**PROJECT DESIGN DOCUMENT FORM
FOR CDM PROJECT ACTIVITIES (F-CDM-PDD)
Version 04.1**

PROJECT DESIGN DOCUMENT (PDD)

Title of the project activity	Tata Power - Wind power project at Samana in Jamnagar district, Gujarat
Version number of the PDD	11
Completion date of the PDD	19/05/2014
Project participant(s)	M/s. The Tata Power Company Limited
Host Party(ies)	India
Sectoral scope and selected methodology(ies)	Sectoral Scope: 1 - Energy industries (renewable - / non-renewable sources) Methodology: ACM0002 ver. 13 - Consolidated baseline methodology for grid connected electricity generation from renewable sources
Estimated amount of annual average GHG emission reductions	96,821 tCO_2

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Purpose

The proposed project activity is an initiative by The Tata Power Company Limited (TPCL) to export renewable electricity produced by Wind Electric Generators to the power deficit grid in order to decrease power shortage, diversify the grid and reduce greenhouse gas emissions.

Project Description

TPCL is the project proponent/sponsor of this wind power project with a total capacity of 50.4MW consisting of 63 Wind Energy Converter (WEC) machines of individual capacity 800 kW each. Project is getting implemented at Samana planes in Gujarat state of India which will provide reliable renewable power to the Gujrat state electricity grid which is now a part of NEWNE (Northern, Eastern, Western and North-Eastern) grid of India.

The proposed project activity is a grid connected renewable energy project that intends to generate electricity through utilization of wind energy. Since WECs converts kinetic energy from the "air in motion" directly into electricity without using conventional sources like coal, oil or natural gas for power generation, contributes to electricity generation without GHG emissions. The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. M/s Enercon (India) Ltd is wind energy technology and equipment supplier of TPCL and is also the operations and maintenance contractor for the Project.

TPCL proposes to develop this project under Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC), as the project helps in significant reduction of GHG emissions and contributes to sustainable development of Gujarat and India in the following way:

Contribution to Greenhouse Gas Emissions Reduction

The wind power generated from the project site will be displacing the electricity generated from the grid connected power plants including fossil fuel based thermal, renewable and nuclear power stations feeding electricity to regional grid. Since wind power is Green House Gas (GHG) emissions free, the power generated will prevent the anthropogenic green house gas GHG emissions generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas.

The contribution of this project activity in terms of following four indicators of sustainable development as stipulated by the National CDM "Authority (NCDMA) of India[1] is provided below:

1. **Social well being:**

People from local communities are provided employment during construction and operational phases of the project. The project by supplying electricity to the grid ultimately benefits the local communities with improved power supply. It also helps in capacity building and empowerment of vulnerable sections of the

[1] http://cdmindia.nic.in/host_approval_criteria.htm

rural communities dwelling in the project area. Power generation from renewable energy sources paves way for energy security of future generations. Industrial growth in the region may be stimulated with improved power supply.

2. **Environmental well being:**

This project being a zero emissions project contributes to sustainable development through generation of eco-friendly power and essentially reduces GHG emissions compared to a business-as-usual scenario. It also helps in the conservation of natural resources including land, forests, minerals, water and ecosystems. As no particulate matter and anthropogenic emissions are emitted into the atmosphere by the project activity air pollution can be avoided. Consumption of large quantities of water that is required in generation of electricity in current mix of plants is avoided.

3. **Economic well being:**

The project activity will reduce the country's dependence on fossil fuels while narrowing the existing electricity supply gap in the State of Gujrat. The project primarily assists the state of Gujrat and India as a whole in stimulating and accelerating the commercialization of grid connected renewable energy technologies. The project activity will aid in infrastructure investment in facilities such as roads and electrical transmission. The project also helps in minimising the dependence of Gujarat on neighbouring state grids, central suppliers and other power producers to meet its energy demand. This results in greater local employment, ultimately leading to overall development.

4. **Technological well being:**

The project activity demonstrates and helps in stimulating the growth of the wind power industry in India**.** With its advanced technology the project contributes to sustainable development through generation of eco-friendly power. It increases the share of renewable energy power generation in the regional and national grid. It provides national energy security, especially when global fossil fuel reserves threaten the long term sustainability of the Indian economy. Increased interest in wind energy projects will further push R&D efforts by technology providers to develop more efficient and better machinery in future.

Further to above, TPCL will be spending more than 2% of annual CER revenue of this project for various sustainable development activities/initiatives. Detailed record of the sustainable activities taken up in the project area for the benefit of the project affected peoples along with expenses incurred for the same will be maintained appropriately for monitoring. The funds will be allocated to the following major initiatives.

- Rain Water Harvesting – Funding shall be provided to collect rainwater that may then be used during lean periods.
- Area Drainage studies and water management schemes on grass root level – Surveys and studies will be carried out to assess the water sources and drainage systems in the area and then plans will be developed and disseminated to optimize its use.
- Sanitation and Solid Waste disposal – Sanitation and solid waste disposal systems will be funded to improve hygiene amongst local residents

- School Education Program – School programmes educating students on the need to protect the environment through energy and water conservation and other environment-friendly activities will be funded.
- Tree Plantation/ Agro Forestry Development – There will be an attempt to fund tree plantation and also to train people in local forest development and management.

This is the preliminary plan and it can be reorganized based on the then prevailing priorities in the area and inputs from beneficiaries.

A.2. Location of project activity

A.2.1. Host Party(ies)

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India

A.2.2. Region/State/Province etc.

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Gujarat

A.2.3. City/Town/Community etc.

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District: Jamnagar
Taluk: Kalavad and Jamjodhpur
Site: Samana Planes
Village: Dhun Dhoraji, Mota Paanchdevada, Nana Paanchdevada, Sadodar, Narmana, Dal Devaliya

A.2.4. Physical/Geographical location

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The project activity is located in the Samana planes (Kalavad and Jamjodhpur taluk) of Jamnagar district in Gujarat.

WEC Name	Co-ordinates
TATASP-01 (2100)	22° 4' 39.900" N, 70° 13' 56.940" E
TATASP-02 (2101)	22° 4' 47.520" N, 70° 13' 53.340" E
TATASP-03 (2105)	22° 5' 20.520" N , 70° 13' 33.300" E
TATASP-04 (2106)	22° 5' 30.000" N, 70° 13' 29.340" E
TATASP-05 (2107)	22° 5' 38.160" N, 70° 13' 25.380" E
TATASP-06 (2109)	22° 5' 57.240" N, 70° 13' 17.160" E
TATASP-07 (2110)	22° 6' 3.600" N, 70° 13' 16.200" E
TATASP-08 (2111)	22° 6' 11.200" N, 70° 13' 14.000" E
TATASP-09 (2112)	22° 6' 20.940" N, 70° 13' 11.340" E
TATASP-10 (2113)	22° 6' 30.600" N, 70° 13' 8.400" E
TATASP-11 (2121)	22° 4' 53.700" N, 70° 14' 29.700" E
TATASP-12 (2022)	22° 4' 52.380" N, 70° 11' 32.880" E
TATASP-13 (2023)	22° 4' 46.320" N , 70° 11' 36.900" E
TATASP-14 (2024)	22° 4' 48.600" N, 70° 11' 52.980" E

TATASP-15 (2025)	22° 4' 42.660" N, 70° 12' 4.140" E
TATASP-16 (2102)	22° 4' 57.000" N, 70° 13' 50.580" E
TATASP-17 (2103)	22° 5' 2.820" N, 70° 13' 43.020" E
TATASP-18 (2104)	22° 5' 11.040" N, 70° 13' 35.700" E
TATASP-19 (2108)	22° 5' 45.300" N, 70° 13' 18.900" E
TATASP-20 (2075)	22° 6' 41.460" N, 70° 12' 31.200" E
TATASP-21 (2026)	22° 4' 36.900" N, 70° 12' 5.760" E
TATASP-22 (2029)	22° 4' 12.300" N, 70° 11' 59.100" E
TATASP-23 (2001)	22° 5' 14.760" N, 70° 11' 10.500" E
TATASP-24 (2115)	22° 6' 45.660" N, 70° 13' 6.060" E
TATASP-25 (2117)	22° 7' 6.120" N, 70° 13' 9.540" E
TATASP-26 (2073)	22° 6' 22.020" N, 70° 12' 28.560" E
TATASP-27 (2074)	22° 6' 32.700" N, 70° 12' 27.540" E
TATASP-28 (2085)	22° 5' 38.940" N, 70° 13' 2.460" E
TATASP-29 (2086)	22° 5' 30.900" N, 70° 13' 4.620" E
TATASP-30 (2098)	22° 4' 21.900" N, 70° 14' 13.500" E
TATASP-31 (2070)	22° 5' 56.820" N, 70° 12' 31.380" E
TATASP-32 (2002)	22° 5' 25.260" N, 70° 11' 7.920" E
TATASP-33 (2004)	22° 5' 35.940" N, 70° 10' 46.740" E
TATASP-34 (2005)	22° 5' 42.420" N, 70° 10' 49.800" E
TATASP-35 (2027)	22° 4' 29.160" N, 70° 12' 8.760" E
TATASP-36 (2028)	22° 4' 21.000" N, 70° 12' 7.680" E
TATASP-37 (2068)	22° 5' 40.200" N, 70° 12' 39.780" E
TATASP-38 (2097)	22° 3' 58.740" N, 70° 14' 5.460" E
TATASP-39 (2077)	22° 6' 58.500" N, 70° 12' 25.080" E
TATASP-40 (2078)	22° 7' 10.260" N, 70° 12' 49.800" E
TATASP-41 (2116)	22° 6' 56.160" N, 70° 13' 6.360" E
TATASP-42 (2114)	22° 6' 39.000" N, 70° 13' 7.080" E
TATASP-43 (2048)	22° 5' 48.240" N, 70° 12' 19.320" E
TATASP-44 (2019)	22° 5' 6.480" N, 70° 11' 44.400" E
TATASP-45 (2123)	22° 3' 54.660" N, 70° 11' 45.840" E
TATASP-46 (2003)	22° 5' 26.640" N, 70° 10' 47.580" E
TATASP-47 (2008)	22° 6' 23.280" N, 70° 11' 15.420" E
TATASP-48 (2009)	22° 6' 15.060" N, 70° 11' 15.300" E
TATASP-49 (2010)	22° 6' 6.600" N, 70° 11' 16.260" E
TATASP-50 (2012)	22° 5' 49.980" N, 70° 11' 21.240" E
TATASP-51 (2013)	22° 5' 42.060" N, 70° 11' 24.060" E
TATASP-52 (2015)	22° 5' 29.520" N, 70° 11' 30.480" E
TATASP-53 (2016)	22° 5' 22.800" N, 70° 11' 28.980" E
TATASP-54 (2017)	22° 5' 21.240" N, 70° 11' 44.700" E
TATASP-55 (2038)	22° 6' 51.360" N, 70° 11' 32.340" E

TATASP-56 (2039)	22° 6' 58.560" N, 70° 11' 53.580" E
TATASP-57 (2040)	22° 6' 49.320" N, 70° 11' 54.960" E
TATASP-58 (2051)	22° 5' 22.800" N, 70° 12' 28.140" E
TATASP-59 (2052)	22° 5' 14.580" N, 70° 12' 11.940" E
TATASP-60 (2062)	22° 4' 49.380" N, 70° 12' 48.780" E
TATASP-61 (2063)	22° 4' 58.020" N, 70° 12' 46.860" E
TATASP-62 (2064)	22° 5' 6.000" N, 70° 12' 46.620" E
TATASP-63 (2066)	22° 5' 19.860" N, 70° 12' 43.800" E

The nearest airport and railway station is at Jamnagar city and distance of approximately 60 kms from the project activity site. The WEC wise details of location are provided below.

Table 1 : Project WEC locations

Total Project Capacity -50.4 MW		
Name of Taluka	**Name of Village**	**No. of WEC**
Kalavad	Dhun Dhoraji	09
	Mota Paanchdevada	25
	Nana Paanchdevada	01
Jamjodhpur	Sadodar	15
	Narmana	01
	Dal Devaliya	12

Unique identification numbers of the wind machines are mentioned in the Annex II.

Location map of project site

A.3. Technologies and/or measures

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The Project involves 63-wind energy converters (WECs) of Enercon make (800 kW E-53) with internal electrical lines connecting the Project with evacuation facility. The WECs generates 3-phase power at 400V, which is stepped up to 33 kV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 10%. The other salient features of the state-of-art-technology are:

- Gearless Construction - Rotor & Generator Mounted on same shaft eliminating the Gearbox.
- Variable speed function – has the speed range of 12 to 29 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times.
- Minimum drawl (less than 1% of kWh generated) of Reactive Power from the grid.
- No voltage peaks at any time.
- Operating range of the WEC with voltage fluctuation of -20 to +20%.
- Rotor diameter is 53m & having Swept area of 2205 m², Blade material used is Fibreglass (reinforced epoxy) with integral lightning protection
- Three Independent Braking Systems with power back up supply.
- Generator achieving rated output at only 29 rpm.
- Starts Generation of power at wind speed of 3 m/s.

