

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

CONTENTS

- A. General description of the small scale project activity
- B. Application of a baseline and monitoring methodology.
- C. Duration of the project activity / crediting period
- D. Environmental impacts
- E. Stakeholders' comments

Annexes

- Annex 1: Contact information on participants in the proposed small scale project activity
- Annex 2: Information regarding public funding
- Annex 3: Baseline information
- Annex 4: Monitoring Information
- Appendix A : WTG location details

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	<ul style="list-style-type: none">• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document.• As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at http://cdm.unfccc.int/Reference/Documents.
03	22 December 2006	<ul style="list-style-type: none">• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity**A.1 Title of the small-scale project activity:**

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“6.3 MW Bundled Wind Power Project in Western Region of India”**A.2. Description of the small-scale project activity:**

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The project activity being considered here uses renewable energy in the form of wind to generate electricity for the western region grid of India. It consists of a seven Wind Turbine Generators (WTGs) of different rated capacities from 600 KW to 1250 KW belonging to various textile companies. These companies are bound by a common commitment to environment and specific attributable action against climate change.

This bundled renewable energy project brings together seven companies located in the states of Gujarat and Maharashtra as illustrated further in this document. These companies have managed to carve a niche in the market with their range of specialty products. Colourtex Industries Ltd. has been appointed as the coordinators for this bundled renewable energy project vide power of attorney letters from each of the other participating companies.

This renewable energy project activity brings together seven companies with one WTG each. Five of these seven WTGs are located in the state of Gujarat and the other two are in Maharashtra. Hence this bundled project activity comprises of two sub-bundles as under:

Sub-bundle 1

Owner	WTG Model	Installed Capacity (MW)	Technology	District	State
Colourtex Industries Ltd.	NM – 48	0.750	NEG Micon (P) Ltd.	Kutch	Gujarat
Shahlon Industries (P)Ltd	S – 52	0.60	Suzlon Energy Ltd.	Kutch	Gujarat
Fairdeal Filaments Ltd	S - 52	0.60	Suzlon Energy Ltd.	Kutch	Gujarat
T.A Textiles	S - 66	1.25	Suzlon energy Ltd.	Jamnagar	Gujarat
M.S Synthetics	S - 52	0.6	Suzlon Energy Ltd.	Jamnagar	Gujarat
Total		3.8			

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Sub-bundle 2

Owner	WTG Model	Installed Capacity (MW)	Technology	District	State
Mehratex India (P) Ltd	S - 70	1.25	Suzlon Energy (P) Ltd.	Nandurbar	Maharashtra
Beekaylon Synthetics (P) Ltd.	S - 70	1.25	Suzlon Energy (P) Ltd.	Dhule	Maharashtra
Total		2.5			

Hence, the total capacity of the bundled project is 6.3 MW. As the resource input needed for power production from these WTGs is Wind, which is renewable, the project emissions on account of power generation from this bundled project is nil.

Contribution to Sustainable Development:

Ministry of Environment & Forests, has stipulated the following indicators for sustainable development in the interim approval guidelines for Indian CDM projects. The project complies with the stipulations as under:

Social well-being:

Activities such as site preparation, construction, building, operation and maintenance etc required significant amount of skilled and unskilled manpower. This has (and still is) resulted in significant employment generation. Furthermore, as the locations of some of the WTGs incorporated in this bundled project are in the remotest areas, it is a great opportunity for people in the interiors to come face to face with state of the art modern technologies. This will surely lead to capacity building in terms of technical knowledge and long-term skills.

Economic well-being:

The renewable energy project will supply electricity to the grid thereby not only reducing the load on an already deficit electricity grid but also result in an indirect saving of non-renewable fossil fuels such as coal that are consumed by thermal power stations. In addition, the generation of employment opportunities also promotes the Economic well-being of the region. Lastly, the development of infrastructure of the region is imminent as such WTGs, riding on their success will invite more investments for the region.

Environmental well-being:

This is the fundamental intent behind the project activity. All the participants of the project activity had desired to produce electrical power, by using renewable resources, the utilisation or consumption of which would not create environmental pollution. As such, not only does the project avoid any GHG emissions, but also avoids any form of pollution.

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Technological well-being:

This project activity incorporates WTGs that have rated outputs ranging from 600 KW to 1.25 MW. Moreover, although the technology for each of them is more or less similar, these WTGs are placed in different locations. Since, the parameters such as Wind densities, wind speeds and ‘swept-areas’ of rotors are different in each case, the project activity will also yield very useful data in terms of plant load factors (PLFs) achieved in each case. These data will be very useful to technology providers, project participants, developers, wind power enthusiasts and students etc., the analysis of which may help in bringing about further improvements in technology.

A.3. Project participants:

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Name of the Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) Project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Govt. of India (Host Party)	1. Colourtex Industries Ltd.	No

A.4. Technical description of the small-scale project activity:**A.4.1. Location of the small-scale project activity:**

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A.4.1.1. Host Party(ies):

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India

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

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The Wind Turbines are installed in the states of Gujarat and Maharashtra in Western part of India.

