CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

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Annexes

SECTION A. General description of project activity

A.1 Title of the project activity:

>>
Title: Enercon Wind Farms in Karnataka Bundled Project – 73.60 MW
Version: 7.0
Date of completion of PDD: 23/08/2012

A.2. Description of the project activity:

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Objective of the Project

The objective is development, design, engineering, procurement, finance, construction, operation and maintenance of Enercon Wind Farm (Krishna) Ltd 15 MW, Enercon Wind Farm (Karnataka) Ltd 3.2 MW and other wind power projects of 55.40 MW capacity ("Project") in the Indian state of Karnataka to provide reliable, renewable power to the Karnataka state electricity grid which is part of the Southern regional electricity grid. The Project will lead to reduced greenhouse gas emissions because it displaces electricity from fossil fuel based electricity generation plants.

Nature of Project

The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. Enercon (India) Ltd ("Enercon") will be the equipment supplier and the operations and maintenance contractor for the Project. The generated electricity will be supplied to Karnataka Power Transmission Company Ltd ("KPTCL")/ Bangalore Electricity Supply Company Ltd ("BESCOM") / Hubli Electricity Supply Company Ltd ("HESCOM") under long-term power purchase agreements (PPA). Enercon Wind Farm (Krishna) Ltd and Enercon Wind Farm (Karnataka) Ltd is owned by Enercon (India) Ltd and Enercon GmbH and the rest of the projects are owned by Enercon's customers.

Contribution to sustainable development

The Project meets several sustainable development objectives including:

- contribution towards the policy objectives of Government of India and Government of Karnataka of incremental capacity from renewable sources;
- contribution towards meeting the electricity deficit in Karnataka;
- CO_2 abatement and reduction of greenhouse gas emissions through development of renewable technology;
- reducing the average emission intensity (SO_x, NO_x, PM, etc.), average effluent intensity and average solid waste intensity of power generation in the system;
- conserving natural resources including land, forests, minerals, water and ecosystems; and

- developing the local economy and create jobs and employment, particularly in rural areas, which is a priority concern for the Government of India;

A.3. Project participants:

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Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Government of India (Host)	Enercon (India) Ltd	No
Government of Japan	Japan Carbon Finance	No

The contact details of the entities are provided in Annex – 1. All the projects have authorized Enercon (India) Ltd to take them through the CDM process.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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The host party to the project activity is the Government of India.

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

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The Project is located in the State of Karnataka that forms part of the Southern regional electricity grid of India.

A.4.1.3. City/Town/Community etc:

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Sub-projects No. 1 to 76 and No. 106 to 108 are located in Elladakere, Ittegehalli, Kathehole, Haladyamenahalli, Myakenahalli, Lakkihalli and Gulihoshahalli villages in Jogimatti Wind Zone in Chitradurga District, while sub-Project No. 77 to 105 are located in Chikkavadatti, Hirevadatti and Kadakol villages which fall under Kapatagudda Wind Zone in Gadag District. Both Chitradurga and Gadag district are in the state of Karnataka.

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

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Details of physical location of project activities are as follows:

S. No	Name of Customer	Individual Capacity (MW)	Site	R.R. NO.	Location No	Latitude			Longitude		
						Deg	Minutes	Second	Deg	Minutes	Second
1	MK Agrotech Private Ltd	0.6	Vanivilas Sagar	VVS 43	10	76	29	27.00	13	52	15.50
2	MK Agrotech Private Ltd	0.6	Vanivilas Sagar	VVS 43	11	76	29	28.31	13	52	11.91
3	International Conveyors Ltd	0.6	Vanivilas Sagar	VVS 38	13	76	29	23.36	13	51	57.17
4	Swaraj PVC Pipes P. Ltd.	0.6	Vanivilas Sagar	VVS 39	14	76	29	24.00	13	51	53.74
5	I. G. E. (India)	0.6	Vanivilas Sagar	VVS 40	15	76	29	25.01	13	51	50.19
6	Shilpa Medicare Ltd	0.6	Vanivilas Sagar	VVS 41	18	76	29	27.80	13	51	39.01
7	Shilpa Medicare Ltd	0.6	Vanivilas Sagar	VVS 41	19	76	29	32.10	13	51	28.90
8	Unnathi Projects Ltd	0.6	Vanivilas Sagar	VVS 36	21	76	29	34.10	13	51	23.26
9	Unnathi Projects Ltd	0.6	Vanivilas Sagar	VVS 36	22	76	29	33.85	13	51	20.30
10	Unnathi Projects Ltd	0.6	Vanivilas Sagar	VVS 36	23	76	29	36.29	13	51	17.65
11	Amrit Bottlers	0.6	Vanivilas Sagar	VVS 42	24	76	29	36.94	13	51	14.58
12	Amrit Bottlers	0.6	Vanivilas Sagar	VVS 42	25	76	29	37.45	13	51	11.03
13	S.E.Investment	0.6	Vanivilas Sagar	VVS 35	28	76	29	40.08	13	51	1.16
14	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	29	76	29	43.16	13	50	57.95
15	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	30	76	29	44.41	13	50	54.72
16	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	31	76	29	45.12	13	50	51.88
17	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	32	76	29	46.27	13	50	49.47
18	S.E.Investment	0.6	Vanivilas Sagar	VVS 35	33	76	29	48.12	13	50	41.97
19	S.E.Investment	0.6	Vanivilas Sagar	VVS 35	34	76	29	49.84	13	50	39.13

20	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	35	76	29	55.45	13	50	37.67
21	S.E.Investment	0.6	Vanivilas Sagar	VVS 35	37	76	29	53.97	13	50	29.25
22	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	38	76	29	54.58	13	50	25.63
23	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	39	76	29	55.82	13	50	21.95
24	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	40	76	29	56.66	13	50	18.43
25	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	41	76	29	57.74	13	50	14.48
26	Brindavan Agro	0.6	Vanivilas Sagar	VVS 33	42	76	29	58.71	13	50	10.83
27	Rohit Surfactants Pvt Ltd	0.6	Vanivilas Sagar	VVS 27	43	76	29	59.10	13	50	8.39
28	Brindavan Agro	0.6	Vanivilas Sagar	VVS 33	44	76	29	59.84	13	50	4.48
29	Patel Shanti Steels P. Ltd.	0.6	Vanivilas Sagar	VVS 32	47	76	30	2.59	13	49	51.64
30	Cooper Foundry	0.6	Vanivilas Sagar	VVS 26	48	76	30	9.48	13	49	46.59
31	Cooper Foundry	0.6	Vanivilas Sagar	VVS 26	49	76	30	9.79	13	49	42.32
32	Cooper Foundry	0.6	Vanivilas Sagar	VVS 26	50	76	30	10.50	13	49	38.93
33	Cooper Foundry	0.6	Vanivilas Sagar	VVS 26	51	76	30	10.88	13	49	36.75
34	Laxmi Organics	0.6	Vanivilas Sagar	VVS 25	52	76	30	12.08	13	49	31.54
35	Laxmi Organics	0.6	Vanivilas Sagar	VVS 25	53	76	30	12.99	13	49	27.69
36	Jitendra D. Majetha	0.6	Vanivilas Sagar	VVS 31	57	76	30	23.06	13	49	9.73
37	Patel Shanti Steels P. Ltd.	0.6	Vanivilas Sagar	VVS 21	72	76	30	58.20	13	47	42.69
38	Unnathi Projects Ltd	0.6	Vanivilas Sagar	VVS 30	73	76	30	59.38	13	47	39.40
39	Primetex Apparels India	0.6	Vanivilas Sagar	VVS 24	76	76	31	1.44	13	47	29.40
40	Neharaj Energy	0.8	GIM-II	ELP-2	2	76	28	32.73	13	58	15.64
41	Jubilee	0.8	GIM-II	ELP-3	3	76	28	29.82	13	58	18.10

	Textiles										
42	Vivek Trading Company	0.8	GIM-II	ELP-11	4	76	28	27.14	13	58	21.08
43	Prasad Technology Park	0.8	GIM-II	ELP-18	10	76	28	11.45	13	58	53.68
44	Unnathi Projects Ltd	0.8	GIM-II	ELP-19	11	76	28	10.37	13	58	57.36
45	Prasad Technology Park	0.8	GIM-II	ELP-18	12	76	28	3.46	13	59	0.89
46	Avanti Feeds Ltd	0.8	GIM-II	ELP-4	13	76	27	59.21	13	59	7.52
47	Avanti Feeds Ltd	0.8	GIM-II	ELP-4	14	76	27	57.29	13	59	11.01
48	Avanti Feeds Ltd	0.8	GIM-II	ELP-4	15	76	27	58.49	13	59	15.43
49	Avanti Feeds Ltd	0.8	GIM-II	ELP-4	16	76	27	58.88	13	59	19.11
50	Srinivasa Cystine Ltd	0.8	GIM-II	ELP-5	17	76	27	58.74	13	59	22.95
51	Srinivasa Cystine Ltd	0.8	GIM-II	ELP-5	18	76	27	58.56	13	59	26.85
52	B.V.Finance and Leasing	0.8	GIM-II	ELP-6	19	76	27	53.77	13	59	33.72
53	B.V.Finance and Leasing	0.8	GIM-II	ELP-6	20	76	27	54.63	13	59	37.84
54	Amrit Bottlers	0.8	GIM-II	ELP 13	21	76	27	53.59	13	59	41.95
55	Brindavan Agro	0.8	GIM-II	ELP-7	22	76	27	51.71	13	59	45.44
56	Indian Power Corporation Ltd	0.8	GIM-II	ELP-15	23	76	27	54.87	13	59	49.52
57	Indian Power Corporation Ltd	0.8	GIM-II	ELP-15	24	76	27	57.13	13	59	52.67
58	Indian Power Corporation Ltd	0.8	GIM-II	ELP-15	25	76	27	55.72	13	59	56.52
59	Brindavan Agro	0.8	GIM-II	ELP-7	26	76	27	26.08	13	59	50.38
60	Brindavan Agro	0.8	GIM-II	ELP-7	27	76	27	27.18	13	59	43.87
61	Brindavan Agro	0.8	GIM-II	ELP-7	28	76	27	26.18	13	59	39.64
62	Indian Power Corporation Ltd	0.8	GIM-II	ELP-16	29	76	25	23.82	13	59	47.27

63	Indian Power Corporation Ltd	0.8	GIM-II	ELP-16	30	76	25	29.91	13	59	45.28
64	Indian Power Corporation Ltd	0.8	GIM-II	ELP-16	31	76	25	33.12	13	59	42.33
65	Indian Power Corporation Ltd	0.8	GIM-II	ELP-16	32	76	25	38.83	13	59	38.39
66	Indian Power Corporation Ltd	0.8	GIM-II	ELP-16	33	76	25	42.15	13	59	36.06
67	Indian Power Corporation Ltd	0.8	GIM-II	ELP-16	34	76	25	43.66	13	59	32.54
68	Mumbai Stock Brokers Pvt. Ltd.	0.8	Gim-II	ELP-21	40	76	24	8.45	13	59	48.78
69	D. R. Container Terminal	0.8	Gim-II	ELP-22	41	76	24	3.54	13	59	41.68
70	D. R. Container Terminal	0.8	GIM-II	ELP-22	42	76	23	40.29	13	59	37.55
71	Indian Power Corporation Ltd	0.8	GIM-II	ELP-26	52	76	25	11.40	13	59	15.90
72	Indian Power Corporation Ltd	0.8	GIM-II	ELP-26	53	76	25	13.08	13	59	12.35
73	Indian Power Corporation Ltd	0.8	GIM-II	ELP-26	54	76	25	15.36	13	59	9.01
74	Indian Power Corporation Ltd	0.8	GIM-II	ELP-26	55	76	25	17.30	13	59	5.46
75	Siddaganga Oil Extractions Ltd.	0.8	GIM-II	ELP-32	63	76	25	29.79	13	58	37.36
76	Siddaganga Oil Extractions Ltd.	0.8	GIM-II	ELP-32	64	76	25	31.94	13	58	34.06
77	Enercon Wind Farms	0.6	Gadag	EWK LH-6	1	75	44	15.11	15	11	48.10

	(Krishna) Ltd										
78	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	2	75	44	17.51	15	11	44.22
79	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	3	75	44	18.61	15	11	41.19
80	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	4	75	44	18.89	15	11	37.80
81	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	5	75	44	16.41	15	11	35.01
82	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	6	75	43	31.81	15	12	48.51
83	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	7	75	43	50.49	15	12	41.81
84	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	8	75	43	52.29	15	12	38.71
85	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	9	75	43	55.60	15	12	35.29
86	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	10	75	44	23.26	15	13	17.08
87	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	11	75	44	2.08	15	12	29.80
88	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	12	75	44	10.74	15	11	52.99
89	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	13	75	44	11.63	15	11	50.29
90	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	14	75	44	23.69	15	13	14.09

91	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	15	75	44	23.30	15	13	9.40
92	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	16	75	44	21.78	15	13	6.22
93	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	17	75	44	20.10	15	13	3.59
94	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	18	75	44	19.52	15	13	0.10
95	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	19	75	44	18.39	15	12	54.90
96	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	20	75	44	19.29	15	12	52.10
97	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	21	75	44	18.00	15	12	49.11
98	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	22	75	44	20.00	15	12	45.39
99	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	23	75	44	20.39	15	12	42.01
100	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	24	75	44	4.59	15	12	27.41
101	Enercon Wind Farms (Krishna) Ltd	0.6	Gadag	EWK LH-6	25	75	44	3.61	15	12	24.29
102	Enercon Wind Farms (Karnataka) Ltd	0.8	Gadag	EWK LH-7	26	75	44	2.69	15	12	21.01
103	Enercon Wind Farms (Karnataka) Ltd	0.8	Gadag	EWK LH-7	27	75	43	57.98	15	12	16.99
104	Enercon Wind Farms (Karnataka) Ltd	0.8	Gadag	EWK LH-7	28	75	43	58.31	15	12	13.31

105	Enercon Wind Farms (Karnataka) Ltd	0.8	Gadag	EWK LH-7	29	75	44	1.71	15	12	10.30
106	Dinesh Pouches	0.8	EP-II	EP2-26	2	76	18	46.56	13	59	23.86
107	UshDev International	0.8	EP-II	EP2-24	3	76	18	49.11	13	59	14.58
108	UshDev International	0.8	EP-II	EP2-24	4	76	18	50.56	13	59	10.92
	Total Capacity (MW)	**73.6**									

Sub-projects 1 to 39 are connected to the Mathod 66/11 kV KPTCL sub-station.

Sub-projects 40 to 76 are connected to the Hiriyur 220/66/11 kV KPTCL sub-station.

Sub-projects 77 to 105 are connected to Dambal 66/11 kV KPTCL sub-station.

Sub-projects 106 to 108 are connected to Ramgiri 66/11 kV KPTCL sub-station.

The sites are located at a distance of 200 km from Bangalore by road. The nearest railway station is at Bangalore. The maps of site showing location of the respective installed wind turbine have been provided in Appendix- 1.

A) Site map of Vanivilas Sagar
B) Site map of GIM-II
C) Site map of Gadag
D) Site map of EP-II

A.4.2. Category(ies) of project activity:

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The project activity is considered under CDM category zero-emissions **'grid-connected electricity generation from renewable sources'** that generates electricity in excess of 15 MW (limit for small scale project). Therefore as per the scope of the project activity enlisted in the 'list of sectoral scopes and related approved baseline and monitoring methodologies (version 02 Mar 05/07:23)', the project activity may principally be categorized in Scope Number 1, Sectoral Scope - Energy industries (renewable/ non-renewable sources).

A.4.3. Technology to be employed by the project activity:

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The Project involves 64 wind energy converters (WECs) of Enercon make 600 kW E-40 and 44 WECs of Enercon make 800 kW E-48 totalling 108 WECs connected with internal electrical lines connecting the Project with local 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 ± 12.5%. 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 18 to 33 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times.
- Minimum drawal (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%.
- Less Wear & Tear since the system eliminates mechanical brake, which are not needed due to low speed generator which runs at maximum speed of 33 rpm and uses Air Brakes.
- Three Independent Braking System.
- Generator achieving rated output at only 33 rpm.
- Incorporates lightning protection system, which includes blades.
- Starts Generation of power at wind speed of 3 m/s.