Technical Specifications of 0.8 MW WEC (Enercon E - 53/800 kW):

The technical specifications of the wind energy converter (E-53/800 kW) are set out in the table below:

0.8 MW (E-53, Enercon Make)		
Sr. No.	**Particulars**	**Specifications**
1	Turbine Model	Enercon E-53
2	Rated Power	800 kW
3	Rotor Diameter	53 meters
4	Hub height	75 meters
5	Turbine Type	Direct driven, upwind, horizontal axis WEC with variable rotor speed
6	Power Regulation	Independent pitch system for each blade
7	Design life time	20 years
8	Cut-in wind speed	2.5 m/s
9	Rated wind speed	12 m/s
10	Cut-out wind sped	28-34 m/s
11	Extreme Wind Speed	59.5 m/s
12	Rated rotational speed	32 rpm
13	Operating range rot. speed	12-29 rpm
14	Orientation	Upwind
15	No. of blades	3
16	Blade material	Glass Fibre Epoxy Reinforced
17	Gear box type	Gearless
18	Generator type	Synchronous Generator
19	Braking	Aerodynamic

20	Output Voltage	400 V
21	Yaw System	Active yawing with 4 electric yaw drives with brake motor
22	Tower	Concrete Tower of 74 meters

The technology is environmentally safe & sound and not leads to any GHG emissions. The project technology manufactured, operated & maintained indigenously and doesn't involve any technology transfer from foreign countries.

A.4. Parties and project participants

Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	The Tata Power Company Limited (a private entity)	No

A.5. Public funding of project activity

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There is no public funding involving Annex I countries for the Project.

SECTION B. Application of selected approved baseline and monitoring methodology

B.1. Reference of methodology

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Title: Approved consolidated baseline and monitoring methodology ACM0002, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", Version 13.0.0

Scope no.: 1
Sectoral scope – Energy industries (renewable/non-renewable)

This methodology refers to,

Tool for the demonstration and assessment of additionality (Version- 06.1.0, Annex 20, EB- 69)
Tool to calculate the emission factor for an electricity system (Ver. 02.2.1 EB 63, Annex 19)

B.2. Applicability of methodology

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The methodology ACM0002 is applicable to grid-connected renewable power generation project activities that involve electricity capacity additions.

The project activity is applicable for ACM0002 methodology as

- It is a renewable wind power project connected Northern, Eastern, **Western** and North-Eastern (NEWNE) regional electricity grid.
- The project involves the installation of new wind based power generation machines
- The geographic and system boundaries for the project activity can be clearly identified.
- The project activity also doesn't involve any fuel switch from fossil fuels to renewable energy.

Further the project activity meets the applicability conditions of the ACM0002 methodology as follows:

Condition No.	Conditions	Applicability
The methodology is applicable under the following conditions		
Condition I	The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit	• *The project activity is the installation of a wind power plant of total capacity 50.4 MW.*
Condition II	In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power capacity addition projects which use option 2: on page 10 to calculate the parameter $EG_{PJ,y}$): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity	• *The project activity is new installation of wind power plants hence, this condition is not applicable.*
Condition III	In case of hydro power plants, one of the following conditions must apply: o The project activity is implemented in an existing single or multiple reservoirs , with no change in the volume of any of reservoirs; or o The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the project emissions section, is greater than 4 W/m^2; or o The project activity results in new single or multiple reservoirs and the power density of each reservoir, as	• *The project activity is new installation of wind power plants hence, this condition is not applicable.*

	per definitions given in the project emissions section, is greater than 4 W/m^2	
The methodology is not applicable under the following conditions		
	Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; Biomass fired power plants; A hydro power plant[2] that results in the creation of a new single reservoir or in the increase in an existing single reservoir where the power density of the power plant is less than 4 W/m^2.	• *The project activity is new installation of wind power plants hence, this condition is not applicable.*

So in light of the above, the applicability of this type and category of methodology to this project is justified.

B.3. Project boundary

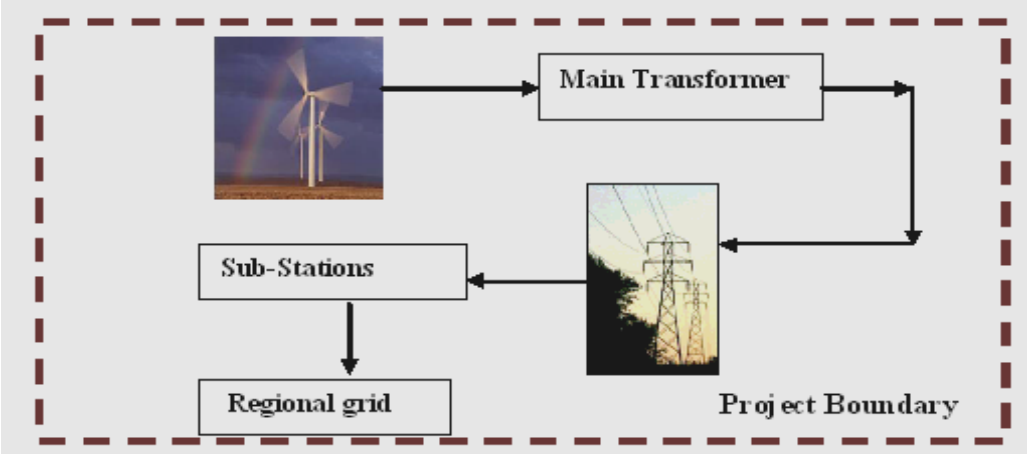
Source		GHGs	Included?	Justification/Explanation
Baseline scenario	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project scenario	Electricity generation from the project activity	CO_2	No	Electricity generation from wind does not have any emission sources.
		CH_4	No	
		N_2O	No	

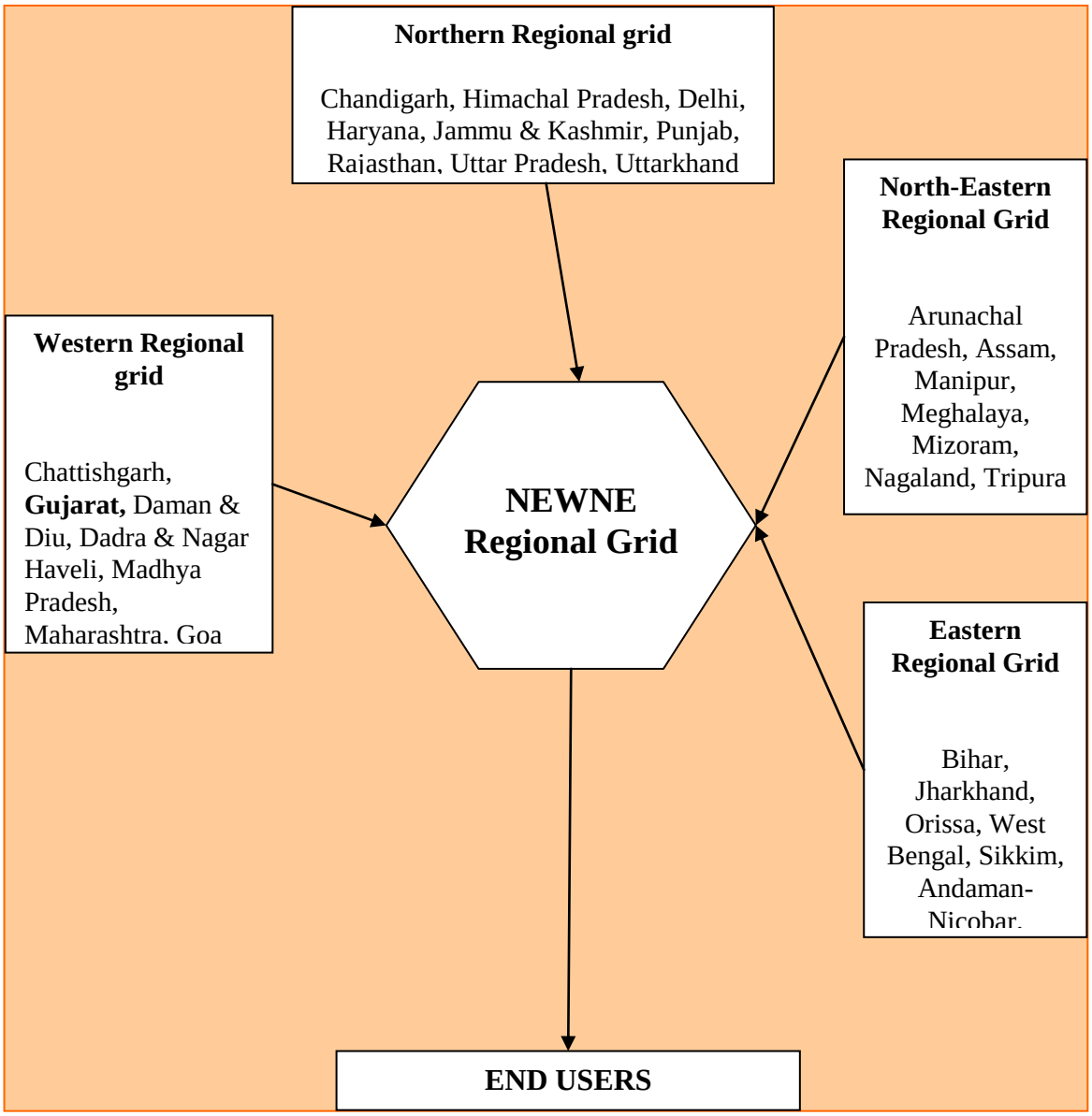
As ACM0002 specifies, the **spatial extent** of the project boundary includes the project site and all power plants connected physically to the electricity system to which the wind project power plant is connected.

Proposed project activity is connected to Gujarat State Grid which is a part of NEWNE grid. NEWNE grid description is mentioned in section B.4 below. Project boundary diagram is attached herewith.

Also, the flowchart given below identifies all the state wise sources that supply electricity to the NEWNE Grid. This includes conventional and non conventional renewable energy based power plants owned by the different state governments, central suppliers, Independent Power Producers and other industrial power producers.

[2] Project participants wishing to undertake a hydroelectric project activity that result in a new reservoir or an increase in the existing reservoir, in particular where reservoirs have no significant vegetative biomass in the catchments area, may request a revision to the approved consolidated methodology.


Main Transformer
Sub-Stations
Regional grid
Project Boundary



In the absence of proposed project activity an equivalent amount of electricity will get generated by these power plants along with future capacity additions which led to higher GHG emissions.

B.4. Establishment and description of baseline scenario

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Identification of baseline scenario

As per ACM0002, for the project activity that is grid-connected electricity generation from renewable energy sources and for the project activities that do not modify or retrofit an existing electricity generation facility, the baseline scenario is determined as follows.

Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation source. As the Project does not

modify or retrofit an existing generation facility, the baseline scenario is the emissions generated by the operation of grid-connected power plants and by the addition of new generation sources. This is estimated using calculation of Combined Margin multiplied by electricity delivered to the grid by the Project.

Variable	**Data Source**
EG_y – Electricity generated	Records maintained by project proponents
Parameter	**Data Source**
$EF_{OM,y}$ = Operating Margin Emission Factor (t CO_2/MWh)	CEA Data
$EF_{BM,y}$ = Build Margin Emission Factor (t CO_2/MWh)	CEA Data
EFy – Grid Emission Factor	Calculated as the weighted average of the operating margin and build margin

The Indian power system was historically divided into five independent regional grids, namely Northern, Eastern, Western, Southern, and North-Eastern. Each grid covers several states. During the last decade, the Powergrid Corporation has undertaken interconnection of the regional grids to enable smooth flows of excess power from surplus regions to those demanding. As a result the constraints to transmission of power between the Northern, Eastern, Western and North Eastern grids have substantially reduced. Due to this, in the latest exercise for estimation of grid emission factor, the Central Electricity Authority (CEA) has included these as part of one unified grid namely NEWNE grid. Power generation and supply within the different regions are still managed by Regional Load Dispatch Centres (RLDC) in these regions. The Regional Power Committees (RPCs) provide a common platform for discussion and solution to the regional problems relating to the grid.

Recently, the Indian regional grids have started to work in synchronous mode, i.e. at same frequency. Each state in a regional grid meets their demand with their own generation facilities and also with allocation from power plants owned by the central sector such as NTPC and NHPC etc. Specific quotas are allocated to each state from the central sector power plants. Depending on the demand and generation, there are electricity exports and imports between states in the regional grid. There are also electricity transfers between regional grids, and small exchanges in the form of cross-border imports and exports.

The proposed project activity lies in the state of Gujarat which comes under Western Region part of NEWNE Grid. So NEWNE Grid is considered as the "project boundary" of the proposed project. Table below provides the information about the states included in the NEWNE Grid.

Table 3.Statewise Grid details

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

NEWNE Grid scenario

Electricity generation in Gujarat State Grid and NEWNE Regional Grid is dominated by fossil fuel based power plants.