A.4.1.3. City/Town/Community etc:

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The bundled project activity comprises of WTGs located in the states of Gujarat and Maharashtra in India. The location details are as under:

- Sub-bundle 1**

WEG Owner	WEG Location	Survey No.	Village/ Region	Taluka	District	State	Reference
Colourtex Industries Ltd.	W - 1	868/9	Shikarpur	Bachau	Kutch	Gujarat	1
Shahlon	M – 127	904/2	Suthari	Abdasa	Kutch	Gujarat	2

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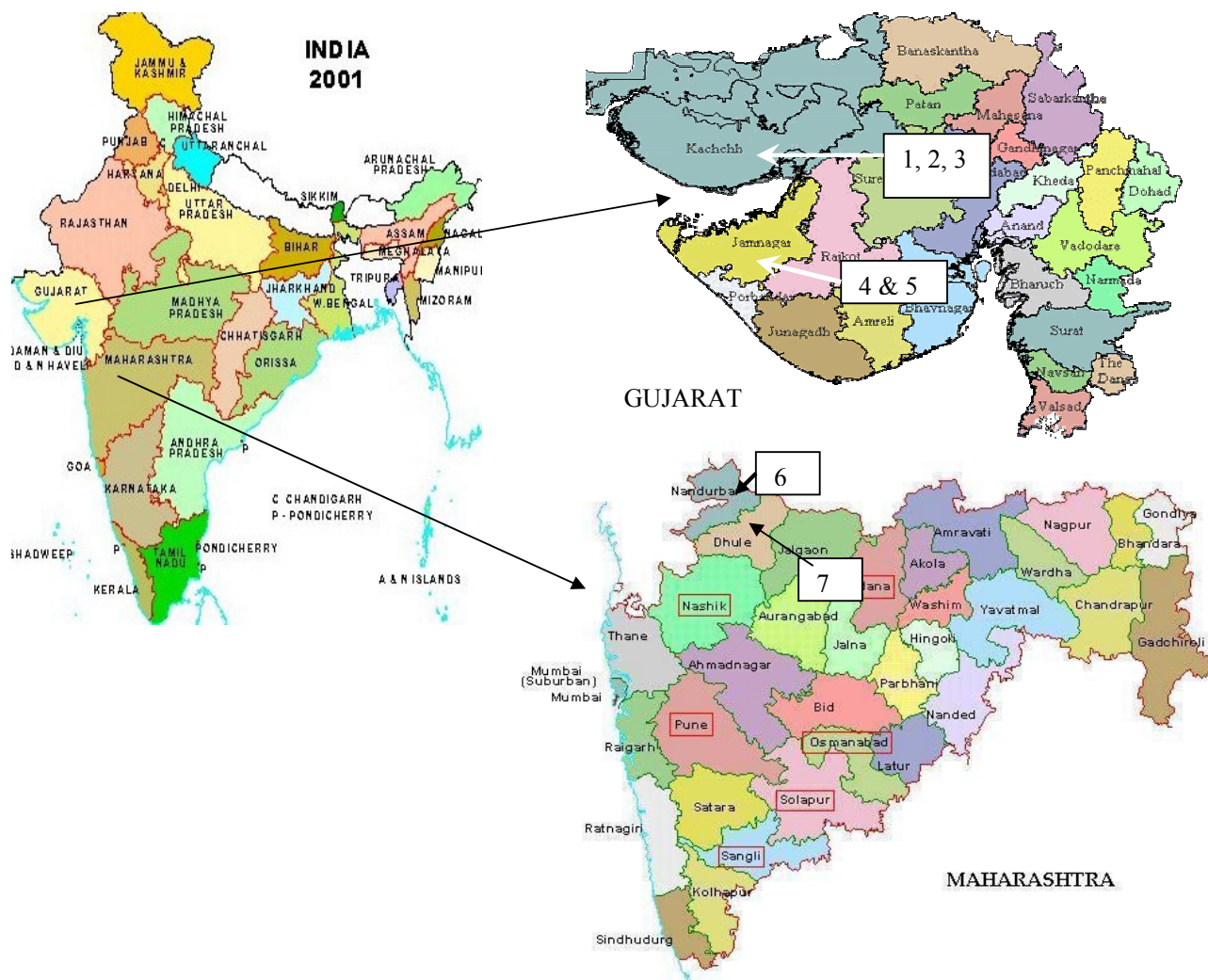
WEG Owner	WEG Location	Survey No.	Village/ Region	Taluka	District	State	Reference
Industries (P) Ltd.							
Fairdeal Filaments Ltd	M – 125	17/2	Suthri	Abdasa	Kutch	Gujarat	3
T.A Textiles	B – 69	415 (plot no 11/p)	Lamba	Kalyan pur	Jamnagar	Gujarat	4
M.S Synthetics	B – 102	1/p	Gandhvi	Kalyan pur	Jamnagar	Gujarat	5

- Sub-bundle 2

WEG Owner	WEG Location	Survey No.	Village/ Region	Taluka	District	State	Reference
Mehratex India (P) Ltd	K- 533	182/2	Akrale	Nandurbar	Nandurbar	Maharashtra	6
Beekaylon Synthetics (P) Ltd	K – 225	79	Korde	Sakri	Dhule	Maharashtra	7

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

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

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Project has applied approved methodologies available for small-scale CDM project at UNFCCC website under Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Project type & category:
Type I: Renewable Energy Projects
Category D: Grid Connected *Renewable Electricity Generation*

Version 13,

EB 36

The project activity may principally be categorized in Scope Number 1, Sectoral Scope - Energy industries (renewable/ nonrenewable sources).

The aggregated installed capacity of this project activity is 6.3 MW. Hence, it conforms to the criteria specified under Appendix B of the Simplified Modalities and Procedures for Small Scale CDM project activities.

