Environmental and Social Due Diligence Report

Project Number: 47083-004
December 2019

INDIA: Accelerating Infrastructure Investment Facility in India – Tranche 3

Mytrah Vayu (Krishna) Private Limited (Part 7 of 10)

Prepared by India Infrastructure Finance Company Limited for the India Infrastructure Finance Company Limited and the Asian Development Bank.

	panels, fencing of transformer yards, presence of authorized safety personnel, display of danger signage and notice, adequacy of provisions of safety and protection of equipment's, periodical testing of installations etc.	Yes	CEIG Available
8	Have the involved contractors obtained labour license for involved workforce under The Contract Labour (Regulation and Abolition) Act, 1970.	Yes	Available
9	Has the contractor obtained license under The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979 in case more than five or more Inter-State migrant workmen are employed.	N/A	Local hired
10	Does the contractor pay minimum wages to the workers in line with the Minimum Wages Act, 1948.	Yes	Verified
11	Does the contractor provide wage slips to its workforce in line with Section 78(b) [1] of The Contract Labour (Regulation and Abolition Act, 1970)	Yes	
12	Does the contractor pay overtime to the deployed labourers in line with the regulatory requirements (The Contract Labour (Regulation and Abolition Act, 1970)).	Yes	Verified the record
13	Is the contractor workforce insured under Workmen's Compensation Act, 1923	Yes	
14	Are commitments under Environment and Social Management Plan implemented	Yes	
15	Is ambient noise levels monitored and are wind turbines sited near to any sensitive receptors (relevant only to Wind Power projects)	Yes	Available
16	Is waste water quality being tested regularly before disposal, if not justify	N/A	
17	Is there a waste disposal plan and is it practiced at Site	Yes	All the system avalable except Form-4
18	Are all temporary structures for construction phase removed and land restored	N/A	
19	Are plantation activities and green belts maintained	Yes	plantation done
20	Is there an accident incident reporting system	No	No any incident
21	Are records of Health and Safety incidents and mock fire drills maintained	Yes	Aspect plan Conducted
22	Are facilities for first aid available at site and does it meet the requirements prescribed under the Factories Rules of the applicable state	Yes	
23	Is Health and Safety training being imparted as per requirements	Yes	
24	Does the Site have operational On site emergency Plan and are employees aware of it.	Yes	
25	Does the site conduct mock drills on regular basis	Yes	
26	Does the switch yard, transformer area and invertor rooms are in compliance with the rules stated under Indian Electricity Act and relevant Rules.	Yes	
27	Is the transformer oil free of Poly chlorinated Biphenyls (PCB's) which has been banned by the Indian	Yes	MSDS Available

[1] Every contractor shall, where the wage period is one week or more, issue wage slips in Form XII, to the workmen at least a day prior to the disbursement of wages

	government.		
28	Is the stakeholder engagement plan followed during the operations	Y/S	
29	Does the site follow the MEIPL's grievance redressal procedure	Y/S	
30	Additional Points if any form -04 Needs to be Submitted	Y/S	

Signature of the auditor

- **Assessment by EHS team**

All requirements met: _____
If No, what are the additional requirements?
1. _____
2. _____
3. _____

Signature of team members

1. _____ Shivanand. P.K
2. _____
3. _____ Sankarlyhan. N

CONTROLLED

Monthly EHS Report

Basic details of Site

Project Name	Savalsang		Capacity of Project (MW)	95.2 MW		
Month/Year	Jul-19	Doc.Ref.No :QSHER16		WTG Type & Qty	S52 & 850KW 112nos	
Location	Savalsang	Project start Date	NA	Project description	NA	
Nearast Hospital (Area & Contact)	Inchagere /08422285525 Dr-8277504516	Nearast police station (Area & Contact)	Horti 100/08352250844	Nearast Fire station (Area & Contact)	Indi 101/0835-270160	
WTG Monthly Generation (KWh)	33919261	Avarage Machine availability (%)	99.14%	Site Grid availability (%)	99.56%	
PLF Per WTG	47.89%					
Nearast Airport	HUBLI	Nearast Railway station	VIJAYAPURA	No of Machine installed & Commissioned up to date	112 WTGs	

Site Responsible person details

MYTRAH	Site Manager Project/O&M	EHS & SM Incharge	Civil Incharge	Electrical (HT/LT) Incharge	Mechanical Incharge	
Name & Contact	Sadananad Patil		NA	Sharad More		
	9880917070		NA	9448891634		
Subcontractor Company Name	Site Manager Project/O&M	EHS Person Name	Civil Incharge	Electrical Incharge	Mechanical Incharge	
Gamesa	Mr.Shankarlingam -7349294330	Rakesh M N- 9972998758	NA		Mr.Mahesh	
M/S Arudhra (Sub contractor of Gamesa)	Mr.Vacent					
M/S Sakshi (Sub contractor of Mytrah)	Mr.Sunil Pisal -098-814-69674					
M/A Target	Mr.Madani					
M/S Creative	Mr.Manju					
M/s.Sajjan	Mr.Subhash					

Basic EHS datas

No of EHS Meetings	0	No of permit issued	128	No of Tree planted	0
No of internal EHS Audit done	0	No of EHS Improvments	0	External Audit done (Y/N/NA)	NO
No of EHS Inspection conducted	0	No of EHS Orientation done	0	Greivences if any	NO
No of Tool box talk	128	No of EHS Suggestions received	0	Greivences redressel if any	NO

SUMMARY

Incident Over view	Incident & Near miss Details	Consumption & Waste	Awards & Recoganaization	Safety equipment stock	Training	Tracking sheet
UA /UC - Findings	EHS Statistics					
53	3	2+3=5	0	Sufficient stock available	6/140hours	Attached

WIND BASED POWER GENERATION BY MYTRAH ENERGY (INDIA) LIMITED (EKIESL-VCS-JANUARY-16-01)

Document Prepared By: **EKI Energy Services Limited**

Project Title	Wind Based Power Generation by Mytrah Energy (India) Limited (EKIESL-VCS-January-16-01)
Version	2
Date of Issue	10-February-2016
Prepared By	EKI Energy Services Limited
Contact	Rucha Natu Manager Operations – GHG Services EKI Energy Services Limited Email ID : rucha@enkingint.org T +91 731 42 89 086, M +91 7566 66647 Address: Office no. 201, Plot 48, Scheme 78 part 2 Vijay Nagar, Near Brilliant Convention Centre Indore - 452010 (M.P, India) Website www.enkingint.org

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The purpose of the project activity is to generate electrical energy using renewable energy source (wind) for the purpose of captive utility. The project activity generates electricity using wind potential and converts it into kinetic energy using Wind turbines, which drives the alternators to generate energy. The generated electricity is exported to the regional grid system which is under the purview of the Southern grid of India.

The proposed project activity involves the installation of Wind Power Projects. The total installed capacity of the project is 233.1 MW; which involves operation of 156 Wind Turbine Generators (WTGs) with capacity of 0.85 MW each located at Karnataka and Andhra Pradesh implemented by **Mytrah Vayu Krishna Private Limited** and 67 Wind Turbine Generator (WTGs) of 1.5 MW implemented by **Mytrah Vayu (Manjira) Private Limited** Tamil Nadu state in India. These are the subsidiary companies of **Mytrah Energy (India) Limited.** However the project is promoted by **Mytrah Energy (India) Limited,** which is also the project proponent in the project activity.

The power produced displaces an equivalent amount of power from the grid, which is fed mainly by fossil fuel fired power plants. Hence, it results in reduction of GHG emissions. GHG emission reductions from the project activity will be 479,448 tonnes of CO_2 and total GHG emission reductions for the chosen 10 year crediting period will be 4,794,480 tonnes of CO_2.

The Project activity is a new facility (Greenfield) and the purpose of the project activity is to generate electricity by the utilization of wind velocity, and selling the generated electrical energy from 132.6 MW project implemented by Mytrah Vayu Krishna Private Limited to respective state utitlies under the Southern Grid. Further energy generation from 100.5 MW wind mill project implemented by Mytrah Vayu (Manjira) Private Limited will be for captive utilization, under Tamil Nadu state. In this process there is no consumption of any fossil fuel and hence the project does not lead to any greenhouse gas emissions. Thus, electricity would be generated through sustainable means without causing any negative impact on the environment.

In the Pre- project scenario the equivalent amount of electricity delivered to the grid by the project activity, would have otherwise been generated by the operation of grid-connected fossil fuel based power plants and by the addition of new generation sources. The Pre- project scenario for the facility where the electricity is wheeled (in case of TN WEGs), the electricity was sourced from southern grid.

1.2 Sectoral Scope and Project Type

The project activity falls under the following Sectoral scope and Project Type:

Sectoral Scope: 01 - Energy industries (renewable / non renewable sources)
Project Type : I - Renewable Energy Projects

Methodology : ACM0002: Grid-connected electricity generation from renewable sources - Version 16.0[1]

The project is not a grouped project activity.

