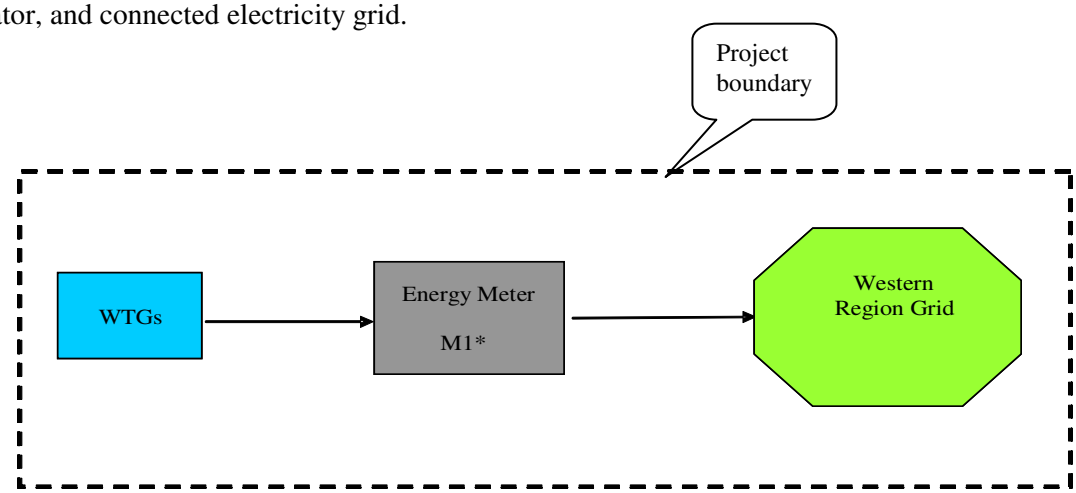
The project status is in line with the methodology AMS ID; specific features of project and applicability of methodology AMS ID are discussed below:

| Applicability of AMS ID | Project Status |
|---|---|
| This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, 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 firing power station | Project activity involves wind energy generating units that supply electricity to the regional distribution system (WR grid) that is supplied by a number of fossil fuel fired units. |
| 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. | The project has only renewable components and the capacity is less than 15MW (13.25 MW). |
| Combined heat and power (co-generation) systems are not eligible under this category. | The project is not a heat & power generation project. The only output from a wind installation is electricity |
| In the case of project activities that involve the | Not applicable, all the windmills are new and this |

| | |
|---|---|
| addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units. | project is not capacity enhancement or up gradation project |
| 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 | Not applicable, this project is not a retrofit or modification of existing facility. |

## B.3. Description of the project boundary:

The project boundary consists of the Wind Turbine Generator (WTG), the metering equipments for each generator, and connected electricity grid.




* M1 is explained in the monitoring plan in Annex 4

## B.4. Description of baseline and its development:

The methodology AMS-ID suggests that, for all other systems, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2e/kWh) calculated in a transparent and conservative manner as:

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

OR

(b) The weighted average emissions (in kg CO2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.
Calculations must be based on data from an official source (where available) and made publicly available.

Baseline for the project activity is power generated from renewable energy source multiplied by the grid emission factor of WR grid calculated in transparent and conservative manner.

**Option (a) has been considered to calculate the grid emission factor as per the** 'Tool to calculate the emission factor for an electricity system' as per the methodology as data is available from an official source.

**Baseline Methodology Procedure**

Project participants shall apply the following six steps:

STEP 1. Identify the relevant electric power system.

STEP 2. Select an operating margin (OM) method.

STEP 3. Calculate the operating margin emission factor according to the selected method.

STEP 4. Identify the cohort of power units to be included in the build margin (BM).

STEP 5. Calculate the build margin emission factor.

STEP 6. Calculate the combined margin (CM) emissions factor.

**STEP 1. Identify the relevant electric power system :**

The tool defines the *electric power system* as the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity and that can be dispatched without significant transmission constraints. Keeping this into consideration, the Central Electricity Authority (CEA)1, Government of India has divided the Indian Power Sector into five regional grids (see table below).

| Northern | Western | Southern | Eastern | North-Eastern |
|---|---|---|---|---|
| Chandigarh | Chhattisgarh | Andhra Pradesh | Bihar | Arunachal Pradesh |
| Delhi | Gujarat | Karnataka | Jharkhand | Assam |
| Haryana | Daman & Diu | Kerala | Orissa | Manipur |
| Himachal Pradesh | Dadar & Nagar Haveli | Tamil Nadu | West Bengal | Meghalaya |
| Jammu & Kashmir | Madhya Pradesh | Pondicherry | Sikkim | Mizoram |
| Punjab | Maharashtra | Lakshadweep | Andaman-Nicobar | Nagaland |
| Rajasthan | Goa | | | Tripura |
| Uttar Pradesh | | | | |
| Uttaranchal | | | | |

Since the project supplies electricity to the Western grid, emissions generated due to the electricity generated by the western regional grid as per CM calculations will serve as the baseline for this project. The Western Region grid managed by Western Region Electricity Board (WREB) constitutes five states

(viz Maharashtra, Madhya Pradesh, Chhatisgarh, Gujarat and Goa) and two Union territories (Daman & Diu and Dadra & Nagar Haveli). These States under the regional grid have their own power generating stations as well as centrally shared power-generating stations.

**STEP 2. Select an operating margin (OM) method.**

The calculation of the operating margin emission factor ($EF_{OM,y}$) is based on one of the following methods:

(a) Simple OM, or

(b) Simple adjusted OM, or

(c) Dispatch data analysis OM, or

(d) Average OM.

Any of the four methods can be used. However, the simple OM method (option a) can only be used if low-cost/must-run resources[3] constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

| Generation | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 | Average of the last five years |
|---|---|---|---|---|---|---|
| Total Power generation GWh) | 164448 | 159780 | 170726 | 176003 | 185493 | 856450 |
| Low cost/ Must run sources (GWh) | 13559 | 14516 | 14994 | 21085 | 25812 | 89966 |
| % of Low cost/ Must run sources | 8.2% | 9.1% | 8.8% | 12.0% | 13.9% | 10.4% |

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

The above table clearly shows that the percentage of total grid generation by low-cost/must-run plants (on the basis of average of five most recent years) for the Western regional grid is only 10.4%, which is much lesser than 50% of the total generation. Thus, Simple OM method can be used for calculating the emission factor.

**STEP 3. Calculate the operating margin emission factor according to the selected method.**

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

• Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or

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

The simple OM emission factor is calculated as the generation-weighted average $CO_2$ emissions per unit net electricity generation (tCO2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units.

**Method adopted for Simple OM in the project activity:**

In the project activity, (*ex-ante*) the full generation-weighted average for the most recent 3 years for which data are available at the time of PDD submission has been considered. The data is published annually by the Central Electricity Authority. The CEA database is based on the methodology ACM0002 version 7.