Technical details of Wind Turbine Generators are as under:

Sr. no.	Item	Description
1.	Make	NEG Micon
2.	Model no.	NM 48/750
3.	Rating in kW	750
4.	Rotor diameter	48.2 m
5.	Cut-in wind speed	3.5 m/s
6.	Cut out wind speed	25m/s
7.	Maximum rotational speed	22.2 rpm
8.	Tower Type	Conical modular tower, 24 edged
9.	Height	53.6 m
10.	Rotational speed (Synchronous)	22.2/14.8 rpm
11.	Rotor position	Upwind
12.	Nominal power	750 kW
13.	Hub height:	55 m

Sr. no.	Item	Description
1.	Make	Suzlon
2.	Model no.	S52
3.	Rating in kW	600
4.	Rotor Type	3 bladed, horizontal axis
5.	Rotor diameter	52 m
6.	Rotor Swept area	2124 m ²
7.	Cut-in wind speed	3.5 m/s
8.	Rated wind speed	12 m/s
9.	Cut-out wind speed	25 m/s
10.	Rotation speed	1500 RPM

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11.	Regulation	Pitch-Regulated
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Sr. no.	Item	Description
1.	Make	Suzlon
2.	Model no.	S70
3.	Rating in kW	1250
4.	Rotor Type	3 bladed, horizontal axis
5.	Rotor diameter	69.1 m
6.	Rotor Swept area	3750 m ²
7.	Cut-in wind speed	3 m/s
8.	Rated wind speed	12 m/s
9.	Cut-out wind speed	20 m/s
10.	Rotation speed	1010/1515rpm RPM
11.	Regulation	Pitch-Regulated

Sr. no.	Item	Description
1.	Make	Suzlon
2.	Model no.	S66
3.	Rating in kW	1250
4.	Rotor Type	3 bladed, horizontal axis
5.	Rotor diameter	66m
6.	Rotor Swept area	3241 m ²
7.	Cut-in wind speed	3 m/s
8.	Rated wind speed	14 m/s
9.	Cut-out wind speed	22 m/s
10.	Regulation	Pitch-Regulated

Furthermore, as this project activity bundles WTGs, which are renewable energy generation units and supplies electricity to/ displaces electricity from the regional grid that are mainly fossil fuel-fired, the applicable methodology is AMS I. D.

NEG Micon (P) Ltd. is the technology supplier for Colourtex Industries Ltd. whereas; Suzlon Energy Ltd. is the technology supplier for all the other project participants.

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

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For Sub-bundle 1 (3.8 MW):

Year	Annual estimation of Emission Reduction in t- CO₂e
2008-2009	7706
2009-2010	7706
2010-2011	7706
2011-2012	7706
2012-2013	7706
2013-2014	7706
2014-2015	7706
2015-2016	7706
2016-2017	7706
2017-2018	7706
Total estimated reductions (tonnes of CO ₂ e)	77060
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO ₂ e)	7706

For sub-bundle 2 (2.5 MW):

Year	Annual estimation of Emission Reduction in t- CO₂e
2008-2009	4120
2009-2010	4120
2010-2011	4120
2011-2012	4120
2012-2013	4120
2013-2014	4120
2014-2015	4120
2015-2016	4120
2016-2017	4120
2017-2018	4120
Total estimated reductions (tonnes of CO ₂ e)	41200
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO ₂ e)	4120

For the Bundled Project Activity of 6.3 MW

Total chosen crediting period is 10 years	
Years	Annual estimation reductions in tonnes of CO ₂ e
2008-2009	11827
2009-2010	11827
2010-2011	11827
2011-2012	11827
2012-2013	11827
2013-2014	11827
2014-2015	11827
2015-2016	11827
2016-2017	11827
2017-2018	11827
Total estimated reductions (tonnes of CO ₂ e)	11827
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO ₂ e)	11827

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

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Public funding such as grants from official development funds is not involved in this project activity

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

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As mentioned under *Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project Activities*, the following results into debundling of large CDM project:

“A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

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

With reference to points of de-bundling, none of the aforementioned conditions are applicable to the project activity and, therefore, the project activity is considered as small scale CDM project activity.

SECTION B. Application of a baseline and monitoring methodology

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

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Project has applied approved methodology available for small-scale CDM project at UNFCCC website under Appendix B of the simplified modalities and procedures for small-scale CDM project activities

Type I: Renewable Energy Projects

Category D: Grid connected renewable electricity generation

Reference:

I.D./Version 13

Scope: 1

EB36.

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

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The project activity involves generation of electricity by the means of renewable energy, wind. The project activity falls under the small scale projects. The methodology chosen for the project activity and its applicability to the project activity is discussed below.

Type I: Renewable Energy Projects

Category D: Grid Connected Renewable Electricity Generation

The chosen project category of the project activity is :

Project Category: I D. Grid connected renewable electricity generation

The choice of the project category is justified below:

Methodology	Proposed Project Activity	Justification
This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.	The project activity is electricity generation using wind which is a renewable energy source, which supplies to the state electricity board/or is connected to the state grid.	Since project activity involves renewable energy generation unit that supply electricity to an electricity distribution system (Western Regional Grid) that is mainly supplied by at least one fossil fuel fired generating unit, hence this applicability condition is satisfied.
If the unit added has both renewable and non-renewable components (e.g.. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not	The installed capacity of the project activity is 6.3 MW.	Since the installed capacity of the project activity is less than the 15 MW, hence this applicability condition is satisfied.

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exceed the limit of 15 MW		
Combined heat and power (co-generation) systems are not eligible under this category. Biomass combined heat and power (co-generation) systems that supply electricity to and/or displace electricity from a grid are included in this category. To qualify under this category, the sum of all forms of energy output shall not exceed 45 MW thermal e.g. for a biomass based co-generating system the rating for all the boilers combined shall not exceed 45 MW thermal	In this project activity only power generation is involved.	Since no cogeneration is involved in the project activity, this condition is not applicable to the project activity.
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	This is a new project activity and does not involve addition to any existing facility.	Since the project activity does not involve addition to any existing renewable power generation facility, this applicability condition is not relevant.
Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	There is no existing facility in the project activity.	Since there is no existing facility hence this condition is not applicable to the project activity.