1.3 Project Proponent

Organization name	**Mytrah Energy (India) Limited**
Contact person	Ms. Mangaljyoti
Title	Deputy Manager
Address	1st Floor, Prestige Meridian-II, No. 30 M.G Road, Bangalore – 560 001.
Telephone	+91 80-30005715, Mobile No. +91 9900066524
Email	mangaljyoti.m@mytrah.com

1.4 Other Entities Involved in the Project

Not applicable

1.5 Project Start Date

Project Start Date: 21-February-2014

The project start date is the date on which first WTG was commissioned under the Project activity. The details of the project at Andhra Pradesh is as follows;

Burugula @ Andhra Pradesh - 37.40MW (0.85* 44)		
Gamesa Make WTG model G58/850 kW		
S. No.	**Machine ID**	**DOC[2]**
1	Location No. 508	21-Feb-14
2	Location No. 509	21-Feb-14
3	Location No. 510	21-Feb-14
4	Location No. 511	21-Feb-14
5	Location No. 512	21-Feb-14
6	Location No. 513	21-Feb-14
7	Location No. 514	21-Feb-14
8	Location No. 515	21-Feb-14
9	Location No. 516	21-Feb-14
10	Location No. 517	21-Feb-14
11	Location No. 518	21-Feb-14
12	Location No. 519	21-Feb-14
13	Location No. 520	21-Feb-14

[1] http://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHLAR6MJ6VEU83

[2] Date Of commissioning

14	Location No. 521	21-Feb-14
15	Location No. 522	21-Feb-14
16	Location No. 523	21-Feb-14
17	Location No. 524	21-Feb-14
18	Location No. 525	21-Feb-14
19	Location No. 526	21-Feb-14
20	Location No. 527	21-Feb-14
21	Location No. 528	21-Feb-14
22	Location No. 529	21-Feb-14
23	Location No. 530	21-Feb-14
24	Location No. 531	21-Feb-14
25	Location No. 550	21-Feb-14
26	Location No. 551	21-Feb-14
27	Location No. 532	15-Mar-14
28	Location No. 533	15-Mar-14
29	Location No. 534	15-Mar-14
30	Location No. 535	15-Mar-14
31	Location No. 536	15-Mar-14
32	Location No. 537	15-Mar-14
33	Location No. 538	15-Mar-14
34	Location No. 539	15-Mar-14
35	Location No. 540	15-Mar-14
36	Location No. 541	15-Mar-14
37	Location No. 542	15-Mar-14
38	Location No. 543	15-Mar-14
39	Location No. 544	15-Mar-14
40	Location No. 545	15-Mar-14
41	Location No. 546	15-Mar-14
42	Location No. 547	15-Mar-14
43	Location No. 548	15-Mar-14
44	Location No. 549	15-Mar-14

Village: - Burgula **District:-** Kurnool.

Commissioning dates are as follows:-

Vagarai @ Tamil Nadu - 100.5 MW(1.5 * 67)			
ReGen make Vensys - 87 1.5 MW WTG of model			
S. No.	**Machine ID**	**HTSC No.**	**DOC[3]**
1	KOO - 518	DRA 001	1-Jun-14
2	KOO - 1359	DRA 003	1-Jun-14

[3] Date Of commissioning

3	APY - 241	DRA 004	1-Jun-14
4	APY - 416	DRA 005	1-Jun-14
5	PAR - 9	DRA 006	1-Jun-14
6	PON - 534	DRA 008	1-Jun-14
7	PON - 1043	DRA 009	1-Jun-14
8	NAL-119	DRA 012	1-Jun-14
9	NAL - 81	DRA 013	1-Jun-14
10	NAL - 57	DRA 015	1-Jun-14
11	MAN - 210	DRA 017	1-Jun-14
12	MAN - 898	DRA 018	1-Jun-14
13	MAN - 802	DRA 021	1-Jun-14
14	KON - 556	DRA 022	1-Jun-14
15	KON - 563	DRA 023	1-Jun-14
16	KON - 590	DRA 024	1-Jun-14
17	KON - 640	DRA 025	1-Jun-14
18	KON - 658	DRA 026	1-Jun-14
19	KON - 621	DRA 027	1-Jun-14
20	KON - 501	DRA 031	1-Jun-14
21	ALA - 1639	DRA 043	23-Jun-14
22	ALA - 1946	DRA 044	23-Jun-14
23	NAL - 434	DRA 049	23-Jun-14
24	KON - 234	DRA 054	14-Jul-14
25	PAR - 50	DRA 007	1-Jun-14
26	MAN - 625	DRA 032	1-Jun-14
27	MAN - 604	DRA 033	1-Jun-14
28	ALA-2301/2304	DRA 046	23-Jun-14
29	ALA - 1569	DRA 047	23-Jun-14
30	ALA-2352	DRA 048	23-Jun-14
31	KOO - 1157	DRA 002	1-Jun-14
32	PON - 1081	DRA 010	1-Jun-14
33	MAN - 940	DRA 019	1-Jun-14
34	PON - 1565	DRA 037	23-Jun-14
35	PON - 1568	DRA 038	23-Jun-14
36	VEL - 1936	DRA 039	23-Jun-14
37	ALA - 1618	DRA 042	23-Jun-14
38	PON - 908	DRA 050	23-Jun-14

39	PON - 1203	DRA 052	23-Jun-14
40	MAN - 963	DRA 055	16-Jul-14
41	PON - 1021	DRA 011	1-Jun-14
42	KUL - 652	DRA 014	1-Jun-14
43	PON - 4	DRA 016	1-Jun-14
44	MAN-828	DRA 020	1-Jun-14
45	KON - 618	DRA 028	1-Jun-14
46	KON-395	DRA 029	1-Jun-14
47	KON-451	DRA 030	1-Jun-14
48	APA-84	DRA 034	1-Jun-14
49	PUN-270	DRA 035	1-Jun-14
50	PUN - 34	DRA 036	4-Jun-14
51	VEL-1702	DRA 040	23-Jun-14
52	KAL-93	DRA 041	23-Jun-14
53	ALA-2290	DRA 045	23-Jun-14
54	PON - 775	DRA 051	23-Jun-14
55	ALA - 2260	DRA 053	23-Jun-14
56	MET 1664	DRA 065	09-Jan-15
57	NAL - 445	DRA 061	03-Dec-14
58	KOO-1036	DRA 056	31-Oct-14
59	VEL-1540	DRA 060	03-Dec-14
60	KOO-1174	DRA 058	31-Oct-14
61	KOO-1000	DRA 057	31-Oct-14
62	PON-1304	DRA 059	31-Oct-14
63	APY-247	DRA 064	06-Jan-15
64	KON-411	DRA 67	26-Feb-15
65	KOO - 581	DRA 062	18-Dec-14
66	VEL - 2119	DRA 063	24-Dec-14
67	ALA 1385	DRA 066	04-Feb-15

Village: - Manakadavu, Ponnivadi, Nallampalayam, Kongoor, Alampalayam, Vellaviputhur, Paruthiyur, Koothampoondi, Pungamuthur, Appiyampatti **Taluka:-** Dharapuram, Ottanchatiram, Dharapuram **District:-** Tirupur and Dindigul.

The details of the project at Karnataka is as follows:-

Savalsang @ Karnataka - 95.20 MW (0.85*112)		
Gamesa Make WTG model G58/850 kW		
S. No.	**Machine ID**	**DOC[4]**

[4] Date Of commissioning

1	MVKPL-1-03	29-Apr-14
2	MVKPL-1-04	2-Jun-14
3	MVKPL-1-05	2-Jun-14
4	MVKPL-1-06	29-Apr-14
5	MVKPL-1-07	29-Apr-14
6	MVKPL-1-08	29-Apr-14
7	MVKPL-1-09	29-Apr-14
8	MVKPL-1-10	29-Apr-14
9	MVKPL-1-11	29-Apr-14
10	MVKPL-1-12	29-Apr-14
11	MVKPL-1-13	29-Apr-14
12	MVKPL-1-14	29-Apr-14
13	MVKPL-1-15	29-Apr-14
14	MVKPL-2-01	29-Apr-14
15	MVKPL-2-02	29-Apr-14
16	MVKPL-2-03	29-Apr-14
17	MVKPL-2-04	29-Apr-14
18	MVKPL-2-05	29-Apr-14
19	MVKPL-2-06	29-Apr-14
20	MVKPL-2-07	29-Apr-14
21	MVKPL-2-08	26-Jul-14
22	MVKPL-2-09	29-Apr-14
23	MVKPL-2-10	29-Apr-14
24	MVKPL-2-11	29-Apr-14
25	MVKPL-2-12	29-Apr-14
26	MVKPL-2-13	29-Apr-14
27	MVKPL-2-14	23-Jan-15
28	MVKPL-2-15	29-Apr-14
29	MVKPL-2-16	23-Jan-15
30	MVKPL-2-17	29-Apr-14
31	MVKPL-2-18	29-Apr-14
32	MVKPL-2-19	29-Apr-14
33	MVKPL-2-20	29-Apr-14
34	MVKPL-3-01	2-Jun-14
35	MVKPL-3-02	29-Apr-14
36	MVKPL-3-03	29-Apr-14
37	MVKPL-3-04	29-Apr-14
38	MVKPL-3-05	26-Jul-14
39	MVKPL-3-06	23-Jan-15
40	MVKPL-3-07	23-Jan-15
41	MVKPL-3-08	02-Jun-14
42	MVKPL-3-09	02-Jun-14
43	MVKPL-3-10	29-Apr-14
44	MVKPL-3-11	23-Jan-15