It is confirmed that ex-ante vintage is considered in the project activity and cannot be changed during the crediting period.

| Parameter | Value (tCO2/ MWh) | Source |
|---|---|---|
| Simple OM, 2004-05 | 1.01 | The OM is based on ACM0002 version 7 as calculated in CEA database for grid emission factor. http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf |
| Simple OM, 2005-06 | 1.00 | |
| Simple OM, 2006-07 | 0.99 | |
| **Simple OM, average** | **1.00** | |

**STEP 4. Identify the cohort of power units to be included in the build margin (BM).**

The value of the data has been taken from the data published by CEA as referred in earlier step. The CEA Baseline Database has been calculated as per the methodology ACM0002 and the details of the key assumptions considered to calculate the figure can be found in the User Guide of the same.

Project participants can choose one of the following two options:

*Option 1*
Calculate the Build Margin emission factor $EF_{BM,y}$ **ex-ante** based on the most recent information available on plants already built for sample group m at the time of PDD submission. The sample group *m* consists of either the five power plants that have been built most recently or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. Project participants should use from these two options that sample group that comprises the larger annual generation.

*Option 2*
For the first crediting period, the Build Margin emission factor $EF_{BM,y}$ must be updated annually ex-post for the year in which actual project generation and associated emissions reductions occur. For subsequent crediting periods, $EF_{BM,y}$ should be calculated ex-ante, as described in option 1 above. The sample group *m* consists of either the five power plants that have been built most recently or the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. Project participants should use from these two options that sample group that comprises the larger annual generation.

**STEP 5. Calculate the build margin emission factor (EFgrid, BM,y)**

Option 1 as described above is chosen in the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PDD and is fixed for the entire crediting period.

As per the CEA CO2 Baseline Database, the BM for the 2006-07 has been calculated to be EFgrid, BM,y = 0.59 tCO2e/MWh

**STEP 6. Calculate the combined margin (CM) emissions factor (EFgrid, CM, y )**

The CM can be calculated as per the following:

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

Where:

EFgrid, OM,y = Build Margin CO2 emission factor in the year *y* (tCO2/GWh)
EFgrid, BM,y = Operating Margin CO2 emission factor in the year *y* (tCO2/GWh)
WOM = Weighting of operating margin emission factor (%)
WBM = Weighting of build margin emission factor (%)

Owing to their intermittent and non-dispatchable nature, the default weights for wind and solar projects are as follows: *w*OM = 75% and *w*BM = 25%

In the project activity, **combined margin has been chosen as the baseline emission factor** for grid emission factor. The value chosen is taken from relevant official sources and is publicly available[4]. .

| **Parameter** | **Value (tCO2/ MWh)** |
|---|---|
| OM, Operating Margin | 1.00 |
| BM, Build Margin | 0.59 |
| **CM, Combined Margin** | **0.898** |

Thus, the CM emissions factor (EFgrid, CM, y ) for the project has been calculated to be **EFgrid, CM, y = 0.898 tCO2/MWh and is fixed ex-ante for the entire crediting period.**

[4] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf

**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 is a clean energy project and reduces anthropogenic emissions of greenhouse gases below those that would have occurred in absence of the proposed CDM project activity. It is located in Kutch district of Gujarat. It is a small scale project. Hence, the additionality of the project can be established through any one of the barriers listed in Attachment A to Appendix B.

The methodology lists four barriers, viz.,

a) Investment barrier
b) Technological barrier
c) Barrier due to prevailing practice and
d) Other barriers.

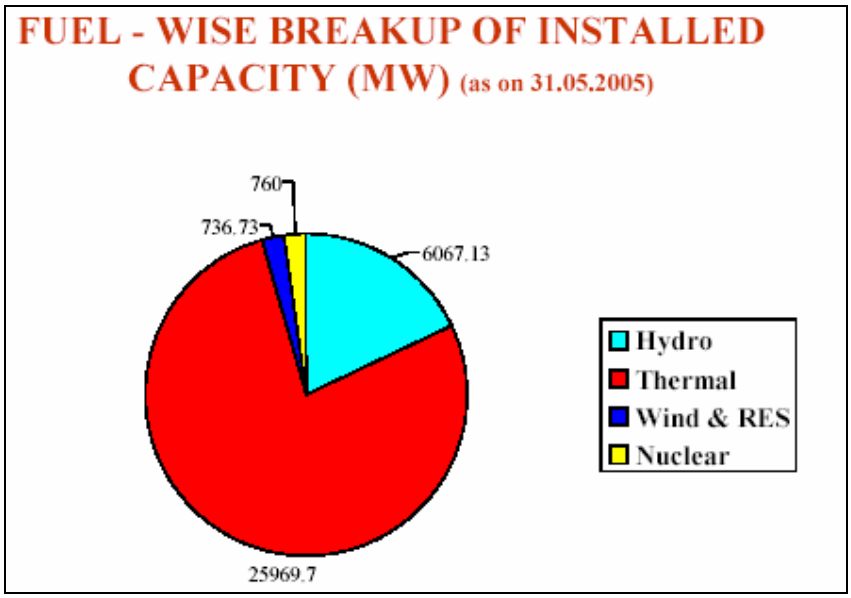
Subsequently, in its 35th Meeting, EB issued Non-binding best practice examples for demonstrating additionality for SSC project activities, wherein the EB has once again reiterated that project participants have to provide an explanation to show that the project activity would not have occurred anyway due to *at least one of the* barriers.

Of the barriers listed above, PP has chosen to demonstrate the additionality through investment barrier, barrier due to prevailing practices and other barriers.

The State of Gujarat has a long[5] coastline of 1600 km with adequate wind speed for generation of electrical energy. The gross wind energy potential of the State has been estimated at 7362 MW.

Presently, coal based power plants contribute approximately 77% [6]towards the total power generation in the Western Region, while non-conventional sources of energy contribute less than 2.5% [7]of the total annual generation in the WR grid. In the absence of the proposed project activity, equivalent power would be generated by grid connected power stations and no emission reduction would take place. Government of India plans to generate at least 10% of the total power generation through renewable sources of power by 2012[8] and to achieve the target provides a number of incentives to these projects. The fact that these projects are still offered incentives goes to prove that wind power projects are not common practice. The present break up of the power generation in the country is given in the following chart.

[5] http://www.geda.org.in/wind/wind_ov.htm
[6] Source: http://powermin.nic.in/indian_electricity_scenario/pdf/WR0505.pdf
[7] Source: http://powermin.nic.in/indian_electricity_scenario/pdf/WR0505.pdf
[8] http://www.nri.org/biomass/conference_papers/policy_material_section_3.pdf




(Source: http://powermin.nic.in/indian_electricity_scenario/pdf/WR0505.pdf)

Even though investment in wind power project is not financially attractive, project proponents have decided to go ahead with the project, after taking into consideration the CDM benefits likely to accrue, with a view to contributing to the environmental protection.