Enercon (India) Ltd has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH, has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

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Crediting Period for the Project: fixed for 10 years

Years	**Annual estimation of emission reductions in tonnes of CO2e**
25 October 2007 to 31 March 2008	64,227
01 April 2008 to 31 March 2009	159,244
01 April 2009 to 31 March 2010	159,244
01 April 2010 to 31 March 2011	159,244
01 April 2011 to 31 March 2012	159,244
01 April 2012 to 31 March 2013	159,244
01 April 2013 to 31 March 2014	159,244
01 April 2014 to 31 March 2015	159,244
01 April 2015 to 31 March 2016	159,244
01 April 2016 to 31 March 2017	159,244
01 April 2017 to 24 October 2017	95,017
Total estimated reductions (tonnes of CO2e)	1,592,437
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	159,244

A.4.5. Public funding of the project activity:

>>

There is no ODA financing involved in the Project.

SECTION B. Application of a baseline and monitoring methodology

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

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The approved consolidated baseline and monitoring methodology **ACM0002 Version 6.0** (19 May 2006) has been used. The titles of these baseline and monitoring methodologies are "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" and "Consolidated monitoring methodology for grid-connected electricity generation from renewable sources.

B.2 Justification of the choice of the methodology and why it is applicable to the project activity:

>>

The Project is wind based renewable energy source, zero emission power project connected to the Karnataka state grid, which forms part of the Southern regional electricity grid. The Project will displace fossil fuel based electricity generation that would have otherwise been provided by the operation and expansion of the fossil fuel based power plants in Southern regional electricity grid.

The approved consolidated baseline and monitoring methodology ACM0002 Version 6 is the choice of the baseline and monitoring methodology and it is applicable because:

- the Project is grid connected renewable power generation project activity
- the Project represents electricity capacity additions from wind sources
- the Project does not involve switching from fossil fuel to renewable energy at the site of project activity since the Project is green-field electricity generation capacities from wind sources at sites where there was no electricity generation source prior to the Project, and
- the geographical and system boundaries of the Southern electricity grid can be clearly identified and information on the characteristics of the grid is available.

B.3. Description of the sources and gases included in the project boundary

>>

According to ACM0002, for the baseline emission factor, the spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

The Indian electricity system is divided into five regional grids, viz. Northern, Eastern, Western, Southern, and North-Eastern. Each grid covers several states. As the regional grids are interconnected, there is inter-state and inter-regional exchange. A small power exchange also takes place with neighbouring countries like Bhutan and Nepal.

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 regional problems relating to the grid. Each state in a regional grid meets its demand with its 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. The regional grid thus represents the largest electricity grid where power plants can be dispatched without significant constraints and thus, represents the "project electricity system" for the Project. As the Project is connected to the Southern regional electricity grid, the Southern grid is the "project electricity system".

Accordingly, the project boundary encompasses the physical extent of the southern regional electricity grid which includes the project site and all power plants connected physically to the electricity system.

	Source	Gas	Included?	Justification/ Explanation
Baseline	Electricity generation from power plants connected to the Southern Grid	CO_2	Included	Main emission source
		CH_4	Excluded	This source is not required to be estimated for wind energy projects under ACM0002
		N_2O	Excluded	This source is not required to be estimated for wind energy projects under ACM0002
Project Activity	Electricity generation from the Project	CO_2	Excluded	Wind energy generation does not have any direct GHG emissions.
		CH_4	Excluded	
		N_2O	Excluded	

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

>>

According to ACM0002, for project activities that do not modify or retrofit an existing electricity generation facility, the baseline scenario is the following:

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 sources, as reflected in the combined margin (CM) calculations described below.

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.

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 CDM project activity (assessment and demonstration of additionality): >>

The additionality of the project is being proved using additionality tool Version 2.

Step 0: Preliminary screening based on the starting date of the project activity

If project participants wish to have the crediting period starting prior to the registration of their project activity, they shall:

a) Provide evidence that the starting date of the CDM project activity falls between 1 January 2000 and the date of the registration of a first CDM project activity, bearing in mind that only CDM project activities submitted for registration before 31 December 2005 may claim for a crediting period starting before the date of registration.

b) Provide evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available at, or prior to, the start of the project activity.

The Project start date is before the date of validation of the PDD.

Wind power projects prior to the implementation of the sub-Projects were required to share CDM revenues with KPTCL in accordance with the PPAs approved by Karnataka Electricity Regulatory Commission (KERC). While KPTCL requested KERC to retain the sharing of CDM revenues for the sub-Projects, KERC removed the sharing of CDM revenues with KPTCL while approving the PPAs for the Project recognizing the nascent stage of the CDM market and potential adverse impact on new investments. The various regulatory orders that a) allowed CDM benefits to be shared between KPTCL and the developers for earlier projects, and b) did not allow KPTCL to share CDM benefits with developers will be provided to the validator.

Enercon's management had considered CDM benefits in wind power development and already had experience with CDM process (CERUPT tender of 2001, Letter of Intent for other wind power projects in Karnataka in December 2003, etc.). It had also informed its customers of the CDM benefits. Evidence for this is available which will be provided to the validator.

The Project start date is prior to the date of validation of the PDD. Enercon and a CER purchaser had entered into an Emission Reduction Purchase Agreement dated December 2005 for purchase of emission reductions from the Project.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:

1. Identify realistic and credible alternative(s) available to the project participants or similar project developers that provide outputs or services comparable with the proposed CDM project activity. These alternatives are to include:

- The proposed project activity not undertaken as a CDM project activity;
- All other plausible and credible alternatives to the project activity that deliver outputs and on services (e.g. electricity, heat or cement) with comparable quality, properties and application areas;
- If applicable, continuation of the current situation (no project activity or other alternatives undertaken).

Alternative(s) available to the project participants or similar project developers include:

(a) The Project is not undertaken as a CDM project activity.

(b) Setting up of comparable utility scale fossil fuel fired or hydro power projects that supply to the Karnataka grid under a PPA.

Continuation of the current situation where no project activity or any of the above Alternatives are undertaken would not be applicable as Karnataka had energy (MU) shortages of 0.7% and peak (MW) shortages of 9.8% in 2005-06 (Source: Southern Region Power Sector Profile, August 2006, Ministry of Power).

Outcome of step 1 a:

Alternatives a and b, as identified above are realistic and credible alternatives to the project activity.

Sub-step 1b. Enforcement of applicable laws and regulations

2. The alternative(s) shall be in compliance with all applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution. This sub-step does not consider national and local policies that do not have legally-binding status.

3. If an alternative does not comply with all applicable legislation and regulations, then show that, based on an examination of current practice in the country or region in which the law or regulation applies, those applicable legal or regulatory requirements are systematically not enforced and that non-compliance with those requirements is widespread in the country. If this cannot be shown, then eliminate the alternative from further consideration.

4. If the proposed project activity is the only alternative amongst the ones considered by the project participants that is in compliance with all regulations with which there is general compliance, then the proposed CDM project activity is not additional.

There are no legal and regulatory requirements that prevent Alternatives (a) and (b) from occurring.

Outcome of step 1 b

Both alternative a and alternative b are in compliance with mandatory laws and regulations taking into account the enforcement in the region or country and EB decision on national and sectoral policies. Hence Alternative a and b as identified in the step 1 a are realistic and credible alternatives to the project activity.

Proceed to Step 2 (Investment analysis) or Step 3 (Barrier analysis). (Project participants may also select to complete both steps 2 and 3.)

Step 2: Investment Analysis

Determine whether the proposed project activity is the economically or financially less attractive than other alternatives without the revenue from the sale of certified emission reductions (CERs). To conduct the investment analysis, use the following sub-steps:

Sub-step 2a. - Determine appropriate analysis method

1. Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis (sub-step 2b). If the CDM project activity generates no financial or economic benefits other than CDM related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III).

Sub-step 2b. – Option I. Apply simple cost analysis

2. Document the costs associated with the CDM project activity and demonstrate that the activity produces no economic benefits other than CDM related income.

Sub-step 2b. – Option II. Apply investment comparison analysis

3. 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.

Sub-step 2b. – Option III. Apply benchmark analysis

4. 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 context.

Option I – Simple cost analysis is not applicable as the project activity sells electricity to the grid and obtains economic benefits in the form of electricity tariffs.

Enercon proposes to use **Option III – Benchmark analysis** and the financial indicator that is identified is the post-tax return on equity or the equity IRR.

Our project is a 73.6 MW bundled wind power project that generates and supplies electricity to the state electricity grid in the state of Karnataka, India. During the request for registration stage, the EB referred our project to “request for review” and sought clarifications from us. In response to the queries raised in request for review, we presented the clarifications in EB 36. The EB then instructed to register our project with corrections provided we submit a revised PDD and corresponding revised validation report that provides clarification regarding suitability of the 16% regulatory commission benchmark. Subsequently, the Executive Board in EB 40 meeting ruled that the 16% post tax return on equity considered by regulatory commissions is not a suitable benchmark. In light of above, the reply to the question on suitability of 16% benchmark, as asked by EB under correction requested stage, is not addressed in the PDD.

We also understand that as per Guidance to investment analysis issued in EB 51 (paragraph 12), the required return on equity can be considered as appropriate benchmark for Equity IRR. In light of

this and keeping in mind the EB 40 ruling, we have considered the cost of equity[1] applicable to the project type i.e. electricity generation projects, as the suitable benchmark for the project. The cost of equity has been determined using the Capital Asset Pricing Model (CAPM) considering Beta values of all listed power generating companies in India. The CAPM economic model is widely used to determine the required/expected return on equity based on potential risk of an investment. The CAPM framework is the Nobel award winning work of financial economist Dr. William Sharpe.

In line with the requirements of the Guidance to Investment Analysis (paragraph 12), data and parameters used in calculation of cost of equity i.e. beta values of power generating companies in India, risk free rate of return, market risk premium etc. have been derived from publicly available data sources. The detailed calculations of cost of equity along with an elaboration of the approach are provided in Annex 5.

As can be seen, the benchmark cost of equity works out to be 16.41 %.

Sub-step 2c. Calculation and comparison of financial indicators (only applicable to options II and III):

5. Calculate the suitable financial indicator for the proposed CDM project activity and, in the case of Option II above, for the other alternatives. Include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding CER revenues, but including subsidies/fiscal incentives where applicable), and, as appropriate, non-market cost and benefits in the case of public investors.
6. Present the investment analysis in a transparent manner and provide all the relevant assumptions in the CDM-PDD, so that a reader can reproduce the analysis and obtain the same results. Clearly present critical techno-economic parameters and assumptions (such as capital costs, fuel prices, lifetimes, and discount rate or cost of capital). Justify and/or cite assumptions in a manner that can be validated by the DOE. In calculating the financial indicator, the project's risks can be included through the cash flow pattern, subject to project-specific expectations and assumptions (e.g. insurance premiums can be used in the calculation to reflect specific risk equivalents).
7. Assumptions and input data for the investment analysis shall not differ across the project activity and its alternatives, unless differences can be well substantiated.
8. Present in the CDM-PDD submitted for validation a clear comparison of the financial indicator for the proposed CDM activity and:

[1] The Guidance to investment analysis (paragraph 13) states that, for projects where there are more than one possible project developers, the internal cost of equity can not be considered as the benchmark as benchmarks should not include the subjective profitability expectations or risk profile of a particular project developer. The project activity is a Greenfield renewable energy generation activity that generates and supplies electricity to the Karnataka state grid; and hence can have more than one potential project developer. Therefore, we have not used company or project specific parameters for the calculation of the benchmark (such as company Beta etc.).

(a) The alternatives, if Option II (investment comparison analysis) is used. If one of the other alternatives has the best indicator (e.g. highest IRR), then the CDM project activity can not be considered as the most financially attractive;

(b) The financial benchmark, if Option III (benchmark analysis) is used. If the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity cannot be considered as financially attractive.

Detailed assumptions used and the results of financial analysis for Avanti Feeds Ltd, the sub project with the highest equity IRR, is presented below.

Owner:	**Avanti Feeds Ltd**
Project:	3.2 MW
Location:	Karnataka

Assumptions for Financial Model

Capacity of Machines in kW	800
Number of Machines	4
Project Capacity in MW	3.20
Project Commissioning Date	1-Sep-05
Project Cost (Rs. Million)	145.80
Project Cost per MW (Rs. In Millions)	45.56

Operations	
Plant Load Factor	26.5%
Insurance Charges @ % of capital cost	0.18%
Operation & Maintenance Cost base year @ % of capital cost	1.25%
% of escalation per annum on O & M Charges	5.0%

Tariff	
Base year Tariff for 10 years - Rs./kWh	3.40
Annual Escalation (Rs./kWh per Year)	0.00
Tariff applicable after 10 years (Rs/kWh)	Cost plus 16% return on equity

Project Cost	Rs Million
Land and Infrastructure, Generator & Electrical Equipments, Mechanical Equipments, Civil Works, Instrumentation &	

Control, Other Project Cost, Pre operative Expenses, etc.	
Total Project Cost	146

Means of Finance		Rs Million	
Own Source	30%	43.74	
Term Loan	70%	102.06	
Total Source		145.80	
Terms of Loan			
Interest Rate	10.50%		
Tenure	7.0	Years	
Moratorium	6	Months	

Income Tax Depreciation Rate (Written Down Value basis)	
on Wind Energy Generators	80%
On other Assets	10%
Book Depreciation Rate (Straight Line Method basis)	
On all assets	7.86%
Book Depreciation up to (% of asset value)	90%

Income Tax	
Income Tax rate	30%
Minimum Alternate Tax	10%
Surcharge	10%
Cess	2%

Working capital	
Receivables (no of days)	45
O & m expenses (no of days)	30
Working capital interest rate	12%

CER Revenues	
CER Price in US$	6.5
Exchange rate Rs./US$*	45.34

* RBI reference rate as of 15 November 2006

Crediting period starts	15-Sep-07
Length of Crediting period	10

Baseline Emission Factor for Southern Region (tCO2/GWh)	932.04

The equity IRR for this sub projects (without CDM revenues) is 11.39%.

The financial analysis also demonstrates that the equity IRRs (without CDM revenues) for the other sub projects are in the range of 7.00% to 11.39% i.e. less than the benchmark rate of 16.41%. Equity IRRs of all sub projects that comprise the project activity are provided in Appendix 3.

Sub-step 2d. Sensitivity analysis (only applicable to options II and III):

9. Include a sensitivity analysis that shows whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favor of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially attractive (as per step 2c para 8a) or is unlikely to be financially attractive (as per step 2c para 8b).

Plant load Factor

Sensitivity analysis of the Equity IRR to the Plant Load Factor (the most critical assumption) has been carried out considering a plant load factor of 23% and 28% (the range indicated in KERC Order dated 18 January 2005). Plant Load Factor is the key variable encompassing variation in wind profile, variation in off-take (including grid availability) including machine downtime. The post tax Equity IRRs at the stated PLFs are as follows:

Sensitivity Analysis	PLF at 23%	PLF at 26.5% (Base case)	PLF at 28%
Post tax Equity IRR without CER revenues	7.45%	11.39%	13.22%

Tariff : Apply a fixed electricity tariff through the life time of the project;

In EB 36, the Executive Board has required us to consider a fixed electricity tariff for the entire project life period. We would like to submit that the tariff for our project is governed by a legally binding Power Purchase Agreement (PPA) signed between the project developer and the off-taker. The fixed tariff of Rs. 3.40 is applicable for the PPA tenure which is 10 years. For tariff beyond 10^{th} year, the PPA states that [Source: Section on Rates and Charges]: *"From 11^{th} year onwards, from the date of signing of the agreement the corporation shall pay to the company for the energy delivered at the metering point at a rate based on operating costs and incentives to be agreed upon by mutual negotiations"*

As can be seen, the PPA very clearly states that only "operating costs" and "incentives" to be agreed upon by mutual negotiation will determine the tariffs from 11^{th} year to the 20^{th} year. You will notice in the financial model that the tariffs from the 11^{th} to 20^{th} year have accordingly been considered – operating costs plus the 16% return on equity that KERC considers for setting wind power tariff.

The reason why the tariff number comes down substantially after the 10th year is because the largest component of tariff being the debt service (principal repayment and interest payments) is over by the 10th year of operations and these have already been factored in while determining the regulated tariff for the first 10 years. In fact KERC, while working out the tariff schedule for wind energy projects for the first 10 years, has noted that the reduction in tariff from year to year is mainly on account of repayment of debts and also that there are no running costs other than O&M costs which increases only marginally from year to year. Please refer Page 19 third line of KERC order dated 18th January 2005 which is applicable to project activity. (Source: http://www.kerc.org/order2005/Order%20on%20NCE%20Tariff%20(FINAL).doc).