45	MVKPL-3-12	23-Jan-15
46	MVKPL-3-13	29-Apr-14
47	MVKPL-3-14	29-Apr-14
48	MVKPL-3-15	29-Apr-14
49	MVKPL-3-16	29-Apr-14
50	MVKPL-3-17	29-Apr-14
51	MVKPL-3-18	2-Jun-14
52	MVKPL-3-19	29-Apr-14
53	MVKPL-4-01	2-Jun-14
54	MVKPL-4-02	29-Apr-14
55	MVKPL-4-03	29-Apr-14
56	MVKPL-4-04	29-Apr-14
57	MVKPL-4-05	29-Apr-14
58	MVKPL-4-06	02-Jun-14
59	MVKPL-4-07	29-Apr-14
60	MVKPL-4-08	29-Apr-14
61	MVKPL-4-09	2-Jun-14
62	MVKPL-4-10	29-Apr-14
63	MVKPL-4-11	29-Apr-14
64	MVKPL-4-12	29-Apr-14
65	MVKPL-4-13	29-Apr-14
66	MVKPL-4-14	29-Apr-14
67	MVKPL-4-15	29-Apr-14
68	MVKPL-4-16	02-Jun-14
69	MVKPL-4-17	02-Jun-14
70	MVKPL-4-18	29-Apr-14
71	MVKPL-4-19	29-Apr-14
72	MVKPL-4-20	29-Apr-14
73	MVKPL-4-21	29-Apr-14
74	MVKPL-5-01	29-Apr-14
75	MVKPL-5-02	29-Apr-14
76	MVKPL-5-03	29-Apr-14
77	MVKPL-5-04	29-Apr-14
78	MVKPL-5-05	29-Apr-14
79	MVKPL-5-06	29-Apr-14
80	MVKPL-5-07	29-Apr-14
81	MVKPL-5-08	29-Apr-14
82	MVKPL-5-09	29-Apr-14
83	MVKPL-5-10	29-Apr-14
84	MVKPL-5-11	29-Apr-14
85	MVKPL-5-12	29-Apr-14
86	MVKPL-5-13	29-Apr-14
87	MVKPL-5-14	02-Jun-14

88	MVKPL-5-15	02-Jun-14
89	MVKPL-5-16	02-Jun-14
90	MVKPL-5-17	02-Jun-14
91	MVKPL-5-18	02-Jun-14
92	MVKPL-6-01	26-Jul-14
93	MVKPL-6-02	26-Jul-14
94	MVKPL-6-03	26-Jul-14
95	MVKPL-6-04	26-Jul-14
96	MVKPL-6-05	26-Jul-14
97	MVKPL-6-06	26-Jul-14
98	MVKPL-6-07	26-Jul-14
99	MVKPL-6-08	26-Jul-14
100	MVKPL-6-09	26-Jul-14
101	MVKPL-6-10	26-Jul-14
102	MVKPL-6-11	23-Jan-15
103	MVKPL-6-12	26-Jul-14
104	MVKPL-6-13	26-Jul-14
105	MVKPL-6-14	26-Jul-14
106	MVKPL-6-15	26-Jul-14
107	MVKPL-6-16	23-Jan-15
108	MVKPL-6-17	26-Jul-14
109	MVKPL-6-18	26-Jul-14
110	MVKPL-6-19	26-Jul-14
111	MVKPL-6-20	23-Jan-15
112	MVKPL-6-21	23-Jan-15

Village: Savalsang, Kannuru, Kolurgi , Domnal, Inchageri, Mahaveeranagar, Jigagivani, Hadalasang **District** Bijapur

1.6 Project Crediting Period

Crediting Period Start date: 21-February -2014[5]

Crediting Period End date: 20-Febtruary-2024

The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times.

[5] Start date of crediting period is 21/02/2014, as on this day 1st set of WTGs associated to the project activity starts its commenrcial operations. Accordingly end date of the crediting period is also been revised

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

The project is a large scale project that involves setting up of 233.1 MW of wind power project.

Project Scale	
Project	-
Large project	✓

As the Estimated GHG emission reductions or removals per year is 479,448 (tCO2e) which greater than 300,000 tonnes of CO2e per year, thus the project falls in the category of Large project.

Year	Estimated GHG emission reductions or removals (tCO_2e)
Year 1	479,448
Year 2	479,448
Year 3	479,448
Year 4	479,448
Year 5	479,448
Year 6	479,448
Year 7	479,448
Year 8	479,448
Year 9	479,448
Year 10	479,448
Total estimated ERs	4,794,480
Total number of crediting years	10 years
Average annual ERs	479,448

1.8 Description of the Project Activity

The proposed project activity involves the installation of Wind Power Projects. The total installed capacity of the project is 233.1 MW; which involves operation of 223 Wind Turbine Generators (WTGs) with capacity of 1.5 MW & 0.85 MW at Andhra Pradesh, Karnataka, and Tamil Nadu state in India. The project is promoted by **Mytrah Energy (India) Limited**. Details of the installation of project in respective state is as follows:-

Serial No.	**Investor**	**State**	**Capacity in MW**
1.	Mytrah Vayu Krishna Private Limited	Karnataka	(0.85*112)
		Andhra Pradesh	(0.85*44)

2.	Mytrah Vayu (Majira) Private Limited	Tamil Nadu	(1.5*67)
Total			**233.1**

The Project activity is a new facility (Greenfield) and the electricity generated by the Project will be exported to the Southern Grid and for Tamil Nadu state the electrical energy is used for captive purpose. The Project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The Project Proponent plans to avail the VCS benefits for the Project.

In the Pre- project scenario the equivalent amount of electricity, either fetched (under captive cases) or delivered to the grid by the project activity, would have otherwise been generated by the operation of grid-connected fossil fuel based power plants and by the addition of new generation sources.

The project shall result in replacing anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 479,448 tCO_2e per year, thereon displacing 488,388 MWh/year amount of electricity from the gird.

Wind Power Project Technology Details –

The technology employed, converts wind energy to electrical energy. In wind power generation, energy of wind is converted into mechanical energy and subsequently into electrical energy. The technology is an environment friendly technology since there are no GHG emissions associated with the electricity generation. There is no transfer of technology involved in the project activity.

The project activity comprises a total of 156 WTG's of Gamesa India Limited Model No. G 58[6], commissioning of these 156 WTG's is completed, and the details of are mentioned in section 1.5. The project activity also comprises a total of 67 WTG's of Vensys V87[7], commissioning of these project activity is completed and details are mentioned in section 1.5. Thus, the project activity comprises of 233.1 MW total capacity.

Emission Reductions from anthropogenic sources:

The wind power generated from the Project will be displacing the electricity generated from thermal power stations feeding into Southern grid and will be replacing the usage of diesel generators for meeting the power demand during shortage periods. Since, the wind power is Green House Gas (GHG) emissions free, the power generated will prevent the anthropogenic GHG emissions generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas. The estimation of GHG reductions by this project is limited to carbon dioxide (CO2) only.

1.9 Project Location

[6] http://www.wind-power-program.com/Library/Turbine%20leaflets/Gamesa/Gamesa%20G58%20850kw.pdf

[7] http://www.regenpowertech.com/104/technical-data

Provided in Appendix 1.

1.10 Conditions Prior to Project Initiation

The project is a Greenfield wind power project and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal or destruction. Prior to the initiation of the this project activity, the equivalent amount of electricity would have been drawn from grid connected or new power plants, in Southern Grid. The grid is predoninanatly coal based and therefore is a major source of carbon di oxide emissions in India. The main emission in the pre poject scenario is the power plants connected to the Southern Grid, and main GHG involved is CO_2.

The Pre- project scenario for the facility where the electricity is wheeled (in case of TN WEGs), the electricity was sourced from southern grid.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Project has received necessary approvals for development and commissioning for each WTG from the state Nodal agencies and is in compliance to the local laws and regulations.

1.12 Ownership and Other Programs

1.12.1 Right of Use

The Project is owned by Mytrah Energy (India) Limited, hence it possess right of use of ER credits. The Ownership is demonstrated through the following documents.

1) Commissioning certificates for WTGs in the name of Mytrah Vayu Krishna Private Limited and Mytrah Vayu (Manjira) Private Limited issued by respective state nodal ageniceis/authorities of the Tamil Nadu, Karnataka & Andhra Pradesh States of India. These two companies are the subsidiary of the Mytrah Energy (India) Limited..

2) Power Purchase Agreement with respective State Electricity Board for sale of electricity by the Mytrah Vayu Krishna Private Limited and WheelingAgreement is signed for the captive usage.

1.12.2 Emissions Trading Programs and Other Binding Limits

Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

1.12.3 Other Forms of Environmental Credit

The Project has no intend to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

1.12.4 Participation under Other GHG Programs

No applied for any other GHG programs.

1.12.5 Projects Rejected by Other GHG Programs

The Project is not rejected by other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

This is not a grouped project activity. Thus, this section is not applicable for this project.

Leakage Management

Not applicable to the project activity.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description

Further Information

Contribution to sustainable development:

Ministry of Environment and Forests, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project contributes to sustainable development using the following ways.

- **Social well-being:** The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region like development of roads and also may promote business with improved power generation.

- **Economic well-being:** The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits the project activity will also help to reduce the demand supply gap in the state.

  The project activity will generate power using zero emissions wind based power generation which helps to reduce GHG emissions and specific pollutants like SOx, NOx, and SPM associated with the conventional thermal power generation facilities.