Since the project activity meets all the applicability criteria as required by the project category the choice of the project category AMS- ID, version 13 is justified.

B.3. Description of the project boundary:

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According to the methodology, the project boundary encompasses the physical, geographical site of the renewable generation source.

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The project boundary encompasses the physical, geographical site of the 6.3 MW project activity at the project location as specified in Section A.4.1.4 above. It includes the wind turbine installations and pooling and the sub-stations.

	Source	Gas	Included/ Excluded	Justification/Explanation
B a s e l i n e	Fossil fuel fired power plants connected to the grid	CO ₂	Included	Main emission source
		CH ₄	Excluded	Excluded.
		N ₂ O	Excluded	Excluded.
P r o j e c t A c t i v i t y	Electricity generation through wind energy	CO ₂	Excluded	The project activity is renewable energy project which will not create any emissions itself.
		CH ₄	Excluded	The project activity is renewable energy project which will not create any emissions itself.
		N ₂ O	Excluded	The project activity is renewable energy project which will not create any emissions itself.

B.4. Description of baseline and its development:

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As per the methodology AMS I.D, the applicable baseline scenario for the project activity is:

For all other systems, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh) calculated in a transparent and conservative manner as:
(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002. Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered
 OR

(b) The weighted average emissions (in kg CO₂e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

The emission reductions occur as the project activity generates electricity by the renewable energy, wind energy, which displaces electricity generation from the fossil fuel based power plants. The electricity thus generated from the aggregated 6.3 MW WEG in the states of Gujarat and Maharashtra replaces GHG intensive power generated in the western regional grid.

In the absence of the project activity the equivalent amount of electricity would have been generated by the operation of grid connected power plants that are predominantly GHG intensive Thermal power plants. The Project activity will thus reduce the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation.

Hence the emissions in the baseline scenario would be the emissions from the equivalent amount of electricity generated by the prevailing generation mix of the grid.

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Baseline Emissions:

$$BE_y = EG_y \cdot EF_y$$

EG_y = electricity produced by the renewable generating unit (MWh)

EF_y = Emission Factor of the grid (tCO₂/MWh)

The grid emission factor is the combined margin (CM) of the grid, consisting of the combination of operating margin (OM) and build margin (BM) and this is calculated by the Central Electricity Authority (CEA,) India according to the procedures prescribed in the approved methodology ACM0002. We have referred the same value for the baseline calculation.

$$EF_y = w_1 \times EF_{OM,y} + w_2 \times EF_{BM,y}$$

$EF_{OM,y}$ = Build Margin Emission Factor (tCO₂/MWh)

$EF_{BM,y}$ = Operating Margin Emission Factor (tCO₂/MWh)

As per methodology ACM0002

“For wind and solar projects, the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature).”

$$w_1 = 0.75$$

$$w_2 = 0.25$$

Grid Selection

This approach is based on the assumption that the renewable energy project is displacing the average electricity mix in the grid. In India, power is a concurrent subject between the state and the central governments. The perspective planning, monitoring of implementation of power projects is the responsibility of Ministry of Power, Government of India. At the state level the state utilities or state electricity boards (SEBs) are responsible for supply, transmission, and distribution of power. With power sector reforms there have been unbundling and privatization of this sector in many states. Many of the state utilities are engaged in power generation also. In addition to this there are different central / public sector organizations involved in generation like National Thermal Power Corporation (NTPC), National Hydro Power Corporation (NHPC), etc. in transmission e.g. Power Grid Corporation of India Ltd. (PGCIL) and in financing e.g. Power Finance Corporation Ltd. (PFC). There are five regional grids: Northern, Western, Southern, Eastern and North-Eastern. Different states are connected to one of the five regional grids as shown in below table.

Northern	Western	Southern	Eastern	North Eastern
Haryana	Gujarat	AP	Bihar	Assam
HP	MP	Karnataka	Jharkhand	Manipur
JK	Chhattisgarh	Kerala	Orissa	Meghalaya
Rajasthan	Maharashtra	TN	WB	Nagaland
UP	Goa	Lakshadweep	D.V.C	Tripura
Uttarnanchal	D.N.H	Pondicherry	A&N	Arunachal Pradesh
Chandigarh	Daman& Diu		Sikkim	Mizoram
Delhi				

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The management of generation and supply of power within the regional grid is undertaken by the load dispatch centres (LDC). Different states within the regional grids meet the demand from their own generation facilities plus generation by power plants owned by the central sector i.e. NTPC and NHPC etc. Specific quota is allocated to different states from the central sector power plants. Depending on the demand and generation there are exports and imports of power within different states in the regional grid. Thus there is trading of power between states in the grid. Similarly there are imports and export of power between regional grids.

Since the CDM project is connected to the regional grid it is also preferred to take the Western regional grid as project boundary than the state boundary. It also minimizes the effect of inter state power transactions, which are dynamic and vary widely.

The Operating Margin as calculated by CEA for the Western Grid is 0.99 tCO₂/MWh and the build margin for the Western grid is 0.59 tCO₂/MWh.

Variable	Data Source
EG _v – Electricity generated	Records maintained by project proponent
Parameter	Data Source
EF _{OM, y} - Build Margin Emission Factor (tCO ₂ /MWh)	CEA Data, version 03, 15/12/2007
EF _{BM, y} = Operating Margin Emission Factor (tCO ₂ /MWh)	CEA Data, version 03, 15/12/2007
EF _y – Grid Emission Factor	Calculated as the weighted average of the operating margin and build margin

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

In the absence of the project activity the equivalent amount of electricity would have been generated by the operation of grid connected power plants that are predominantly GHG intensive Thermal power plants. The Project activity will thus reduce the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation.