Thus, from the 11th year to the 20th year, the tariff number cannot contain the element of debt service (principal repayment and interest payment) and even with the increased operating costs, the overall tariff number is lower in the 11th year. In the public hearing held by KERC on 28-December-2004 to seek inputs on its "Consultation Paper on Back ground Issues on treatment of Renewable Energy Projects in the light of Electricity Act- 2003" under article (8-vii), common issues raised in the discussion paper on renewable energy projects: Tariff determination for old and new projects, KERC has ruled that the same tariff cannot be applied for projects that have completed 10 years of operational life since these projects has completed their loan repayment obligations.

It is therefore clear that the tariff for the project activity beyond the initial PPA period would be lower. This is bound to happen in any regulated tariff structure and several instances are available in the cost plus tariff regulated power projects (both in case of non conventional as well as conventional coal-fired power projects) where the tariff comes down significantly after the debt service is over.

For example, in case of Maharashtra wind power projects, the MERC order provides a clear understanding of the approach to be followed for tariff setting beyond the initial PPA period. [MERC order Section 1.4.2, Para 2, page-25 of 116, weblink: http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf]

The Commission notes that in Cost Plus Approach, which the Commission has adopted for tariff proposal, rate per unit charged by such projects during initial period of 10 years is bound to be higher as during this period the project has various debt related obligations. However, it is essential that the consumer is able to enjoy the benefit of cheaper power once all debt related obligations are paid off and project has virtually no variable costs.

This can be further corroborated from the table 3 on page 69 of MERC order (link: http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf) that beyond the 11th year the cost of electricity only comprises O & M cost and return of equity for tariff calculation.

Also in case of projects in other states, like Maharashtra, that are approaching the end of the term for the PPA, the state utilities have applied for the petition for revision in tariff which is much lower than the tariff for the term of the PPA. The state utility in the state of Maharashtra has approached commission for revision in tariff after the period of 13 years of the PPA (MERC has provided PPA term for the period of 13 years for wind power projects) at the rate of INR 1.17 per kWh [Source: MERC order dated 20 November 2007, para 2(a)] which is much lower than the tariff [INR 3.50 per

kWh with escalation of INR 0.15 per year for the first 13 years of operation] approved by the Maharashtra electricity regulatory commission for the first 13 years under PPA.

As you would note from the above the regulatory framework for tariff setting in India do not allow us to obtain a fixed tariff throughout the lifetime of the project activity. Therefore, for carrying out the investment analysis, we have considered the tariff in accordance with the terms of the Power Purchase Agreement that governs the sale of electricity for the first 10 years and have adopted the approach considered by the commission for computing the tariff beyond the term of PPA.

Therefore we would like to submit that it is unrealistic to assume that the project will be able to obtain the same constant tariff beyond the PPA tenure. We have carried out sensitivity analysis considering a reasonable escalation in tariff of 10% (as per EB Guidance para 17, Annex 45 of EB 41). As can be seen, with reasonable variations in tariff the IRR remains below the benchmark. The IRR based on constant tariff of Rs. 3.40 for the entire project life is also presented in the table.

Sensitivity Analysis	-10% (on base Case)	Tariff as per KERC principles beyond 13th year (Base Case)	+10% (on base Case)	Rs. 3.40 Per Kwh (Unrealistic/ Not Possible)
Post tax Equity IRR without CER revenues	10.79%	11.39%	11.95%	15.00%

As can be seen from above, the Project is not the most financially attractive (as per step 2c para 8a) we proceed to Step 4 (Common practice analysis).

Outcome of step 2

As can be seen from above, the Project is not the most financially attractive (as per step 2c para 8a) we proceed to Step 4 (Common practice analysis).

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity:

1. Provide an analysis of any other activities implemented previously or currently underway that are similar to the proposed project activity. Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Other CDM project activities are not to be included in this analysis. Provide quantitative information where relevant.

Sub-step 4b. Discuss any similar options that are occurring:

2. If similar activities are widely observed and commonly carried out, it calls into question the claim that the proposed project activity is financially unattractive (as contended in Step 2) or faces barriers (as contended in Step 3). Therefore, if similar activities are identified above, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain why the similar activities enjoyed certain benefits that rendered it financially attractive (e.g., subsidies or other financial flows) or did not face the barriers to which the proposed project activity is subject.
3. Essential distinctions may include a serious change in circumstances under which the proposed CDM project activity will be implemented when compared to circumstances under which similar projects where carried out. For example, new barriers may have arisen, or promotional policies may have ended, leading to a situation in which the proposed CDM project activity would not be implemented without the incentive provided by the CDM. The change must be fundamental and verifiable.

Justify the existence of common practice under sub step 4 (b);

According to the additionality tool, sub step 4 (a), other activities similar to the proposed project are required to be analyzed to determine whether and to which extent similar activities have already diffused in the relevant region. Accordingly, we have analyzed similar projects operational in the region (Karnataka) that are similar in technology and scale (WEG make and installed capacity) and were invested in a comparable regulatory and investment environment (time period when real action was taken towards the proposed project).

Sub step 4(a) - Analyze other activities similar to the proposed project activity:

The state of Karnataka, where the project activity is implemented, has witnessed three different tariff regimes until May 2004 (start date for our project); the first tariff regime was implemented by the MNES (Ministry of Non conventional Energy Sources) as per its directive in 1994-95. MNES policy stated that the power purchase price for wind projects would be Rs. 2.25 per kWh for the base year 1994-95 with 5% year on year escalation on the base year price. This tariff regime is applicable to the projects that have executed PPA on or before 31 July 2002 and are commissioned before 31 March 2005.

The second tariff was applied by KERC to projects that have executed PPA after 31 July 2002 and are commissioned before 31 August 2003. The second tariff regime is applicable to the projects that are not eligible under Government of Karnataka orders dated 17 Sep 2002 and 17 Feb 2003 and are commissioned before 31 August 2003.

The third tariff regime applies to projects commissioned from 01 September 2003. In 2003, the Karnataka Electricity Regulatory Commission (KERC) came out with its order on determination of tariff for NCE projects which set a tariff of Rs. 3.10/kWh for projects implemented after September

2003 and 2% year on year escalation in tariff. (http://www.kerc.org/orders2003/wind_mill ppas.doc).

Tariff Regime	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	Average
Regime 1 (Projects which are allotted and have executed PPA on or before 31 July 2002 and are commissioned before 31 March 2005) [2]	3.67	3.85	4.04	4.24	4.45	4.68	4.91	5.16	5.41	5.69	4.61
Regime 2 (Projects which have executed PPA after 31 July 2002 and are commissioned before 31 August 2003) [3]	3.32	3.38	3.45	3.51	3.58	3.64	3.71	3.77	3.84	3.90	3.61
Regime 3 (Projects commissioned from 01 September 2003) [4]	3.16	3.22	3.29	3.35	3.41	3.47	3.53	3.60	3.66	3.72	3.44

It is important to note that the different tariff regimes have progressively reduced the tariff applicable for wind energy suppliers for the first three regimes. The start date for the project activity is 04 May 2004; therefore we have analysed all the projects that are installed from 01 September 2003 to 04 May 2004. The table below provide the references for the projects that have applied for carbon revenues under any GHG program:-

[2] Rs.2.25 for 1994-95 and 5% annual escalation thereafter for Projects commissioned till 31 July 2002

[3] Rs.3.25 for 2003-04 and 2% annual escalation thereafter for the project commissioned before 31 August 2003

[4] Rs.3.10 for 2003-04 and 2% annual escalation thereafter for the projects commissioned from 01September 2003

Name of Developer	Date of Commissioning	Reference	Capacity [MW]
Ramgad Mineral and mining Pvt. Ltd-1	30-Sep-03	http://www.sgsqualitynetwork.com/tradeassurance/ccp/projects/434/Revised%20Final%20CDM_4_Kar_PDD.pdf	1.900
MSPL—2	30-Sep-03	http://www.sgsqualitynetwork.com/tradeassurance/ccp/projects/434/Revised%20Final%20CDM_4_Kar_PDD.pdf	4.750
Mansukmahal Pvt., Ltd.,	21-Nov-03	http://cdm.unfccc.int/UserManagement/FileStorage/TNG2TJ04HKGYDD0FDPQ3183YMSH0IE	0.950
Good luck syndicate.,	24-Mar-04	http://cdm.unfccc.int/Projects/DB/SGS-UKL1187708460.15/view	0.600
Associate Autotex Ancillaries (P) Ltd.,	24-Mar-04	http://cdm.unfccc.int/Projects/DB/SGS-UKL1187708460.15/view	0.600
Sanja D Ghodawat (HUF)	24-Mar-04	http://www.myclimate.org/fileadmin/images/ksp/ksp_international/726_wind_india/India_Chitradurga_bundled_wind_power_project_PDD.pdf	0.600
B.S. Chanabasappa & sons	Mar-04	PP has envisaged the project with carbon revenues and project is currently under VCS validation.	0.60
Shardha Constructions Enginners and Contractors	27-Mar-04	http://cdm.unfccc.int/Projects/Validation/DB/RA4Q4SH9WQM0UF4PVY66UTUAHZAT84/view.html	4.200
VXL Systems.,	27-Mar-04	http://cdm.unfccc.int/Projects/DB/SGS-UKL1187708460.15/view	0.600
Star Flexi Pack Industries	27-Mar-04	http://www.myclimate.org/fileadmin/images/ksp/ksp_international/726_wind_india/India_Chitradurga_bundled_wind_power_project_PDD.pdf	0.600
Sanjay D Ghodawat (Individual)	27-Mar-04	http://www.myclimate.org/fileadmin/images/ksp/ksp_international/726_wind_india/India_Chitradurga_bundled_wind_power_project_PDD.pdf	0.600
Ghodawat pan Masala products (I) Pvt., Ltd.,	27-Mar-04	http://www.athensclassicmarathon-green.gr/images/offsetting%20projects.pdf	4.200
Shreyalakshmi and properties	27-Mar-04	http://cdm.unfccc.int/Projects/DB/SGS-UKL1187708460.15/view	0.600
CEPCO Industries Pvt. Ltd.	29-Mar-04	http://cdm.unfccc.int/Projects/DB/SGS-UKL1187708460.15/view	1.200
MSPL Ltd.	31-Mar-04	http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view	3.750

Name of Developer	Date of Commissioning	Reference	Capacity [MW]
MSPL-3	31-Mar-04	http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view	3.800
MSPL-7	31-Mar-04	http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view	2.850
MSPL-6	31-Mar-04	http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view	3.800
MSPL -1	10-Apr-04	http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view	2.500
MSPL-5	16-Apr-04	http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view	2.250
MSPL-4	16-Apr-04	http://cdm.unfccc.int/Projects/DB/DNV-CUK1142448670.58/view	1.500
Esawi knittings	16-Apr-04	http://www.cdmindia.nic.in/cdmindia/projects/PCN_931_08.pdf	1.500
Eswari Garements	16-Apr-04	http://www.cdmindia.nic.in/cdmindia/projects/PCN_931_08.pdf	0.750
Total Capacity envisaged with carbon revenues			**44.70**

The total of 46.84 MW capacity is installed in the period of 01 September 2003 to 04 May 2004 out of which 44.70 MW are envisaged with carbon revenues and information on these is publicly available. This clearly establishes that diffusion of similar project activities without CDM/Carbon revenues in the relevant region is insignificant.

Sub step 4(b) 'Discuss any similar options that are occurring'

In total 46.84 MW of wind project capacity was installed during the period from 01 September 2003 to 04 May 2004, of which information of 44.70 MW being in the CDM/VCS pipeline (i.e more than 95% of the installed capacity is envisaged with carbon revenues) is publicly available and can be corroborated from the UNFCCC website and other VCS registries.

In regard to the balance 2.14 MW, information relating to CDM/VCS is not publically available. We have also tried to contact the project owners for this 2.14 MW capacity and requested for information such as PLF, interest rate, debt-equity ratio etc. but we have not received any infomation from the project owners. Therefore it is not possible to make a detailed analysis of this 2.14 MW and its distinction from our project activity and we have therefore excluded this 2.14 MW for further analysis. It can therefore be concluded that there are no similar projects observed in the region of project activity.

Hence the project activity is not common practice and the project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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According to the approved baseline methodology ACM0002, the emission reductions ***ERy*** by the project activity during a given year "*y*[1]" is

ERy = BEy – PEy – Ly……..(1)

where *BEy* is the baseline emissions
PEy is project activity emissions and;
Ly is the amount of emissions leakage resulting from the project activity.

Baseline Emissions for the amount of electricity supplied by project activity, *BEy* is calculated as

BEy = EGy * EFy ……..(2)

where *EGy* is the electricity supplied to the grid, *EFy* is the CO_2 emission factor of the grid as calculated below.

The emission factor *EFy* of the grid is represented as a combination of the Operating Margin (OM) and the Build Margin (BM). Considering the emission factors for these two margins as $EF_{OM,y}$ and $EF_{BM,y}$, then the *EFy* is given by:

$$EFy = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y} \quad \text{……...(2)}$$

with respective weight factors w_{OM} and w_{BM} (where $w_{OM} + w_{BM} = 1$).

The Operating Margin emission factor

As per ACM0002, dispatch data analysis should be the first methodological choice. However, this option is not selected because the information required to calculate OM based on dispatch data is not available in the public domain for the Southern electricity regional grid.

The Simple Operating Margin approach is appropriate to calculate the Operating Margin emission factor applicable in this case. As per ACM 0002 the Simple OM method can only be used where low cost must run resources constitute less than 50% of grid generation based on average of the five most recent years. The generation profile of the Southern grid in the last five years is as follows:

Generation in GWh	2004-05	2003-04	2002-03	2001-02	2000-01

[1] Throughout the document, the suffix *y* denotes that such parameter is a function of the year y, thus to be monitored at least annually.

Low cost/must run sources					
Hydro	24,951	16,943	18,288	26,260	29,902
Wind & Renewables	3,256	1,865	1,607	1,456	1,262
Nuclear	4,408	4,700	4,390	5,244	4,331
Other sources					
Coal	99,010	98,435	92,053	84,032	83,292
Diesel	2,434	3,295	4,379	4,155	2,868
Gas	12,428	14,214	13,950	10,331	7,132
Total Generation	**146,487**	**139,451**	**134,667**	**131,478**	**128,787**
Low cost/must run sources	32,615	23,508	24,285	32,960	35,496
Low cost/must run sources	22%	17%	18%	25%	28%

Source: Table 3.4 of CEA General Review 2004-05, 2003-04, 2002-03, 2001-02, 2000-01

From the available information it is clear that low cost/must run sources account for less than 50% of the total generation in the Southern grid in the last five years. Hence the Simple OM method is appropriate to calculate the Operating Margin Emission factor applicable.

Build Margin Emission Factor

The Build Margin emission factor *EF_BMy* (tCO_2/GWh) is given as the generation-weighted average emission factor of the selected representative set of recent power plants represented by the 5 most recent plants or the most recent 20% of the generating units built (summation is over such plants specified by k):

$$EF_{BM,y} = [\sum_i F_{i,m,y} * COEFi] / [\sum_k GEN_{k,m,y}] \quad \text{.....(5)}$$

The summation over *i* and *k* is for the fuels and electricity generation of the plants in sample *m* mentioned above.

The choice of method for the sample plant is the most recent 20% of the generating units built as this represents a significantly larger set of plants, for a large regional electricity grid have a large number of power plants connected to it, and is therefore appropriate.

The Central Electricity Authority, Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. The CO2 Baseline Database provides information about the Operating Margin and Build Margin Emission Factors of all the regional electricity grids in India. The Operating Margin in the CEA database is calculated ex ante using the Simple OM approach and the Build Margin is calculated ex ante based on 20% most recent capacity additions in the grid based on net generation as described in ACM0002. We have, therefore, used the Operating Margin and Build Margin data published in the CEA database, for calculating the Baseline Emission Factor.

Combined Margin Emission Factor

As already mentioned, baseline emission factor (EFy) of the grid is calculated as a combined margin (CM), calculated as the weighted average of the operating margin (OM) and build margin (BM) factor. In case of wind power projects default weights of 0.75 for EF_{OM} and 0.25 for EF_{BM} are applicable as per ACM0002. No alternate weights are proposed.