**Investment Barrier:**

The project proponent has chosen benchmark analysis to demonstrate the additionality of the project, which is sought to be compared with the financial indicator, project Internal Rate of Return (IRR).

Though not required, by virtue of the project being a small scale project activity, the PP has relied on the benchmark suggested by the Additionality Tool, Version 5. The Additionality Tool states that the Discount rates and benchmarks, shall be derived from, *inter alia* Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data.

As per the methodology, the benchmark can be derived from Government Bond rates by adding suitable risk premium to reflect private investment and/or project type. The PP has depended on the Reserve Bank of India Annual Report to derive the bond rate. The Reserve Bank of India publishes Annual Report every year wherein the YTM (which is nothing but the bond rate) of bonds are published. The weighted average yield of bond for the year 2005 (upto August 2005), relevant to the year in which decision to invest in the project was taken was 7.28%[9].

Three research articles have been published on the equity risk premium for Indian Stock Markets, viz.,

[9] http://rbidocs.rbi.org.in/rdocs/AnnualReport/PDFs/65526.pdf page 155

a) The Equity Premium in India by *Rajnish Mehra*, University of California, Santa Barbara and National Bureau of Economic Research[10], and
b) A First Cut Estimate of the Equity Risk Premium in India by *Prof. Jayant R. Verma and Samir K. Barua*, Indian Institute of Management, Ahmedabad[11]
c) Cost of Capital for Central Sector Utilities, CRISIL Advisory Services[12].

While Prof. Rajnish Mehra has estimated the risk premium at 9.7%, Prof. J.R. Verma has placed it 8.75%. CRISIL has estimated the risk premium at 8.20%. However, this return represents the risk premium for investing in the *stock market* as the authors have taken Sensex as a proxy for market return. The methodology requires the risk premium added should reflect private investment and/or the project type. From the above, as a conservative approach, the lowest market risk premium of 8.20% has been chosen.

The CAPM states that the excess of expected return on *any stock* over the risk free rate is equal to the equity risk premium times the *riskiness of the stock as measured by its beta*[13]. In the case of new projects, beta value will not be available. Therefore, the only option to estimate the risk premium of the project is to go by the beta value of similar existing listed projects. Among the power projects listed in the Indian stock exchanges, BF Utilities Ltd. is the only wind power project comparable to the project under consideration. The beta value of BF Utilities has been computed based on the data publicly available from BSE Website. A period of three year, i.e., from January 2003 to December 2005 has been taken into account to compute the beta value. The beta works out to 2.155.

Based on the equity beta, debt-equity ratio and the tax rate[14] of BF Utilities Ltd. the Asset Beta has been arrived at using the following formula:

$$\text{Asset beta} = \text{Equity beta} / [(1 + (1-Tc) * D/E]$$

Asset Beta works out to 1.48. Since Asset Beta is an unlevered beta, the underlying assumption is that it is an all equity firm. In other words, it is the risk premium for this project type, i.e., the premium the project developers expect from such projects. Since this figure represents the risk premium expected of a project type, the risk premium together with the Government Bond rates represent the benchmark, which is comparable to project IRR[15].

[10] http://www.academicwebpages.com/preview/mehra/pdf/Equity%20Premium%20in%20India.pdf

[11] http://www.iimahd.ernet.in/~jrvarma/papers/WP2006-06-04.pdf

[12] *Cost of Capital for Central Sector Utilities*, CRISIL Advisory Services can be accessed at http://cercind.gov.in/rep1304.pdf

[13] *Prof. Jayant R. Verma and Samir K. Barua*, A First Cut Estimate of the Equity Risk Premium in India Indian Institute of Management, Ahmedabad

[14] The debt equity ratio of BFU as on 30-9.2005 (relevant to the period in which decision was taken) was 0.755 and the tax rate was 39.75%. Relevant data are available at the website http://www.moneycontrol.com/india/stockpricequote/powergenerationdistribution/bfutilities/16/38/profitloss/marketprice/BFU

[15] Factoring in project's financial structure would render the risk premium lose its characteristic as the risk premium of the project type; instead it would become risk premium of the project.

A conservative approach has been adopted to estimate the risk premium for the project type and the beta value has been taken at 0.75 only[16]. Thus, taking into account risk premium of the project type, the risk premium estimated by CRISIL (8.20 X 0.75) and the Government bond rate (7.28%), the benchmark works out to 13.43%. A certificate on the calculation of beta – sources of data, method of calculation and the arithmetical accuracy thereof and the appropriateness of the Government bond value selected from a financial expert is enclosed.

The PP has chosen the financial indicator - project IRR, to demonstrate the additionality. The project IRR is compared to the Benchmark to establish the additionality of the project activity. Following assumptions have been made for estimation of IRR. All the assumptions made while estimating the projected profitability of the project activity and the IRR are based on documentary evidence, copies of are submitted to DOE for verification.

| Parameter | Value | Remarks |
|---|---|---|
| WTG Capacity | 1.5 MW and 1.25 MW | Capacity of WTG installed in the project activity |
| No of WTGs | 08 nos.(1.5 MW) and 01 No. (1.25 MW) | |
| Project cost | Rs. 749.3 million | As per Purchase Orders |
| Capacity Utilization Factor (CUF) | 23% | As per Gujarat Electricity Regulatory Commission order, 2006.<br>CUF based on actual performance of the WTGs is less than 23%[17]. |
| Power generation | 26696 MWh per annum | Computed |
| Tariff for power sale to grid | Rs. 3.37/ kWh | As per Power Purchase Agreement fixed for 20 years between the GUVNL and PP |
| Tariff rate for wheeling | Rs. 4.81/ kWh | 100% of 1.25 MW WTG and 70% of 1.5MW WTG will be used for captive consumption. |
| Wheeling | 4% | As per GERC Order |

[16] The additionality tool referred to carry out the investment analysis suggests that for those projects which can be developed by an entity other than the project proponent, *"the benchmark should be based on publicly available data sources which can be validated by DOE. Such data sources may include local lending and borrowing rates, equity indices, or benchmarks determined by relevant national authorities."* In the project activity, PP has used the publicly available information to establish the benchmark using the Government Bond Rates increased by a suitable risk premium, which reflects the return on any investment in the project type, beyond the subjective profitability expectation of the project proponent. The financial structure of the company is thus not relevant and has not been considered as this may change across companies.