Additionality

The following paragraphs have been detailed on project additionality.

In accordance with simplified modalities and procedures for small-scale Clean Development Mechanism (CDM) project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used if project participants can demonstrate that the project activity would otherwise not be implemented due to the existence of one or more barrier(s) listed in attachment A of Appendix B. Similarly, for the identified CDM project, following barriers have been overcome during project planning and execution:

The barriers that is considered:

(A) Investment Barrier

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There is a variation in the project cost estimated by different agencies entities for investment in wind power projects. The estimated project cost has been referred from the figure which was given by the supplier as a realistic approach.

The project costs associated with the project activity are the initial investments that are incurred by the project proponent for the supply, commissioning and erection of the wind mills. This includes the cost that was paid to the manufacturer of the turbine (cost of the machine and charges for erection) and also to State Electricity Board (infrastructure and development charges).

The electricity generated from the five WTG's of sub project 1 are being wheeled to the factory side of the WTG owner's. The electricity generated from the two WTG's of sub project 2 is being sold to the Maharashtra State Electricity Board (MSEB).

For the investment analysis of this project each sub project activity has been individually considered. The financial indicators, namely the Post Tax Equity IRR is considered and calculated. The investment analysis has been developed for each sub projects as they are unique in their own nature. The Post Tax Equity IRR is compared with the benchmark 14% post tax return on equity applicable for Indian power industry as provided by Central Electricity Regulatory Commission (CERC) for projects in public or private sector based on cost-plus regulations (Source: Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2004 dated 26th March 2004).

The following table illustrates the parameters used for the investment analysis. Some of these parameters are common for all sub projects. Some of the parameters are specific to sub projects.

Techno Economic parameters for Sub Project 1		
Owner : Colourtex Industries Limited		
		Unit
Capacity of machine	750	KW
Number of machine	1	Number
Total Investment	30.56	Million INR
Insurance charge per annum	0.06	Million INR
Operational and Maintenance Expenses	0.60 with 5% escalation every year	Million INR
Equity /Debt ratio	100/0	
Interest rate	-	Percentage
Estimated Electricity Generation	1.60	million Kwh
Savings/Revenue per unit of Electricity generated	4.31	INR/kwh
Income Tax Depreciation Rate (Written Down Value basis)		
on Wind Energy Generators	80	Percentage
On other Assets	10	Percentage
Book Depreciation Rate (Straight Line Method basis)		Percentage

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on Wind Energy Generators	7.86	
Book Depreciation up to (% of asset value)	90	Percentage
Income Tax		
Income Tax rate	30	Percentage
Minimum Alternate Tax	7.5	Percentage
Surcharge	10	Percentage
Education Cess	2	Percentage
Working capital		
Receivables (no of days)	45	
O & m expenses (no of days)	30	
Working capital interest rate	12	Percentage
Loan Processing Charges/ Upfront Fees	1% of the total loan taken	Percentage

Techno Economic parameters for Sub Project 1		
Owner : Shahlon Industries Limited		
		Unit
Capacity of machine	600	kW
Number of machine	1	Number
Total Investment	36.86	Million INR
Insurance charge per annum	0.06	Million INR
Operational and Maintenance Expenses	0.60 with 5% escalation every year	Million INR
Equity /Debt ratio	73/27	
Interest rate	13%	Percentage
Estimated Electricity Generation	1.60	million Kwh
Savings/Revenue per unit of Electricity generated	4.31	INR/kwh

Techno Economic parameters for Sub Project 1		
Owner : Fairdeal Filaments Limited		
		Unit
Capacity of machine	600	kW
Number of machine	1	Number
Total Investment	36.86	Million INR
Insurance charge per annum	0.06	Million INR
Operational and Maintenance Expenses	0.60 with 5% escalation every year	Million INR

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Equity /Debt ratio	80/20	
Interest rate	13%	Percentage
Estimated Electricity Generation	1.60	million Kwh
Savings/Revenue per unit of Electricity generated	4.31	INR/kwh

Techno Economic parameters for Sub Project 1		
Owner : T.A Textiles		
		Unit
Capacity of machine	1250	kW
Number of machine	1	Number
Total Investment	55.08	Million INR
Insurance charge per annum	0.13	Million INR
Operational and Maintenance Expenses	1.00 with 5% escalation every year	Million INR
Equity /Debt ratio	70/30	
Interest rate	12%	Percentage
Estimated Electricity Generation	2.60	million Kwh
Savings/Revenue per unit of Electricity generated	4.54	INR/kwh

Techno Economic parameters for Sub Project 1		
Owner : M.S Synthetics		
		Unit
Capacity of machine	600	kW
Number of machine	1	Number
Total Investment	35.30	Million INR
Insurance charge per annum	0.06	Million INR
Operational and Maintenance Expenses	0.55 with 5% escalation every year	Million INR
Equity /Debt ratio	70/30	
Interest rate	12%	Percentage
Estimated Electricity Generation	1.60	million Kwh
Savings/Revenue per unit of Electricity generated	4.31	INR/kwh

Techno Economic parameters for Sub Project 2		
Owner : Mehratex India Pvt. Limited		
		Unit
Capacity of machine	1250	kW
Number of machine	1	Number

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Total Investment	61.60	Million INR
Insurance charge per annum	0.15	Million INR
Operational and Maintenance Expenses	1.00 with 5% escalation every year	Million INR
Equity /Debt ratio	100/0	
Interest rate	-	Percentage
Estimated Electricity Generation	2.70	million Kwh
Savings/Revenue per unit of Electricity generated	3.50	INR/kwh