Using the values for operating margin and build margin emission factors provided in the CEA database and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 932.04 tCO2e/GWh or 0.93204 tCO2e/MWh.

Project Emissions:

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

PEy = 0

Leakage:

Emissions Leakage on account of the project activity is ignored in accordance with ACM0002.

Ly = 0

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

>>

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO2e/MWh
Description:	Operating Margin Emission Factor of Southern Regional Electricity Grid
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value applied:	2002 – 03: 0.9970 2003 – 04: 1.0094 2004 – 05: 1.0038
Justification of the choice of data or description of measurement methods and procedures actually applied :	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002.

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO2e/MWh
Description:	Build Margin Emission Factor of Southern Regional Electricity Grid
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value applied:	2004 – 05 | 0.718
Justification of the choice of data or description of measurement methods and procedures actually applied :	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002.

B.6.3 Ex-ante calculation of emission reductions:

>>

Ex-ante calculation of emission reductions is equal to ex-ante calculation of baseline emissions as project emissions and leakage are nil.

Baseline emission factor (combined margin)
= 932.04 tCO2e/GWh

Annual electricity supplied to the grid by the Project
= 73.60 MW (Capacity) x 26.5% (PLF) x 8760 (hours) / 1000 GWh
= 170.85504 GWh

Annual baseline emissions
= 932.04 tCO2e/GWh x 170.85504 GWh
= 159,244 tCO2e

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

>>

Year	Estimation of project activity emissions (tonnes of CO2e)	Estimation of baseline emissions (tonnes of CO2e)	Estimation of leakage (tonnes of CO2e)	Estimation of overall emission reductions (tonnes of CO2e)
25 October 2007 to 31March 2008	0	86,257	0	86,257
01 April 2008 to 31 March 2009	0	159,244	0	159,244

01 April 2009 to 31 March 2010	0	159,244	0	159,244
01 April 2010 to 31 March 2011	0	159,244	0	159,244
01 April 2011 to 31 March 2012	0	159,244	0	159,244
01 April 2012 to 31 March 2013	0	159,244	0	159,244
01 April 2013 to 31 March 2014	0	159,244	0	159,244
01 April 2014 to 31 March 2015	0	159,244	0	159,244
01 April 2015 to 31 March 2016	0	159,244	0	159,244
01 April 2016 to 31 March 2017	0	159,244	0	159,244
01 April 2017 to 24 October 2017	0	72,987	0	72,987
Total (tonnes of CO2e)	0	1,592,440	0	1,592,440

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

B.7.1 Data and parameters monitored:

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Data / Parameter:	EGy
Data unit:	MWh (Mega-watt hour)
Description:	Net electricity supplied to the grid by the Project
Source of data to be used:	Electricity supplied to the grid as per Joint Meter Readings (Form B) taken at 33kV metering point for each of the sub project included in the project activity.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Annual electricity supplied to the grid by the Project = 73.6 MW (Capacity) x 26.5% (PLF) x 8760 (hours) MWh = 170855.04 MWh
Description of measurement methods and procedures to be applied:	Metering system for the project activity consists of dedicated main and check meters for each of the sub project owner included in the project activity at 33 kV metering location.Additionally, another set of main and check meters (bulk meters) are installed at the substation to which the project activity's sub-project is connected with projects of other project developers. The subprojects included in the project activity are connected to respective Enercon substations as shown in Annex-4. The bulk meters installed at the substation are also connected to other sub project activities of the same project and to other project activities. Based on individual readings of each meter at the sub project activity site and of respective bulk meters at the substation, a factor known as Transmission Loss% is calculated and recorded by the by the statutory authority. The transmission loss% calculated by the state utility is endorsed / confirmed jointly by the representatives of Enercon (India) Ltd.(EIL).Each meter is also assigned a Multiplication Factor (MF) based on the CT ratio of the installation; this (MF) is displayed at the metering station and is also recorded in the JMR. The meter readings are multiplied with the MF to which the transmission loss is applied to arrive at the net export of power from the sub project activity. The import readings recorded at the sub project activity site are adjusted for a default factor of 15%. The difference of net export and 115% of import reading is recorded as net electricity supplied to the grid by the sub project activity and is shown as the net energy to be billed in the JMR. The aggregate sum of all such individual net electricity supplied by the bundle components is reckoned as the net electricity supplied to the grid by the project for calculation of Certified Emission Reductions. The Joint Meter Readings (JMR) issued in FORM B by the statutory authority contains recorded details of opening and closing meter readings of export and import as per the main and check meters of each sub project activity, the transmission losses apportioned and the net electricity supplied by the sub project activity. The JMR is recorded by the authorised representative of the power purchasing company in the presence of the authorised representative of the project and is duly signed by both in acceptance of the correctness of the

	entries. Frequency of recording data: Monthly Recording: The values of electricity supplied to the grid are sourced from JMR for the sub projects at 33 kV metering point. Responsibility: Joint responsibility of EIL and state utility.
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by the state utility pursuant to the provisions of the power purchase agreement. Main and check meters are calibrated once in a year. Refer Annex – 4 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data 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.

Data / Parameter:	**EGexport**
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity Export recorded at the designated meter. All the subprojects included in the project activity have dedicated main and check meters at 33 kV metering point.
Source of data to be used:	Electricity export to the grid as per joint meter reading (FormB) for each of the sub project taken at 33kV metering point. The main meter reading is considered for all calculations. The purpose of the check meter is to serve as a check on the accuracy of measurement and its reading is used when main meter is not working properly.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This value will be taken from the JMR (Form B) taken at 33kV metering point.
Description of measurement methods and procedures to be applied:	Monitoring: Electricity export to the grid will be recorded by the meters (main and check meters) at 33kV point. Refer section B.7.2 and Annex – 4 for an illustration of the provisions for measurement methods. Frequency of recording data: Monthly Recording: The values of electricity exports to the grid are sourced from JMR for the sub projects at 33 kV metering point. Responsibility: Joint responsibility of EIL and state utility
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility. Refer Annex – 4 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data 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.

Data / Parameter:	EG_{import}
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity Import recorded at the meters (main and check meters). All the subprojects included in the project activity have dedicated main and check meters at 33 kV metering point.
Source of data to be used:	Electricity import from the grid as per joint meter reading for each of the sub project taken at 33kV metering point.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This value will be taken from the JMR (Form B) taken at 33 kV metering point and will be applied directly. The main meter reading is considered for all calculations. The purpose of the check meter is to serve as a check on the accuracy of measurement and its reading is used when main meter is not working properly.
Description of measurement methods and procedures to be applied:	Monitoring: Electricity import from the grid will be recorded by meters (main and check meters) at 33kV metering point. Refer section B.7.2 and Annex – 4 for an illustration of the provisions for measurement methods. Frequency of recording data: Monthly Recording: The values of electricity import to the grid are sourced from JMR for the sub projects at 33 kV metering point. Responsibility: Joint responsibility of EIL and state utility
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility and the PP except or otherwise explicitly stated in the PDD. Refer section B.7.2 Annex – 4 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data 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.

Data / Parameter:	T_E
Data unit:	MWh (Mega-Watt hour)
Description:	Transmission loss for export between the metering location at 33 kV metering point and the high voltage side of the substation to which the subproject is connected.
Source of data to be used:	Transmission Loss for export will be sourced from the joint meter reading (Form B) taken at 33kV metering point for all the sub projects included in the project activity.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	This value is certified by the State utility in the JMR (Form B). This value will be directly sourced from the JMR (Form B).
Description of measurement methods and procedures to be applied:	Monitoring: Transmission loss between metering location at 33 kV and the metering location at receiving substation is applied to the meter reading taken at meters connected at 33 KV point for the project activity.

	The Substation is connected to the machines of the project activity and the machines commissioned by the other project owners. Therefore transmission loss is applied by the state utility as reflected in the JMR (Form B) taken at 33kV point for all the sub projects included in the project activity. The JMR is signed by the representatives of Enercon and the state utility. Refer section B.7.2 and Annex – 4 for an illustration of the provisions for measurement methods. Frequency of recording data: Monthly Recording: The value of transmission loss is sourced from JMR for all sub projects at 33 kV metering point. Responsibility: Joint responsibility of Enercon and state utility Refer section B.7.2 and Annex – 4 for an illustration of the provisions for measurement methods.
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility and the PP. Refer section B.7.2 and Annex – 4 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data 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.

The data will be stored in hard format and soft format by PP (EIL) at the project site office. Joint meter reading is taken in the presence of the persons representing EIL [Operation and Maintenance Contractor] and the state utility. The archived records will be kept for the period up to two years after the completion of the crediting period.

B.7.2 Description of the monitoring plan:

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Approved monitoring methodology ACM0002 / Version 06 Sectoral Scope: 1, "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources", by CDM - Meth Panel is proposed to be used to monitor the emission reductions.

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.

There is dedicated main and check meters for each of the sub projects included in the project activity at 33kV metering point. The feeders of 33 kV metering point are further connected to step up transformer at substation and subsequently to bulk meter at high voltage side of receiving substation. The bulk meters are connected to machines of the project activity and the machines commissioned by the other project developers.

The subprojects included in the project activity are connected to respective Enercon substations as shown in Annex-4, where the bulk meters are located:
Therefore in order to determine the net electricity supplied to the grid by the project at high voltage side of receiving substation, the state utility applies the transmission loss to the meter reading recorded at the 33 KV metering point. The transmission loss calculated by the state utility is endorsed / confirmed jointly by the representatives of EIL and the state utility.

The procedure for calculation of transmission loss as given in the PPA is set-out below:

$$Z = \frac{(X1+X2+X3\ldots+Xn)-Y}{(X1+X2+X3\ldots+Xn)} \times 100$$

Z = Percentage transmission loss for export incurred in transmission line between the meters located at 33 kV metering point (including the machines of the project activity and other project developers) and the meters located at high voltage side (bulk meter: main and check) of receiving sub-station.

Summation of meter readings at 33 kV metering points for all the project developers connected to receiving substation (including the machines of the project activity and other project developers)= $(X1 + X2 + X3 \ldots + Xn)$

Xi (where, i can vary from 1 to n)= Energy Export Reading (Xi) noted at energy meter installed at 33kV metering point and represents the meters connected to project activity and other project developers. X1, X2, X3,…Xn are the meters that are installed at 33kV metering point (including the machines of the project activity and other project developers) and further connected to the receiving substation by internally connected lines.

Y = Energy Export Reading at bulk meter installed at high voltage side of transformer of the receiving sub-station

The Export Reading is adjusted for transmission loss that is determined by the state utility as above is applied directly to the JMR (Form B) for each sub project included in the project activity taken at 33 kV metering point.

Transmission Loss in Export **(TE)** = Transmission Loss% (Z) * Energy Export at 33kV metering point (EGExport)

This calculated value of transmission loss (expressed in MWh) is shown in the JMR and can be verified.

In case of Energy Import, the state utility conservatively applies adjustment of 15% to the import values noted at 33 kV metering point.

Therefore, Energy Supplied to Grid for each of the sub projects is calculated after adjustment of actually calculated transmission loss to the electricity exported from which 115% import is deducted. Thus,

EGy (Sub project) = EGexport– 115%*EGimport – Transmission Loss (TE)
This is shown as the energy to be billed in the JMR recorded in FORM B.
The JMR in FORM B for each of the sub project noted at 33 KV metering location contains the following data:-

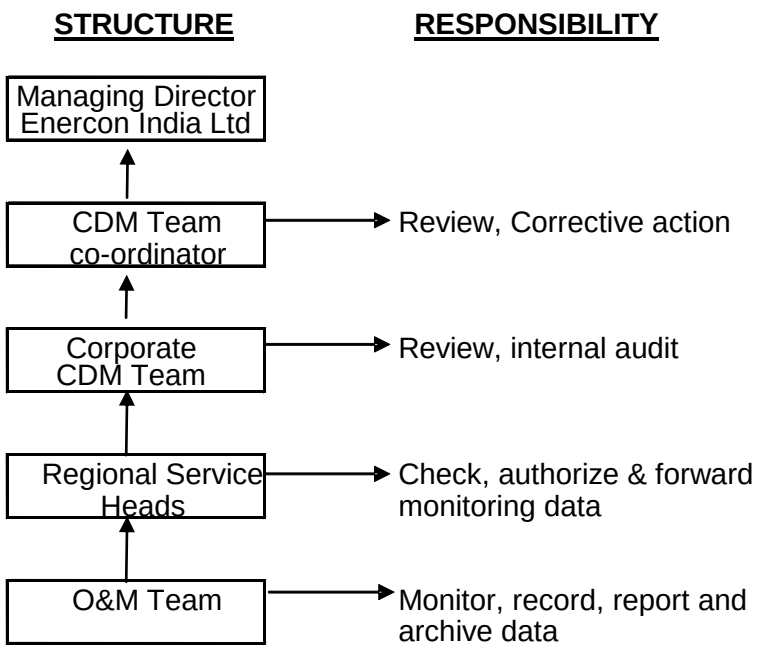
1. Present meter readings of main and check meters for export and import
2. Previous meter readings of the main and check meters for export and import
3. Multiplying constant
4. Energy exported / energy imported (difference of 1 and 2 multiplied by 3)
5. Transmission losses (calculated as above)
6. Energy to be billed (calculated as energy exported–transmission loss-115% import) (reckoned as net energy generated and used for calculation of CER)

JMR is signed by the representatives of EIL and the state utility. The net electricity supplied to the grid can be cross checked from the invoices for each of the sub project raised on the state utility for supply of net electricity supplied to the grid.
In addition to the JMR (Form B) at 33kV metering location for each of the sub project included in the project activity as per details shown above, the following documents will also be provided to the DoE for verification:

1. JMR (Form B) at high voltage side of receiving sub-station (bulk meters: main and check).
2. Transmission loss calculation endorsed / confirmed jointly by the representatives of Enercon and the state utility.

Net electricity Supplied to Grid for the project activity is summation of Net electricity Supplied to Grid for each of the sub project included in the project activity.

The Project is operated and managed by Enercon (India) Ltd. The operational and management structure implemented by Enercon is as follows:



Training and maintenance:

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the Wind Energy Converters (WECs), it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that Enercon's service staff is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. 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 site personnel of EIL are also provided training about monitoring aspects of wind turbine performance; they are fully qualified to carry out all site duties such as preventive maintenance, operation controls and all monitoring processes.

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

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Date of completion: 12/02/2007

Name of responsible person/entity:
PricewaterhouseCoopers (not a Project Participant)

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

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04/05/2004, being the date of place of purchase order for the first project in the bundle

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

>>

20 years

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

C.2.1. Renewable crediting period

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

>>

C.2.1.2. Length of the first crediting period:

>>

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

25/10/2007, or date of registration with CDM-EB

C.2.2.2. Length:

>>

10 years

SECTION D. Environmental impacts

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D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

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Enercon appointed Aditya Environmental Services Private Limited to conduct Rapid Environmental Impact Assessment Study, in the districts of Chitradurga and Gadag where the project activity of Enercon is located, to assess the impact of the project on the local environment

Environmental Impact Assessment (EIA) of this project is not an essential regulatory requirement, as it is not covered under the categories as described in EIA Notification of 1994 or the Amended Notification of 2006. However, Enercon conducted the EIA to study impacts on the environment resulting from the project activity.

The EIA study included identification, prediction and evaluation of potential impacts of the CDM activities on air, water, noise, land, biological and socioeconomic environment within the study area. The ambient air concentrations of Suspended Particulate Matter, Respirable Particulate Matter, Oxides of Nitrogen, Sulphur dioxide and Carbon Monoxide were monitored and were found under limits as specified by CPCB. The noise levels were observed through out the study period and were found to be in the permissible range. Water quality monitoring studies were carried out for determination of physico-chemical characteristics of bore wells. The ph level of water was found to be under the specified limits.

The study area represents part of Chitradurga and Gadag districts. The terrain comprises hilly areas which are sparingly populated, the hills are generally covered with shrubs and grass and trees are not found on the hilltops. Moreover the project area doesn't fall under any protected land for wildlife and it has no adverse ecological impacts on the surroundings, flora and fauna found in the vicinity of the project area. The wind-farms do not effect the path of migratory birds.