[17] The CUF for 2007-08 as per the actual operation has been calculated in Annexure 5 and is below the 23% CUF

| | | |
|---|---|---|
| O&M of WTG | Free for first two years and Rs.1 million per year for 1.25[18] MW WTG and Rs.1.4 million per WTG per year for 1.50[19] MW WTG with annual escalation of 5% | As per the contract with wind turbine supplier in the Purchase Order. |
| O&M charges to GETCO | Rs. 70924 per annum per WTG | Actual charges towards GETCO as per the debit note |
| O&M charges towards Infrastructure development | Rs. 0.1 million[20] per annum per MW | As per the Purchase Order for Power Evacuation Facility. |
| Depreciation rate | 4.5% | As per the tariff order of GERC. |
| IT Depreciation | 80% | Income Tax Rules |
| Tax rates | 33.66% | As per Income Tax Act of India http://incometaxindia.gov.in/ |
| Minimum Alternative Tax | 11.22% | As per Income Tax Act of India http://incometaxindia.gov.in/ |
| Service Rate | 12.24% | As per the Service Tax rate |
| Insurance | Rs. 0.9465 million per annum | Actual insurance cost to company for 9 WTGs |
| Debt | Rs. 5565.5 million | As per loan documents |
| Interest rate on loan | 7.20 % for first 7 years<br>7.70% for 8th year<br>8.20% for 9th year | As per the loan documents |
| Moratorium | 15 months | As per the loan documents – repayment is at the end of each quarter |
| Exchange rate for Euro | Rs. 62 | News paper reports |

In computing the profitability projections, the tax shield likely to be enjoyed by the parent company on account of accelerated depreciation (though notional) has been taken into account. The tax holiday provided by section 80IA of the Income Tax Act has also been taken into account. Based on the above assumptions, the project IRR works out to 9.97% in contrast to the benchmark of 13.43%. A simple comparison of the two establishes that the project is additional. In fact, the IRR is much less than even

[18] Source for 1.25 MW: RMTL/KUTCH/SEL-S/05-06 Clause 11

[19] Source for 1.5 MW: RMTL/NWM/2006-07/WTG/02 Clause 11.

[20] Source - RMTL/NWM/2006-07/EVAC/01 Clause 5

the least risky and more secured Prime Lending Rate (PLR) of Banks, which ranged between 11 and 11.5% during that period.[21]

*Sensitivity Analysis:*

The robustness of the conclusion derived above, i.e., the project is additional has been tested with a sensitivity analysis. Though the Guidance to the assessment of additionality issued by the EB in its 39th Meeting is not applicable to this project activity, by virtue of it being a small scale project, nevertheless, the PP has subjected the critical assumptions made in the projections (which account for more than 20% of the cost and revenue) to reasonable variations, i.e., by 5%. The PP has chosen three variables, viz., project cost, CUF and O&M cost. The results of the sensitivity analysis are as follows:

| Sensitivity factors considered | Project IRR | | |
|---|---|---|---|
| | -5% | Baseline | +5% |
| Project cost | 10.64% | 9.97% | 9.36% |
| CUF | 9.17% | 9.97% | 10.76% |
| O&M Cost | 10.12% | 9.97% | 9.82% |
| Benchmark | 13.4% | 13.4% | 13.4% |

Though the robustness of the conclusion arrived at has been established with the sensitivity analysis, the PP submits that the optimistic assumptions made for the purpose of sensitivity analysis are not realistic and such conditions are unlikely to occur for the following reasons:

1. Investment: The PP has already released the purchase orders of the wind turbines and in the last few years, the price has been going up and not coming down. Hence, an assumption of even a 5% decrease in project cost is unlikely to happen.
2. Capacity Utilization Factor (CUF): The Capacity Utilization Factor has been recommended by GERC after collection and analysis of exhaustive data on wind in the area. Moreover, the project activity achieved only 18% and 15% CUF for the 1.25 MW and 12 MW capacity WTGs respectively during the year gone by. Hence, the possibility of the project activity achieving a CUF of more than 23% is highly remote.
3. O&M Cost: The PP has already signed an O&M Contract with the WTG supplier, which provides for only yearly escalation. Hence, any reduction in O&M Cost is also unrealistic.

In the above background, the PP submits that the project is unlikely to achieve a project IRR of more than 9.97% and hence the project is additional and not a business as usual scenario

**Common Practice Analysis**

The total installed capacity for electricity generation in Gujarat in 2004-2005 was 7678.87 MW. Of this, only 219.9[22] MW is from wind installations. The total energy available in the state for the same year was 53410.68[23] GWh of which 350.00[24] GWh was contributed by wind energy. This is merely 0.6% of the total generation as shown in the Table below.

[21] RBI Bulletin, December 2005 - http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/74643.pdf

[22] Source: Table No. 2.4, CEA General Review 2006

[23] Source: Table No. 5.3, CEA General Review 2006

| State | % of Total Generation |
|---|---|
| Tamil Nadu | 4.7 |
| Karnataka | 1.5 |
| Rajasthan | 1.1 |
| Gujarat | 0.6 |
| Andhra Pradesh | 0.3 |
| Madhya Pradesh | 0.1 |

It can be inferred from the table that the grid penetration of wind power projects in Gujarat is merely 0.6%, which clearly demonstrates that wind power generation is not a common practice in the State.

**Other barriers**

WTGs of 1.5 MW capacity are relatively[25] new in India. Not many wind farms have WTGs of such capacity. These are state of the art technology from the manufacturer with newly introduced systems to control and operate and require dedicated management practices. Moreover, power generation in a WTG is considered infirm due to its dependence on availability of suitable wind at all times. The capacity utilization may vary depending on adequate wind availability. CUF in case of WTG may be further affected by the non-availability of grid (grid evacuation problem).

As wind power is infirm, it is not amenable to grid dispatch instructions. Most of the costs of wind energy generation are fixed in nature. For this reason the Gujarat Electricity Regulatory Commission (GERC) decided to have a Single Part tariff for wind power. However, this implies a higher investment risk for the proposed project activity. Thus, transmission unavailability, back-down of generation or part-load operations, which are beyond the control of the investors are likely to affect the project activity more severely and therefore the project activity investors would require higher rate of return to compensate them for these risk.

Further the project is located in Zone V[26] with a complicated geology comprising of thrusts and faults. The project area lies in the zone where earthquakes of high intensity occur. There were major earthquakes in the project area in the past, one of them being the 2001 Bhuj earthquake (about 80 Km from the project site), which resulted in considerable damage to property.