Techno Economic parameters for Sub Project 2		
Owner Beekaylon Synthetics Pvt. Limited		
		Unit
Capacity of machine	1250	kW
Number of machine	1	Number
Total Investment	61.60	Million INR
Insurance charge per annum	0.15	Million INR
Operational and Maintenance Expenses	1.00 with 5% escalation every year	Million INR
Equity /Debt ratio	50/50	
Interest rate	10%	Percentage
Estimated Electricity Generation	2.70	million Kwh
Savings/Revenue per unit of Electricity generated	3.50	INR/kwh

Common assumptions for sub project 1 and sub project 2		
Income Tax Depreciation Rate (Written Down Value basis)		
on Wind Energy Generators	80	Percentage
On other Assets	10	Percentage
Book Depreciation Rate (Straight Line Method basis)		Percentage
on Wind Energy Generators	7.86	
Book Depreciation up to (% of asset value)	90	Percentage
Income Tax		
Income Tax rate	30	Percentage
Minimum Alternate Tax	7.5	Percentage
Surcharge	10	Percentage
Education Cess	2	Percentage

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Working capital		
Receivables (no of days)	45	
O & m expenses (no of days)	30	
Working capital interest rate	12	Percentage
Loan Processing Charges/ Upfront Fees	1% of the total loan taken	Percentage

Equity IRR for Sub Project 1

Sr. No	Owner	Equity IRR with out CDM revenue	Benchmark
1.	Colourtex Industries Ltd.	11.87%	14%
2.	Shahlon Industries (P)Ltd	7.93%	14%
3.	Fairdeal Filaments Ltd	7.31%	14%
4.	T.A Textiles	11.58%	14%
5.	M.S Synthetics	10.83%	14%

Equity IRR for Sub Project 2

Sr. No	Owner	Equity IRR with CDM revenue	Benchmark
6.	Mehratex India (P) Ltd	9.53%	14%
7.	Beekaylon Synthetics (P) Ltd	10.68%	14%

As can be seen from the above tables the maximum post tax equity IRR for the Sub project 1 is 11.87% and the maximum post tax equity IRR for Sub project 2 is 10.68%. It can be seen the Post Tax Equity IRR is less than the benchmark Return on Equity of 14%.

As can be seen from above, the Project is not a financially attractive option.

It was only considering the CDM revenue that the project proponents decided to opt for the wind energy based power generation.

B.6. Emission reductions:**B.6.1. Explanation of methodological choices:**

>>

B.6.2. Data and parameters that are available at validation:*(Copy this table for each data and parameter)*

Data / Parameter:	EF _{OM, y}
Data unit:	tCO ₂ /MWh
Description:	The Operating Margin emission factor of Western grid

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Source of data used:	CEA Data, version 03
Value applied:	0.99
Justification of the choice of data or description of measurement methods and procedures actually applied :	The value is calculated as average of the last three years of the Operating margin provided by CEA
Any comment:	

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO ₂ /MWh
Description:	The Build Margin emission factor of Western Grid
Source of data used:	CEA Data, version 03
Value applied:	0.59
Justification of the choice of data or description of measurement methods and procedures actually applied :	The data has been provided by Central Electricity Authority
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

>>

Baseline Emissions:

$$BE_y = EG_y \cdot EF_y$$

 EG_y = electricity produced by the renewable generating unit (kWh)

 EF_y = Emission Factor of the grid (tCO₂/MWh)

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$$EF_y = w1 \times EF_{OM,y} + w2 \times EF_{BM,y}$$

$EF_{OM,y}$ = Build Margin Emission Factor (tCO₂/MWh)

$EF_{BM,y}$ = Operating Margin Emission Factor (tCO₂/MWh)

As per methodology ACM0002

“For wind and solar projects, the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature).”

$$w1 = 0.75$$

$$w2 = 0.25$$

the Operating Margin as calculated by CEA for the Western Grid is 0.99 tCO₂/MWh and the build margin for the Western Grid is 0.59 tCO₂/MWh.

$$EF_y = 0.75 \times 0.99 + 0.25 \times 0.59 \text{ tCO}_2\text{e/MWh} = 0.89 \text{ tCO}_2\text{e/MWh}$$

Installed capacity of the Project activity (IC): 6.3MW

Electricity generated from Sub-Project 1: 8659487 kWh

Electricity generated from Sub-Project 2: 4629825 kWh

Electricity generated (EGy) = 13289313 kWh = 13289 MWh

$$BE_y = 13289 \text{ MWh} \times 0.89 \text{ tCO}_2\text{e/MWh}$$

$$= 11827 \text{ tCO}_2\text{e}$$

Emissions Reductions = Baseline Emissions (BE) – Project Emissions (PE) – Leakage (L)

In accordance with methodology AMS I.D, leakage is to be considered only if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity.