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:

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EIA demonstrated that there is no major impact on the environment due to the installation and operation of the windmills. The local ecology is not likely to get impacted by this type of project activity. The local population confirmed that there is no noise or dust nuisance due to windmills. The EIA also ruled out any adverse impacts due to the project activity.

SECTION E. Stakeholders' comments

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

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The comments from local stakeholders were invited through local stakeholder meeting conducted on 2 September at Arashinagundi Village, Hiriyur in Chitradurga District and 15 June 2006 in Dhoni, Mundaragi in Gadag district. An advertisement was placed in a local newspaper in Vijaya Karnataka on 19 August 2006 inviting the local stakeholders for the meeting for the projects in Chitradurga district and in Vijaya Karnataka on 4 June 2006 for the projects in Gadag district.

The local stakeholder consultation meeting had representatives from the nearby villages, representatives of Enercon and representative of Aditya Environmental Services (consultant to Enercon) in Chitradurga district and representative of Care Sustainability (consultant to Enercon) in Gadag district. The minutes of the two meetings are set out in Appendix 2.

E.2. Summary of the comments received:

>>

Chitradurga district:

The local stakeholders commented that the development of wind projects has helped the local villagers and provided employment. Further, there is no impact of windmills on the rainfall in the region. The local stakeholders queried Enercon if any afforestation work is being conducted, impact on ground water, generation capacity of the machine, if public can purchase the machines and whether revenue land is used wherever electricity overhead lines pass through.

The local villagers responded to the questions queries made by Enercon by stating that there is no noise pollution as the projects are located in hilltops and away from villages. Further, there is no water draining and soil erosion due to wind mills and there has been no problem with No cattle grazing in the hills. There has been better food production due to better quality of electricity and less load shedding. There has been no deforestation noticed except while road formation and installation of machines and no damage or accidents during construction or erection.

Gadag district:

The local stakeholders commented that there is no adverse impact of wind project activities including no adverse impact on livelihood. The local villages do not use the hill tops or slopes for cattle grazing. There is no impact on ground water or supply of water to agriculture fields. There is no disturbance or high noise level due to operation of the wind mills. There have been no accidents and no disturbance or heavy traffic on account of wind mills. No dust emissions were observed at project site or in the neighbourhood. The wind projects have not affected migratory path of birds. There have been local employment opportunities. Improvement in quality of electricity supply has been observed.

The local stakeholders suggested that in addition to planting medicinal plants at the project site, Enercon should also plant them at the down plains. Enercon should extend help to villagers by providing "lift/transportation" and additional watchmen should be deployed to warn of forest fire.

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

>>

Enercon provided the following responses in relation to the comments received from the local stakeholders in Chitradurga district:

- Enercon is carrying out afforestation work in all the hills where the wind turbines are installed.
- There is no impact on ground water due to wind mills.
- Generation capacity of wind mills is 800 and 600 kW.
- It is possible to purchase wind mills. In Maharashtra, farmers association has purchased one wind machine.
- Revenue land is not being used wherever electrical overhead lines pass. Access to the land is required only for line inspection in case of a fault.

Enercon provided the following responses in relation to the comments received from the local stakeholders in Gadag district:

- Regarding planting medicinal plants, Enercon is currently doing it at the project site and would also be planting on the slopes.
- Regarding assistance with transport, Enercon would do their best to provide help to the villagers in the emergency cases.
- Regarding forest fire warning/safety, Enercon would be constructing a three feet trench on the slopes and around the project site. It has also instructed watchmen and security guards to be vigilant and provide warning in the cases of occurrences of forest fires.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

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Represented by:	
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The Project activity does not involve any ODA financing.

Annex 3

BASELINE INFORMATION

The Operating Margin data for the most recent three years and the Build Margin data for the Southern Region Electricity Grid as published in the CEA database are as follows:

Simple Operating Margin

	tCO2e/GWh
Simple Operating Margin - 2002-03	997.02
Simple Operating Margin - 2003-04	1,009.37
Simple Operating Margin - 2004-05	1,003.76
Average Operating Margin of last three years	1,003.38

Build Margin

	tCO2e/GWh
Build Margin - 2004-05	717.99

Combined Margin calculations

	Weights	**tCO2e/GWh**
Operating Margin	0.75	1003.38
Build Margin	0.25	717.99
Combined Margin		**932.04**

Detailed information on calculation of Operating Margin Emission Factor and Build Margin Emission Factor is available at www.cea.nic.in.

Annex 4

MONITORING INFORMATION

- **Metering:** Electricity supplied to the grid is metered jointly by state utility and Enercon through dedicated main and check meters at 33 kV metering point for each of the sub project included in the project activity.

  In addition to this there are main and check meters (Bulk meters) at high voltage side of receiving sub-station covering sub projects of the project activity and machines of other project developers. There are four receiving stations to which the sub projects included in the project activity are connected. The sub projects and the respective sub stations to which they are connected is provided under section B.7.2.

  The schematic diagram shows location of meters for the project activity is attached as Appendix 1.

- **Metering Equipment:** Metering system for the project activity consists of main and check meters at 33kV metering point for each of the sub project included in the project activity and set(s) of main and check meters at high voltage side of receiving substation. All the meters are **two-way trivector meters capable of recording import and export of electricity.** The meters installed are capable of recording and storing half hourly readings of the electrical parameters for a minimum period of 35 days with digital output.

- **Meter Readings:** The electricity export and import to the grid is recorded by taking a Joint Meter Reading (JMR) in the presence of Officials from state Utility and Enercon India Limited at 33kV metering point for each of the sub project included in the project activity. The Joint meter reading contains the value of energy imported, exported, transmission loss and the net electricity exported to the grid during the recording period. This Joint meter reading is certified by the Executive engineer of the state utility and by Enercon Officials. These certified readings are then used by the state utility to prepare the tariff invoices. Thus net electricity supplied to the grid for each of the sub project included in the project activity can be crosschecked with the value mentioned in the invoices raised on the state utility by each of the sub project included in the project activity

- **Inspection of Energy Meters:** All main and check energy meters and all associated instruments, transformers installed at the Project are of 0.2% accuracy class. Each meter is jointly inspected and sealed on behalf of the Parties and is not to be interfered with by either Party except in the presence of the other Party or its accredited representatives.

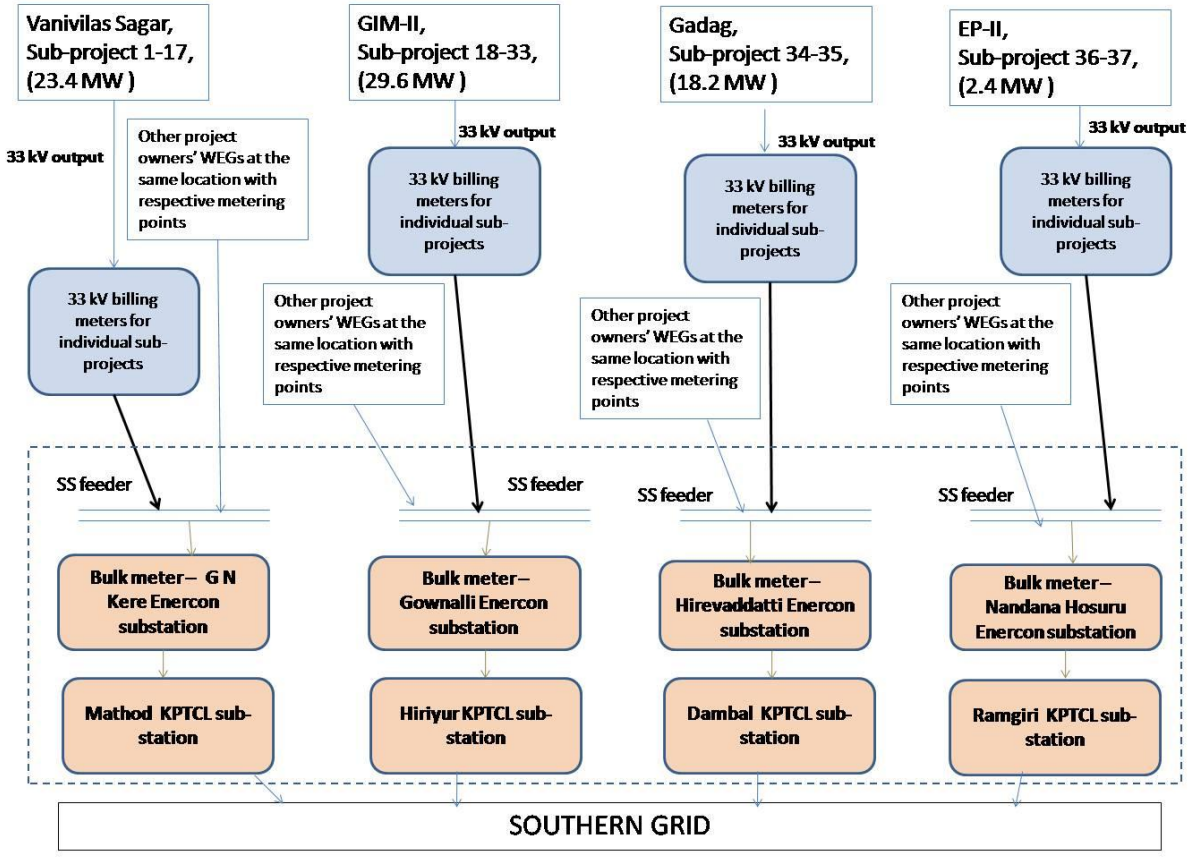
- **Meter Test Checking:** All main and check meters are tested for accuracy with reference to a portable standard meter. The portable standard meter is owned by KPTCL. The main and check meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. The consumption registered by the main meters alone will hold good for the purpose of metering electricity supplied to the grid as long as the error in the main

meters is within the permissible limits. All the meters will be tested / calibrated for accuracy annually.

If during the meter test checking,

- The main meter is found to be within the permissible limit of error and the corresponding check meter is beyond the permissible limits, then the meter reading will be as per the main meter as usual. The check meter shall, however, be calibrated immediately.
- The main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within permissible of error, then the meter reading for the month up to the date and time of such test shall be as per the check meter. There will be a revision in the meter reading for the period from the previous calibration test up to the current test based on the readings of the check meter. The main meter shall be calibrated immediately and meter reading for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.
- Both the main meters and the corresponding check meters are found to be beyond the permissible limits of error, both the main meters shall be immediately calibrated and the correction applied to the reading registered by the main meter to arrive the correct reading of energy supplied for metering electricity supplied to the grid for the period from the last month's meter reading up to the current test. Meter reading for the period thereafter till the next monthly reading shall be as per the calibrated main meter.
- If during any of the monthly meter readings, the variation between the main meter and the check meter is more than the permissible limit for meters of 0.2% accuracy class, all the meters shall be re-tested and calibrated immediately.

Metering Arrangement for the Project Activity



NOTE: There are 37 installations of 33 kVA billing meters and 4 substation (ss) metering points, details of which are as provided below:

S. No	Name of Customers	Capacity (MW)	R.R. NO.	Site Name	Name of Enercon Substation	Meter Accuracy Class
1	Primetex Apparels India	0.6	VVS-24	Vanivilas Sagar	G N Kere sub-station	0.2S
2	Patel Shanti Steels P. Ltd.	0.6	VVS-21,	Vanivilas Sagar		0.2S
3	Patel Shanti Steels P. Ltd.	0.6	VVS-32	Vanivilas Sagar		0.2S
4	Laxmi Organics	1.2	VVS 25	Vanivilas Sagar		0.2S
5	Rohit Surfactants P.Ltd	6	VVS 27	Vanivilas Sagar		0.2S
6	Cooper foundry	2.4	VVS-26	Vanivilas Sagar		0.2S
7	I. G. E. (India)	0.6	VVS-40	Vanivilas Sagar		0.2S
8	International Conveyors Ltd	0.6	VVS-38	Vanivilas Sagar		0.2S
9	Jitendra D. Majetha	0.6	VVS-31	Vanivilas Sagar		0.2S
10	Swaraj PVC Pipes P. Ltd.	0.6	VVS-39	Vanivilas Sagar		0.2S
11	Shilpa Medicare Ltd.	1.2	VVS-41	Vanivilas Sagar		0.2S
12	Amrit Bottlers	1.2	VVS-42	Vanivilas Sagar		0.2S
13	Brindavan Agro	1.2	VVS-33	Vanivilas Sagar		0.2S
14	MK Agrotech Private Ltd	1.2	VVS-43	Vanivilas Sagar		0.2S
15	Unnathi Projects Ltd	0.6	VVS-30	Vanivilas Sagar		0.2S
16	Unnathi Projects Ltd	1.8	VVS-36	Vanivilas Sagar		0.2S
17	S.E.Investment	2.4	VVS-35	Vanivilas Sagar		0.2S
18	Jubilee Textiles	0.8	ELP-3	GIM-II	Gownalli sub-station	0.2S
19	Amrit Bottlers	0.8	ELP-13	GIM-II		0.2S

20	Srinivasa Cystine Ltd	1.6	ELP-5	GIM-II		0.2S
21	B.V.Finance and leasing	1.6	ELP-6	GIM-II		0.2S
22	Brindavan Agro	3.2	ELP-7	GIM-II		0.2S
23	Avanti Feeds Ltd	3.2	ELP-4	GIM-II		0.2S
24	Indian power corporation	2.4	ELP-15	GIM-II		0.2S
25	Indian power corporation	4.8	ELP-16	GIM-II		0.2S
26	Indian power corporation	3.2	ELP-26	GIM-II		0.2S
27	Neharaj Energy	0.8	ELP-2	GIM-II		0.2S
28	Vivek Trading Co.	0.8	ELP-11	GIM-II		0.2S
29	Unnathi Project Ltd	0.8	ELP-19	GIM-II		0.2S
30	Mumbai Stock Brokers Pvt. Ltd.	0.8	ELP-21	GIM-II		0.2S
31	Siddaganga Oil Extractions Ltd.	1.6	ELP-32	GIM-II		0.2S
32	Prasad Technology Park	1.6	ELP-18	GIM-II		0.2S
33	D. R. Container Terminal	1.6	ELP-22	GIM-II		0.2S
34	Enercon Wind Farms (Krishna) Ltd	15	HBL/TL&SS / WF/EWKLH /6	Gadag	Hirewadatti sub-station	0.2S
35	Enercon Wind Farms (Karnataka) Ltd	3.2	HBL/TL&SS / WF/EWKLH /07	Gadag		0.2S
36	Dinesh Pouches	0.8	EP2-26	EP-II	Nandana Hosuru sub-station	0.2S
37	Ush Dev International	1.6	EP2-24	EP-II		0.2S
	Total Capacity (MW)	**73.60**				

The details of meters installed at receiving station for the purpose of measuring and allotting transmission losses are provided below:

S. No	Name of Substation	RR. No	Meter accuracy class
1	EP-II Sub-station at Nandana Hosuru	EP2-01	0.2S
		EP2-02	0.2S
2	GIM-II Sub-station at Gownalli	ELP-17	0.2S
		ELP-41	0.2S
3	Gadag Sub-station at Hiredawatti	HBL/TL/&SS/WF/SP ML/5	0.2S
4	VVS Sub-station at G N Kere	VVS-01	0.2S
		VVS-02	0.2S

Annex 5
COST OF EQUITY CALCULATION

Calculation of Cost of Equity:

The expected return on equity has been determined using the Capital Asset Pricing Model (CAPM)[5]. The CAPM economic model is used worldwide to determine the required/expected return on equity based on potential risk of an investment. The CAPM framework is the Nobel award winning work of financial economist Dr. William Sharpe.

Ke = Rf + B x (Rm – Rf)
where:
Ke = Rate of return on equity capital;
Rf = Risk-free rate of return;
B = Beta;
Rm – Rf = Market risk premium;

Risk free rate:

The risk free rate is understood as the rate of return on an asset that is theoretically free of any risks, therefore the rate of interest on government bonds are considered as risk free rates. Page 191 of text book on "Corporate Finance Theory and Practice" by Dr. Aswath Damodaran[6] of Stern School of Business, New York University (attached as Appendix 5) describes that the long term government bond rates are suitable indicators of risk free rates when the time horizon for the investment is long term.

Accordingly the risk free rate has been taken from long dated Indian government bond rates at the project start date (which is 2004) which has been considered as it was in the year of investment (i.e in that year, the company had the alternative of this long term risk free investment). The data on government bond rates is published by Reserve Bank of India. (Web-link: http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf)

The applicable risk free rate is 5.71%.