**Summary**

Thus, it can be summarized that the proposed project activity is not a business-as-usual scenario as it is not a financially viable option available to the project proponent. The primary barriers faced by the proponent are:

- High capital investment as compared to thermal power plants
- Low returns

[24] Source: Table No. 3.4, CEA General Review 2006

[25] www.suzlon.com/WindTurbines.html?cp=2_3

[26] http://asc-india.org/seismi/seis-gujarat.htm#7 , Refer Annex 6

- Not a common practice
- Other barriers

Further, Capacity Utilization Factor (CUF) depends on several factors such as wind velocity, air density, and quality, which is beyond the control of the project proponent. Another risk involved is related to installation of high capacity wind turbine generators, which are relatively new in India. Thus the project activity is additional and project proponents seek CDM backed benefits to mitigate the risks.

**Early Consideration of CDM**

The project participant had considered CDM revenues for the project activity before the installation of windmills. The chronology of events leading to CDM benefits for the project activity is given below. The proof of consideration is provided to the operational entity at the time of validation.

*Chronology of events*[27]

1. 9th January 2006: Techno-commercial offer from wind mill supplier Suzlon for 1.25 MW WTG
2. 9th January 2006: The project proponent RMTL placed a LOI to Suzlon subject to the Board's consideration of CDM benefits in the meeting scheduled for 28th January 2006.
3. 28th January 2006: The Board ratifies the proposal that the company has to avail carbon revenue by registration with UNFCCC and the company confirms the order to Suzlon.
4. 15th June 2006: RMTL awards LOI for the CDM work of the project to a Consultant. The Consultant was already entrusted with the responsibility of registration of another 5 MW capacity wind power project by RMTL vide agreement dated 27th December 2005. Hence no offers from other Consultants were invited.
5. 12th December 2006: Techno-commercial offer from Suzlon for 8*1.5 MW WTGs.
6. 19th December 2006: RMTL places an order for the supply of 8 WTGs stating specifically therein that the order is subject to the Board's consideration of CDM revenue.
7. 29th January 2007: The Board ratifies the proposal that the company has to avail carbon benefits by registering with UNFCCC and the company confirms the order to Suzlon.
8. 16th March 2007: ICICI Bank approves loan for the project activity.
9. March 2007: Looking at the slow progress of the Consultant, RMTL starts looking for other consultant for awarding the 13.25 MW wind project.
10. E-mail dated 24/04/2007, 08/08/2007, 15/08/2007 received from various consultants for awarding the CDM work.
11. 26th September 2007: The project proponent engages another Consultant for registering the project under CDM at UNFCCC.
12. Host Country Approval received dated 23/01/2008.

In view of the above analysis, it is submitted that the CDM was considered as a necessary adjunct for the company to take up this project activity even at the time of planning stage.

## B.6. Emission reductions:

### B.6.1. Explanation of methodological choices:

*Baseline emission:*

[27] All evidences for the chronology of events is provided to DOE

BE = GEN X CM /1000
Where;
BE = Baseline emission in $tCO_2$/MWh
GEN =Net electricity supplied by WTGs per annum in the project activity in kWh
CM = Combined margin of WR grid in $tCO_2$/MWh

*Project emissions:*
There is no emission due to the project activity and hence,
Emission reduction, ER = BE-PE = BE – 0 =BE

*Leakage:*
As the energy generating equipment is not transferred from another activity or the existing equipment is transferred to another activity, hence leakage is not to be considered.

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

| **Data / Parameter:** | EFgrid, CM, y |
|---|---|
| Data unit: | $tCO_2$ / MWh |
| Description: | Combined Margin for WR grid |
| Source of data used: | Central Electricity Authority ,India |
| Value applied: | 0.898 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement.<br><br>http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf |
| Any comment: | |

| **Data / Parameter:** | EFgrid, OM,y |
|---|---|
| Data unit: | $tCO_2$ / MWh |
| Description: | Operating Margin for WR grid |
| Source of data used: | Central Electricity Authority ,India |
| Value applied: | 1.00 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement.<br><br>http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf |
| Any comment: | |

| **Data / Parameter:** | EFgrid, BM,y |
|---|---|
| Data unit: | $tCO_2$ / MWh |
| Description: | Build Margin for WR grid |
| Source of data used: | Central Electricity Authority ,India |

| | |
|---|---|
| Value applied: | 0.59 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Central Electricity Authority (India) is a government body and data published is in line with the methodological requirement.<br><br>http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf |
| Any comment: | |

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

The emission reductions for the project activity are calculated as the power generated from the WTGs multiplied by the grid emission factor of WR grid. The Grid emission factor has been calculated in Section B.4.

GEN = Net electricity supplied by WTGs per annum in the project activity
= Capacity of all WTGs in MW X CUF X No of hrs per year X 1000
= 13.25 X (23/100) X 365 X 24 X1000
= 26696100 kWh per annum

CM = 0.898 tCO2e/ MWh

ER = 26696100 X 0.898 / 1000
= **23960 tCO2/ annum**

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

| Year | Estimation of project activity emissions (tCO2e) | Estimation of baseline emissions (tCO2e) | Estimation of leakage (tCO2e) | Estimation of overall emission reductions (tCO2e) |
|---|---|---|---|---|
| 2008-09* | 0 | 23960 | 0 | 23960 |
| 2009-10 | 0 | 23960 | 0 | 23960 |
| 2010-11 | 0 | 23960 | 0 | 23960 |
| 2011-12 | 0 | 23960 | 0 | 23960 |
| 2012-13 | 0 | 23960 | 0 | 23960 |
| 2013-14 | 0 | 23960 | 0 | 23960 |
| 2014-15 | 0 | 23960 | 0 | 23960 |
| 2015-16 | 0 | 23960 | 0 | 23960 |
| 2016-17 | 0 | 23960 | 0 | 23960 |
| 2017-18 | 0 | 23960 | 0 | 23960 |
| **Total** (tonnes of CO2 e) | **0** | 239600 | 0 | 239600 |

*Period: December – November every year

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

### B.7.1 Data and parameters monitored:

| | |
|---|---|
| **Data / Parameter:** | GEN |
| Data unit: | kWh per annum |
| Description: | Net electricity supplied by WTGs per annum in the project activity |
| Source of data to be used: | Monthly certificates issued by GEDA/ Electricity meter installed by State Electricity Board at uploading station connected to WTGs |
| Value of data | 26696100 (per annum) |
| Description of measurement methods and procedures to be applied: | Reading from meter installed by State Electricity Board at uploading station as shown in section B.7.2 is used for estimation of emission reduction in the project activity. Meter readings are taken jointly by respective SEB and O&M service provider |
| QA/QC procedures to be applied: | These meters are the property of state electricity boards and calibration of the meters will be carried out by them as per UNFCCC requirements. The meters have an accuracy class of 0.5s. |
| Any comment: | |

### B.7.2 Description of the monitoring plan:

The project proponents have proposed a detailed procedure to ensure proper monitoring for the purpose of CDM activity.