This is not applicable here so $L_y = 0$

Project Emissions $PE_y = 0$

Hence,

$$ER_y = BE_y$$

$$ER_y = 11827 \text{ tCO}_2\text{e}$$

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

>>

Year	Estimated Project Activity Emissions (tonnes of CO ₂ e)	Estimated Baseline Emissions (tonnes of CO ₂ e)	Estimated Leakage (tonnes of CO ₂ e)	Estimated Emission Reduction (tonnes of CO ₂ e)
2008-2009	0	11827	0	11827
2009-2010	0	11827	0	11827
2010-2011	0	11827	0	11827
2011-2012	0	11827	0	11827

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2012-2013	0	11827	0	11827
2013-2014	0	11827	0	11827
2014-2015	0	11827	0	11827
2015-2016	0	11827	0	11827
2016-2017	0	11827	0	11827
2017-2018	0	11827	0	11827
Total (tonnes of CO2e)	0	118270	0	118270

B.7 Application of a monitoring methodology and description of the monitoring plan:**B.7.1 Data and parameters monitored:***(Copy this table for each data and parameter)*

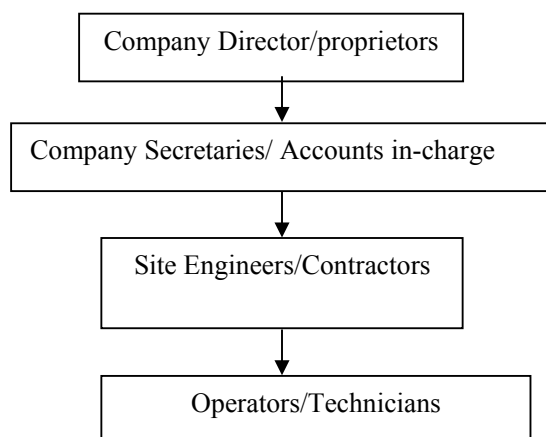
Data / Parameter:	EGy
Data unit:	MWh
Description:	Net amount of electricity supplied to the grid by the individual WTG
Source of data to be used:	Real time measurements and accurate record keeping
Value of data	13289
Description of measurement methods and procedures to be applied:	Metering equipment at dedicated substation of the WTG. These values to be cross-checked by State Electricity Board's meters for authenticity and accuracy.
QA/QC procedures to be applied:	Periodic calibration as per prescribed norms.
Any comment:	

B.7.2 Description of the monitoring plan:

>>

The PPs have Operation and Maintenance (O & M) contract signed with their respective suppliers. Hence as per the provisions of the contract, all the parameters associated with performance of the wind turbines, safety in operation, scheduled maintenance service records, breakdowns and other running repair records are maintained by the suppliers.

Hence, monitoring at the ground level will be done by the supplier of the WEG. From there onwards, monitoring plan designed for the CDM activity is as under:



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Flowchart of the Monitoring Plan.

While the project proponents are aware of the relative ease of monitoring the project activity, proper care has been taken to set up a structure to maintain accurate records of monthly electricity generation. The Account Managers (and company secy) have been tasked with the responsibility of maintaining monthly generation bills and liaison with financial institution as well the on site operators.

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

>>

Date of completion of Baseline methodology: 01 June 2007

Date of completion of Monitoring Methodology: 21 June 2007

Entity responsible:

Colourtex Industries Ltd.
 Survey No.80, G.I.D.C,
 Pandesara,
 Surat –394 221,
 Gujarat, India

SECTION C. Duration of the <u>project activity</u> / <u>crediting period</u>.
--

C.1 Duration of the <u>project activity</u>:

C.1.1. <u>Starting date of the project activity</u>:

>>

Sub-bundle 1:

05/08/2004 (Based on commissioning date of the first WTG)

Sub-bundle 2:

23/02/2007 (Based on commissioning date of the first WTG)

C.1.2. <u>Expected operational lifetime of the project activity</u>:

>>

20 years (From the date of commissioning of each WTG)

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C.2 Choice of the crediting period and related information:**C.2.1. Renewable crediting period****C.2.1.1. Starting date of the first crediting period:**

>>

N.A

C.2.1.2. Length of the first crediting period:

>>

N.A

C.2.2. Fixed crediting period:**C.2.2.1. Starting date:**

>>

01/08/2008 (or the date of registration, whichever is later)

C.2.2.2. Length:

>>

10 years

SECTION D. Environmental impacts

>>

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

>>

As per the Ministry of Environment and Forests (Government of India) notification the project activity does not fall under the purview of the Environmental impact Assessment thus the project activity is exempted from the environmental clearances.¹

It should be noted here that EIA is not a regulatory requirement in India for wind energy projects. There are no negative environmental impacts that are envisaged due to the project activity. The following are the positive impacts due to the project activity.

- *Impact on air and water:* wind energy is renewable electricity generation; hence there would be no release of GHG into the atmosphere. Also as there is no fuel used for electricity generation, there aren't any effluents discharged into the water.
- *Socio economic impact:* The project activity helps the upliftment of skilled and unskilled manpower in the region. The project will be providing employment opportunity to not only during the construction phase, but also during its operational life time. 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.

¹ <http://envfor.nic.in/divisions/iass/notif/eia.htm>

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

>>

The Environmental Impacts are not considered significant both by the project participants and also the host party.

SECTION E. Stakeholders' comments

>>

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

>>

Colourtex Industries Limited on behalf of all the associated project partners had invited a stakeholder consultation meeting on the 8th of December 2007. Public announcements were made from 23rd November using several means such as Public Notices, word of mouth and personal invites through letters. This public announcement was also uploaded on the Company's website. Furthermore, in order to ensure maximum participation at the Regulatory level, PP had also send personal invitation letters to officials of the State Pollution Control Board, Surat Municipal Corporation, members of the Gujarat Industrial Development Corporation and the like.

The agenda items have also been clearly listed in the invitation. The comments have also been invited through other forms such post, fax or email. All these comments have been compiled and presented.

A brief description of how the meeting was conducted is as under:

- Welcome address by Mr. Mahesh Kabutarwala (Director, Colourtex Industries Ltd) on behalf of all the project participants.
- Brief introduction of the agenda items by Mr. Gaurang Sheth (H.R)

Presentations:

1. Global Warming
2. Clean Development Mechanism (CDM) and Carbon trading market
3. 6.3 MW Bundled Wind Power project in Western Region of India.