Risk Premium:

The most common approach for estimating the risk premium is to base it on historical data, in the CAPM, the premium is estimated by looking at the difference between average return on stocks and return on government securities. It is preferred to use long term premimums, since considering shorter time periods can lead to large standard errors because volatility in stock returns [page 191,

[5] The Capital Asset Pricing Model (CAPM) was published in 1964 by William Sharpe, for his work on CAPM Sharpe received the Nobel Prize in 1990. http://www.investopedia.com/articles/06/CAPM.asp

[6] Dr. Damodaran is one of the foremost authorities in the world in the field of Investment Analysis

Corporate Finance Theory and Practice, Dr. Aswath Damodaran. Attached as appendix 5]. It is also preferred to calculate the risk premium based on geometric mean of the returns since arithmatic mean overstates the risk premium. Geometric mean is defined as the compounded annual return over the same period [page 191, Corporate Finance Theory and Practice, Dr. Aswath Damodaran. Attached as appendix 5].

Therefore the risk premium has been calculated as the difference in compounded annual return bewteen the BSE-200 and the Government bond rates since the year of inception of BSE 200. The detailed calculations are presented in the attached excel sheet.

Source: BSE Stock Exchange (www.bseindia.com)

The applicable risk premium is 11.00%.

Beta:

Beta (B) indicates the sensitivity of the company to market risk factors. For companies that are not publicly listed, the beta is determined by referring beta values of publicly listed companies that are engaged in similar types of business. The project activity type is wind power generation; the approach therefore should be to base the beta for the project on the beta values of listed wind power generation companies in India. Therefore, in the absence of adequate data on companies which are exclusively into the exactly same type of business (i.e wind power projects), the next best option for assessing the risk of these projects is to consider the data available on companies which are involved in similar businesses.

Therefore, we have considered beta values of all electricity generating companies in India. The group of companies considered includes renewable as well as conventional power generating companies. Investors demand a higher return from renewable energy projects than from conventional energy ones, given the higher risks in renewable, including risks of technology, risks from significantly varying and unpredictable resource availability (e.g. wind), and a lower established support base for such projects relative to that for conventional power (e.g. grid connections, bank finance, suppliers, etc.).

The applicable Beta value has been determined on the basis of the Beta values of all power generating companies in India which were listed on the stock exchange at the time of this investment. Beta values of individual companies have been sourced from Bloomberg and screenshots are available in appendix 4.

The table below summarizes the beta values:

Bloomberg Symbol	Company Name	Beta
		Period (Mar 2001 to Mar 2004)
RELE IN Equity	Reliance Infrastructure	0.973
TPWR IN Equity	TATA Power	1.333
GIP IN Equity	Guj Industries	1.189
CESC IN Equity	CESC	1.414
		1.227

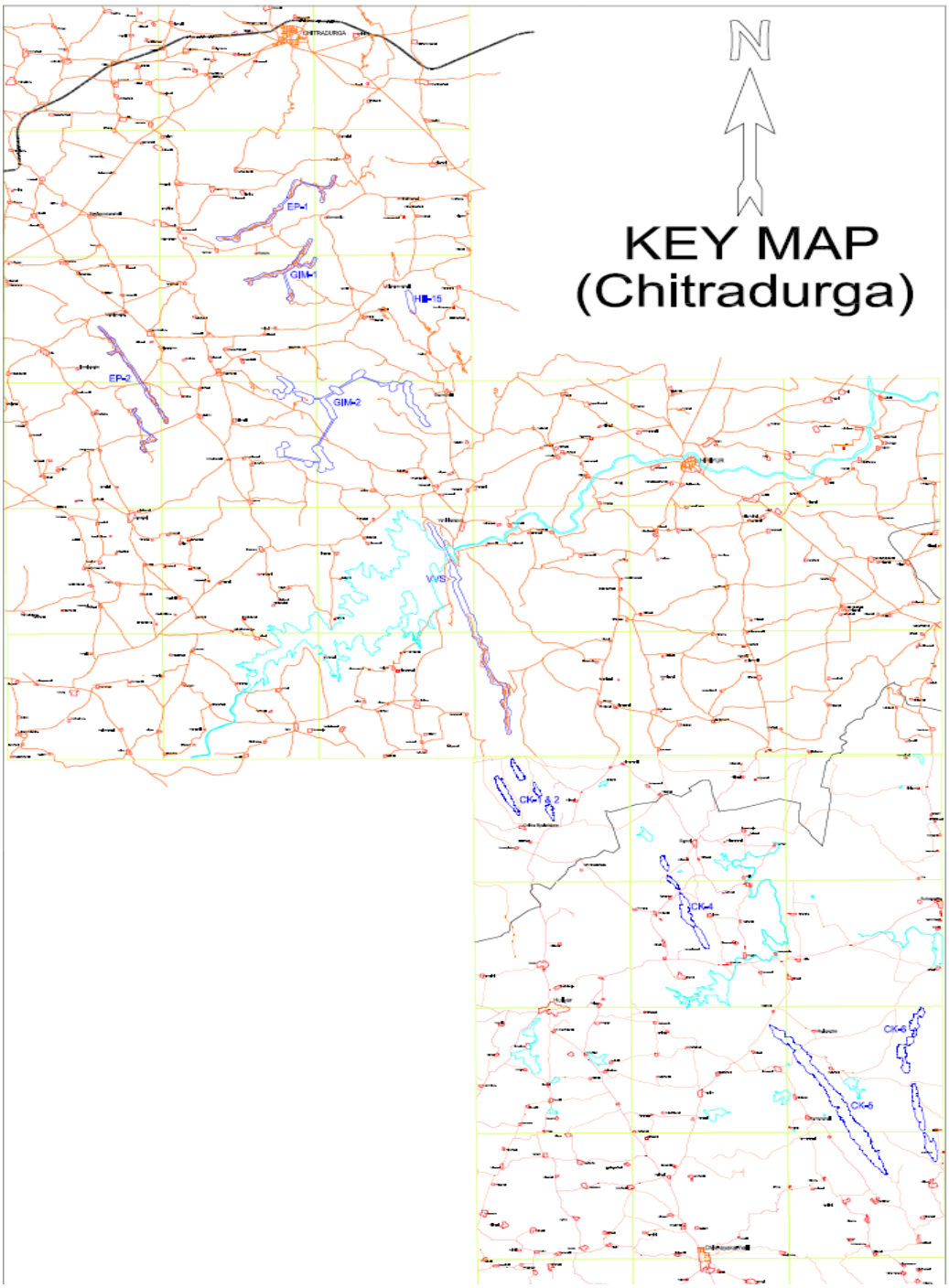
Source: Bloomberg

The average applicable beta for the project activity is 1.227; however conservatively we have applied lowest beta of 0.973 for Reliance Infrastructure for computation of the WACC.

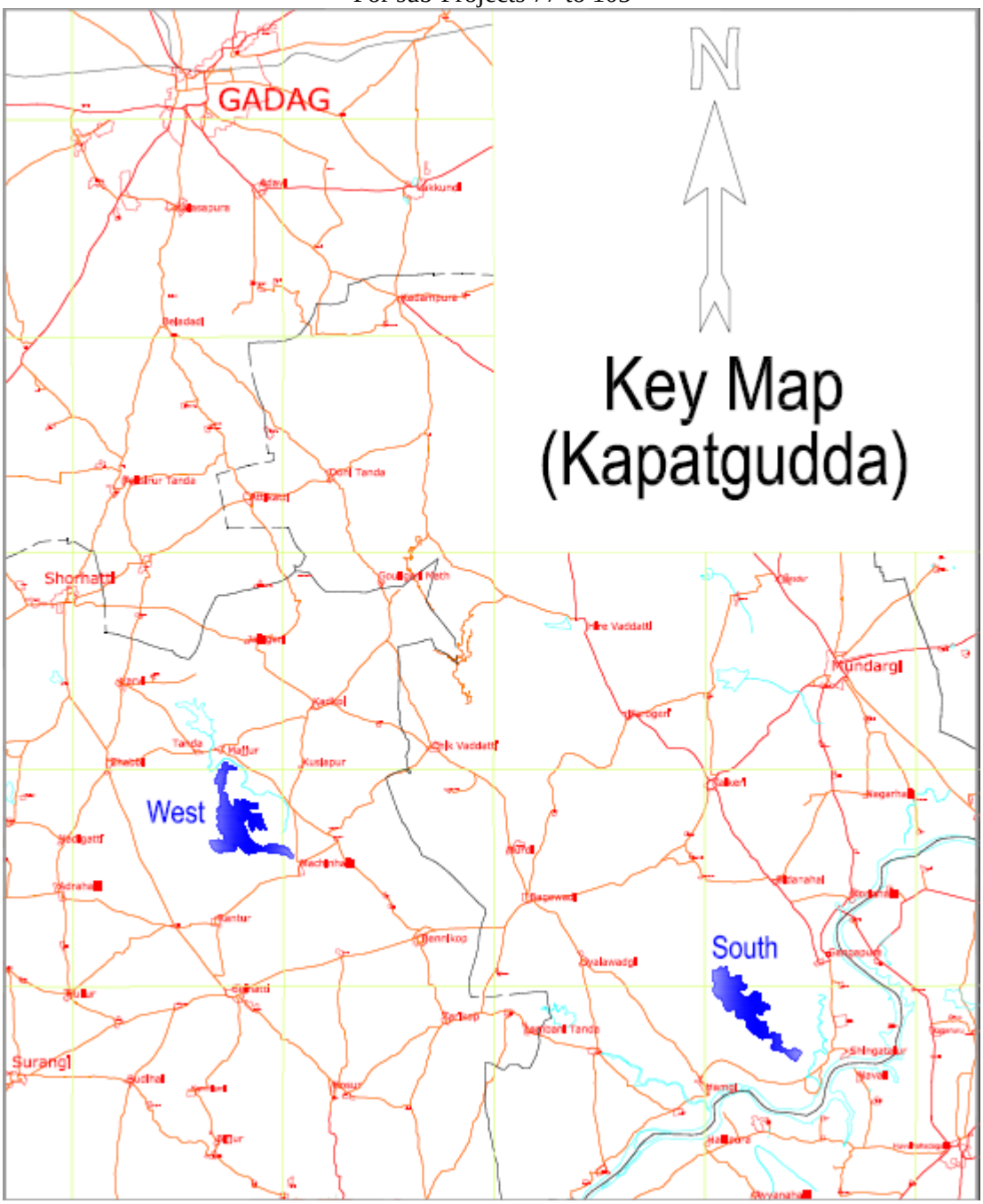
Accordingly, the benchmark cost of equity works out to: Rf + B (Rm – Rf) = 5.71% + 0.973 x 11.00%
Cost of Equity = 16.41%

Appendix 1 – Location Map

For sub-Projects 1 to 76, and 106, 107, 108



For sub-Projects 77 to 105



Appendix 2 – Minutes of stakeholder consultation meeting

Public Consultation Meeting for Wind Farm Projects as Clean Development Mechanism Projects at sites – CK 1&2, Gim Sites and VVS, Chitradurga District, Karnataka State.

Venue: Enercon (India) Limited, CK 1 & 2 Site, Arashinagundi Village, Hiriyur, Chitradurga Dist.

Date: 02nd September 2006, 10 am – 12 pm

Members from the Villages:

1. Sri. Thimmanna
2. Sri. Kanumappa
3. Sri. Rajappa
   And 19 participants from the village.

Members from Enercon (India) Ltd., Chitradurga

1. Mr. C.B.Poonacha
2. Mr. Sajith
3. Mr. Fathahulla
4. Mr. Naveen Kumar
5. Mr. Ravidhara

Members from Enercon (India) Ltd., Mumbai

1. Mr. Vivek Sen
2. Mr. Neeraj Gupta

Members from Aditya Environmental Services Pvt. Ltd.

1. **Mr. Gurmeet Singh**

Agenda of the Meeting:

1. Welcome Address and Introduction
2. Project Profile, CDM, Environmental and social issues
3. Description about Wind Energy Conversion.
4. Suggestions and Opinions
5. Queries and Responses from the Stakeholders and Co. Authorities respectively.
6. Vote of Thanks.

1. **Welcome Address:** In the Welcome Address, Mr. C.B. Poonacha has briefed about the purpose of this Public Meeting, how Wind Mills and Wind Energy are occupied major role in generating power thereby rural population is benefited. Further he was pointing out how the benefits of employment opportunities, economical growth taken place in the areas. And also he has quoted examples of various social and religious activities taken up in the villages, for ex. construction of temples, roads through villages etc.

Then Mr. C.B.Poonacha invited Mr. Thimmanna, Village Panchayat leader to preside over the meeting and conducts the further proceedings. And also he has invited village leaders viz. Mr. Kanumappa and Mr. Rajappa on the dias.

2. Project Profile:

Mr. Md. Fathahulla: Mr. Md. Fathahulla has described about the Wind Mills and how the Wind Power is generated, why it is called Green Energy and our project is emission free and it is pollution free energy when compared with Thermal power. He reiterated that in Thermal Power, carbon would be emitted into the air, which causes air pollution. He said that the public would not have any bad impact by the Wind Mills. When asked by the villagers about the clouds running away due to running of Wind Mills and thereby causing deficiency in rainfall, Mr. Fathahulla has cleared the doubts of the stakeholders by convincing them about the height of the clouds and the height of the Wind Mill Erector. He said we are conducting aforestation and drainage work to eradicate the soil erosion from the hills. He also informed that the co-operation by the villagers required for successful completion and service of Wind Mills.

Mr. Ravidhara: Mr. Ravidhara has described to the villagers how the power is converted from Wind to Electricity and how the generators are running and generate electricity power. And also he has specified where the generated power will be transmitted and at what rate. He has told about the safety measures taken in our Wind Erectors and automatic stoppage of m/c with more rpm in order to avoid any untoward incidence.

3. President's Address:

a) Sri. Thimmanna who has presided over the meeting has informed the villagers about how Wind Mills are helped our Villagers and Farmers, benefits to the unemployed one. And we have benefited more from wind mills rather loss of any kind. He also strongly quoted that "The economic and social life has changed due to wind mills in and around Chitradurga Villages. He extended fullest cooperation for development of such activities and also stated that lack of rainfall in the region is not due to Wind Mills. Since last two years we had plenty of rainfall. He also pledged that the cooperation from our villagers is there in future also and sought the same from Enercon.
b) Sri. Kanumappa has accepted that the temple work is been completed by Enercon only and praised about the social and religious activities by Enercon. Eco friendly project like wind power should come up in all villages which will not harm any environmental balancing, he specified.
c) Sri. Rajappa, who has told that there was no rainfall shortage due to Wind Mills.

Questionnaire:

a) By the Stakeholders:

i) Are you conducting afforestation work in the hills where the plants are removed?

Ans: Yes, We are doing afforestation work in all the hills where M/cs are installed.

ii) Are there any chances of drying up Ground Water?
Ans: No, Wind Mills do not use any ground water for its process.
iii) What is the generation capacity of the Machine?
Ans: 800 and 600 kW per hour.
iv) Is there any scope of purchasing machine by the public?
Ans: Yes, In Maharashtra farmers association has purchased one machine.
v) There is a rumour that revenue land is used wherever the electrical line passes through? Is it true?
Ans: No, Only line inspection will be done.

b) By the Company:

i) Is there any Noise Pollution by running the Wind Mills?
Ans: So far no idea. But as it is in hilltops and away from villages such nuisance may not happen.
ii) Is there any water draining, soil erosion due to Wind Mills?
Ans: No, such incidence not occurred.
iii) Is there any problem for animals grazing in the hills?
Ans: No, Cattle are grazing in hill areas as usual.
iv) How Wind Mills helped in improvement of Crops?
Ans: By increase in voltage capacity and less load shedding results in increase in food grain production.
v) Have you observed any deforestation problem?
Ans: No, Except while forming the roads and installing the machines, there found no deforestation is taken place.
vi) During construction or erection any damages or accidents occurred?
Ans: Absolutely not. The Project work is taken up very smoothly and run with more safety standards.

For further queries the representatives from ENERCON put forward to the participants that they could raise any queries within a week and the same can be submitted at ENERCON Office, Bangalore as the address mentioned in the Paper Notification on 19th Aug. 2006.