Total installed capacity of NEWNE Regional Grid[3] is 94687.31 MW as on 31 March 2007.Thermal power plants (Coal, Gas and Diesel) contribute 65246.7 MW which is 68.9% of the total installed capacity. Hydro power plants contribute 23636.43 MW, which is 24.96% of the total installed capacity. Renewable energy sources including wind contribute 2783.08 MW which is 2.94% of the total capacity & nuclear plant contributes 3020MW which is 3.1% of total installed capacity of NEWNE grid.

Total installed capacity (Annex I, Reference 2) in Gujarat state is 10490.79MW. In which Thermal power plants (Coal, Gas and Diesel) contribute 8480.49MW which is 80.8% of the total installed capacity. Hydel plants contribute 777MW, 7.4% of the total installed capacity. Renewable energy sources including wind contribute 408.30 MW which is 3.9% of the total installed capacity & Nuclear plant contribute 825MW which is 7.9% of total installed capacity.

It is further clarified from the above data that the Gujarat state power sector is dominated by fossil fuel based installations and depends on them for meeting its power requirements. The share of other power generation sources such as hydro and others is comparatively small in the state of Gujarat

Table 4: Power Supply Position in Gujarat

[3] Source: http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver2.pdf

	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Energy (MUs)								
Requirement	45685.00	51202.00	53038.00	53693.00	60175.00	57171.00	59681.00	57129.00
Availability	42835.00	46994.00	47787.00	47530.00	53316.00	50292.00	52724.00	52428.00
Shortage (%)	6.20	8.20	9.70	11.50	11.40	12.00	11.70	8.20
Peak (MW)								
Requirement	7018.00	7554.00	7801.00	8005.00	8641.00	9820.00	10162.00	9783.00
Peak Met	5877.00	5962.00	6905.00	6700.00	7336.00	7204.00	7578.00	7610.00
Shortage (%)	16.30	21.10	11.50	16.30	15.10	26.60	25.40	22.20

Reference: Western Region Power sector profile – Ministry of Power (November 2006)

The table illustrates how the average requirement of power in Gujarat is much higher than the availability, leading to consistent power shortages in the state for various years reaching a maximum energy shortage of 12% in the year 2003-04. The peak load further shows an increasing trend in the amount of shortage between peak requirement and peak met.

Thus in the absence of the proposed CDM project activity by TPCL, taking into account high energy shortages in the region and specifically the state of Gujarat, the electricity delivered to the grid by the project would have otherwise been generated by the continued operation of grid-connected power plants and by the addition of new generation sources (mainly large fossil fuel based power generation plants) to meet the existing and future power requirement. Hence, the scenario where current mix of power plants in the NEWNE grid would have been operated to produce an equivalent amount of electricity as that of the project activity would produce, is considered as the Baseline Scenario.
Following information is used for baseline determination:

Sr. No.	Key information/ data used for baseline determination	Source of data/ information
1	Grid Emission Factor (NEWNE Region)	CO_2 baseline database for the Indian power sector, User guide (ver. 05, November 2009) http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf

B.5. Demonstration of additionality

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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. TPCL is aware that the project activity contributes to GHG emission reductions and can avail financial benefits under CDM if the project activity is found to be additional.

Awareness of and seriousness prior consideration of CDM

The starting date of the project is 11-12-2007, which was the date on which P.O. was issued to the WEC supplier. The project proponent had been well aware of the CDM prior to this date. TPCL conceived the project activity as a CDM project since its inception. A detailed financial analysis of proposed wind energy project at Samana planes was carried out by TPCL and observed that for financial sustainability, CDM funds are required. The analysis was then submitted to the board of directors, based on which board took decision regarding the implementation of wind energy project at Samana planes with consideration of CDM benefits. Necessary evidence/documents are available in this regard and can be verified by the validator. Moreover, the purchase order on equipment supplier also states clearly that CDM revenues are essential for implementation of the project.

TPCL expects to overcome the uncertainties involved in the project activity with the revenue generated from the sale of CERs. TPCL management has gained regular updates and awareness and is abreast on the CDM global initiatives and developments through attending various seminars, workshops and conferences and by interaction with various consultants and financial institutions.

TPCL also having one registered project with UNFCCC under CDM (Project ID no. 2819); title "50.4 MW Tata Wind Farm – in Maharashtra"[4] (with CDM project start date of August 2006[5]). This indicates that the promoters were well aware of the clean development mechanism. Consideration of CDM funds is also recorded as a part of the board meeting in which the decision to proceed ahead with the setting up of the project was taken.

Chronology of events in the implementation of the project activity by TPCL indicating how continuing real actions were taken to achieve CDM status is indicated below:

Chronology of Events for 50.4 MW Tata Wind Farm at Samana Planes, Gujarat

S.No.	Date	Activities
1	23/08/2007	*Company Board Note*
2	31/08/2007	LOI from TPCL to EIL
3	11/12/2007	Purchase Order placed to WEC manufacturer by TPCL
4	03/03/2008	*Work Order from TPCL to ADB for CDM Consultancy*
5	29/05/2008	Local Stake Holder meeting conducted
6	04/06/2008	Loan Sanctioned
7	June, 2008 to Sept, 2009	PDD Preparation Phase, Data Collection for the same
8	29/09/2008	1st WEC commissioned
9	18/03/2009	PPA Signed for 29.6 MW capacity
10	07/05/2009	Last WEC commissioned
11	20/01/2010	HCA obtained
12	08/02/2010	*Work Order to DOE*
13	25/02/2010	PPA Signed for 20.0 MW Capacity
14	06/07/2010	Invitation for Contract Negotiations for CDM consultancy from ADB to

[4] http://cdm.unfccc.int/Projects/DB/DNV-CUK1249024361.28/view
[5] Board Approval on May 29, 2006

		MITCON
15	21/07/2010	PPA Signed for 0.8 MW Capacity
16	26/07/2010	*Contract for CDM Validation process consultancy between ADB and MITCON*

From the above chronology it can be seen that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation and TPCL were well aware of the CDM prior to the start date of the project activity as stated in their Board Resolution. Also there is less than 2 years gap between each continuing and real action taken. This confirms the para 6 & 8 of the Annex 13, EB 62.

STEP 1: IDENTIFICATION OF ALTERNATIVES TO THE PROJECT ACTIVITY THOSE ARE CONSISTENT WITH CURRENT LAWS AND REGULATIONS

The project is based on ACM 0002 methodology and methodology itself defines the baseline scenario. The baseline scenario of the proposed project activity is the continued operation of existing grid-connected power plants and the addition of new generation sources on the NEWNE Grid to meet electricity demand, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Hence, the discussion on the alternative is not necessary here.

Baseline Scenario identified for the project activity

Alternative 1 faces various barriers like low capacity utilization of WECs and low returns on investment. Hence it is unlikely to be the most economically attractive option and thus cannot be chosen as a baseline scenario. Moreover various regional and national policies favors the generation of electricity through GHG intensive power plants. Also, as mentioned above, Alternative 2 is not a possible option for project proponent as it is not feasible to implement equivalent capacity hydro or biomass power plant at the selected project site.
So, "continuation of current situation- current grid mix of power plants would have generated an equivalent amount of electricity in the absence of the project activity" is the most feasible option and hence is chosen as the baseline scenario for the proposed project activity. This scenario is the baseline scenario identified for the project using the baseline methodology.

STEP 2: INVESTMENT ANALYSIS

Expecting to negate the financial risks associated with the project activity with the help of CDM funding, TPCL, during the financial planning, has given due consideration and taken into account the potential CER revenue to be accrued by the project activity through CDM in the decision to proceed with the project activity. On this basis, the TPCL's top management decided to recommend the project activity to the Board of Directors for approval, which was received as mentioned earlier.

The PP has carried out investment analysis by using UNFCCC *"Tool for the demonstration and assessment of additionality",* (Version- 06.1.0, Annex 20, EB- 69).

As per this tool, it is to be determined that the project activity is not:

(a) The most economically or financially attractive; or

(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

As per Sub-step 2a, Paragraph (1), as the project activity is selling the generated electricity to state electricity utility & getting financial benefits other than CDM benefits and hence, Option- I is not applicable under this situation. TPCL has signed Power Purchase Agreement (PPA) with Gujarat Urja Vikas Nigam Ltd. (GUVNL) for sale of electricity and accordingly the electricity generated by the project activity will be exported to GUVNL. The major revenue streams of the TPCL project activity is through sale of electricity to GUVNL. Also as per para 19, annex 5 of EB 62 "The purpose of an investment analysis in the context of the CDM is to determine whether the project is less financially attractive than at least one alternative in which the project participants could have invested. In cases where the alternative requires investment anyhow and baseline emissions are based on that alternative, the only means of determining that the project activity is less financially attractive than at least one alternative is to conduct an investment comparison analysis. The benchmark approach is therefore suited to circumstances where the baseline does not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer is to invest or not to invest" Here the project proponent had choice whether invest in wind power project or not, hence the Option- II is also not applicable for this activity and Option- III is appropriate analysis method to demonstrate the investment barrier. Hence the project proponent has chosen benchmark analysis method to demonstrate additionality of the project.

Selection of financial indicator:

Additionality Tool (Version- 06.1.0, Annex 20, EB- 69) requires the PP to identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g. levelized cost of electricity production in $/kWh or levelized cost of delivered heat in $/GJ) most suitable for the project type and decision-making context. Since the project has both debt and equity components and PP want to asses total return generated from the project, PP has selected Project IRR as a suitable financial indicator for a comparison with the selected benchmark. Additionality Tool (Version- 06.1.0, Annex 20, EB- 69) permits the use of project IRR, for demonstrating the additionality using benchmark analysis.
Para 12 of Annex 5 of EB 62 states that where the project IRR is used to demonstrate the additionality of the project, WACC or the commercial lending rates are suitable benchmarks. As per the additionality tool, Version- 06.1.0, Annex 20, EB- 69, Sub-step- 2b, Option- III, paragraph 30(b); the PP has chosen the commercial lending rate – Prime Lending Rate (PLR) – as the benchmark. The investment decision was taken by the PP in August 2007. At that point of time the PLR was ranging from 12.75% to 13.25%[6]. The mid rate of 13% has been selected as the benchmark. This benchmark is in conformity with para 13 Annex 5 of EB 62, transparent and available publicly.

As per para 7 & 8 of page 8, Annex 5 of EB 62 PP has calculated the WACC which is suitable benchmark for project IRR. Calculation for WACC is as follows

Parameter	Value	Remarks
Expected Return Calculation		

[6] http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/79214.pdf

Expected Return	11.75%	Para 8, page 8 of EB 62, Annex 5, Version 05
Average forecasted inflation rate for next five years after the start of the project activity	9.36%	http://www.imf.org/external/pubs/ft/weo/2011/01/weodata/weorept.aspx?sy=2007&ey=2016&scsm=1&ssd=1&sort=country&ds=.&br=1&c=534&s=PCPIPCH&grp=0&a=&pr.x=48&pr.y=6 Para 7, page 8 of EB 62, Annex 5, Version 05
Expected Return	**21.11%**	Calculated
Cost of Debt		
Debt Equity Ratio	70:30	As per Project Report August 2007
Debt	70%	As per Project Report August 2007
Equity	30%	As per Project Report August 2007
Interest on Term Loan	13.00%	http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/79214.pdf
Income Tax during Repayment (MAT)	11.33%	As per income Tax Act 1961
Weighted Average Cost of Capital (WACC)	**14.40%**	Calculated ((13%*(1-11.33%)*70%)+(21.11%*30%))

From the above table we can conclude that PP has selected conservative benchmark of PLR i.e 13.00% which is less than WACC of 14.40%.

The PP has calculated electricity generation by applying the PLF of 24.26% and then deducted 2 % transmission losses to arrive at net saleable electricity to grid, hence the plant load factor (PLF) chosen is 23.78%, which is mentioned in the bank application letter. During the validation process DOE is provided with the same. The PLF considered is in accordance to the definition mentioned in the paragraph 3 (b) of "Guidelines for the Reporting and Validation of Plant Load Factors" Annex 11, EB 48.

Calculation and comparison of financial indicators:

The project IRR for the proposed project activity without CDM revenues was computed for a period of 20 years, lifetime of the 50.4 MW wind power project, based on the following assumptions.

Time Period for IRR computed	Yrs.	20
Total Capacity of wind-farm[7]	MW	50.4
Number of WECs[8]	Nos.	63
Plant Load Factor Projected by Technology Supplier	%	24.26%
Transmission Losses[9]	%	2%
Expected Net Annual Generation	Million kWh	104.97

[7] As per Term Sheet dated 23/07/2007
[8] As per Term Sheet dated 23/07/2007
[9] As per Term Sheet dated 23/07/2007

Deration in Energy after 10th year[10]	%	5%
Depreciation (Income tax act)[11]	% per Annum	80.00
Income Tax Rate[12]	% per Annum	33.99%
GETCO Tariff Rate per kWh[13]	Rs. Per kWH	3.37
Total Project Cost	INR in Million	2602.35
Debt[14]	INR in Million	1807.43
Equity	INR in Million	794.92
Debt-Equity Ratio	In %	70-30
Residual/ Salvage Value[15]	After 20 yrs.	5%

On the basis of the above assumption Project IRR comes to be 11.91% which is below the benchmark of 13%.