- **Technological well-being:** The successful operation of project activity would lead to promotion of wind based power generation and would encourage other entrepreneurs to participate in similar projects

- **Environmental well-being**: Wind being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the Project activity also helps in avoiding significant amount of GHG emissions.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Methodology: ACM0002: Grid-connected electricity generation from renewable sources --- Version 16.0, Sectoral Scope: 01, EB 81, Annex 9
https://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHLAR6MJ6VEU83

The project activity also takes reference from following Tools from the tools prescribed by applied methodology:
1. Tool for the demonstration and assessment of additionality --- Version 07.0.0, EB 70, Annex 8
https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

2. Tool to calculate the emission factor for an electricity system --- Version 05.0, EB 87, Annex 09
https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf

2.2 Applicability of Methodology

The following steps will show the applicability of the project under this methodology.

Applicability Criterion	Project Case
1. This methodology is applicable to grid-connected renewable energy power generation project activities that: a. Install a Greenfield power plant; b. Involve a capacity addition to (an) existing plant(s); c. Involve a retrofit of (an) existing operating plants/units; d. Involve a rehabilitation of (an) existing plant(s)/unit(s);or e. Involve a replacement of (an) existing plant(s)/unit(s).	The project activity is installation of a new grid connected wind power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant) and hence this criterion is applicable.
2. The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	The proposed project activity is an installation of a new grid connected wind power plant. Hence this condition is met.

3. In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	The proposed project activity is the greenfield installation of a wind power plant/unit. Therefore, the said criteria is not applicable
4. In case of hydro power plants, one of the following conditions shall apply: a. The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or b. The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m2; or c. The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m2; or d. The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3),is lower than or equal to 4 W/m2, all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4),is greater than 4 W/m2; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m2 shall be: a) Lower than or equal to 15 MW; and b) Less than 10 per cent of the total installed capacity of integrated hydro power project.	The proposed project activity is the installation of a wind power plant/unit. Therefore, the said criteria is not applicable
5. In the case of integrated hydro power projects, project proponent shall: • Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation	The proposed project activity is the installation of a wind power plant/unit. Therefore, the said criteria is not applicable

capacity of the integrated hydro power project; or • Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	
6. The methodology is not applicable to: • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • Biomass fired power plants/units.	The proposed project activity is the installation of grid connected wind power plant/unit and it does involve fossil fuel switch. Therefore, the said criteria is not applicable
7. In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	The project activity is a new grid connected wind power plant and does not involve retrofits, replacement or capacity additions and therefore this criterion is not applicable to the project activity.
8. In addition, the applicability conditions included in the tools referred to below apply.	The project applies the following tools and is in compliance to the same; • "Tool to calculate the emission factor for an electricity system"; • "Tool for the demonstration and assessment of additionality";

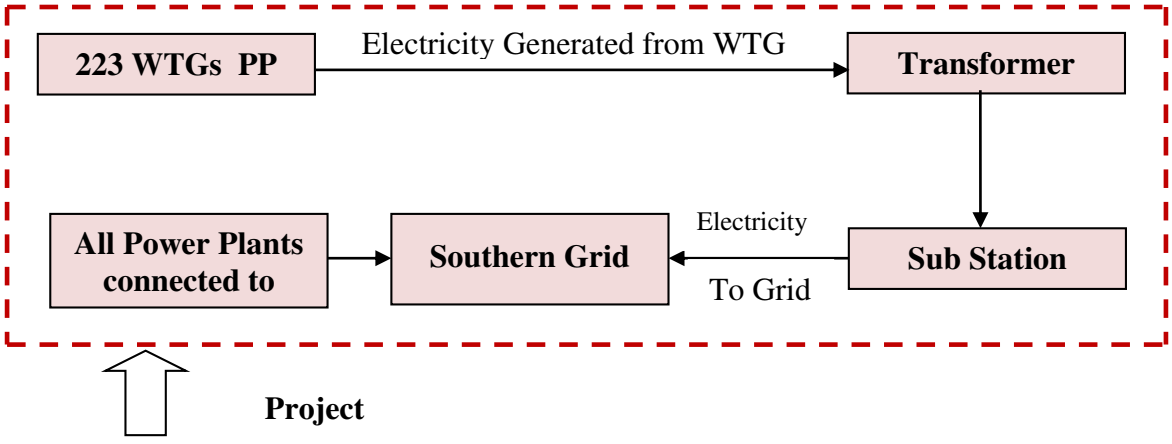
2.3 Project Boundary

As per the para 21 of the applicable methodology ACM0002 (Version 16.0.0) "*The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to*".

Therefore, the project boundary includes all the 223 numbers of WTGs along with the WTGs of the other project proponents connected to the sub-station, which is further connected to the network of the Southern grid, i.e. the project boundary also includes the Southern grid. Thus, the project boundary further includes all the power plants physically connected to the Southern grid

Source		GHGs	Included?	Justification/Explanation
Baseline Scenario	Grid-connected electricity generation	CO_2	Yes	Major emission sources.
		CH_4	No	Excluded for simplification. This is conservative
		N_2O	No	Excluded for simplification. This is conservative
Project Scenario	Greenfield Wind energy conversion system	CO_2	No	The project activity does not emit any emissions.
		CH_4	No	No methane generation is expected to be emitted.
		N_2O	No	No nitrous oxide generation is expected to be emitted.

Project Boundary Diagram:



2.4 Baseline Scenario

As per para 23 of ACM0002 version 16.0; If the project activity is the installation of a Greenfield power plant

"Electricity delivered to the grid by the project activity 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 in the "Tool to calculate the emission factor for an electricity system".

2.5 Additionality

In line with VCS Standard version 3.5, the additionality of the Project activity is ascertained in line with the applicable guidance from the UNFCCC. The demonstration of additionality for the proposed Project activity is being carried out in accordance with the additionality tool provided by the UNFCCC i.e. "Tool for demonstration and assessment of Additionality" Version 07.0.0,. The tool provides a step-wise approach to demonstrate additionality which is displayed below:

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind;

No, this project activity is not first-of-its-kind project. The additionality of the project activity has demonstrated by using the investment barrier and the same has been discussed in the following steps.

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

Sub-step 1a: Define alternatives to the project activity:
Identify realistic and credible alternative(s) available to the project participants or similar project developers that provide outputs or services comparable with the proposed VCS project activity.

Alternative 1: The proposed project activity not undertaken as a VCS project activity.
The PP could proceed with the implementation of the project without Carbon credit benefits. The electricity produced from the renewable energy project would have been sold to the grid. This is in compliance with all applicable legal and regulatory requirements and can be a part of the baseline. However, the Project activity is not feasible without revenues from sale of Carbon Credits. This argument has been discussed in step 2 of the Additionality section.

Alternative 2: No proposed project activity and equivalent amount of energy would have been produced by the grid electricity system through its currently running power plants and by new capacity addition to the grid i.e. Continuation of the present situation.

The PP would have continued without investment in Project activity with usual business activities. The grid would continue with the fossil fuel based power projects and this would result in GHG emissions. Hence, the new capacity add-on from a fossil fuel based power plant is appropriate, realistic & credible baseline alternative for the project activity.

Outcome of Sub-step 1a: All the realistic alternatives for the project activity have been enlisted above.

Sub-step 1b: Consistency with mandatory laws and regulations:
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.).

The relevant national laws and regulations pertaining to generation of energy in India are:

- Electricity Act 2003
- National Electricity Policy 2005
- Tariff Policy 2006

The Project activity conforms to all the applicable laws and regulations in India:

- Power generation using wind energy is not a legal requirement or a mandatory option.
- There are state and sectoral policies, framed primarily to encourage wind power projects. These policies have also been drafted realizing the extent of risks involved in the projects and to attract private investments.
- The Indian Electricity Act, 2003 (May 2007 Amendment) does not influence the choice of fuel used for power generation.
- There is no legal requirement on the choice of a particular technology for power generation.

Outcome of Sub-step 1b: Hence, both the alternatives enlisted above are found to comply with the mandatory laws and regulations taking into account the enforcement of the legislations in the region or country and EB decisions on national and/or sectoral policies and regulations. However, Alternative 2 has been selected as the appropriate baseline alternative for this project activity.

Step 2: Investment analysis

Determine whether the proposed project activity is economically or financially less attractive than at least one other alternative, identified in step 1, without the revenue from the sale of emission reductions credits. To conduct the investment analysis, use the following sub-steps:

Sub-step 2a: Determine appropriate analysis method

The Project activity envisages to export the power to Southern grid and the revenues from the sale would be generated in accordance with the terms and tariffs established in the Power Purchase Agreement (PPA). Thus, simple cost analysis cannot be used as the analysis method as the sale of the units of generated electricity shall result in a revenue stream during the operations of the Project activity.

After eliminating Option I, the use of Benchmark analysis (Option III) is the method of analysis that has been selected as the most suitable method. This method determines the attractiveness of the project activity for the investors, as well as provides a measure of the viability of the investment to generate revenues during its operation, as compared with other avenues and investment options. Hence, the Benchmark analysis method is to be employed for analysis of the said project.

Sub-step 2b (Option III): Apply benchmark analysis

The investment analysis using Benchmark analysis approach (Option III) has been chosen. Further, this method illustrates the evaluation of the Project by the PP before the decision to undertake the project was taken and management approval granted.

Choice of Financial Indicator:

According to the "Tool for demonstration and assessment of Additionality", *the financial indicator can be based either on (1) project IRR or (2) equity IRR. There is no general preference between the approaches (1) or (2). The benchmark chosen for analysis shall be fully consistent with the choice of approach.* Therefore in accordance with the guidance, the relevant financial indicator for project activity has been chosen as post tax equity IRR.