- Question and Answer Session
- Vote of thanks by Mr. Kirit Gandhi (General Manager, Colourtex Industries Ltd.) on behalf of all the project participants.

The following stakeholders (apart from all the Project participants) attended the meeting:

- 1) G.I. D.C
- 2) G.P.C.B
- 3) Gujarat Gas Company Limited (G.G.C.L)
- 4) Pandesara Industrial Cooperative Society
- 5) Neighbouring Industries
- 6) Consultants

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7) Staff Members

The proceeding was recorded electronically through Video camera and the clippings of the same will be made available to the NCDMA members as well as the DOE.

E.2. Summary of the comments received:

>>

Overall, the stakeholder meeting generated a lot of interest and prompted discussion at a general level. Stakeholders enthusiastically supported the project activity and applauded Colourtex and its partners for such an initiative while wishing them success in the endeavour to secure CDM benefits and set up similar GHG reducing project activities. No negative comment was received throughout the course of the meeting and till the date of submitting this PDD to NCDMA members. It should be noted that all the invitees and attendees were encouraged to submit their comments in whichever form they prefer and at any time post the stakeholder meeting.

The queries of the stakeholders and the response by Colourtex Industries Limited have been complied and presented in the table that follows.

Name (Organisation/Company)	Question/Comment	Response by Colourtex
Dr. Pankaj Desai, Head R & D, Colourtex Industries Ltd.	Under the Kyoto Protocol, developed Countries are set to reduce their GHG emissions while on the other hand; developing countries continue to increase their GHG emissions. What is the net result anticipated by 2012?	Although there are differing data available for Global emission reduction in GHG since 1990, one such published by Energy Information Administration ² (EIA), indicates that the total world carbon dioxide emissions measured in Million Metric tonnes of CO ₂ e in 1990 were 21,563 expected to rise to 27,715 by 2010.
Shri N. L. Kansagra, Regional officer, Gujarat Pollution Control Board	Do all project activities that reduce GHG emissions stand to benefit from CDM approval?	No, project activities have to demonstrate conformities to specific guidelines. For instance, the most important being additionality- which means that the project would not have come about on its own without carbon credit benefits (or in other words), it is not a business-as-usual scenario.
Shri Ashraf Noorani, Chairman, T. A. Textiles	What is the cost of generation of electricity from Wind power projects?	The cost of generation varies from region to region and is inversely proportional to the capacity utilisation factor for every Wind turbine generator. However, according to a report by Pricewaterhouse Cooper, cost of power from wind in India is between Rs.3 to Rs. 5 per KWh.

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

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² www.eia.doe.gov/iea/

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All the comments/questions were recorded. Furthermore, the stakeholder meeting has also been recorded electronically. Since, no adverse comment was received no further action was deemed necessary.

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Annex 1**CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

Organization:	Colourtex Industries Limited
Street/P.O.Box:	Gujarat Industrial Development Corporation (G.I.D.C)
Building:	Survey No. 80, Pandesara
City:	Surat
State/Region:	Gujarat
Postfix/ZIP:	394 221
Country:	India
Telephone:	91-261-2890122/0775/0001
FAX:	+91-261-2891011
E-Mail:	
URL:	www.colourtex.co.in
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Kabutarwala
Middle Name:	Dhansukhbhai
First Name:	Mahesh
Department:	
Mobile:	+91-9825057932
Direct FAX:	
Direct tel:	
Personal E-Mail:	Mahesh.kabutarwala@colourtex.co.in

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding has been availed by any of the project participants involved in this project activity for the purpose of this project.

Annex 3**BASELINE INFORMATION**

For determining the Western region grid emission factor, the latest data published by Central Electricity Authority, Govt. of India was used, a part of which is presented here.

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE	
VERSION	3.0
DATE PUBLISHED	15 DECEMBER 2007
BASELINE METHODOLOGY	ACM 0002/ Version 7
http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm	

EMISSION FACTORS

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	0.72	0.73	0.74	0.71	0.72	0.73	0.74
East	1.06	1.03	1.09	1.08	1.05	1.05	1.00
South	0.74	0.75	0.82	0.84	0.79	0.74	0.72
West	0.90	0.92	0.90	0.90	0.92	0.89	0.86
North-East	0.42	0.41	0.40	0.43	0.52	0.33	0.40
India	0.82	0.83	0.85	0.85	0.84	0.81	0.80

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	0.98	0.98	1.00	0.99	0.98	1.00	1.00
East	1.22	1.19	1.17	1.20	1.17	1.13	1.09
South	1.02	1.00	1.01	1.00	1.00	1.01	1.00
West	0.98	1.01	0.99	0.99	1.01	1.00	0.99
North-East	0.74	0.71	0.74	0.74	0.90	0.70	0.70
India	1.01	1.02	1.02	1.02	1.02	1.02	1.01

Build Margin (tCO₂/MWh) (not adjusted for imports)

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

Combined Margin in tCO₂/MWh (incl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	0.76	0.76	0.77	0.76	0.76	0.80	0.81

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East	1.06	1.05	1.04	1.05	1.04	1.05	1.01
South	0.86	0.85	0.86	0.85	0.85	0.86	0.85
West	0.87	0.89	0.88	0.88	0.89	0.82	0.79
North-East	0.44	0.43	0.44	0.44	0.52	0.42	0.46
India	0.85	0.86	0.86	0.86	0.86	0.85	0.84

Annex 4

MONITORING INFORMATION

Please refer section B.7.2 of the PDD

APPENDIX A

Gujarat WTG Location Detailed