Vote of Thanks: **Mr. Naveen Kumar** thanked the village leaders and villagers who have set aside their work and shown interest and eagerness to know about the Wind Mills. He also sought cooperation from all the corners for successful operation of windmills thereby achieving the National Target of self-sufficiency in Power Sector.

Minutes of the Public Consultation Stakeholders
Meeting Held at Gadag, Karnataka on 15/06/06

Venue: The meeting is held at Panchayat office, Dhoni, Mundaragi, GADAG, which is about Nine Km. From the project site.

The meeting has begun at 3:30pm. There are more than forty people attending the meeting. The participants are the people from the villages surrounding the project site- Dambal, Dhoni-Thanda, Kadampura, Katkol, HireVaddatti. Other participants are the panchayat officials- President and Vice President, Representatives from ENERCON, and CARE SUSTAINABLILTY

The language of meeting is Kannada. In between Hindi was also used.

The meeting began with the appointment of chairman for the meeting Mr. K.S. Narayanpur. The agenda for the meeting has been as follows:

- Welcome to the participants (by representatives from ENERCON)
- Brief to the participants about the project and CLEAN DEVELOPMENT MECHANISM (CDM)
- Questions and answers: concerns/issues/comments/ about the project and related matters by the participants
- Response from ENERCON
- Announcement by the representatives of ENERCON
- Vote of thanks

The list of the participants with their names and signature are in attached sheet.

The meeting proceeded as per agenda

Table below gives the concerns/issues/comments from the participants and response from ENERCON

Sr. No	Questions/concerns/issues/comments relating to the CDM activity	Details of concerns/issues/comments expressed by the participants	Response from ENERCON
1	How does the project impact the general quality of the people	All participants expressed that the establishment of the wind units do not adversely affect them (villagers around the project). In brief the projects neither adversely nor bring significant benefits to them. All of them expressed they are happy with the project activity	-
2	Any impact on the livelihood of the villagers	Villagers expressed that their livelihood have not been impacted adversely by the establishment of the wind units. The hill tops or slopes have not been used by them for grazing the cattle.	-

3	Does the project increase the employment opportunities	The following facts have been given by the villagers. During the construction stage, most of the laborers have been locals. During operation stage, at present out of the six local technical staff, two of them at present are locals. All security staff are locals. The drivers are locals.	For locals with ITL(technical training) qualifications, ENERCON does provide employment in technical category. Most of the unskilled workers are locals.
4	Does the project improves the electricity supply to villagers/ neighborhood areas	Improvements in the voltage fluctuations and supply are observed. KPCL has established a Sub Station at Dambal There are more than six hundred water pumps (for agricultural activities) in the neighborhood. Operations of them have become for time and without fluctuations at present	Conditions of electricity and voltage fluctuations have improved this year compared to last year, and is expected to improve further. Only KPCL and ENERCON have the functioning wind units at the present.
5	Would the project result in drinking water shortage/ increase in shortage of water for agriculture	Water Table has decreased in recent times in the neighborhood agricultural areas. Villagers themselves have expressed that this is not due to the establishment of wind units, but due to the increase in the agricultural activities and number of bore wells in the areas.	-
6	Would the erection of the wind unit result in stoppage of water to agricultural field	Villagers expressed that no stoppage of the water due to the construction of the units and the approach roads to the wind units.	-
7	Would the project increase the noise level in the neighborhood areas and affect the villagers	Villagers expressed that there is no disturbance nor high noise levels are present due to the operation of the wind units	-
8	Any occurrence of accidents. Would the project increase undesirable vehicular traffic during construction or during operation phase	Villagers expressed that no accidents so far have occurred. Also no disturbance or heavy traffic due to the establishment of wind units	-
9	Would the project increase dust particles	During the construction nor the operation stage, no dust emissions are observed in the project sites nor the neighborhood	-
10	Tree/ plantations	Villagers suggested that planting of the medicinal plants could be carried out at	ENERCON is planting medicinal

		the down plains.	plants at the project site. They would also be planting on the slopes.
11	Social welfare activities	Villagers expressed that help should be extended to villagers by providing "lifts"/transportation, when they request during cases like "deliveries" cases etc.	ENERCON would do their best ot provide help to the villagers in the emergency cases.
12	Forest fire	Villagers expressed fear about the occurrence of forest fire on the hills. (last year there was heavy forest fire on the hill tops). **"Kalpatamallaiah"** temple which is worshipped by the villagers is located on the hill. There should be additional watchmen to be deployed by ENERCON for warning the villagers in the event of forest fire.	ENERCON told about the efforts being made by them. They would be constructing a three feet trench on the slopes and around the project site. Also watchmen and security guards have been instructed to be vigilant and provide warning in the cases of occurrences of forest fires
13	Does any disturbance to Avi fauna occur due to the wind units?	Villagers expressed that due to the increased usage of pesticide in the agricultural areas in the neighbourhood there is a decrease in the birds due to the lack of insects/worms etc. There is no bird's migratory path in the areas	-

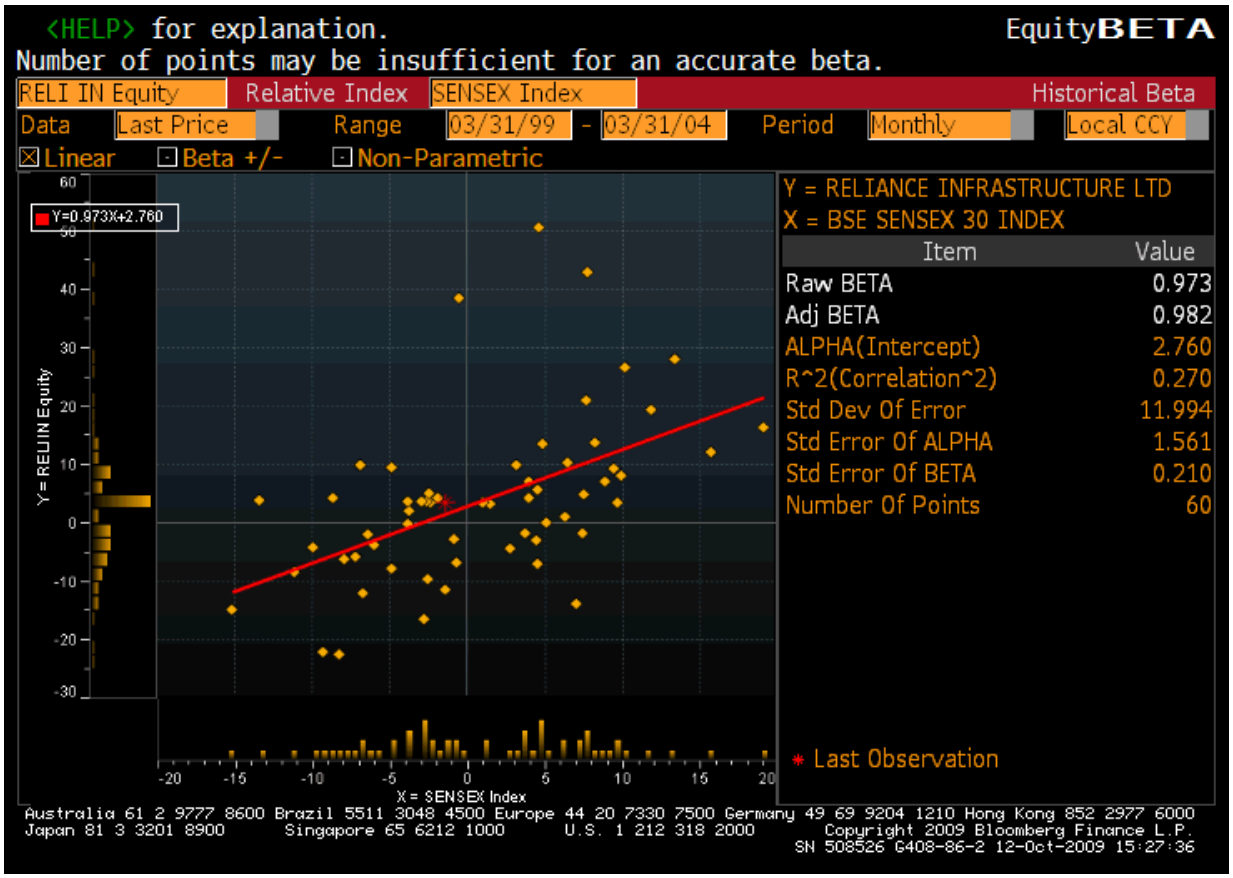
The representative of ENERCON announced that if the villagers or the participants still wish to bring to notice of ENERCON any further issues/concerns/comments about the wind farms owned by ENERCON, they may approach and convey to their respective representative Mr. Mahesh Arali located at the project site. The response could be made during the next one month starting from the sate of 15/06/06

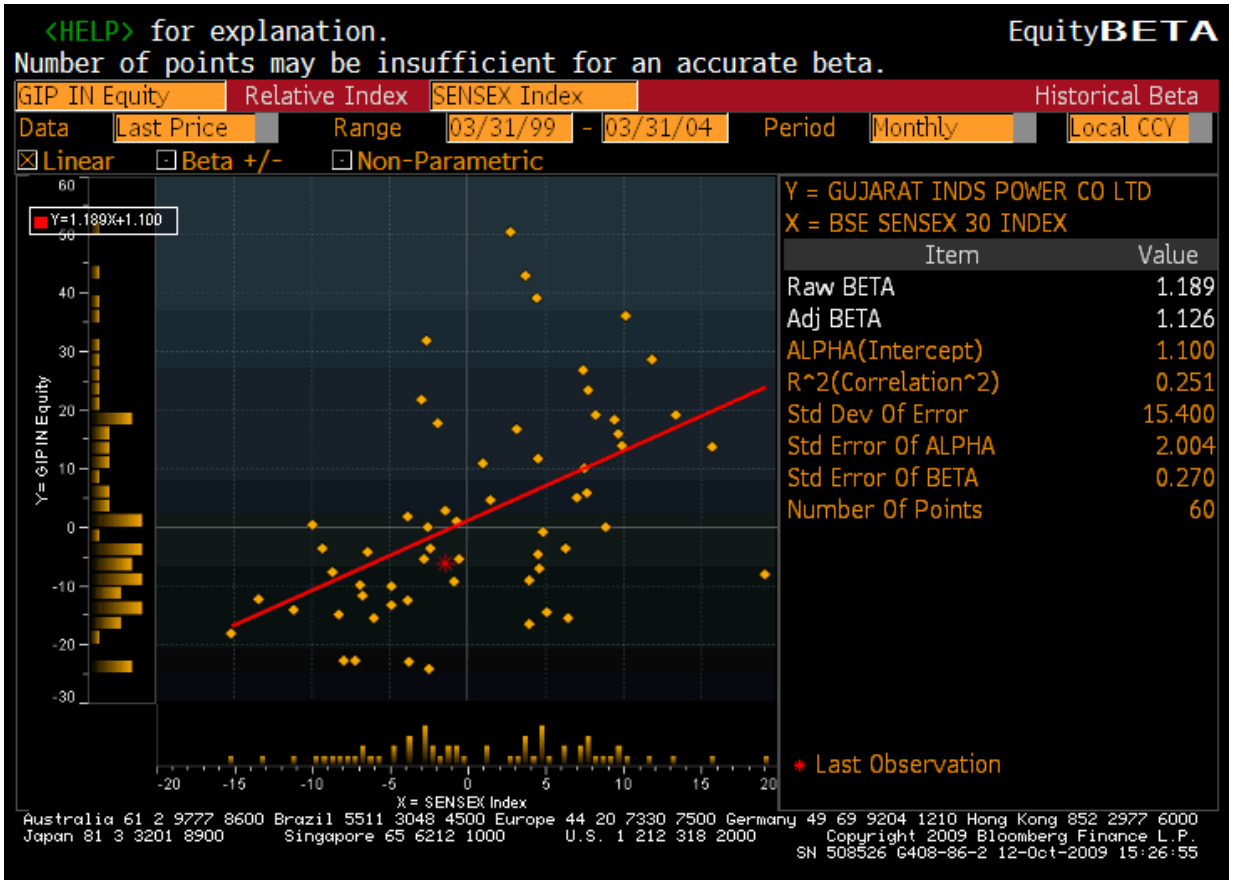
The meeting closed with giving thanks to all the participants and the chairman of the meeting.

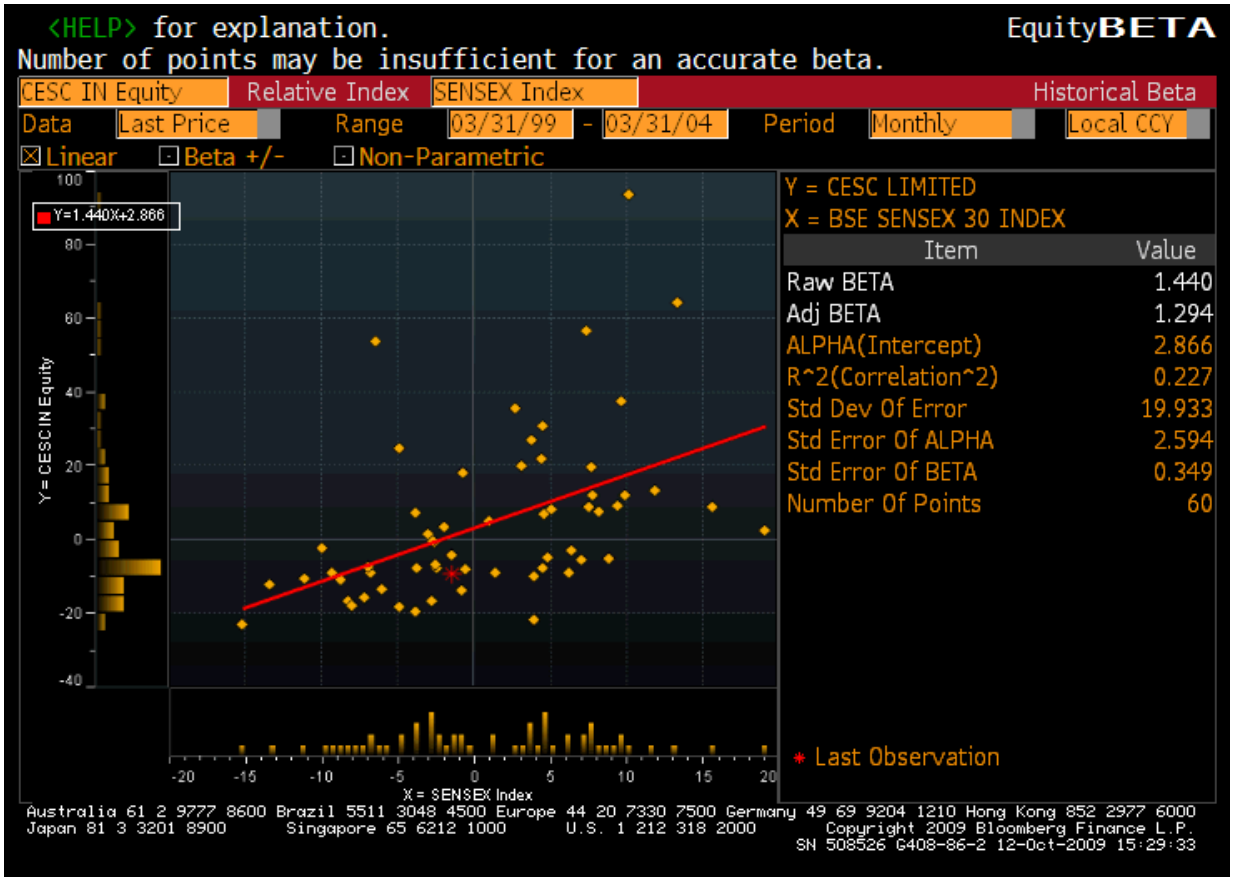
Appendix 3 - Equity IRR of all sub projects