Sensitivity analysis

As per the Guidance on the Assessment of Investment Analysis para 20 of Version 05 of EB 62, which states that only variables, including the initial investment cost, that constitute more than 20 % of either total project costs or total project revenues should be subjected to reasonable variation. Also the Guidance on the Assessment of Investment Analysis EB 62, Version 05, paragraph 21 states a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and -10%.

The different parameters that affect the viability of a wind power project as per above clause are mentioned below –

Sensitivity based on Plant Load Factor (Annual Generation).

Particulars.	-10%	0% (Base IRR)	10%
Project IRR	10.24%	11.91%	13.46%

Sensitivity based on O&M Cost.

Particulars.	-10%	0% (Base IRR)	10%
Project IRR	12.02%	11.91%	11.80%

Sensitivity based on Project Cost.

Particulars.	-10%	0% (Base IRR)	10%

[10] As per TERI report 2005-06.
[11] As per Income tax rule.
[12] As per Income tax rule.
[13] As per GERC order dated 11.08.2006.
[14] As per IREDA Guideline (can be referred at Annexure A, http://www.ireda.gov.in/pdf/October-March_2008.pdf)
[15] As per GERC order dated 11.08.2006

Project IRR	13.49%	11.91%	10.55%

Sensitivity based on Tariff.

Particulars.	-10%	0% (Base IRR)	10%
Project IRR	10.24%	11.91%	13.46%

From above table it is clear that the IRR will marginally cross the benchmark of the project if PLF increase by 10% or project cost reduced by 10% or tariff of the project increase by 10%.

Chances of occurrence of condition where financial indicator will cross the benchmark.

Increase in Plant Load Factor by 7.10%: highest Average generation PLF achieved in the state between 2006 to 2008 was only 9.26%.

Year wise installed capacity[16].

Year	Up-to March-06	Up-to March-07	Up-to March-08
Installed Capacity in MW	352.6	636.55	1252.91
Installed Capacity in kW	352600	636550	1252910

Year wise generation details[17].

Year	Up-to March-06	Up-to March-07	Up-to March-08
Generation in Billions kWh	0.286	0.455	0.851
Generation in Millions kWh	286	455	851
Generation in Lacs kWh	2860	4550	8510
Achieved PLF	**9.26%**	**8.16%**	**7.75%**

Even the project has achieved maximum average running PLF of 17.68% till May 2012. So the PLF of 24.26% considered by PP is already on the higher side and chances of increase in PLF by further 7.10% is highly unrealistic scenario.

Reduction in Project cost by 7.15%: PP has already placed the orders with the supplier and the project is commissioned. Actual cost of the project is Rs. 2675.5 Million (cost is increased due to the delay in the project implementation, which ultimately increased the Interest during construction and cost of project), which is 1.02% more than the cost estimated at the time of decision making, so chances of decrease in cost by 7.15% is the most unlikely scenario.

Increase in Tariff by 7.10%: PP has already entered in to PPA with GUVNL for a period of 20 years (i.e. the life of the project), so chances of increase in tariff by 7.10% is highly unrealistic scenario.

[16] http://www.mnre.gov.in/wp-installed.htm

[17] http://www.mnre.gov.in/wp8.htm

It can be seen from the above that the project activity is clearly unattractive in absence of CDM revenues. The promoter was aware of this fact and had considered this investment only in light of CDM revenues being available for this project. Inclusion of CDM revenues in project inflow will help to mitigate the risk associated with the project up to some extent.

The CDM revenue is likely to obtain through sale of CERs is critical to sustain the operations of the project activity over its intended lifetime.

Hence, it can be justifiably concluded that the project is not a financially attractive option and CDM revenue that the project activity would obtain through sale of the emission reductions, is very crucial to sustain the operations of the project activity.

STEP 3. BARRIER ANALYSIS

Not opted for

STEP 4: COMMON PRACTICE ANALYSIS

Annex 20 of EB 69 the "Tool for the demonstration and Assessment of Additionality", Version 06.1.0 has been used for performing the common practice analysis for the project activity. As per the same, the identification of projects and further analysis has been done in the following step wise manner:

As per para 47 of EB 69, Annex 20 following steps have been applied to prove that the proposed project activity is not a common practice within the applicable geographical area. The applicable geographical area has been defined as the host country, India as default as defined in para 5 of the tool.

Step 1: Calculate applicable output range as +/- 50 % of the design output or capacity of the proposed project activity.

Total capacity of the project activity is 50.4 MW

-50 %	**Actual Capacity**	**+50 %**
25.2 MW	50.4 MW	75.6 MW

Hence the applicable range is from 25.2 MW to 75.6 MW.
Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number Nall. Registered CDM project activities and projects activities undergoing validation shall not be included in this step.

As per para 5 of "Tool for the demonstration and assessment of additionality" version 06.1.0, EB 69, Annex 20, applicable geographical area covers the entire country as a default, hence India as the geographical area has been selected.

Based on the Indian Wind Power directory 2007[18], all the large scale Wind Power Plants (within the range 25.2 MW to 75.6 MW) which have started commercial operation before the start date of the project are listed below :-

S. NO.	PP	Capacity MW	CDM status	Reference
1	**Enercon Windfarms Hindustan P. Ltd.**	44.80	Yes	http://cdm.unfccc.int/Projects/DB/DNV-CUK1185356859.49/view 44.8 MW is the part of 68.8 MW project under CDM
2	**Enercon Windfarms Hindustan P. Ltd.**	60.00	Yes	http://cdm.unfccc.int/Projects/DB/SGS-UKL1181742063.57/view
3	**Essel Mining & Industries Ltd.**	75.00	Yes	http://cdm.unfccc.int/Projects/DB/DNV-CUK1178530835.69/view
4	**Gujarat NRE Coke Ltd.**	26.25	Yes	http://cdm.unfccc.int/Projects/Validation/DB/2WHFROEPK85ARNQ1TVKJV4WC8ATMAB/view.html
5	**HZL**	38.40	Yes	https://cdm.unfccc.int/Projects/DB/BVQI1211956663.14/view 38.4 MW is the part of 88.8 MW project under CDM
6	**MSPL Group**	30.00	Yes	https://cdm.unfccc.int/Projects/DB/BVQI1286434210.07/view
7	**Ramgad Minerals & Mining Pvt. Ltd.**	38.75	Yes	http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view 38.75MW is the part of 125 MW project under CDM
8	**Shanmugavel group**	25.50	Yes	http://cdm.unfccc.int/Projects/DB/TUEV-SUED1173364563.43/view 25.5 MW is the part of 467.79 MW project under CDM
9	**Tata Power Co. Ltd.**	37.60	Yes	http://cdm.unfccc.int/Projects/DB/DNV-CUK1249024361.28/view 37.6 MW is the part of 50.4 MW project under CDM
10	**Vijayanand Roadlines Ltd.**	30.00	Yes	http://cdm.unfccc.int/Projects/DB/SGS-UKL1225104443.35/view 30 MW is the part of 42.5 MW project under CDM
11	**Bajaj Auto Ltd.**	45.2	Yes	http://cdm.unfccc.int/Projects/DB/BVQI1135690844.37/view (Rejected)
12	**Aban Loyd Chiles O. Ltd.**	**31.57**	**NO**	**Commissioned on March, 1997**

[18] Indian Wind Power directory 2007 (published on 04/08/2007) is publically available information at the time of start date of project activity (20/10/2007).

Nall = Total number of Power Plants existing before the start date of the project activity i.e. 20/10/2007 in India, within the range of 25.2 MW to 75.6 MW Capacity, that are not registered and are not under validation of CDM project activity.

It can be seen from the above table that all the wind power project within the defined range in step 1 are either registered or under validation phase of the CDM cycle, except there is one wind power plant (**Aban Loyd Chiles O. Ltd.)** commissioned in the March 1997, which falls in the range of specified in step 1 above.

Hence , Nall arrived at

Nall = 1

Step 3 : Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number Ndiff.

As per the para 9 of "Tool for the demonstration and assessment of additionality" version 06.1.0, Annex 20, EB 69, different technologies are technologies that deliver the same output and differ by at least one of the following (as appropriate in the context of the measure applied in the proposed CDM project and applicable geographical area):

(i) Energy source/fuel;
(ii) Feed stock;
(iii) Size of installation (power capacity):
(iv) Investment climate in the date of the investment decision
(v) Other features

Aban Loyd Chiles O. Ltd wind power plant was commissioned in different regulatory regime as compared to the regulatory regime existing in India during the Project activities start date. Pre September 2001 in India there was the central regulatory regime, i.e. the governing body was MNES (Ministry of New and Renewable Energy), where the government policies and business parameters such as cost structure was favourable. In post September 2001 the central regulatory regime was converted into state regulatory regime of TNERC policies (Tamil Nadu Electricity Regulatory Commission), which was not as favourable as the earlier regime.

The Tariff rate prevailing pre September 2001, i.e. MNES(central government regime), 1994-95 tariff rate of INR 2.25 per unit with 5% escalation per year for the 1st 10 years. And the state government regulatory regime of Tamil Nadu that started from September 2001 had the tariff rate of INR 2.70 per unit fixed.
Also, the wheeling charges has changed from 2% to 5% in the current regulatory regime as compared to the pre September, 2001 regulatory regime.

It is to be noted that India on 16th Feb 2005, came into force for the CDM, earlier to that there was no CDM programme, and there is a huge gap of almost 8 years, in between the CDM enforcement and commissioning of the Aban Loyd Chiles O. Ltd. wind project in the year 1997.

Since the investment climate is different for Aban Loyd Chiles O. Ltd. project, considered under Ndiff.
Hence,

Ndiff = 1

Step 4 : Calculate factor F=1-Ndiff/Nall representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

F=1-Ndiff/Nall

From the above step 2 and step 3, Nall = 1, and Ndiff = 1

F = 1-(1/1)

F= 0

As per the para 47 of "Tool for the demonstration and assessment of additionality" version 06.1.0, Annex 20, EB 69, the proposed project activity is a common practice within a sector in the applicable geographical area if both the following conditions are fulfilled:

(a) the factor F is greater than 0.2, and

(b) N_{all}-N_{diff} is greater than 3.

Nall – Ndiff = 1-1 = 0

F =0 , the factor F is not greater than 0.2
N_{all}-N_{diff} = 0, which is not greater than 3
Hence the project activity is not a common practice[19].

B.6. Emission reductions
B.6.1. Explanation of methodological choices
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Emission reduction due to project activity are calculated as follows,

$ER_y = BE_y – PE_y$ as per equation 11 (ACM 0002, Ver. 13.0.0)

Where:
ER_y = Emission reductions in year *y* (t CO_2e/yr)
BE_y = Baseline emissions in year *y* (t CO_2/yr)
PE_y = Project emissions in year *y* (t CO_2e/yr)

As current project is renewable energy project generating no project emissions, PE_y = 0.

Baseline emissions

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity

[19] The result is also in line with latest guideline on " Common Practice Analysis " , EB 69, Annex 8, Version 02.0.

generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$ As per equation 06 (ACM 0002, Ver. 13.0.0)

Where:

BE_y = Baseline emissions in year *y* (tCO_2/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

Calculation of $EG_{PJ,y}$

As the project activity is the installation of a new grid-connected renewable power plant at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$EG_{PJ,y} = EG_{facility,y}$ as per equation 07 (ACM 0002, Ver. 13.0.0)

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

Calculation of $EF_{grid,CM,y}$

Combined margin CO_2 emission factor has been estimated using 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"* (Version 02.2.1, EB 63 Annex 19) by using the following six steps:

Step 1: Identify the relevant electricity systems

Central Electricity Authority of India (CEA), Ministry of Power, Government of India (Host Country) has given the delineations of the project electricity system and the connected electricity system in India. As per CEA, the Indian power system is divided into two independent regional grids, namely NEWNE & Southern. Each grid covers several States. Power generation and supply within the regional grid is managed by Regional Load Dispatch Centre (RLDC). The Regional Power Committees (RPCs) provide a common platform for discussion and solution to the problems relating to the regional grid. Each State in a regional grid meets its demand with its own generation facilities and with allocation of power plants owned by the central agencies such as NTPC and NHPC etc. Depending on the demand and generation, there are electricity imports and exports between the States of a regional grid. There are also electricity transfers between regional grids.

Geographical Scope of two regional grids:

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

For the purpose of calculating the emission reductions achieved by any CDM project, the *"Tool to calculate the emission factor for an electricity system"* (Version 02.2.1, Annex 19, EB 63) requires that the "project electricity system is defined by the spatial extent of the power plants that can be dispatched without significant transmission constraints". This implies that the grid emission factors could be most appropriately calculated at the level of the two regional grids. As per the delineation given by CEA, Maharashtra state falls into the NEWNE Regional Grid.

Step 2: Choose whether to include off grid power plants in the project electricity system

PP may choose between the following two options to calculate the operating margin and build margin emission factor:

Option 1: Only grid power plants are included in the calculation

Option 2: Both grid power plants and off grid power plants are included in the calculation.

PP has chosen option 1 to calculate operating margin and build margin emission factor.