The methodology requires monitoring of the electricity generation from the project activity. Analysis of daily power generation reports, performance report and monthly meter reading will be handled by project proponent on a regular basis. The metering system shall comprise a main meter and a back up meter, which will be sealed in the presence of the representatives of the power producer and GETCO. The State Electricity Board personnel will take reading of power generation every month; this data will be used for billing purposes.

The meter reading taken jointly at the appointed date and time will be signed by the representatives of the GUVNL, GETCO and the O&M service provider every month. The back up meter shall be used during the period the main metering system is not in service. The project proponent will ensure that the meters are repaired, re-calibrated or replaced immediately in case they are found to be outside the acceptable limits of accuracy or not functioning properly. The meters will be calibrated at least once in three years as per UNFCCC guidelines[28]. The metering arrangement details are provided in Annex 4 of the document.

The proponent shall keep complete and accurate records and all other data required for the purpose of proper administration and operation of the windmills. The proponent shall also maintain an accurate and up-to-date operating log at the wind mill sites. The data will be kept for at least 2 years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

## B.8 Date of completion of the application of the baseline and monitoring methodology and the

[28] http://cdm.unfccc.int/EB/035/eb35_repan35.pdf , Page 3

| name of the responsible person(s)/entity(ies) |
|---|

Date of completion of the application of the baseline and monitoring methodology: 14/08/2008

Mr. Vimal Katta
**Ratnamani Metals and Tubes Ltd**
17, Rajmugat Society, Naranpura Char Rasta
Ankur Road, Naranpura
Ahmedabad - Gujarat
Tel: 91-79-27415501/2/3/4
Mobile: 91- 9879556602

## 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:

28/1/2006

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

20 years

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

#### C.2.1. Renewable crediting period

NA

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

##### C.2.1.2. Length of the first crediting period:

#### C.2.2. Fixed crediting period:

##### C.2.2.1. Starting date:

01/01/2009 or date of registration of project activity, whichever is later

##### C.2.2.2. Length:

10 years

## SECTION D. Environmental impacts

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

Ministry of Environment and Forest i.e. Government of India does not require any Environment Impact Assessment (EIA) of wind turbine projects[29]. The project activity does not result in any negative impacts on environment. It results in no emission of GHGs and other gases i.e. SOx and NOx common in conventional power generation sources.

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

The project activity is a renewable energy project. Wind power projects do not negatively impact environment and are only having positive environmental benefits.

## SECTION E. Stakeholders' comments

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

In the project activity following stakeholders were identified –

1. Sarpanch
2. Villagers

Comments, suggestions were invited from one and all on the project activity. A newspaper advertisement detailing about the project activity was published in local daily *"Kutch Mitra"* on 14 November 2007. A general meeting was conducted in Vanku, Suthri, Kamand, Arikhana villages for discussion on project activity and its impact on people in the area. The meeting was attended by Sarpanch (Village head) - Gram panchayat and the local people in the area.

### E.2. Summary of the comments received:

Against the newspaper advertisement, letters were also sent to the stakeholders to get their opinion of the project. They were informed that project is set up collectively by Suzlon as developer as per MOU signed with Govt. of Gujarat and according to wind power policy declared by states and Gujarat Electricity Regulatory Commission within frame work of Electricity Act 2003.

The general meeting was conducted by project proponent at the project site. Mr. Rakesh Sharma and Mr. Prakash Christine from the company first welcomed all and informed them about the purpose of meeting and wind power generation. People asked a few queries about the project and technology and whether it had any negative impact on people, animals, crop or rains. Mr. Prakash Christine detailed them about

[29] MoEF Notification S.O 1533, 14th November 2006, http://envfor.nic.in/legis/eia/so1533.pdf

wind power technology, wind power development in India and the effects, CDM made on wind power penetration in the country. They were also briefed on CDM process and why the consultations were being held.

Mr. Sharma explained about the wind power generation system and told them that there was no scientific study suggesting any negative impact on environment including effect on rains. People in general appreciated the efforts and wished all luck to the group.

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

People participated with great enthusiasm and raised a few questions, which were answered to in an appropriate manner by the project proponent. The gathering applauded the efforts and thanked for calling them for discussion.

## Annex 1

## CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

| | |
|---|---|
| Organization: | Ratnamani Metals and Tubes Ltd |
| Street/P.O.Box: | Naranpura Char Rasta, Ankur Road, Naranpura |
| Building: | 17, Rajmugat Society |
| City: | Ahmedabad |
| State/Region: | Gujarat |
| Postfix/ZIP: | 380 013 |
| Country: | India |
| Telephone: | 91-79-2741 5501/2/3/4 |
| FAX: | 91-79-2748 0999 |
| E-Mail: | info@ratnamani.com |
| URL: | |
| Represented by: | |
| Title: | |
| Salutation: | Mr. |
| Last Name: | Katta |
| Middle Name: | |
| First Name: | Vimal |
| Department: | |
| Mobile: | 98795 56602 |
| Direct FAX: | 91-79-2748 0999 |
| Direct tel: | 91-79-27415501/2/3/4 |
| Personal E-Mail: | vkatta@ratnamani.com |

## Annex 2

## INFORMATION REGARDING PUBLIC FUNDING

- No Public Funding from Annex 1 countries for the project activity.
- No ODA Funding for the project activity.

## Annex 3

## BASELINE INFORMATION

Baseline information has been taken from the annual report of Central Electricity Authority, Government of India. This report is inline with the methodology requirements.

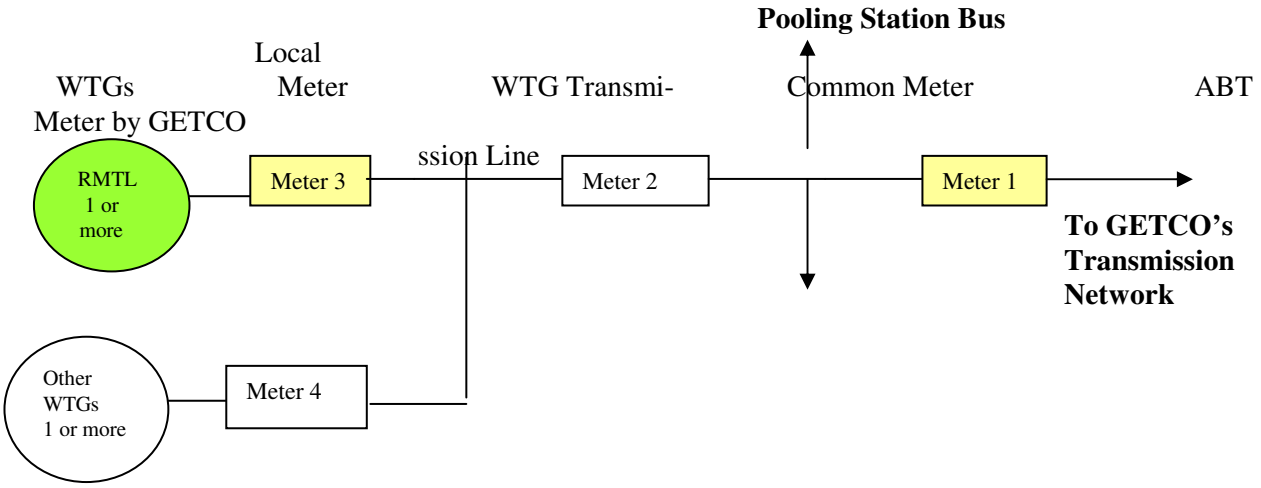
| | |
|---|---|
| OM, Operating Margin | 1.00 |
| BM, Build Margin | 0.59 |
| **CM, Combined Margin** | **0.898** |