Choice of Benchmark:
As per para 15 of Guidelines on the assessment of the investment analysis (Annex 05, EB 62), the value for cost of equity is selected from Appendix A of Annex 05 of EB 62. The default value of Return on Equity for Group-1 projects in India is 11.75%.

As per paragraph 7 of Appendix A of the above mentioned document, "*In situations where an investment analysis is carried out in nominal terms, project participants can convert the real term values provided in the table below to nominal values by adding the inflation rate. The inflation rate shall be obtained from the* ***inflation forecast of the central bank of the host country for the duration of the crediting period****. If this information is not available, the target inflation rate of the central bank shall be used. If this information is also not available, then the average forecasted inflation rate for the host country published by the IMF (International Monetary Fund World Economic Outlook) or the World Bank for the next five years after the start of the project activity shall be used".*

Investment decision made date for each WTG owner:

WTG Owner	Decision made date
Mytrah Vayu Krishna Private Limited (Karnataka)	**25/04/2013**
Mytrah Vayu Krishna Private Limited (Andhra Pradesh)	**25/04/2013**
Mytrah Vayu (Manjira) Private Limited (Taminadu)	**10/08/2012**

Default Value Benchmark Calculations:
As mentioned in Appendix A in EB62 Annex 5 and latest Clarification from UNFCCC in EB 73 (Applicability of the "Guidelines on the assessment of investment analysis" version 01.0), default value benchmark is presented below:

Appendix A in EB62 Annex 5 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = 11.75%

The Required return on equity (benchmark) was computed in the following manner:

Nominal Benchmark[8] = {(1+Real Benchmark)*(1+Inflation rate)} - 1

Where:
- Default value for Real Benchmark = 11.75% (as per Appendix of Annex 5, EB 62)
- Inflation Rate forecast by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India

Inflation Forecast as per RBI:

WTG Owner	WPI Inflation Forecast (Median) [9]		Benchmark	
	5 Years	10 Years	5 Years	10 Years
Mytrah Vayu Krishna Private Limited (Karnataka)	6.50%	6.00%	19.01%	18.46%
Mytrah Vayu Krishna Private Limited (Andhra Pradesh)	6.50%	6.00%	19.01%	18.46%
Mytrah Vayu (Manjira) Private Limited (Taminadu)	6.50%	6.00%	19.01%	18.46%

As a conservative approach, benchmark of 18.46% has been selected for this project activity.
Please refer Appendix III for input parameters of all three sites
Based on input parameters, the IRR comes out to be:

WTG Owner	Equity IRR without CDM	Benchmark
Mytrah Vayu Krishna Private Limited (Karnataka)	7.66%	18.46%
Mytrah Vayu Krishna Private Limited (Andhra Pradesh)	14.07%	18.46%
Mytrah Vayu (Manjira) Private Limited (Taminadu)	10.66%	18.46%

Sub-step 2c: Sensitivity Analysis:

As per Guidance 20 and 21 of Annex 5 of EB 62 Annex 5, only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets. Guidance also states, “All parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude”. The Annex also states, as a general point of departure, variations in the sensitivity analysis should at least cover a range of +10% and –10%, unless this is not deemed appropriate in the context of the specific project circumstances.

Since the project cost is already firmed up, the cost is not variable. The tariff is determined by PPA which is fixed for years mentioned as per the tariff order and hence it need not be subjected to variation. All other expenses are much less than 20% of the total cost. Hence, only PLF needs to be subjected to reasonable variation. Nevertheless, following factors have been subjected to sensitivity analysis:

[8] As per Pg. 320 of Corporate Finance, Second Edition of Aswath Damodaran

[9] https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/01SPFMD250113_F.pdf

(a) PLF
(b) O&M Cost
(c) Project Cost
(d) Tariff Rate

The results of sensitivity analysis are as follows:

For Karnataka state (Mytrah Vayu Krishna Private Limited)

Variation %	-10%	Normal	10%	Breaching Value
PLF	5.23%	7.66%	10.03%	43.20%
O&M Cost	7.98%	7.66%	7.33%	-470.00%
Project Cost	10.15%	7.66%	5.72%	-30.90%
Tariff Rate	5.40%	7.66%	9.95%	45.83%

For Andhra Pradesh (Mytrah Vayu Krishna Private Limited)

Variation %	-10%	Normal	10%	Breaching Value
PLF	10.10%	14.07%	18.25%	15.50%
O&M	14.46%	14.07%	13.66%	-170.00%
Project Cost	18.46%	14.07%	10.82%	-14.00%
Tariff Rate	10.38%	14.07%	18.01%	16.50%

For Tamil Nadu Mytrah Vayu (Manjira) Private Limited

Variation %	-10%	Normal	10%	Breaching Value
PLF	7.46%	10.66%	13.83%	22.27%
O&M	11.04%	10.66%	10.26%	-206.81%
Project Cost	13.77%	10.66%	8.14%	-19.84%
Tariff Rate	7.46%	10.66%	13.83%	22.27%

It can be observed from above table that in various scenarios wherein there are changes in tariff, O&M cost, net saleable units and project's capital cost, the Equity IRR does not cross the benchmark. Thus, it can be concluded that revenue from sale of VCUs is important to alleviate this gap and hence the project has been considered to be additional.

	Probability to breach the benchmark
PLF	Not possible as the PLF has been reported as per the Third Party Report based on long term data and hence a PLF fluctuation of more than 10% is unlikely to happen.
O&M	With the country experiencing 5% inflation on an average, the question of O&M coming down is ruled out. Moreover, the Term sheet also confirms the escalation of 5% in O & cost year on year basis.

Project Cost	The total project cost is higher than considered at the time of decision making cost. Since the project cost[10] is firm, there is no possibility of project cost going below this level. However, we have conducted sensitivity analysis for project cost being 10% less than that considered during decision making. Still, the IRR does not breach the Benchmark.
Tariff Rate	The tariff is determined by PPA which is fixed for years mentioned as per the State Electricity Board's tariff order. Hence, there is no probability to get variation for the same.

Step 3: Barrier analysis

Barrier analysis has not been used.

Step 4: Common practice Analysis

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

Common practice analysis has been carried out as per "Methodological Tool on Common Practice, version 03.1[11] EB84, Annex 7 ". In the context of the project activity, the following parameters are defined as per **Part I. Definitions** of the Guidelines on Common Practice:

1. Applicable Geographical Area (Para 9): The host country, i.e. India has been considered as the applicable geographical area for this project.

2. Measure (Para 10): The project activity reduces greenhouse gas emissions by generating electricity using renewable energy source-wind. Therefore, the project activity falls under the following measure: *(b) Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies*

.

3. Output (Para 11): The project activity produces electricity. Therefore, electricity is considered as output of the project activity.

4. Different Technologies (Para 12): The project activity uses wind energy for producing electricity and hence as per Para 12(a), the technologies which use energy source/ fuel other than wind will be considered as the different technologies for the project activity

   The common practice analysis is carried out step by step as per Part 5 of the guideline.
   Stepwise approach for common practice as follows:

Step (1): *calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.*

Investment State	Range	Capacity	Unit
Andhra Pradesh	+50%	56.1	MW
	Capacity of the proposed project activity	37.4	MW
	-50%	18.7	MW

[10] CA certified specifying the actual project cost.

[11] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf

Karnataka	+50%	142.8	MW
	Capacity of the proposed project activity	92.5	MW
	-50%	47.6	MW
Tamil Nadu	+50%	150.8	MW
	Capacity of the proposed project activity	100.5	MW
	-50%	50.3	MW

Step (2): *identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:*

(a) The projects are located in the applicable geographical area;
(b) The projects apply the same measure as the proposed project activity;
(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

(a) Project is located at Andhra Pradesh, Karnatak & Tamil Nadu, India. The applicable geographical area has been considered as INDIA (Host Country).
(b) The project is a wind power investment. So the PP has considered only wind power projects for the analysis.
(c) The project activity is implementing technology switch measure. Therefore, all projects which use the same energy source/ fuel-wind as being used by the project activity are candidates for similar projects.
(d) Wind power projects are considered for the analysis i.e. projects those produce goods or services with comparable quality, properties and applications areas of the project activity.
(e) The capacity range of the projects is within the applicable capacity range as calculated in Step 1.
(f) The start date of the project activity is 21/02/2014 & the webhosting of the project was done on 29/01/2016. So wind projects prior to the start date of the project activity, and which has started commercial operation after India's ratification of Kyoto Protocol, are considered for the analysis.

As per above guidance, only wind power projects have been considered for the analysis. As per the assessment by the PP, the total CDM & non-CDM wind projects are as follows:

Investment State	Similar Projects[12]	Source
Andhra Pradesh	127	www.cdmpipeline.org & Wind Power Directory 2014, 14th edition
Karnataka	8	
Tamil Nadu	7	

Step 3: *Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number* N_{all}.

Outcome of Step 3:
Out of the identified projects under Step 2, PP has omitted projects under CDM consideration under CDM EB. The balance similar projects are as follows:

Investment State	Particulars	Values
Andhra Pradesh	N_{all}	117
Karnataka	N_{all}	8
Tamil Nadu	N_{all}	7

Step 4: Within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number Ndiff.