Step 3: Select a method to determine the operating margin (OM)

For calculation of operating margin four options are available:

(a) Simple operating margin;
(b) Simple adjusted operating margin;
(c) Dispatch data analysis operating margin;
(d) Average operating margin

CO_2 Baseline Database Version 5, Date –November 09, published by Central Electricity Authority (hereafter CEA Database) has been referred for the values of OM. As per the *"Tool to calculate the emission factor for an electricity system"* (Version 02.2.1, EB 63 Annex 19), any of the four methods can

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

Operating Margin has been calculated using the Simple OM method as the low-cost/must run resources constitute less than 50% (only % - Average of three years, as shown in table below) of the total grid generation of the NEWNE Grid in average of the three most recent years.

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

	2004-05	**2005-06**	**2006-07**	**2007-08**	**2008-09**
NEWNE	16.83%	18.0%	18.5%	19.0%	17.3%
South	21.6%	27.0%	28.3%	27.1%	22.8%
India	18%	20.1%	20.9%	21.0%	18.6%
Average of five years for NEWNE Grid					18.3%
Table reference- CEA Baseline Database, Version 5, Version 4 & Version 3					

For the simple OM method, emission factors can be calculated using either of the two following data vintages:

Ex ante option - If the *ex ante* option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required.
Ex post option - If the *ex post* option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.
PP has chosen ex ante option and emission factor determined at validation stage will be the same through out the crediting period.

Step 4: Calculate the operating margin emission factor ($EF_{grid,OM,y}$) according to the selected method

Simple OM has been calculated using "Tool to calculate the emission factor for an electricity system" version 02.2.1, EB 63. PP has opted for option B and used data provided by CEA, Version 5, Nov. 09. Net electricity generation and absolute CO2 emission of all generating power plants serving the system, not including low-cost/ must–run power plants, calculated from CEA database and CO2 emission per unit net electricity generation (tCO2/ MWh) estimated for year 2006-07, 2007-08 and 2008-09. The simple OM emission factor is calculated as the generation-weighted average CO2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system.

Please refer Baseline emission sheet for detail simple OM emission factor calculation.

As per the *"Tool to calculate the emission factor for an electricity system"*, the calculation of OM has been done *ex ante* based on the most recent 3 years for which data is available at the time of PDD submission.

Weighted generation Operating Margin (OM) = 1.0049 (Refer Baseline emission sheet)

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

Net Generation in Built Margin (MWh)

	2006-07	2007-08	2008-09
NEWNE	93,524,000	100,707,000	102,589
South	30,442,000	31,613,000	31,606
India	123,965,000	132,320,000	134,195

Table reference - CEA Baseline Database, Version 5

Vintage of data is based on option 1 of step 5. (Refer *"Tool to calculate the emission factor for an electricity system"* BM calculation has been done *ex-ante* and hence BM value will remain fixed and need not be monitored during the crediting period.

BM values have been taken from CO_2 Baseline Database for the Indian Power Sector, Version 5, November 2009. CO_2 Baseline Database for the Indian Power Sector is published by Central Electricity Authority, Ministry of Power, Govt. of India.

Year	BM
2008-2009	0.6752

Table reference - CEA Baseline Database, Version 5

Step 6: Calculate the combined margin emission factor

Option (a) of step 6 has been choosen to calculate the combined margin, i.e. Weighted average CM.

The emission factor for grid electricity or Grid Emission Coefficient (also referred as CO_2 Emission factor) is calculated as the weighted average of the operating margin emission factor ($EF_{grid,OM,y}$) and the build margin emission factor ($EF_{grid,BM,y}$), where the weights W_{OM} and W_{BM} for wind & hydro projects, by default, are $W_{OM} = 0.75$ & $W_{BM} = 0.25$ $EF_{grid,CM,y}$ is calculated as below and are expressed in tCO_2/MWh.

NEWNE Region:

$$\mathbf{EF_{grid,CM,y} = 0.75\ EF_{grid,OM,y} + 0.25\ EF_{grid,BM,y}}$$
$$= 0.75 * 1.0049 + 0.25 * 0.6752$$
$$= 0.9224\ tCO_2/MWh$$ (Ref. Baseline calculation Excel sheet)

Further multiplication of electricity generated in kWh with grid emission coefficient (or CO_2 Emission factor) will give the estimated value of baseline emission as given below.

Baseline emissions ($BE_{electricity,y}$) = Grid Emission Coefficient x Net electricity generated
(tCO_2) (tCO_2/MWh) (MWh)

Leakage:

According to ACM 0002, the main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream

emissions from fossil fuel use (e.g. extraction, processing, transport). These emissions sources are neglected. Thus leakage emissions are nil.

$LE_Y = 0$

B.6.2. Data and parameters fixed ex ante

Data / Parameter	**$EF_{OM, y}$**
Unit	tCO_2/MWh
Description	Emission factor for the operating margin of the NEWNE Grid
Source of data	CEA – CO_2 baseline database for Indian power sector
Value(s) applied	1.0049
Choice of data or Measurement methods and procedures	The factor remains constant during the entire crediting period.
Purpose of data	Baseline emission calculation
Additional comment	The four year average of simple operating margin value of the NEWNE grid is considered

Data / Parameter	**$EF_{BM, y}$**
Unit	tCO_2/MWh
Description	Emission factor for the build margin of the NEWNE Grid
Source of data	CEA – CO_2 baseline database for Indian power sector
Value(s) applied	0.6752
Choice of data or Measurement methods and procedures	The factor remains constant during the entire crediting period.
Purpose of data	Baseline emission calculation
Additional comment	Most recent year build margin value of the NEWNE grid is considered

Data / Parameter	EF_y
Unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor for NEWNE regional grid
Source of data	Estimated figure based on 75% of OM and 25% of BM values. Referred from CO_2 Baseline Database for the Indian Power Sector prepared by Central Electricity Authority Version 5.0
Value(s) applied	0.9224 tCO_2/MWh
Choice of data or Measurement methods and procedures	CEA has calculated it as per "Tool to calculate the emission factors for an electricity system" with 3years vintage data and option of ex ante calculation based on 75% of OM and 25% of BM values approach. Computed once during PDD finalization. The project activity will export power to NEWNE regional grid and emission factor of the NEWNE grid is considered.
Purpose of data	Baseline emission calculation
Additional comment	The data will be archived for two years beyond the crediting period.

B.6.3. Ex ante calculation of emission reductions

>>

Electricity generation from the project activity

The total power generated by the project activity during the crediting period is based on the wind speed, turbine blade diameter and the operating days of power generation from the project activity per year.

The project activity is expected to export 104,966 MWh of electricity per annum to the grid with the commissioning of 50.4 MW Wind power project and this electrical energy will displace an equivalent amount of electricity that would be generated by the NEWNE grid mix and GHG emissions would have occurred due to fossil fuel combustion.

Project Emissions

As per the ACM0002 there are no project related emission

Leakage

As per ACM0002, the main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction, fuel handling (extraction, processing, and transport). Project participants do not need to consider these emission sources as leakage in applying this methodology. Therefore TPCL has not taken leakage into consideration. Neither any credits for the TPCL project activity on account of reducing these emissions below the level of the baseline scenario are claimed.

Emission Reductions

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

$$ER_y = BE_y - PE_y$$

Where,

BE_y = Baseline emissions (Please refer to 'Baseline emissions due to displacement of electricity' as given above);

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$$

$EF_{grid, CM, y}$ = Emission Factor of the grid = 0.9224 tCO_2/MWh

$$BE_y = 104{,}966\ MWh * 0.9224\ tCO_2/MWh = 96{,}821\ tCO_2$$

PE_y = Project emissions;

PE_y = 0 for TPCL project activity.

Therefore, Emission reductions achieved due to the project activity for a period of 10 years of crediting period = 968210 - 0 - 0 = 968210 tCO_2.

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
2012-13	96,821	0	0	96,821
2013-14	96,821	0	0	96,821
2014-15	96,821	0	0	96,821
2015-16	96,821	0	0	96,821
2016-17	96,821	0	0	96,821
2017-18	96,821	0	0	96,821
2018-19	96,821	0	0	96,821
2019-20	96,821	0	0	96,821
2020-21	96,821	0	0	96,821
2021-22	96,821	0	0	96,821
Total	**9,68,210**	**0**	**0**	**9,68,210**
Total number of crediting years	**10**			
Annual average over the crediting period	**96,821**	**0**	**0**	**96,821**

B.7. Monitoring plan
B.7.1. Data and parameters to be monitored

Data / Parameter	EG_y
Unit	MWh (Mega-watt hour)
Description	Net electricity supplied to the grid by the Project
Source of data	Monthly share certificate issued by GETCO/GEDA
Value(s) applied	104,966MWh
Measurement methods and procedures	Monthly share certificate issued by GETCO/GEDA mentions only net electricity supplied to the grid after deducting import (the quantity of electricity delivered to the project activity from the grid) from Export (the quantity of electricity supplied by the project activity to the grid) .The invoicing is done on the basis of this share certificate. The net electricity supplied is based on measured value of export and import of electricity. Measurement method: Measured and Calculated Monitoring: Monitored through the main meter and check meter readings. Both the energy meters are bi-directional trivector meters (ABT meters) Data type: Measured continuously and recorded monthly Archiving: Electronically Recording frequency: Monthly Responsibility : The Plant management shall be responsible for the regular reading of data Calibration frequency: The meter shall be calibrated once in 3 years[20].
Monitoring frequency	Measuring frequency: Continuous Recording frequency: Monthly
QA/QC procedures	Meter calibration shall be conducted once in 3 years by GETCO in accordance with the local calibration standards and internal audit system is in place as mentioned in section B.7.2. Meter accuracy: 0.2s of the meter at respective substations that would be used for the metering of electricity exported. TPCL prepare invoices on monthly basis for the net electricity supplied to the grid and submit the same to GUVNL along with copy of joint meter reading as certified by SEA (State energy Account) issued by of Gujarat SLDC (State Load Dispatch Centre). These invoices can be used for cross checking of data mentioned in share of electricity certificate by GEDA, used for Emission reduction calculation
Purpose of data	Calculation of baseline emission

[20] As per the circular from GETCO dated 04/01/2012.

Additional comment	The data (electricity supplied to the grid) will be archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period or the last issuance of CERs for the project activity whichever occurs later. In the case of the crediting period start and end dates of the project activity falls in between the billing cycles, then emission reduction will be claimed for only those billing cycles which fall entirely within the crediting period.

B.7.2. Sampling plan

>>

None of the data's and parameters under the project activity is determined by sampling approach.

B.7.3. Other elements of monitoring plan

>>

The project activity is in accordance with the approved monitoring methodology ACM0002 Version 13.0.0 Sectoral Scope: 1, "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources

This approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid, where *ex post* determination of grid emission factor has been chosen

Since the baseline methodology is based on ex ante determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required. Further, wind based electricity generation is not associated with any kind of leakages. Hence, the sole parameter for monitoring is the electricity generated by the project and supplied to the grid.

Monitoring Process for the Project Activity

Metering of wind power is done as under:

- Monthly joint meter reading is taken at Sadodar (33/220kV) substation meters, where all WECs which are part and not part of the project, are connected, by the representative of GETCO (Gujarat Electricity Transmission Company) and O&M service provider (on behalf of individual wind farm owners).
- All WECs which are part of the project activity are also connected to the cluster meters located in the metering yard. The monthly joint meter reading is also recorded from these cluster meters by the representatives of GETCO and O&M service provider.
- Similarly joint meter reading is also taken from the cluster meters of other wind farm owners.
- GETCO/GEDA distributes recorded share of electricity certificate for the particular month to all owners for their respective WECs which are connected to Sadodar substation.