Unit: tCO2e/ MWh

## Annex 4

## MONITORING INFORMATION

### Metering arrangement for Wind Farm




Metering of wind power is done as under:

- Joint meter reading is taken at Meter-1 by representative of GETCO (Gujarat Energy Transmission Company, GEDA (Gujarat Energy Development Agency) and O&M service provider (on behalf of individual wind farm owners). Meter-1 (M-1) is the meter at the substation. Let us assume total generation recorded for particular month is 'X' units.
- Joint meter reading is taken at Local Meter-3 by representative of GEDA (Gujarat Energy Development Agency) and O&M service provider (on behalf of individual wind farm owners). Let us assume total generation recorded for particular month is 'Y1' units.
- Similarly joint meter reading for other wind farm owners is also taken. Let us assume generation of individual owner recorded for particular month are .....'Y2, Y3.....Yn' units.
- GEDA distributes 'X' to individual wind farm owners using following formula and issues monthly certificates.
- For RMTL (project promoter): Units generated = $'X' \times \frac{'Y1'}{'Y1+Y2+Y3....+Yn'}$
    - In other words, total 'X' units are shared in proportion to generation by individual wind turbine / wind farms.

- Based on certificates issued by GEDA, either credit in consumption is given by corresponding distribution company after deducting 4% wheeling charges or power is purchased by Gujarat Urja Vikas Nigam Ltd. (GUVNL) @ Rs.3.37 without deducting wheeling charges.

## Annex 5

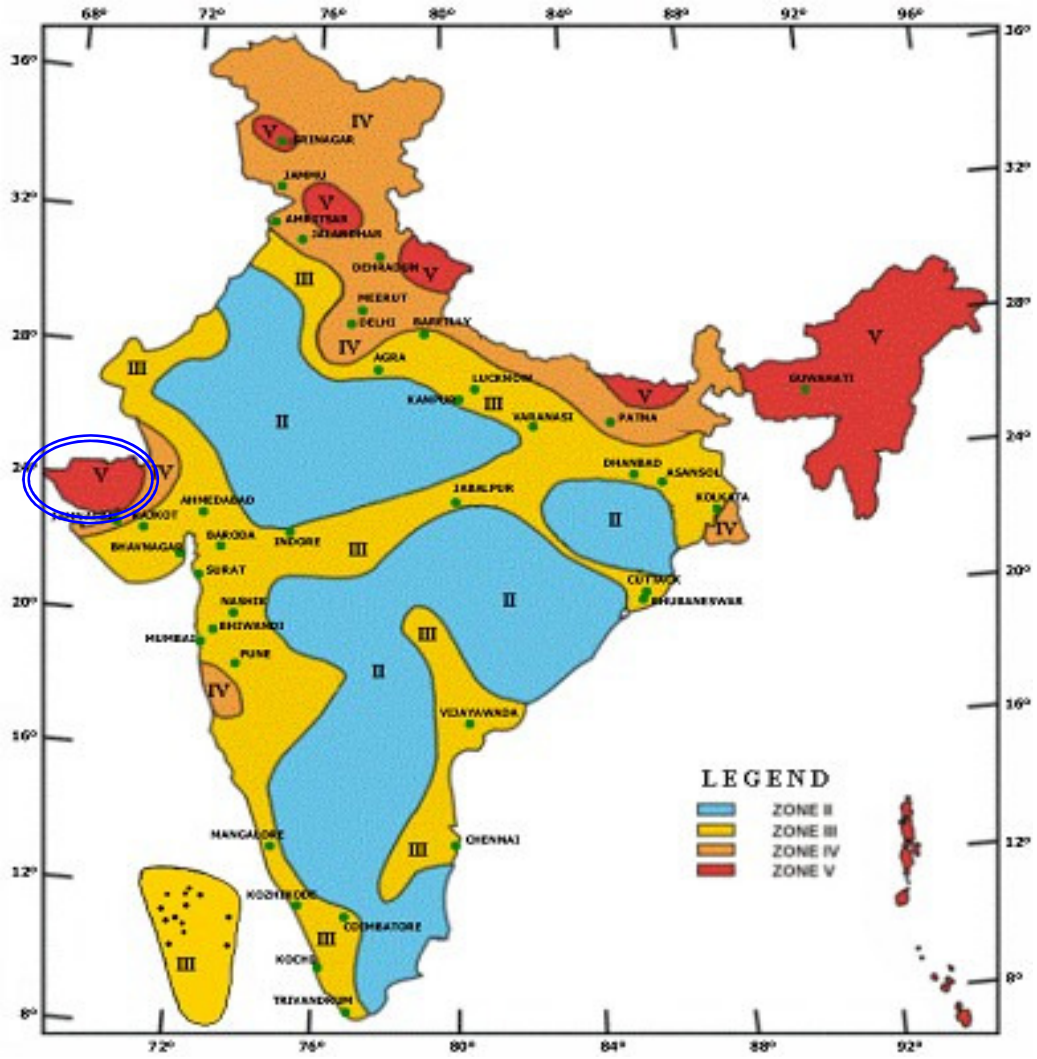
WTG performance for 2007-08 for actual power generation by all the WTGS certified by GEDA

| Month | Power Generation for 1.25 MW (in kWh) | CUF (%) |
|---|---|---|
| Apr-07 | 109828 | 12.2 |
| May-07 | 237735 | 26.4 |
| Jun-07 | 228195 | 25.4 |
| Jul-07 | 223245 | 24.8 |
| Aug-07 | 291200 | 32.4 |
| Sep-07 | 110347 | 12.3 |
| Oct-07 | 40746 | 4.5 |
| Nov-07 | 54396 | 6.0 |
| Dec-07 | 140981 | 15.7 |
| Jan-08 | 133777 | 14.9 |
| Feb-08 | 90759 | 10.1 |
| Mar-08 | 104260 | 11.6 |
| **Total** | **1765469** | **17.6** |

| Month | Power Generation for 8*1.5 MW (kWh) | CUF (%) |
|---|---|---|
| Apr-07 | 164023 | 1.9 |
| May-07 | 414831 | 4.8 |
| Jun-07 | 1023007 | 11.8 |
| Jul-07 | 1428242 | 16.5 |
| Aug-07 | 3003719 | 34.8 |
| Sep-07 | 1394411 | 16.1 |
| Oct-07 | 462945 | 5.4 |
| Nov-07 | 765638 | 8.9 |
| Dec-07 | 1851966 | 21.4 |
| Jan-08 | 1966110 | 22.8 |
| Feb-08 | 1402239 | 16.2 |
| Mar-08 | 1531917 | 17.7 |
| **Total** | **15409048** | **14.9** |

## Annex 6

**Seismic Map of India showing the project location**



## Appendix - I

Ratnamani Metals and Tubes Limited Board Resolution dated 28th January 2006

**Regd. & Sales Office :**
17, Rajmugat Society, Naranpura Char Rasta,
Ankur Road, Naranpura,
Ahmedabad-380 013, Gujarat, INDIA.