Outcome of Step 4:
As per paragraph 4/d of the common practice analysis: Different technologies are technologies that deliver the same output and differ by the following (as appropriate in the context of the measure applied in the proposed clean development mechanism (CDM) project activity and applicable geographical area):

(d) Investment climate on the date of the investment decision, inter alia:

(i) Access to technology;
(ii) Subsidies or other financial flows;
(iii) Promotional policies;
(iv) Legal regulations;

The similar projects considered for the analysis as per step 3 above are located in various States of the host country, India. The policies/tariff for each state is regulated by the State Electricity Regulatory Commission (SERC) of the respective states. So, each of the State is having its distinct investment climate/scenarios for wind power developers on the date of the investment decision, be it Access to technology; Subsidies or other financial flows; Promotional policies; Legal regulations etc. Thus, the projects in the State of Andhra Pradesh, Karnataka & Tamil Nadu are distinct over the rest in the host country India with regards to the investment climate on the date of the investment decision.

Thus the similar projects identified above located in other States apart from these states are considered as N_{diff}.

[12] Source: Common Practice Analysis Worksheet. The evidence is submitted to the DOE

Thus the identified projects under Step 3, projects that have applied different technology than that of the proposed project are as follows:

Investment State	Particulars	Values
Andhra Pradesh	N_{diff}	114
Karnataka	N_{diff}	7
Tamil Nadu	N_{diff}	7

Step 5: *Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity*.

From the information in step 2 and step 3, followings are the results:

Investment State	Particulars	Values	Conclusion
Andhra Pradesh	factor $F=1-N_{diff}/N_{all}$	0.0256	Dissatisfy the criteria i.e. F > 0.2
	$N_{diff} - N_{all}$	3	Dissatisfy the criteria i.e. $(N_{diff} - N_{all}) > 3$
Karnataka	factor $F=1-N_{diff}/N_{all}$	0.1250	Dissatisfy the criteria i.e. F > 0.2
	$N_{diff} - N_{all}$	1	Dissatisfy the criteria i.e. $(N_{diff} - N_{all}) > 3$
Tamil Nadu	factor $F=1-N_{diff}/N_{all}$	0.0000	Dissatisfy the criteria i.e. F > 0.2
	$N_{diff} - N_{all}$	0	Dissatisfy the criteria i.e. $(N_{diff} - N_{all}) > 3$

As per para 18 of "Methodological Tool on Common Practice" Version 03.1 – *The proposed project activity is a common practice within a sector in the applicable geographical area if the factor F is greater than 0.2 and Nall-Ndiff is greater than 3.*"

Outcome of Common Practice Analysis:
The project activity is not the common practice as factor F is less than 0.2 and Nall-Ndiff is less than 3. Hence, propose project is not the common practice & is additional.

2.6 Methodology Deviations

There is no methodology deviation

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

As per para 46 of ACM0002 version 16.0, Baseline emissions include only CO2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$BEy = EG_{PJ,y} * EF_{grid,CM,y}$

Where:

BEy	=	Baseline emissions in year *y* (t CO_2/yr)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year *y* (MWh/yr)
$EF_{grid,CM,y}$	=	Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO_2/MWh)

Baseline Emissions

As per the equation 7 of the methodology ACM 0002 (Version 16.0),

$$BE_y = EG_{PJ,\ y} * EF_{grid,\ CM,\ y} \quad (1)$$

Where:

BE_y: Baseline emissions in year y (tCO_2e/yr)

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

$EF_{grid,\ CM,\ y}$: Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2e/MWh)

Calculation of $EG_{PJ,\ y}$

The methodology ACM 0002 (Version 16.0) has procedures for calculation of $EG_{PJ,\ y}$ for the following cases:

(a) Greenfield plants,
(b) Retrofits and replacements, and
(c) Capacity additions.

As the proposed project activity is Greenfield plant, option (a) as provided in the methodology ACM 0002 (Version 16.0) shall be applicable and is described below:

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

$$EG_{PJ,\ y} = EG_{facility,\ y}$$

Where:

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

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

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

The methodology ACM0002 (Version 16.0) requires that the combined margin for the grid be calculated in accordance with the procedure provided in the *"Tool to calculate the emission factor for an electricity system".*

As per version 4 of Tool to calculate emission factor for an electricity system, following steps are included in the calculation of the emission factor for the baseline scenario:

STEP 1: Identify the relevant electricity systems;
STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional);
STEP 3: Select a method to determine the operating margin (OM);
STEP 4: Calculate the operating margin emission factor according to the selected method;
STEP 5: Calculate the build margin (BM) emission factor;
STEP 6: Calculate the combined margin (CM) emission factor.

The Central Electricity Authority (CEA) has published CO_2 baseline database in its version 10[13] (December, 2014). The values for OM, BM, CM are given excluding and including imports. For the present project activity, including imports are considered.

STEP 1: Identify the relevant electricity power systems

Grid/project electricity system is defined by the spatial extent of the power plants that are physically connected through transmission and distribution lines to the project activity (e.g. the renewable power plant location or the consumers where electricity is being saved) and that can be dispatched without significant transmission constraints.

The Southern grid and the NEWNE Grid form the two independent regional grids of India. As the project activity comprises the project activity located in the state of Tamil Nadu, Andhra Pradesh & Karnataka, the Southern grid is applicable to the proposed CDM project.

Each state in a regional grid meets its own demand with its own generation facilities and also with allocation from power plants owned by the central sector. Depending on the demand and generation, there are electricity exports and imports between states in the regional grid. The volume of the net transfers between the regions in India is relatively small and electricity is largely produced and consumed within the same states. Consequently, it is appropriate to assume that the impacts of the project activity will be confined to the regional gird in which it is located. Hence for the purpose of estimation of the baseline emission factor, the Southern grid has been chosen as the relevant electricity system.

Table: Grid Classification

NEWNE				Southern
Northern	Eastern	Western	North-Eastern	
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Kerala
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Tamil Nadu
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Andhra Pradesh
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	

[13] http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver10.pdf

Punjab	Andaman & Nicobar	Maharashtra	Nagaland	
Rajasthan		Goa	Tripura	
Uttar Pradesh				
Uttarakhand				

STEP 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants have the option of choosing between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.

The Project Participant has chosen only grid power plants in the calculation.

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

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4:

(a) Simple OM, or
(b) Simple adjusted OM, or
(c) Dispatch data analysis OM, or
(d) Average OM.

The data required to calculate simple adjusted OM or Dispatch data analysis is not possible due to lack of availability of this activity data to the project developers. The choice of other two options for calculating the operating margin emission factor depends on the generation of electricity from low cost/must run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.

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

	2009-10	2010-11	2011-12	2012-13	2013-14
Southern	20.6%	20.9%	21.5%	15.8%	21.0%

Data Source: Central Electricity Authority (CEA) database Version 10, Dec'2014

The above data clearly shows that the percentage of total grid generation by low cost/must run plants (on the basis of average of three most recent years) for the NEWNE and Southern grids is less than 50 % of the total generation. Thus the average emission rate method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

The "Simple operating margin" has been calculated as per the weighted average emissions (in tCO_2/MWh) of all generating sources serving the system, excluding hydro, geo-thermal, wind, low-cost biomass, nuclear and solar generation;

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

- **Ex ante option:** If the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. **Or**

- **Ex post option:** If the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

PP has chosen ex ante option for the calculation of OM with 3 years generation weighted average of the most recent years available at the time of submission of VCS-PD to the DOE for validation.

OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the crediting period.

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

The operating margin emission factor has been calculated using a 3 year data vintage:

Net Generation in Operating Margin (MWh) (incl. Imports)			
	2011-12	**2012-13**	**2013-14**
Southern	153155.160	155891.576	162396.860

Simple Operating Margin (tCO_2/MWh) (incl. Imports)			
	2011-12	**2012-13**	**2013-14**
Southern	0.9524	0.9937	1.0182

Weighted Generation Operating Margin	
Southern	**0.9887**

STEP 5: Calculate the build margin emission factor ($EF_{grid,BM,y}$)

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

Build Margin (tCO_2/MWh) (not adjusted for imports)	
	2013-14
Southern	**0.9609**

(With sample group constituting most recent capacity additions to the grid comprising 20% of the system generation)

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

Combined Margin – The combined margin is the weighted average of the simple operating Margin and the build margin. In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Tool to calculate the emission factor for an electricity system, Version 05.0, EB 87, Annex 9, allows to weigh the operating margin and Build margin at 75% and 25%, respectively**.**

The baseline emission factor is calculated using the combined margin approach as described in the following steps:

Calculation of Baseline Emission Factor ($EF_{grid\ y}$**)**

The baseline emission factor $EF_{grid,y}$ is calculated as the weighted average of the Operating Margin emission factor **($EF_{grid,OM,y}$)** and the Build Margin emission factor **($EF_{grid,BM,y}$)**:

$$\mathbf{EF_{grid\ y} = w_{OM} * EF_{grid,CM,y} + w_{BM} * EF_{grid,CM,y}}$$

Where,

w_{OM}	75% weight of operating margin emissions factor (%)
w_{BM}	25% weight of operating margin emissions factor (%)
$EF_{grid,CM,y}$	Build margin CO_2 emission factor of a particular grid in year y; calculated as described in Steps 3&4 above (tCO_2/MWh)
$EF_{grid,CM,y}$	Build margin CO_2 emission factor of a particular grid in year y; calculated as described in Steps 5 above (tCO_2/MWh)

Baseline Emission factor (Southern Grid)

$$\mathbf{EF_{Southern,\ CM,\ y} = 0.75*0.9887 + 0.25*0.9609}$$
$$\mathbf{= 0.9817\ tCO_2/MWh}$$

Therefore, Baseline Emissions:

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

BE_y **= 488,388.4 x 0.9817 = 479,448** $\mathbf{tCO_2}$

3.2 Project Emissions

The project emission calculation as per para 35 of ACM0002 version 16,

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

PE_y	=	Project emissions in year y (t CO2e/yr)

$PE_{FF,y}$	=	Project emissions from fossil fuel consumption in year y (t CO2/yr)
$PE_{GP,y}$	=	Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (t CO2e/yr)
$PE_{HP,y}$	=	Project emissions from water reservoirs of hydro power plants in year y (t CO2e/yr)

$PE_{FF,y} = 0$, As per para 37 of ACM0002 version 16, *"For all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected"*

$PE_{GP,y} = 0$, Not applicable for the wind power projects

$PE_{HP,y} = 0$, Not applicable for the wind power projects

Therefore, $\mathbf{PE_y = 0}$

3.3 Leakage

As per para 60 of ACM0002 version 16, No leakage emissions need to considered for the project activity.