Apportioning procedure followed for the project activity:

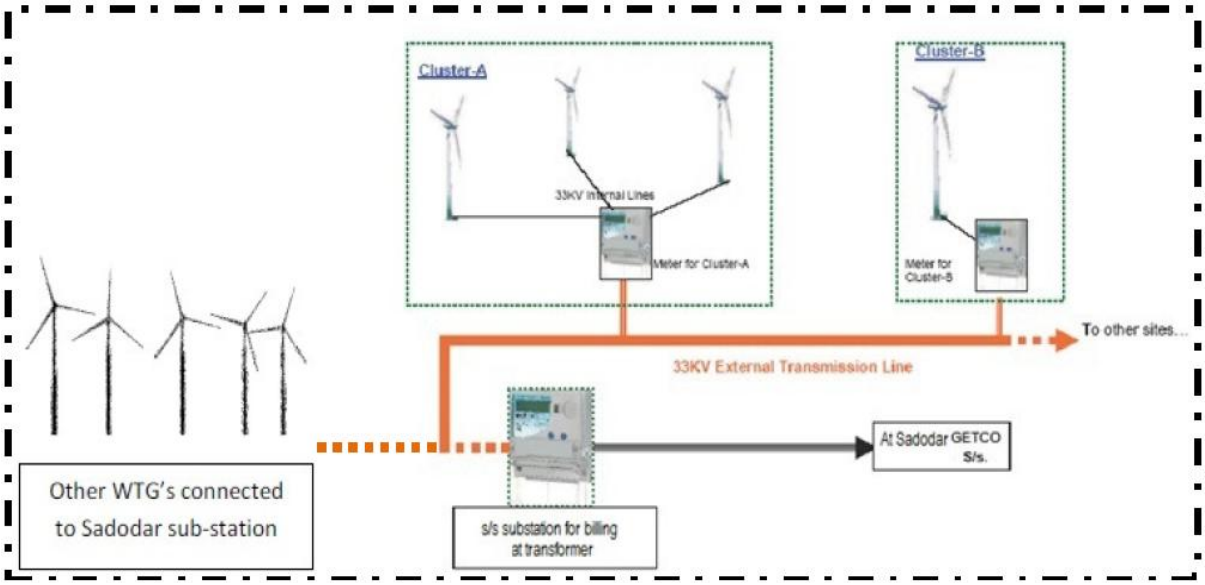
- Joint meter reading is taken at Sadodar (220/33KV) substation meter by representative of GETCO (Gujarat Electricity Transmission Company) and O&M service provider (on behalf of individual wind farm owners). Let the total generation recorded for particular month is 'X' units in sub-station meter.
- Joint meter reading is taken at cluster Meter-(transformer yard meter of each WTG) by representative of GETCO (Gujarat Electricity Transmission Company) and O&M service

provider (on behalf of individual wind farm owners). Let us assume total generation of TPCL recorded for particular month is 'Y1' units.

- Similarly joint meter reading for other wind farm owners is also taken. Let the generation of individual owner recorded for particular month are 'Y2, Y3,.....Yn' units.
- GETCO distributes 'X' to individual wind farm owners using following formula and issues monthly certificates.
- For TPCL, net units calculated for billing = X * Y1 / ΣYn
- It must be noted here that the meter readings as mentioned above are calculated as the product of meter multiplication factor and the difference of the current and previous meter readings.
- The apportioning procedure followed and conducted by GETCO only and TPCL has no part/ role for apportioning procedure, as details of electricity generation from wind power projects by other PPs of the wind farm site are not available with TPCL.

Additionally, all the WECs at the site are connected to a central monitoring system located at that site only. This system captures daily generation figures for each WEC, which are later made available to TPCL on the customized website of Enercon. This will be used to check the electricity generation figures.

Single line diagram for metering details



Emergency Preparedness

If both main mater and check meter are found faulty, energy generation is monitored in accordance with procedures described in PPA as follows.

"In case, both the main meters and check meter are found to be beyond permissible limit of error, both the meters shall be calibrated immediately and the correction applicable to main meter shall be applied to the energy registered by the main meter at the correct energy for the purpose of energy account/billing for the actual period during which inaccurate measurements were made, if such period can be determined or, if not readily determinable, shall be the shorter of:

- ✓ *The period since the immediately preceding test of the relevant main meter, (OR)*

- ✓ *One hundred and eighty (180) days immediately preceding the test at which the relevant Main meter was determined to be defective or inaccurate."*

In case of failure of the main meter, generation value would be taken from the check meter and the grid officials would immediately replace the faulty meter with a calibrated meter. The project promoters have contracted the technology supplier for providing O&M services for the power project. The service provider would be responsible for maintenance of the necessary spare parts and consumables for the maintenance of the WECs such as anemometers, wind vanes and sensors, oil filters, batteries, auxiliary motors and pumps, WEC controllers, slip rings, limit switches and sensors, detergents & solvents etc. The service provider would also be responsible for supply of necessary main components of the WEC such as main gearboxes, blades, generators, towers, hubs, main shafts & bearings, ground and top controller and hydraulic systems. The service provider would also ensure that occupational health and safety procedures are adhered to during the operation & maintenance activities. Additionally, spare meters would also be kept available at the site for replacement in case of failure of any of the monitoring equipments.

Internal audits & Performance review

The records are regularly audited and checked by the senior officials from project proponent on an annual basis. The officials will monitor the actual emission reduction for the project activity. The personnel responsible for taking readings at site are adequately trained.

On behalf of TPCL, the Project is operated and managed by Enercon (India) Ltd. Enercon India Limited is an ISO 9001:2000 certified company and will follow the standard documentation practices to ensure the reliability of the monitored data. The accuracy of monitoring parameter is ensured by adhering to the calibration and testing procedure. The project will adhere to all the mandatory regulatory and statutory requirements at the state as well as national level.

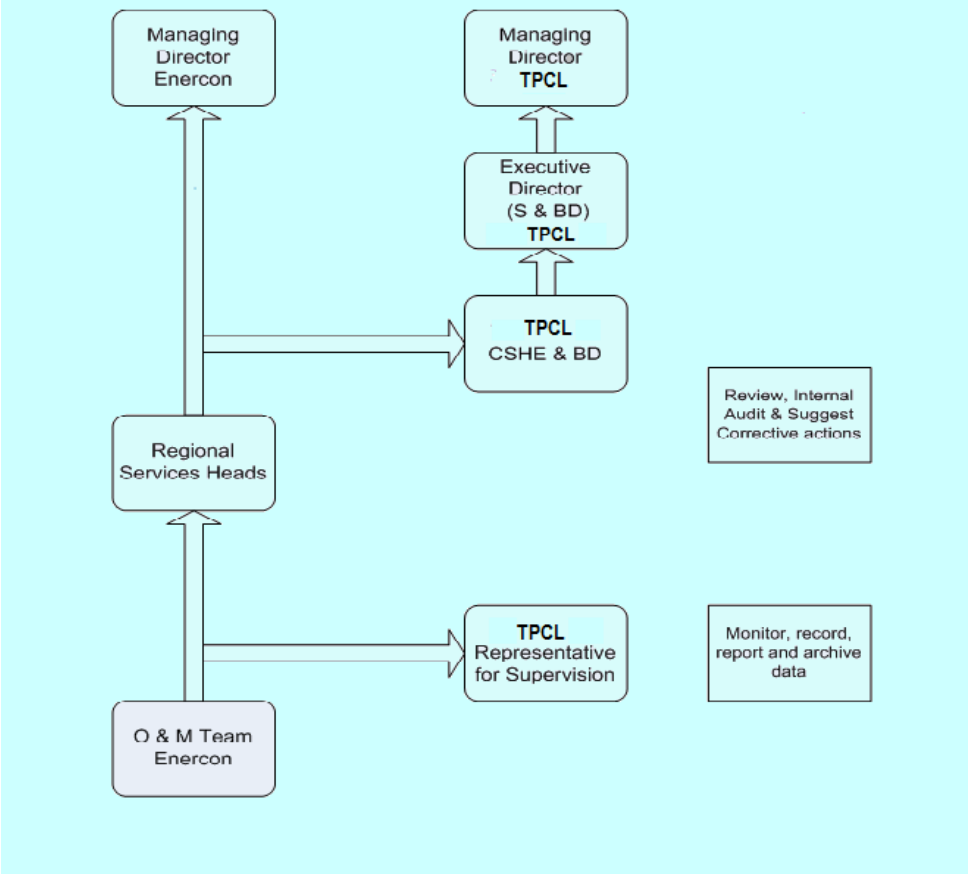
Data cross checking

TPCL prepare invoices on a monthly basis for the net electricity supplied to the grid and submit the same to GUVNL along with copy of joint meter reading as certified by SEA (State energy Account) issued by of Gujarat SLDC (State Load Dispatch Centre). These invoices can be used for cross checking of data mentioned in share of electricity certificate by GEDA, used for Emission reduction calculation.

Training and maintenance requirements:

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. The Enercon Training Academy provides need-based training to meet the training requirements of Enercon projects. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving.

The authority and responsibility of project management as well as registration, monitoring, measurement and reporting lie with The Tata Power Company Ltd. (TPCL) They have formulated a Project Team to ensure proper and continuous monitoring of the performance of WECs and generation of electricity. The same has been outlined as follows:



The O&M personnel are qualified engineers and are trained at the WEC manufacturing facility of Enercon India Limited for operating and ensuring best performance of the WECs.

The general conditions set out for metering, recording, meter readings, meter inspections, Test & Checking and communication shall be as per the PPA (power purchase agreement) with GUVNL.

For monitoring, record, report and archivind data following responsibilities are allotted:-

Designation	**Responsibilities**
Regional Service head	▪ Overall performance monitoring ▪ Project execution ▪ Operation ▪ Verification of data ▪ Site visit to check authenticity of data and take corrective action, wherever necessary ▪ Storage of data
Site Main Controller (TPCL representative for supervision)	▪ Operation, monitoring and verification of data ▪ Data recording ▪ Storage of data
Operation and Maintenance team from Enercon	▪ Operation and maintenance ▪ Data recording ▪ Storage of data

The responsibilities of upper authorities in TPCL are to review, do internal audits and take corrective actions for the project activity.

SECTION C. Duration and crediting period
C.1. Duration of project activity
C.1.1. Start date of project activity
>>
Being the earliest major real action, date of placement of purchase order to Enercon is considered as the start date of the project activity. Purchase order for the supply of wind energy generators for the project was released by TPCL to Enercon on 11/12/2007.

C.1.2. Expected operational lifetime of project activity
>>
The expected life time of the project is 20 years.

C.2. Crediting period of project activity
C.2.1. Type of crediting period
>>
The project proponent intends to apply for a fixed crediting period.

C.2.2. Start date of crediting period
>>
30/11/2012

C.2.3. Length of crediting period
Crediting period is for 10 years.

SECTION D. Environmental impacts
D.1. Analysis of environmental impacts
>>
As per the Indian environmental regulation, the implementation of the wind park does not require an environmental impact assessment. As per the Schedule annexed to the notification dated September 14, 2006[21], issued by Ministry of Environment and Forests (MoEF - Government of India), read with Amendments to this notification, dated December 1, 2009[22] (39 activities are required to undertake environmental impact assessment studies.) states that any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. Wind parks are not included in this list and thus an EIA is not required.
Although EIA is not required project proponent conducted EIA study by independent third party Environment consultancy organization. The project activity has no significant impact on the environment and the same are discussed below:

A) Environmental Impact during construction phase

Impact on air quality

[21] http://www.moef.nic.in/legis/eia/so1533.pdf
[22] http://moef.nic.in/downloads/rules-and-regulations/3067.pdf

Movement of construction material during construction will have some impact on the air. Emissions during this phase are localized and temporary, limited to the construction period only.As the transportation is not substantial for the project activity, the impacts will be negligible. Overall the Project will have a beneficial impact on air quality due to the replacement of fossil fuel energy generation.

Impact on water quality
As there is no involvement of chemicals, groundwater contamination due to disposal of chemicals is ruled out. Not much water discharge takes place during construction. However, proper sanitary arrangements need to be provided by project proponents.

Impact on Land use & soil quality
Prior to the project activity, most of the land in Jamnagar district had no beneficial use. The project proponents had bought the land for a worthwhile application and obtained necessary approvals for installation of windmills. Soil quality may not change during both construction phase and operation phase. No dislocation of people is involved in the course of the project activity. No negative impact is likely on topography or drainage as no natural drain passes through project area and no mitigation measures would be required.

Impact due to noise
The noise levels produced during construction will not have a significant impact on existing ambient noise levels at receiving sites as noise generating activities are dispersed. As this impact is only for the construction phase, the intermittent impact from construction noise is deemed to be negligible. Personal protective equipments were provided to workers involved in the construction activity to mitigate the effects of noise pollution, but they have no impact on ambient noise level.

Taking into consideration the project life cycle, the magnitude of the impacts during the construction phase is negligible and exists for a temporary period of time till the end of construction phase. Therefore, it would not affect the environment considerably. Thus impacts on the environment due to construction activities of WECs are negligible

B) Environmental Impact during Operation and Maintenance Phase

Impact on air
Wind energy plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation.

Impact on water
There is absolutely no effluent discharge during operation of WEC generators. Once the wind farm will be operational, water will be only required for the domestic use of project staff at the site.

Impact on ecology
As all the lands occupied for the purpose are from private & revenue land, there will be no forest loss. No threatened or endangered species of flora or fauna are on the site, therefore the Project will have no impact on biodiversity. No impact on wildlife habitat is predicted. No major water bodies or wetlands exist within 10 km of the WECs and the site is not known to be on the migratory path of any significant bird species. Therefore no harm on the ecological environment is envisaged.

Impact due to noise

Noise is generated due to the movement of rotor blades but it is very much below the regulatory norms. It has no direct effect on the population, as the area is less populated 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
There is no inconvenience to the local community due to the transmission lines. The locals have directly benefited economically through land sales. The project activity will generate opportunities for skilled and unskilled manpower in the region. The project will be providing employment opportunities not only during the construction phase, but also during its operational lifetime. The project activity improves employment rate and livelihood of local populace in the vicinity of the project. Moreover, the project generates eco-friendly, GHG free power, which contributes to sustainable development of the region.

Conclusion
The project activity does not have any substantial adverse impacts on environment during its construction or operational phase. The human interest parameters would show positive impacts due to increased job opportunities at the facility as well as other ancillary units coming up subsequent to the implementation of this project.