**Phone** : +91-79-27415501/2/3/4
**Fax** : +91-79-27480999
**Email** : info@ratnamani.com
**Internet**: http://www.ratnamani.com

RATNAMANI™
METALS & TUBES LTD.

CERTIFIED TRUE COPY OF THE RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF RATNAMANI METALS & TUBES LTD. IN THEIR MEETING HELD ON 28TH JANUARY 2006 AT THE REGISTERED OFFICE OF THE COMPANY SITUATED AT 17, RAJMUGAT SOCIETY, NARANPURA CHAR RASTA, ANKUR ROAD, NARANPURA, AHMEDABAD – 380 013.

**TO CONSIDER AND DISCUSS RISKS AND CDM BENEFITS FROM THE WIND TURBINES**

The Board discussed the risks inherent to the proposed Wind Energy installations at V-12, Survey No. 275/1, Village Vanku, Taluka : Abdasa, Dist. Kutch, State Gujarat and also the possible CDM benefits that can be availed.

"RESOLVED THAT cash flows during the pay back period of the Windmill Project would greatly depend on the generation and grid availability. The Company is undertaking a risk by making a big investment in a technology that may have inconsistent returns. Thus the project carries an inherent risk of power generation."

The Directors are aware that the Government of India has ratified an International Legislation, Kyoto Protocol, working towards mitigation of green house gas concentrations across the globe. The protocol enables a market mechanism, Clean Development Mechanism (CDM), and may provide a source of additional revenue stream to mitigate the risks associated with projects similar to our kind.

"RESOLVED THAT the reduction in emissions of carbon dioxide and other GHGs will be additional to the business as usual scenario in the Indian Power Sector and result in real, measurable and long-term benefits in climate change mitigation. Therefore the project shall be made eligible for carbon revenue by registration under the CDM of the UNFCCC and the CER revenue gained by sale of credits to industrialized countries shall strengthen the finances of the Project and minimize associated risks."

Certified True Copy
For RATNAMANI METALS & TUBES LTD.

V. C. BHAGAT
COMPANY SECRETARY

## Appendix –II

Ratnamani Metals and Tubes Limited Board Resolution dated 29th January 2007

**Regd. & Sales Office :**
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CERTIFIED TRUE EXTRACT OF THE RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF RATNAMANI METALS & TUBES LTD. IN THEIR MEETING HELD ON 29TH JANUARY 2007 AT THE REGISTERED OFFICE OF THE COMPANY SITUATED AT 17, RAJMUGAT SOCIETY, NARANPURA CHAR RASTA, ANKUR ROAD, NARANPURA, AHMEDABAD – 380 013.

**SETTING UP OF 8 WINDMILLS IN MOTI SINDHOLI SITE OF M/S. SUZLON (WINDMILL PROJECT)**

(A) The Managing Director informed the Board that in view of the better profitability due to increased turnover, it would be beneficial to the Company to invest funds in setting up Windmills at the above site of M/s. Suzlon. This will help in reducing the effective tax outflow. Accordingly it is proposed to invest in setting up 8 windmills of 1500 KW each at an aggregate cost of Rs.6889.68 lacs in Moti Sindholi site of M/s. Suzlon. The Managing Director thereafter discussed in detail mentioning following salient features.

a) The Promoters contribution shall be equivalent to the tax saving because of depreciation on windmills (approximately 15% of the project cost)
b) The balance amount (approximately Rs.5856 lacs) shall be funded through borrowings.
c) The units generated would be sold to GEB @ Rs.3.37 per unit as per the Revised Windmill Energy Policy of Government of Gujarat or the Company may opt for any more beneficial scheme as may be announced by the State / Central Government in future at the time of commissioning of Windmills or thereafter, as may be applicable to Windmill Projects.
d) The Windmill investment will be eligible for benefits under CDM by way of CERs in respect of units generated which can be sold at attractive price thus making the investment more attractive.
e) The total re-payment period shall be 9 years with 1 year moratorium

The Managing Director thereafter informed the Board that we have already approached Bank of Maharashtra, State Bank of India, ICICI Bank Ltd., UTI Bank Ltd., to consider our request for sanction of Term Loan. He added that the proposal is in advance stage of consideration with all these lenders and that we would take loan from such lender who would offer best terms and conditions matching our expectations.

The Managing Director also advised the Board that the security offered is Exclusive Charge on windmills, Personal Guarantee of one of the Directors and if necessary extension of the 2nd charge on the entire fixed assets of the Company. The matter was discussed at great length and the following resolutions were passed unanimously.

"RESOLVED THAT in view of the policy of the State Government of Gujarat for the promotion of Wind Power Projects, the Company do invest an amount of Rs.6,889.68 lacs by setting up 8 windmills of 1500 KW each in Moti Sindholi site of M/s. Suzlon and that the action of the Managing Director in releasing orders to M/s. Suzlon Engineering Ltd. on 15th December 2006 and 12th January 2007 at total cost of Rs.6,889.68 lacs be and is hereby approved and ratified."

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"RESOLVED FURTHER THAT Shri P. M. Sanghvi, Managing Director and Shri J. M. Sanghvi, Whole-time Director be and are hereby severally authorized to make the payments against the said Purchase Orders as per the terms and conditions mentioned therein."

"RESOLVED THAT the reduction in emissions of carbon dioxide and other GHGs will be additional to the business as usual scenario in the Indian Power Sector and result in real, measurable and long-term benefits in climate change mitigation. Therefore the project shall be made eligible for carbon revenue by registration under the CDM of the UNFCCC and the CER revenue gained by sale of credits to industrialized countries shall strengthen the finances of the Project and minimize associated risks."

Certified True Copy
For RATNAMANI METALS & TUBES LTD.

V. C. BHAGAT
COMPANY SECRETARY