3.4 Net GHG Emission Reductions and Removals

As per para 61 of ACM0002 version16; Emission Reductions are calculated as follows:

$ER_y = BE_y – PE_y$

Where:

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

Therefore, Net GHG Emission Reductions and Removals are calculated as follows:
$ER_y = BE_y – PE_y$

$ER_y = 479,448 – 0$

= 479,448 **tCO_2**

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
Year 1	479,448	0	0	479,448
Year 2	479,448	0	0	479,448
Year 3	479,448	0	0	479,448

Year 4	479,448	0	0	479,448
Year 5	479,448	0	0	479,448
Year 6	479,448	0	0	479,448
Year 7	479,448	0	0	479,448
Year 8	479,448	0	0	479,448
Year 9	479,448	0	0	479,448
Year 10	479,448	0	0	479,448
Total	4,794,480	**0**	**0**	4,794,480

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014[14]
Value applied:	0.9887 (Southern Grid)
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0" as 3-year generation weighted average using data for the years 2011-2012, 2012-2013 & 2013-2014. The data are obtained from "CO_2 Baseline Database for Indian Power Sector" version 10.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014
Value applied:	0.9609 (Southern Grid)
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05.0" for the year 2013-2014. The data is obtained from "CO_2 Baseline Database for Indian Power Sector" version 10.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid,CM,y}$

[14] http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver10.pdf

Data unit	tCO_2/MWh
Description	Combines Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 10, December 2014[15]
Value applied:	0.9817 (Southern Grid)
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: $EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (tCO_2/MWh) $EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year *y* (tCO_2/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM}= Weighting of build margin emissions factor (%) = 25%
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{PJ,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project (Wind) plant/unit to the grid in year y
Source of data	Credit note/ JMR/Form B reports from respective state electricity board
Description of measurement methods and procedures to be applied	Quantity of net electricity generation supplied by the project (Wind) plant/unit to the grid in year y $EG_{PJ,y} = EG_{BLKNy} + EG_{BLTNy} + EG_{BLAPy}$ Where, $EG_{BLKNy} = EG_{Export,KN} – 115\% * EG_{Import} –$ Transmission Loss ($T_{E,KN}$) EG_{BLTNy} = EG Export – EG Import EG_{BLAPy} = EG Export – EG Import The value of net electricity generation supplied to the grid as per Monthly electricity form B /Credit Note or Joint Meter Reading Report forms the basis for calculation of the emission reductions; which can be cross checked from the invoice raised to DISCOM & Adjustement reports (in case of captive utitlity). Net electricity supplied to grid will be calculated as the difference of the measured values of “export” and “import” of electricity through the dedicated SEB energy meter installed at the delivery point. Monthly meter readings are taken from the main and check meter installed at metering point and certified by the representatives of SEB Officials and the representatives of the project proponent for apportioning procedure refer section 4.3

[15] http://www.cea.nic.in/reports/planning/cdm_co2/user_guide_ver10.pdf

Frequency of monitoring/recording	Continuous monitoring, hourly measurement and at least monthly recording
Value applied:	488,388.4 MWh
Monitoring equipment	Monitoring: Tri vector meter will be used Data type: Measured Type of meter: Static type meter (Main & Check). Both are Bidirectional meters. Class of meter: 0.2s.
QA/QC procedures to be applied	The calibration of all the meters will be undertaken at required intervals and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.2. The meter accuracy class and calibration interval is under purview of state electricity board and PP do not have any control on it. It is also noted that apportioning procedure is under control of state electricity board and PP do not have any control on it. The available parameter to PP is the net electricity supplied to grid and same parameter is mentioned as monitoring parameter The Net electricity exported to the grid will be cross checked against the invoice raised by the PP towards the DISCOM and Adjustment Reports in case of captive consumption.
Purpose of data	Calculation of Baseline emissions
Calculation method	-
Comments	The data would be archived electronically and maintained for the entire crediting period plus two years.

4.3 Monitoring Plan

Aim of monitoring:

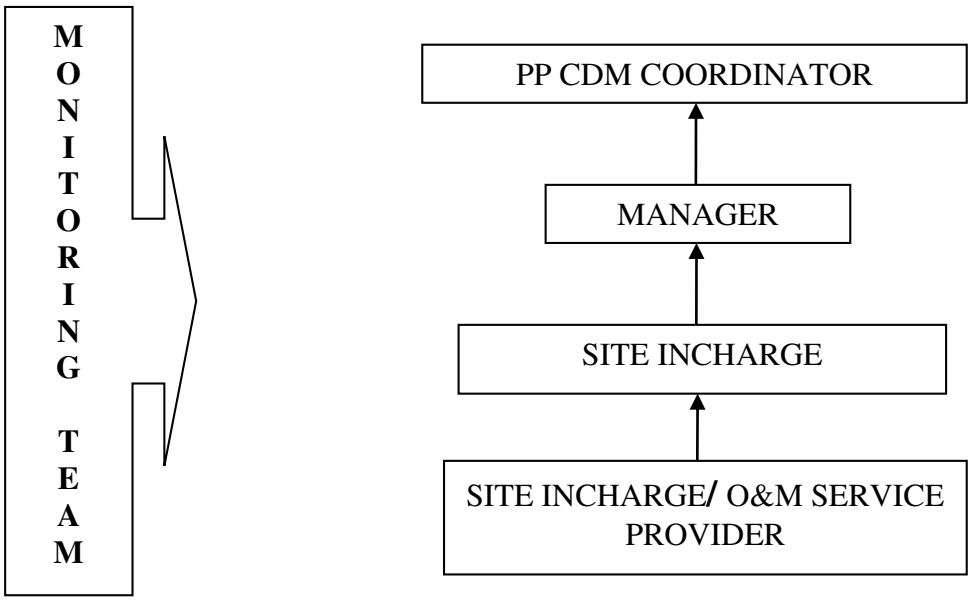
The monitoring procedure will set guidelines for the project investor to monitor the parameters regularly and to ensure quality and accuracy in monitoring. It elaborates on the functions of the monitoring team and procedures to be followed in monitoring of the CDM parameters.

The monitoring shall include all the equipments that contribute towards reduction in GHG emissions. Since the project activity focuses mainly on the generation of renewable power from the WTGs, it is important to monitor all the equipments involved in the metering of all the necessary instruments.

The monitoring plan has been prepared in accordance with the applied methodology, ACM002 Version 16.0. The project investor has a well defined management structure for monitoring the project activity.

The O & M Contractor for the project activity are manufacturers mentioned in the section A.3 above for respective machines.

Organizational Structure for monitoring



Organizational Structure for monitoring (Common for all states):

Designation	Responsibilities
PP CDM COORDINATOR (EKI Energy Services Limited)	Overall project monitoring including collecting and aggregating JMRs/Invoices for all WTG investors
MANAGER	Holds complete control over monitoring aspects pertaining to the project
SITE INCHARGE	• Recording • Verification • Storage of Data
SITE INCHARGE/ O&M SERVICE PROVIDER	• Operation and Maintenance • Storage of data • Data Recording

Monitoring Plan at Karnataka

The main parameter to be monitored for a wind project is the Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y. The parameter is measured as electricity export, import and transmission loss, which was issued by BESCOM officials and recorded in the B-Form and issued monthly to the project proponent. These monthly reports for the entire monitoring period form the basis to report the emission reductions achieved due to the project activity. The project proponent in turn raises the invoices to the BESCOM for the electricity supplied to the grid. The electricity is measured by two way energy meters of an accuracy class of 0.2 which are calibrated periodically by officials from the BESCOM/KPTCL

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

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

Z = Percentage transmission loss for export incurred in transmission line between the meter located at 33 kV metering point and the meters located at bulk 220 metering point (bulk meter: main and check) high voltage side of receiving sub-station.

Xi = Energy Export Reading of energy meter installed at 33 kV metering point

Y = Energy Export Reading at bulk meter installed at high voltage side of transformer of the receiving station220kV.

X1, X2, X3,…Xn are the meters that are installed at 33kV metering point and are connected to the receiving substation by internally connected lines to the receiving station.

The Export Reading Xi is adjusted for transmission loss that is determined by the state utility and is applied directly to the JMR (Form B) taken at 33 kV metering point. This can be checked from the JMR signed jointly by the representatives of PP and the state utility.