D.2. Environmental impact assessment
>>
As per the EIA conducted, the project activity would not have any adverse environmental impacts. The project activity does not fall under the purview of the Environmental Impact Assessment (EIA) notification by Government of India (GoI) dated notification dated September 14, 2006, issued by Ministry of Environment and Forests (MoEF - Government of India), read with Amendments to this notification, dated December 1, 2009.

SECTION E. Local stakeholder consultation
E.1. Solicitation of comments from local stakeholders
>>
TPCL identified the following local stakeholders to be associated with the project activities, directly or indirectly. The following stakeholders were intimated by personal invitation letter in local vernacular language. Copy of invitation letter will be available for validation.

- Local people/villagers
- Farmers
- Technology and equipment supplier (Enercon)
- Equipment O & M contractor (Enercon)
- TPCL Staff Employee
- Officials of Gram Panchayat (Local self Government and people's representatives)

All the stakeholders were invited for the meeting along with the information about the agenda, venue and date of the meeting 8-9 days prior to the meeting. The consultation meeting was conducted by TPCL at Jamnagar on 29 May 2008. The stakeholder consultation meeting was attended by participants representing various groups of the stakeholder (as mentioned above), details on the participants has been recorded and available for validation.

The meetings started with a brief presentation on Clean Development Mechanism under Kyoto Protocol. There after it was explained to the stakeholder as how the wind power project by TPCL has lead to significant reduction in emissions of greenhouse gases either directly or indirectly and hence how it helps in contributing to the global efforts towards combating global warming. TPCL further explained the other sustainable development benefits associated with the project. The stakeholders viewed TPCL as a reputed company contributing to local socio-economy. Overall there was unanimous agreement that the proposed project was a beneficial project from sustainability viewpoint.

The discussion was recorded and minutes of the meeting are set out in Annex III.

E.2. Summary of comments received

>>

The stakeholder meeting was conducted at Project site and was attended by the residents of the nearby villages, the employees of TPCL. Concerns and responses as recorded during the meeting at the sites of the wind farm area.

All the stakeholders were happy in knowing that a CDM project activity in their locality will be contributing to a global cause and they commended the TPCL management for their initiatives in the areas of climate change and sustainable development. In particular, the stakeholders appreciated the project promoters for the environment friendly power generation using wind.

Details of discussions and interaction took place during the CDM project stakeholder consultation meeting between TPCL team and the stakeholders is described as under.

Sr. No	Queries raised by stakeholders	Response / explanation of TPCL team
1.	What is the benefit of Wind Mills to the villagers and the society	Electricity is produced by Wind Mills. It enhances the capacity of local substation. Generates clean and green electricity which free of GHG emissions. This way, requirement of the village gets fulfilled.
2.	How much deep are the pits / bores for earthing?	6 to 7 feet. These do not cause any damage, as well as, water too does not get pulled.
3.	For the transportation of the Company's vehicles condition of the roads is bad.	The condition of the roads has worsened. It has been repaired, too. Besides shorter roads have been constructed by the Company, which are being used by the villagers to go from one village to another.
4.	In regard to the development of the villages, contribution by the TPCL.	After commencement of the Wind Mills, TPCL will organize medical check-up camps as well as distribute notebooks in the village schools under the Corporate Responsibility Mission.

5.	In regard to the provision of services as aforesaid in the current project.	It is under the consideration of the TPCL.
6.	What benefit accrues after Wind Mill is brought?	Local employment and revenue to village Gram Panchayat which will be used for rural development purpose. Wages become available. Roads are developed. Sub-contractors get work. This way, sources of income are generated.
7.	Can we set up more Wind Mills (1000 Mega Watts) or not?	Yes, it will increase benefits in terms of employment generation and related business
8.	Changes are caused in atmosphere by Wind Mills.	No direct or indirect impact on atmosphere. Rotation of Wind Mills causes noise. Efforts should be made to reduce it.
9.	Damage caused to grains/crops by the Wind Mills.	No damage to any crop.
10.	How does Wind Mill affect the life?	Doesn't have any negative impact on life. Inquisitiveness of the villagers increases. It is requested that a small model may be placed in the Gram Panchayat.
11.	Will setting up of Wind Mills enhance daily wages.	Yes, daily wages are increased due to sustainable business model of wind farms along with better working conditions.
12.	Can Cattles go closer to the Wind Mills for grazing.	Yes, cows may go closer to the Wind Mills for grazing.
13.	Trees, etc are required to be cut for paving roads.	Tree Plantation activities will be held.
14.	A problem of blowing dust has increased due to Wind Mills.	Dust is blown by the movements of large vehicles. Hence, good roads should be made.

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

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

E.3. Report on consideration of comments received

>>

No account of the comments was taken as all the received comments were positive.

SECTION F. Approval and authorization

>>

Project activity approval has been obtained from National CDM Authority as DNA of India vide Letter number: 04/19/2009-CCC dated 20/01/2010.

- - - - -

Appendix 1: Contact information of project participants

Organization name	The Tata Power Company Limited
Street/P.O. Box	34, Sant Tukaram Road, Carnac Bunder
Building	Business Development Department, Corporate Center'A' Block
City	Mumbai
State/Region	Maharashtra
Postcode	400009
Country	India
Telephone	+91 22 67171207
Fax	+91 22 66658626
E-mail	rahulshah@tatapower.com
Website	www.tatapower.com
Contact person	
Title	Vice President Business Development
Salutation	Mr.
Last name	Shah
Middle name	
First name	Rahul
Department	Business Development
Mobile	+91 9223301139
Direct fax	+91 22 66658626
Direct tel.	+ 91 67171207
Personal e-mail	rahulshah@tatapower.com

Appendix 2: Affirmation regarding public funding

The project activity does not involve any public funding.

Appendix 3: Applicability of selected methodology

Detailed applicability condition for the selected methodology is provided in section B.2.

Appendix 4: Further background information on ex ante calculation of emission reductions

Refer section B.6.1 for details of emission reduction calculation.

Appendix 5: Further background information on monitoring plan

The detailed monitoring plan is as provided in Section B.7.2.

Appendix 6: Summary of post registration changes

The following changes have been made in the registered PDD. The details about where the changes are incorporated in the revised PDD (post registration) with reference to registered PDD is given in the table below. The revised PDD in VVS is being submitted for approval from EB.

Sl No	Changes done	Reference	
		Registered PDD	Revised PDD
01	The geo co-ordinates of WEC number TATASP-07 and TATASP08 is corrected	• Section A.4.1.4	• Section A.2.4
02	The reference to WTG unique identification numbers is changed from Appendix 2 to Annex II	• Section A.4.1.4	• Section A.2.4
03	The reference to total installed capacity is changed from Annex 3 to Annex I	• Section B.4	• Section B.4
04	The measurement method of the parameter EG_y is changed to 'Measured and Calculated' from 'Calculated'	• Section B.7.1	• Section B.7.1
05	Energy meter calibration frequency is changed to 'once in 3 years' from 'annually'	• Section B.7.1	• Section B.7.1
06	The metering single line diagram is changed	• Section B.7.3	• Section B.7.3
07	The reference to stakeholders meeting recordings and meeting minutes is changed from Appendix 3 to Annex III	• Section E.1	• Section E.1

Annex I

ALL INDIA INSTALLED CAPACITY (IN MW) OF POWER STATIONS LOCATED IN THE REGIONS OF MAIN LAND AND ISLANDS

As on 31.03.07

State	Ownership Sector	Modewise breakup						RES	Grand Total
			Thermal			Total			
		Hydro	Coal	Gas	Diesel	Thermal	Nuclear		
Northern Region	State	6712.18	10977.50	1011.20	14.99	12003.69	0.00	247.87	18963.74
	Private	790.20	0.00	0.00	0.00	0.00	0.00	565.50	1355.70
	Central	5498.00	7050.00	2311.99	0.00	9361.99	1180.00	0.00	16039.99
	Sub Total	**13000.38**	**18027.50**	**3323.19**	**14.99**	**21365.68**	**1180.00**	**813.37**	**36359.43**
Western Region	State	5458.33	14791.50	1390.72	17.28	16199.50	0.00	69.56	21727.39
	Private	460.50	2290.00	1658.00	0.20	3948.20	0.00	1805.20	6213.90
	Central	1000.00	5360.00	2772.00	0.00	8132.00	1840.00	0.00	10972.00
	Sub Total	**6918.83**	**22441.50**	**5820.72**	**17.48**	**28279.70**	**1840.00**	**1874.76**	**38913.29**
Southern Region	State $	10956.26	7572.50	735.80	362.52	8670.82	0.00	557.50	20184.58
	Private	55.45	510.00	2500.50	576.80	3587.30	0.00	4414.05	8056.80
	Central	0.00	8090.00	350.00	0.00	8440.00	880.00	0.00	9320.00
	Sub Total	**11011.71**	**16172.50**	**3586.30**	**939.32**	**20698.12**	**880.00**	**4971.55**	**37561.38**
Eastern Region	State	2292.53	5448.50	100.00	17.06	5565.56	0.00	46.56	7904.65
	Private	0.00	1441.38	0.00	0.14	1441.52	0.00	0.20	1441.72
	Central	204.00	7260.00	90.00	0.00	7350.00	0.00	0.00	7554.00
	Sub Total	**2496.53**	**14149.88**	**190.00**	**17.20**	**14357.08**	**0.00**	**46.76**	**16900.37**
North Eastern Region	State	361.07	330.00	372.00	142.74	844.74	0.00	48.91	1254.72
	Private	0.00	0.00	24.50	0.00	24.50	0.00	0.00	24.50
	Central	860.00	0.00	375.00	0.00	375.00	0.00	0.00	1235.00
	Sub Total	**1221.07**	**330.00**	**771.50**	**142.74**	**1244.24**	**0.00**	**48.91**	**2514.22**
Islands	State	5.25	0.00	0.00	50.02	50.02	0.00	5.25	60.52
	Private	0.00	0.00	0.00	20.00	20.00	0.00	0.00	20.00
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub Total	**5.25**	**0.00**	**0.00**	**70.02**	**70.02**	**0.00**	**5.25**	**80.52**
ALL INDIA	State	25785.62	39120.00	3609.72	604.61	43334.33	0.00	975.65	70095.60
	Private	1306.15	4241.38	4183.00	597.14	9021.52	0.00	6784.95	17112.62
	Central	7562.00	27760.00	5898.99	0.00	33658.99	3900.00	0.00	45120.99
	Total	**34653.77**	**71121.38**	**13691.71**	**1201.75**	**86014.84**	**3900.00**	**7760.60**	**132329.21**

Renewable Energy Sources (RES) includes SHP, BG, BP, U&I, and Wind Energy

Abbreviation:---- SHP=Small Hydro Project, BG=Biomass Gasifier, BP=Biomass Power, U&I=Urban & Industrial Waste Power, RES=Renewable Energy Sources

Note :

(i) * The capacity of Renewable Energy Sources including Small hydro projects(SHP below 25 MW) is 8841.55 MW comprising of 1975.60 MW of SHP Capacity. The common capacity of 1070.95 MW has been considered under Hydro capacity thus balance capacity of SHP of 904.65 MW forms part of RES.The capacity additionin in respect of RES for 2006-07 has been considered however, the Region/State/Sectorwise part details are still awaited from MNRES .

(ii) The Shares of Dulhasti H E P (NHPC) are proposed shares, still to be approved.