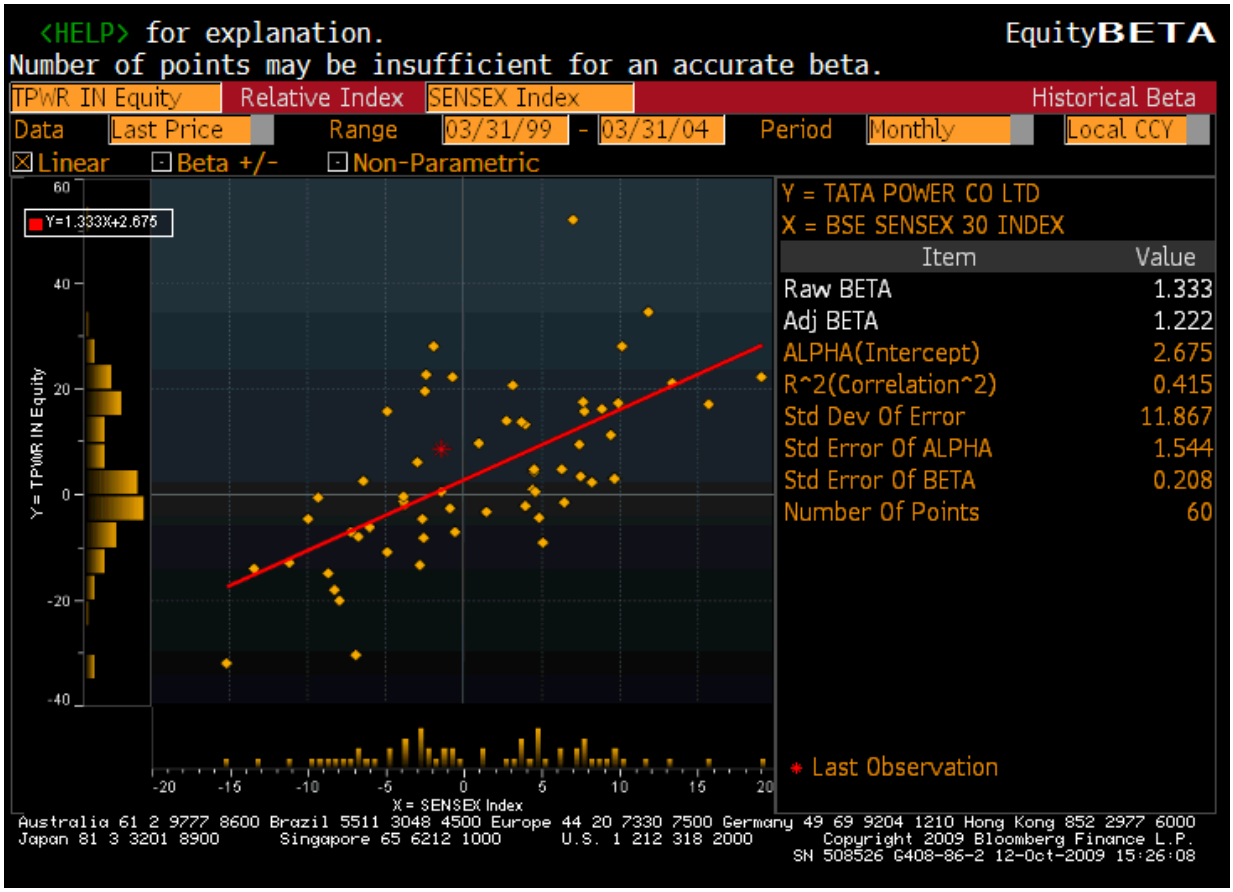
S. No	Name of Customers	Type of M/C	No. of M/C	MW	Date of Commissioning	Project Cost	Debt %	Equity %	Interest rate %	loan tenure (Yrs)	Equity IRR (Without CDM)	Equity IRR (With CDM)
1	Neharaj Energy	0.8	1	0.80	Sep-05	38.0	65.0%	35.0%	11.3%	6.50	9.68%	11.56%
2	Vivek Trading Co.	0.8	1	0.80	Sep-05	38.0	67.0%	33.0%	10.0%	6.00	10.28%	12.18%
3	Jubilee Textiles	0.80	1	0.80	Sep-05	38.0	0.0%	100.0%	0.0%	-	9.56%	10.75%
4	Prasad Technology Park	0.8	2	1.60	Mar-06	74.0	0.0%	100.0%	0.0%	-	9.49%	10.80%
5	Srinivasa Cystine Ltd	0.8	2	1.60	Sep-05	72.9	70.0%	30.0%	10.5%	7.00	11.39%	13.59%
6	**Avanti Feeds Ltd**	**0.8**	**4**	**3.20**	**Sep-05**	**145.8**	**70.0%**	**30.0%**	**10.5%**	**7.00**	**11.39%**	**13.59%**
7	Siddaganga Oil Extractions Ltd.	0.8	2	1.60	Mar-06	74.0	60.0%	40.0%	10.3%	5.00	10.04%	11.94%
8	UNNATHI PROJECTS LTD	0.6	4	2.40	Mar-06	115.2	89.0%	11.0%	12.5%	7.00	7.23%	9.71%
9	B.V. Finance and leasing	0.8	2	1.60	Sep-05	77.0	60.0%	40.0%	8.5%	5.00	10.32%	12.01%
10	Shilpa Medicare Ltd.	0.6	2	1.20	Mar-05	58.0	78.0%	22.0%	10.0%	5.00	9.23%	11.09%
11	Cooper foundry	0.6	4	2.40	Sep-04	115.2	75.0%	25.0%	9.0%	7.00	10.91%	12.89%
12	I. G. E. (India)	0.6	1	0.60	Mar-05	30.0	67.0%	33.0%	7.6%	1.00	8.73%	10.03%
13	International Conveyors Ltd	0.6	1	0.60	Mar-05	30.0	68.0%	32.0%	8.8%	3.00	8.72%	10.19%
14	Jitendra D. Majetha	0.6	1	0.60	Mar-05	29.0	61.0%	39.0%	9.3%	7.00	9.43%	11.26%
15	Patel Shanti Steels P. Ltd.	0.6	2	1.20	Sep-04	58.0	62.0%	38.0%	10.5%	8.50	9.56%	11.37%
16	Swaraj PVC Pipes P. Ltd.	0.6	1	0.60	Mar-05	30.0	67.0%	33.0%	12.3%	5.00	7.53%	9.13%
17	Amrit Bottlers	0.8	1	0.80	Sep-05	38.4	62.5%	37.5%	8.5%	5.00	10.44%	12.17%
18	Amrit Bottlers	0.6	2	1.20	Mar-05	57.6	62.5%	37.5%	8.5%	5.00	9.79%	11.47%
19	Brindavan Agro	0.6	2	1.20	Mar-05	58.0	75.0%	25.0%	8.5%	5.00	9.90%	11.76%
20	Brindavan Agro	0.8	4	3.20	Sep-05	154.0	75.0%	25.0%	8.5%	5.00	10.71%	12.63%
21	Rohit Surfactants P.Ltd	0.6	10	6.00	Sep-04	288.0	70.0%	30.0%	8.9%	5.00	10.48%	12.11%
22	Unnathi Projects Ltd	0.8	1	0.80	Mar-05	40.0	65.0%	35.0%	12.5%	7.00	**7.00%**	8.75%
23	Primetex Apparels India	0.6	1	0.60	Sep-04	30.0	75.0%	25.0%	12.0%	4.00	8.36%	9.82%
24	MK Agrotech Private Ltd	0.6	2	1.20	Mar-05	57.6	68.0%	32.0%	10.5%	5.00	9.12%	10.84%
25	Laxmi Organics	0.6	2	1.20	Sep-04	58.0	0.0%	100.0%	0.0%	-	9.26%	10.33%
26	S.E.Investment	0.6	4	2.40	Mar-05	116.0	63.0%	37.0%	9.0%	10.00	9.86%	12.08%
27	Dinesh Pouches	0.8	1	0.80	Mar-06	38.0	0.0%	100.0%	0.0%	-	9.05%	10.33%
28	Ush Dev International	0.8	2	1.60	Mar-06	78.0	80.0%	20.0%	10.5%	10.00	8.24%	11.44%
29	Mumbai Stock Brokers Pvt. Ltd.	0.8	1	0.80	Mar-06	39.0	65.0%	35.0%	13.3%	7.00	7.25%	9.22%
30	D. R. Container Terminal	0.8	2	1.60	Mar-06	74.0	70.0%	30.0%	8.3%	5.00	11.05%	13.17%
31	Indian power corporation	0.8	13	10.40	Mar-06	509.6	70.0%	30.0%	8.5%	8.00	9.83%	12.25%
32	Enercon Wind Farms (Karnataka) Ltd	0.8	4	3.20	Apr-05	160.0	70.0%	30.0%	8.5%	10.00	10.86%	13.21%
33	Enercon Wind Farms (Krishna) Ltd	0.6	25	15.00	Mar-05	775.0	70.0%	30.0%	8.5%	10.00	8.37%	10.67%
	Total			**73.60**								

Appendix 4: Bloomberg's Screenshots of Individual Companies for Beta Value




<HELP> for explanation.
EquityBETA
Number of points may be insufficient for an accurate beta.
GIP IN Equity
Relative Index
SENSEX Index
Historical Beta
Data
Last Price
Range
03/31/99
-
03/31/04
Period
Monthly
Local CCY
Linear
Beta +/-
Non-Parametric
Y=1.189X+1.100
Y= GIP IN Equity
X = SENSEX Index
Y = GUJARAT INDS POWER CO LTD
X = BSE SENSEX 30 INDEX
Item
Value
Raw BETA 1.189
Adj BETA 1.126
ALPHA(Intercept) 1.100
R^2(Correlation^2) 0.251
Std Dev Of Error 15.400
Std Error Of ALPHA 2.004
Std Error Of BETA 0.270
Number Of Points 60
* Last Observation
Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000
Copyright 2009 Bloomberg Finance L.P.
SN 508526 G408-86-2 12-Oct-2009 15:26:55


<HELP> for explanation.
EquityBETA
Number of points may be insufficient for an accurate beta.
CESC IN Equity
Relative Index
SENSEX Index
Historical Beta
Data
Last Price
Range
03/31/99
-
03/31/04
Period
Monthly
Local CCY
Linear
Beta +/-
Non-Parametric
Y=1.440X+2.866
Y = CESC IN Equity
X = SENSEX Index
Y = CESC LIMITED
X = BSE SENSEX 30 INDEX
Item
Value
Raw BETA
1.440
Adj BETA
1.294
ALPHA(Intercept)
2.866
R^2(Correlation^2)
0.227
Std Dev Of Error
19.933
Std Error Of ALPHA
2.594
Std Error Of BETA
0.349
Number Of Points
60
* Last Observation
Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000
Copyright 2009 Bloomberg Finance L.P.
SN 508526 G408-86-2 12-Oct-2009 15:29:33


<HELP> for explanation.
EquityBETA
Number of points may be insufficient for an accurate beta.
TPWR IN Equity
Relative Index
SENSEX Index
Historical Beta
Data
Last Price
Range
03/31/99
-
03/31/04
Period
Monthly
Local CCY
Linear
Beta +/-
Non-Parametric
Y=1.333X+2.675
Y = TPWR IN Equity
X = SENSEX Index
Y = TATA POWER CO LTD
X = BSE SENSEX 30 INDEX
Item
Value
Raw BETA
1.333
Adj BETA
1.222
ALPHA(Intercept)
2.675
R^2(Correlation^2)
0.415
Std Dev Of Error
11.867
Std Error Of ALPHA
1.544
Std Error Of BETA
0.208
Number Of Points
60
* Last Observation
Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000
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SN 508526 G408-86-2 12-Oct-2009 15:26:08

Appendix 5: Page 191 of text book on "Corporate Finance Theory and Practice"

on stocks and the riskless return and use it as a risk premium to predict future returns. When we use historical premiums, we implicitly assume that the risk aversion of investors has not changed across time and that the relative riskiness of the risky portfolio (stocks) has not changed over time either.

In calculating the average returns over past periods, a measurement question arises: Should we use arithmetic or geometric averages to compute the risk premium? The arithmetic mean is the average of the annual returns for the period under consideration, whereas the geometric mean is the compounded annual return over the same period. The following example demonstrates the difference.

Year	*Price*	*Return*
0	$50	
1	100	100%
2	60	−40%

The arithmetic average return over the two years is 30%, while the geometric average is only 9.54% ($1.2^{0.5} - 1 = 1.0954$). Those who use the arithmetic average premium argue that it is much more consistent with the framework[5] of the CAPM and a better predictor of the risk premium in the next period. The geometric mean is justified on the grounds that it takes into account compounding and that it is a better predictor of the average premium in the long term. There can be substantial differences in risk premiums based on the choices made at this stage, as illustrated in Table 7.1. The data in the table are based on historical data on stock, treasury bill, and treasury bond returns and provide estimates of historical risk premiums. As you can see, the historical premiums can vary widely depending on whether we go back to 1926, 1962, or 1981, whether we use T. Bills or T. Bonds as the riskless rate, and whether we use arithmetic or geometric average premiums.[6] Although it is impossible to prove one premium right and the others wrong, we are biased toward

- *Longer term premiums,* since stock returns are volatile and shorter time periods can provide premiums with large standard errors. For instance, the premium extracted from 25 years of data will have a standard error[7] of about 4 to 5%.
- *Long-term bond rates as riskless rates,* since our time horizons in corporate financial analysis tend to be long term, and we use the treasury bond rate as our riskless rate.
- *Geometric average premiums,* since arithmetic average premiums overstate the expected returns over long periods.[8] The geometric mean yields lower premium

[5] The CAPM is built on the premise of expected returns being averages and risk being measured with variance. Since the variance is estimated around the arithmetic average, and not the geometric average, it may seem logical to stay with arithmetic averages to estimate risk premiums.

[6] Booth (1999) examines both nominal and real equity risk premiums from 1871 to 1997. Although the nominal equity returns have changed over time, he concludes that the real equity return has been about 9% over this period. He suggests adding the expected inflation rate to this number to estimate the expected return on equity.

[7] Assuming that returns in individual years are independent, the standard error of a 25-year estimate can be calculated by dividing the annual standard deviation in stock prices in the United States (about 25%) by the square root of the number of years ($\sqrt{25} = 5$), yielding a standard error of 5% (25%/5) in the estimate.

[8] When we look at markets like the United States that have survived for 70 years without significant breaks, we are looking at the exception. To provide a contrast, consider the other stock markets in which one could have invested in 1926; many of these markets did not survive, and an investor would have lost much of his or her wealth.

Appendix 6: Page 196 of text book on "Corporate Finance Theory and Practice"

Betas

The second set of inputs that we need to put risk and return models into practice are the betas for investments. In the CAPM, the beta of an investment is the risk that the investment adds to a market portfolio. In the APM and multifactor model, the betas of the investment relative to each factor have to be measured. Three approaches are available for estimating these parameters. One is to use historical data on market prices for individual investments; the second is to estimate the betas from the fundamental characteristics of the investment; and the third is to use accounting data. We describe all three approaches in this section.

Historical Market Betas The conventional approach to estimating the beta of an investment is a regression of returns on the investment against returns on a market index. For firms that have been publicly traded for a length of time, it is relatively straightforward to estimate returns that an investor would have made by investing in the firm's stock each interval (such as a week or a month) over that period. In theory, these stock returns on the assets should be related to returns on a market portfolio, that is, a portfolio that includes all traded assets, to estimate the betas of the assets. In practice, we tend to use a stock index, such as the S&P 500, as a proxy for the market portfolio, and we estimate betas for stocks against the index.

The standard procedure for estimating betas is to regress stock returns (R_j) against market returns (R_m).

$$R_j = a + bR_m$$

where

a = Intercept from the regression

$$b = \text{Slope of the regression} = \frac{\text{Covariance}(R_j, R_m)}{\sigma^2_m}$$

The *slope* of the regression corresponds to the beta of the stock and measures the riskiness of the stock.

The *intercept* of the regression provides a simple measure of performance of the investment during the period of the regression, when returns are measured against the expected returns from the capital asset pricing model. To see why, consider the following rearrangement of the capital asset pricing model:

$$R_j = R_f + \beta (R_m - R_f)$$
$$= R_f (1 - \beta) + \beta R_m$$

Compare this formulation of the return on an investment to the return equation from the regression:

$$R_j = a + bR_m$$

Thus, a comparison of the intercept (a) to $R_f (1 - \beta)$ should provide a measure of the stock's performance, at least relative to the capital asset pricing model.[14] In summary, then:

[14] The regression is sometimes calculated using returns in excess of the riskless rate, for both the stock and the market. In that case, the intercept of the regression should be zero if the actual returns equal the expected returns from the CAPM, greater than zero if the stock does better than expected, and less than zero if it does worse than expected.