(iii) Figures at second place of decimal may not tally due to rounding off by computer

Reference1: All India Installed Capacity as on 31-03-1007

Source: **http://www.cea.nic.in/power_sec_reports/Executive_Summary/2007_03/22-28.pdf**

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN WESTERN REGION
INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES

As on 31.03.07

State	Ownership Sector	Modewise breakup						RES	Grand Total
			Thermal			Total			
		Hydro	Coal	Gas	Diesel	Thermal	Nuclear		
Goa	State	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
	Private	0.00	0.00	48.00	0.00	48.00	0.00	0.00	48.00
	Central	0.00	269.03	0.00	0.00	269.03	0.00	0.00	269.03
	Sub-Total	**0.00**	**269.03**	**48.00**	**0.00**	**317.03**	**0.00**	**0.05**	**317.08**
Daman & Diu	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	11.04	4.13	0.00	15.17	1.98	0.00	17.15
	Sub-Total	**0.00**	**11.04**	**4.13**	**0.00**	**15.17**	**1.98**	**0.00**	**17.15**
Gujarat	State *	777.00	4429.00	478.72	17.28	4925.00	0.00	19.30	5721.30
	Private	0.00	640.00	1430.00	0.20	2070.20	0.00	389.00	2459.20
	Central	0.00	1067.89	417.40	0.00	1485.29	825.00	0.00	2310.29
	Sub-Total	**777.00**	**6136.89**	**2326.12**	**17.48**	**8480.49**	**825.00**	**408.30**	**10490.79**
Madhya Pradesh	State	1724.67	2157.50	0.00	0.00	2157.50	0.00	17.26	3899.43
	Private	13.50	0.00	0.00	0.00	0.00	0.00	59.00	72.50
	Central	1000.00	1330.60	252.91	0.00	1583.51	92.88	0.00	2676.39
	Sub-Total	**2738.17**	**3488.10**	**252.91**	**0.00**	**3741.01**	**92.88**	**76.26**	**6648.32**
Chhatisgarh	State	125.00	1530.00	0.00	0.00	1530.00	0.00	13.05	1668.05
	Private	0.00	0.00	0.00	0.00	0.00	0.00	19.50	19.50
	Central	0.00	210.00	0.00	0.00	210.00	0.00	0.00	210.00
	Sub-Total	**125.00**	**1740.00**	**0.00**	**0.00**	**1740.00**	**0.00**	**32.55**	**1897.55**
Maharastra	State	2831.66	6675.00	912.00	0.00	7587.00	0.00	19.90	10438.56
	Private	447.00	1650.00	180.00	0.00	1830.00	0.00	1337.70	3614.70
	Central	0.00	1658.05	1877.28	0.00	3535.33	852.06	0.00	4387.39
	Sub-Total	**3278.66**	**9983.05**	**2969.28**	**0.00**	**12952.33**	**852.06**	**1357.60**	**18440.65**
Dadra & Nagar Haveli	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	13.04	26.61	0.00	39.65	1.98	0.00	41.63
	Sub-Total	**0.00**	**13.04**	**26.61**	**0.00**	**39.65**	**1.98**	**0.00**	**41.63**
	Central - Unallocated	0.00	800.35	193.67	0.00	994.02	66.10	0.00	1060.12
Total western Region	State	5458.33	14791.50	1390.72	17.28	16199.50	0.00	69.56	21727.39
	Private	460.50	2290.00	1658.00	0.20	3948.20	0.00	1805.20	6213.90
	Central	1000.00	5360.00	2772.00	0.00	8132.00	1840.00	0.00	10972.00
	Grand Total	**6918.83**	**22441.50**	**5820.72**	**17.48**	**28279.70**	**1840.00**	**1874.76**	**38913.29**

Reference2: Installed capacity of Western Regional Grid as on 31.03.2007

Source: **http://www.cea.nic.in/power_sec_reports/Executive_Summary/2007_03/22-28.pdf**

Reference 3: Wind Power Potential in various states of India
Source: http://mnes.nic.in/booklets/Book6-h.pdf

State	*Gross potential* (MW)
Andhra Pradesh	8275
Gujarat	9675
Karnataka	6620
Kerala	875
Madhya Pradesh	5500
Maharashtra	3650
Orissa	1700
Rajasthan	5400
Tamil Nadu	3050
West Bengal	450
Total	**45195**

Reference 4: Installed capacity of wind power in various Indian states as on 31.12.2007
Source: http://mnes.nic.in/annualreport/2007_2008_English/Chapter%205/chapter%205_1.htm

State-wise & Year-Wise Wind Power Installed Capacity (MW)

(Upto 31.12.2007)

	Upto 31.03.2002	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	Total
Andhra Pradesh	93.2	0.0	6.2	21.8	0.5	0.8	0.0	122.5
Gujarat	181.4	6.2	28.9	51.5	84.6	284.0	238.2	874.8
Karnataka	69.3	55.6	84.9	201.5	143.8	266.0	96.1	917.2
Kerala	2.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Madhya Pradesh	23.2	0.0	0.0	6.3	11.4	16.4	13.0	70.3
Maharashtra	400.3	2.0	6.2	48.8	545.1	485.3	158.6	1646.3
Rajasthan	16.1	44.6	117.8	106.3	73.3	111.8	25.9	495.7
Tamil Nadu	877.0	133.6	371.2	675.5	857.6	577.9	218.8	3711.6
Others	4.3	0.0	0.0	0.0	0.0	0.0	0.0	4.3
Total	1666.8	242.0	615.2	1111.7	1716.2	1742.1	750.6	7844.5

Reference 5: Central Electricity Authority CO2 Baseline Database for the Indian Power Sector;
Source: http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE										
VERSION			**5.0**							
DATE			**November 09**							
BASELINE METHODOLOGY			**ACM0002 / Ver 13.0.0**	**and "Tool to Calculate the Emission Factor for an Electricity System", Version 02.2.1**						
EMISSION FACTORS										
Weighted Average Emission Rate (tCO2/MWh) (excl. Imports)						**Weighted Average Emission Rate (t CO_2/MWh) (incl. Imports)**				
	2005-06	2006-07	2007-08	2008-09			2005-06	2006-07	2007-08	2008-09
NEWNE	0.84	0.83	0.82	0.84		NEWNE	0.84	0.82	0.81	0.83
South	0.73	0.72	0.72	0.75		South	0.73	0.72	0.72	0.76
India	0.82	0.80	0.80	0.82		India	0.81	0.80	0.79	0.82
Simple Operating Margin (t CO_2/MWh) (excl. Imports)						**Simple Operating Margin (tCO2/MWh) (incl. Imports)**				
	2005-06	2006-07	2007-08	2008-09			2005-06	2006-07	2007-08	2008-09
NEWNE	1.02	1.02	1.01	1.02		NEWNE	1.02	1.01	1.00	1.01
South	1.01	1.00	0.99	0.97		South	1.01	1.00	0.99	0.97
India	1.02	1.01	1.01	1.01		India	1.02	1.01	1.00	1.00
Build Margin (tCO2/MWh) (excl. Imports)						**Build Margin (tCO2/MWh) (not adjusted for imports)**				
	2005-06	2006-07	2007-08	2008-09			2005-06	2006-07	2007-08	2008-09
NEWNE	0.67	0.63	0.60	0.68		NEWNE	0.67	0.63	0.60	0.68

South	0.71	0.70	0.71	0.82		South	0.71	0.70	0.71	0.82
India	0.68	0.65	0.63	0.71		India	0.68	0.65	0.63	0.71
Combined Margin (tCO2/MWh) (excl. Imports)						**Combined Margin in tCO2/MWh (incl. Imports)**				
	2005-06	2006-07	2007-08	2008-09			2005-06	2006-07	2007-08	2008-09
NEWNE	0.85	0.82	0.80	0.85		NEWNE	0.85	0.82	0.80	0.84
South	0.86	0.85	0.85	0.89		South	0.86	0.85	0.85	0.90
India	0.85	0.83	0.82	0.86		India	0.85	0.83	0.81	0.86

Annex II

Details of wind machines under project activity

Project Name – Tata Power - Wind power project at Samana in Jamnagar district,Gujarat			
Total Project Capacity -50.4 MW		**Total WEC's in Project – 63 nos**	
Name of Taluka	**Name of Village**	**No. of WEC**	**Unique Identification of WECs**
Kalavad	Dhun Dhoraji	09	EIL/800/08-09/01220 EIL/800/08-09/01221 EIL/800/08-09/01312 EIL/800/08-09/01313 EIL/800/08-09/01340 EIL/800/08-09/01341 EIL/800/08-09/01342 EIL/800/08-09/01343 EIL/800/08-09/01464
	Mota Paanchdevada	25	EIL/800/08-09/01222 EIL/800/08-09/01223 EIL/800/08-09/01224 EIL/800/08-09/01225 EIL/800/08-09/01226 EIL/800/08-09/01227 EIL/800/08-09/01228 EIL/800/08-09/01229 EIL/800/08-09/01230 EIL/800/08-09/01231 EIL/800/08-09/01232 EIL/800/08-09/01233 EIL/800/08-09/01234 EIL/800/08-09/01330 EIL/800/08-09/01334 EIL/800/08-09/01335 EIL/800/08-09/01336 EIL/800/08-09/01337 EIL/800/08-09/01338 EIL/800/08-09/01339 EIL/800/08-09/01391 EIL/800/08-09/01392 EIL/800/08-09/01465 EIL/800/08-09/01467 EIL/800/08-09/01468
	Nana Paanchdevada	01	EIL/800/08-09/01333
Jamjodhpur	Sadodar	15	EIL/800/08-09/1235 EIL/800/08-09/01236 EIL/800/08-09/01237 EIL/800/08-09/01238 EIL/800/08-09/01239 EIL/800/08-09/01240 EIL/800/08-09/01241 EIL/800/08-09/01242 EIL/800/08-09/01243 EIL/800/08-09/01397 EIL/800/08-09/01244 EIL/800/08-09/01394 EIL/800/08-09/01395 EIL/800/08-09/01393 EIL/800/08-09/1396
	Narmana	01	EIL/800/08-09/01247

	Dal Devaliya	12	EIL/800/08-09/01245 EIL/800/08-09/01246 EIL/800/08-09/01322 EIL/800/08-09/01323 EIL/800/08-09/01324 EIL/800/08-09/01325 EIL/800/08-09/01326 EIL/800/08-09/01327 EIL/800/08-09/01328 EIL/800/08-09/01329 EIL/800/08-09/01331 EIL/800/08-09/01332

Annex III

Documents of Stakeholder Consultation

A) Questions / Answers with the Villagers

1) What is the benefit of Wind Mills to the villagers and the society?

Electricity is produced by Wind Mills. It enhances the capacity of local substation. This way, requirement of the village gets fulfilled.

2) How much deep are the pits / bores for earthing?

6 to 7 feet. These do not cause any damage, as well as, water too does not get pulled.

3) For the transportation of the Company's vehicles condition of the roads is bad.

The condition of the roads has worsened. It has been repaired, too. Besides shorter roads have been constructed by the Company, which are being used by the villagers to go from one village to another.

4) In regard to the development of the villages, contribution by the TPCL.

After commencement of the Wind Mills, TPCL will organize medical check-up camps as well as distribute notebooks in the village schools under the Corporate Responsibility Mission.

5) In regard to the provision of services as aforesaid in the current project.

It is under the consideration of the TPCL.

6) What benefit accrues after Wind Mill is brought?

Wages become available. Roads are developed. Sub-contractors get work. This way, sources of income are generated.

7) Can we set up more Wind Mills (1000 Mega Watts) or not?

Yes, it will benefit in earning more daily wages.

8) Changes are caused in atmosphere by Wind Mills.

Rotation of Wind Mills causes noise. Efforts should be made to reduce it.

9) Damage caused to grains/crops by the Wind Mills.

No, no damage is caused.

10) How does Wind Mill affect the life?

Inquisitiveness of the villagers increases. It is requested that a small model may be placed in the Gram Panchayat.

11) Setting up of Wind Mills have enhanced daily wages.

Yes, daily wages are increased by working in security and labour work.

12) Cattles can go closer to the Wind Mills for grazing.

Yes, cows may go closer to the Wind Mills for grazing.

13) Trees, etc are required to be cut for paving roads.

Tree Plantation activities will be held.

14) A problem of blowing dust has increased due to Wind Mills.

Dust is blown by the movements of large vehicles. Hence, good roads should be made.

B) Signed attendance sheet (in local language)

નંબર	નામ	સહી	ગામનુ નામ
(1)	[illegible]	B. T. Ajndic	[illegible]
(2)	[illegible]	[illegible]	[illegible]
(3)	[illegible]	[illegible]	[illegible]
(4)	[illegible]	[illegible]	[illegible]
(5)	[illegible]	[illegible]	[illegible]
(6)	[illegible]	[illegible]	[illegible]
(7)	[illegible]	[illegible]	[illegible]
(8)	[illegible]	[illegible]	[illegible]
(9)	[illegible]	[illegible]	[illegible]
(10)	[illegible]	[illegible]	[illegible]
(11)	[illegible]	[illegible]	[illegible]
(12)	[illegible]	[illegible]	[illegible]
13)	[illegible]	[illegible]	[illegible]
14)	[illegible]	[illegible]	[illegible]
15)	[illegible]	[illegible]	[illegible]
16)	[illegible]	[illegible]	[illegible]
17)	[illegible]	[illegible]	[illegible]
18)	[illegible]	D.S. Jadeja	[illegible]
19)	[illegible]	[illegible]	[illegible]

ક્રમાંક	નામ	સહી.	હોદ્દો.
(20)	Mohanbhai R. Sanghani	Sanghani	
(21)	કેશવ કાર ગોકુળ કાર	કેશવ ગોકુળ	
(22)	ગરધરા કાંતિભાઈ કાળાભાઈ		
(23)	R R Ayer		
(24)	Rahul R. Hirwe		
(25)	Bharatbhai A. Jathal		
26	Rajeev L. Trivedi		
27	Mayur V Dave		
28	Ashish D. Jikar		
29	Chauhan Paresh A.		
30	Anmol Payeelan		
31	Rushit M Vaishnav		

C) Stakeholder Meeting Photographs


TATA POWER
TATA
Local Stakeholder Consultation Meet on
Clean Development Mechanism (CDM) Initiative
for
Samana Pallej, Gujarat
Time : 11 am
Date : 29th May,2008

- - - - -

History of the document

Version	Date	Nature of revision
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.
04.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the project design document form for CDM project activities" (EB 66, Annex 8).
03	EB 25, Annex 15 26 July 2006	
02	EB 14, Annex 06b 14 June 2004	
01	EB 05, Paragraph 12 03 August 2002	Initial adoption.
Decision Class: Regulatory **Document Type:** Form **Business Function:** Registration		