Transmission Loss in Export (TE) = Percentage Transmission Loss (Z) * Energy Export at 33kV metering point ($EG_{Export,KN}$)

Empirical Formula for Energy Export after adjustment of transmission loss (Equation 1)

Net Energy Export after adjustment of transmission loss = $EG_{Export,KN}$ – TE

The transmission loss in export is generally less than 5%. However in case of Energy Import, the state utility conservatively applies adjustment of 15% to the import values noted at 33 kV metering point.

Transmission Loss in Import (TI) = 15% * Energy Import at 33kV metering point ($EG_{Import,KN}$)

Empirical Formula for Energy Import after adjustment of transmission loss (Equation 2)

Net Energy Import after adjustment of transmission loss = EG_{Import}+15%*EG_{Import}
= 115%* EG_{import}

Therefore Energy Supplied to Grid after adjustment of transmission loss is difference of equation 1 and 2 as given in the Form B signed jointly by representatives of PP and the state utility.

$\mathbf{EG_{BL,KN,y}}$ = $EG_{Export,KN}$– 115%*EG_{Import}– Transmission Loss ($T_{E,KN}$)

The Joint meter reading noted at 33 KV metering location contains the following data:-

1. Electricity Export ($EG_{Export,KN}$)
2. Electricity Import ($EG_{Import,KN}$)
3. Transmission Loss ($T_{E,KN}$) between 33 kV metering point and 220 kV metering point
4. Net Electricity supplied to the Grid [$\mathbf{EG_{BL,KN,y}}$ = $EG_{Export,KN}$ -115%* $EG_{Import,KN}$ – $T_{E,KN}$]

Form B is signed by the representatives of PP and the state utility. The net electricity supplied to the grid can be cross checked from the invoices raised on the state utility for supply of net electricity supplied to the grid.

Monitoring Plan at Tamil Nadu

Reading of net electricity imports & export is taken at the metering point of TNEB, located at yard approximately 5 to 7 meters from the WTG. Each WTG has its individual EB meter, installed by the SEB. Hence, T & D losses are considered between WTG and TNEB meter.

The import & export figure at WTG controller will be recorded in the logbooks (manual / electronic) of the O&M contractor / Investors representative on a daily basis. This data will be preserved both in paper & electronic form. The summary of the generation will be submitted by the O&M contractor / Investors representative to the investor on the monthly basis.

The TNEB meter will be the main source for monitoring net export to the grid. On mutually decided / SEB official availability date of each month, the reading from the TNEB meter will be recorded by the engineers of the SEB in presence of the O & M contractor/ Investors representative. Subsequently the Tamil Nadu Electricity Board statements will be prepared.

A monthly statement is issued by the State Utility every month to the Project investor against sale of power. Based on the monthly sale of power, invoice is raised to TNEB.

QA/QC procedures:
Energy meters will be calibrated once in a five year[16] and faulty meters will be duly replaced immediately. The entire responsibility of this task lies with the state utility. The meters have an accuracy class of at least 0.5s. TNEB has an on-site testing & calibration arrangement; hence there is no need to dismantle the meter for calibration. In case the meters are found faulty and hard to calibrate against the prescribed accuracy class the meter will be replaced by the state utility.

If during any of monthly measurement, main meter is found to be beyond permissible limit of error, then meter shall be calibrated immediately & the correction factor applicable for the main meter shall be used for energy computation at time of such test checks. For the period thereafter the measurement shall be continued in accordance with the calibrated main meter.

Data Management and Data Archiving:
Copies of the break-up sheet, invoices raised on Discom and sales receipts will be retained and archived for the entire crediting period plus two years by the project investor.

Procedures for Data Adjustments / Uncertainties:

Data uncertainties are likely under following conditions:

- In case of error in TNEB meter
- When records are lost

[16] As per CEA regulation file:///C:/Users/ABC/Desktop/Metering_Regulations.pdf

If during any of monthly measurement, main meter is found to be beyond permissible limit of error, then meter shall be calibrated immediately & the correction factor applicable for the main meter shall be used for energy computation at time of such test checks. For the period thereafter the measurement shall be continued in accordance with the calibrated main meter.

When records are lost, the Tamil Nadu Electricity Board Statements will be used as reference.

Meter calibration: The meters are tested for accuracy and calibration of the meters is taken care of, following the applicable guidance. As per the national guidelines given by CEA, electricity meters have to be calibrated once in every 5 years,

Hence the meters are scheduled to be calibrated at least once in every five years[17].

Calculation method

The generated electricity is exported to TNEB grid and the exported electricity is measured by the TNEB energy meter. Representative Officer from Tamil Nadu Electricity Board (TNEB) prepares and provides the TNEB Statement. Once in a month, the designated person takes the TNEB energy meter readings and records the initial and final readings for Export and Import. The difference between the initial and final readings will give net export and net import. The difference between the net export and net import is recorded as Net Generation.

Net exports for Tamil Nadu $EG_{BL, TN,y} = EG_{Export} - EG_{Import}$

Monitoring Plan at Andhra Pradesh

Metering system and monitoring plan:

- The reading will be taken at the individual WEG end by the technology operator on site.
- A Joint Meter Reading shall be taken by the representatives of PP and APTRANSCO at the high voltage side of the step up transformer installed at the substation at a particular date.
- In case the main metering system is not in service, then the check metering system shall be used until the main system is back to service.
- Meter reading would be jointly signed by both the representatives.
- The main and the check metering systems shall be sealed in presence of representatives of Power producers, and APTRANSCO.
- When any of these metering systems is found to be outside acceptable limits of accuracy or otherwise not functioning properly, it shall be repaired, recalibrated or replaced.
- PP will raise a monthly energy bill/statement based on the JMR at the end of each calendar month and the payment by State Electricity Board is done on this basis. The billing and payment records will be maintained by the PP.
- Calibration and Testing of Meters will be done once in 5 years.

[17] As per CER regulation file:///C:/Users/ABC/Desktop/Metering_Regulations.pdf

Calculation of data:
Net exports for Andhra Pradesh $EG_{BL, AP,y} = EG_{Export} - EG_{Import}$

QA and QC Procedures
The electricity meter with accuracy class 0.2s at substation end (i.e. one main and one check meter) will be installed.

Data Storage and Archiving All the data items monitored under the monitoring plan will be kept for 2 years after the end of crediting period or till the last issuance of CERs for this project activity, whichever occurs later. The data will be archived both electronically and manually, and kept in safe storage by PP.

In the event when the individual verification period dates and billing cycle dates of the various WTGs in the project activity do not coincide, then the monitoring procedure will be as-

X	Sum of generation during partial days of the month recorded at controller meter (kwh) source – Electronic / Manual Log Book
Y	Total generation during the month recorded at controller meter (kwh/month)
Z = X/ Y	Ratio
B	Net Energy export by the WTG as per Monthly Report on Generation and Consumption
Z*B	Generation of partial days for calculating emission reduction (kwh)

5 ENVIRONMENTAL IMPACT

As per the Schedule 1 of the EIA notification dated 1/12/2009[18]and latest notification dated 24/12/2013[19], given by the Ministry of Environment and Forests under the Environment (Protection) Act 1986, the proposed Project activity does not fall under the list of activities requiring EIA as the environmental impacts for such project are not considered as significant by the host Party or PP.

6 STAKEHOLDER COMMENTS

The stakeholders of the project activity were invited to attend the stakeholder meeting. Personal invitations were also sent to the prominent members (villagers, local community people) of the regions in the vicinity.

The stakeholders were explained about the project activity and the various benefits arising out of the project activity. A discussion was held in which the views of the local stakeholders were addressed.

Date of Inviataion

[18] http://moef.nic.in/downloads/rules-and-regulations/3067.pdf

[19] http://envfor.nic.in/sites/default/files/ia-24122013.pdf

Tamil Nadu	
Date of invitation	**Meeting date**
10-October- 2012	23-October-2012 24-October-2012 25-October-2012
Andhra Pradesh	
Date of invitation	**Meeting date**
12-April-2013	22-April-2013
Karnataka	
Date of invitation	**Meeting date**
11-April-2013	21-April-2013

APPENDIX I : CO_2 DATABASE OF CEA

From CO2 database of CEA, Version 10 published by Government of India, Ministry of Power Central Electricity Authority, Government of India

CENTRAL ELECTRICITY AUTHORITY: CO_2 BASELINE DATABASE	
VERSION	10
DATE	6-Dec-14
BASELINE METHODOLOGY	ACM0002 / Ver 16.0 and "Tool to Calculate the Emission Factor for an Electricity System", Version 4.0

Net Generation in Operating Margin (MWh) (incl. Imports)			
	2011-12	**2012-13**	**2013-14**
Southern	153,155.160	155,891.576	162,396.860

Simple Operating Margin (tCO_2/MWh) (incl. Imports) (1) (2)			
	2011-12	**2012-13**	**2013-14**
Southern	0.9524	0.9937	1.0182

Weighted Generation Operating Margin(tCO_2/MWh)	
Southern	0.9887

Build Margin (tCO_2/MWh) (not adjusted for imports)			
	2011-12	**2012-13**	**2013-14**
Southern	0.8678	0.9473	0.9609

Combined Margin Emission Factor(tCO_2/MWh)	
Southern	**0.9817**

APPENDIX II : LATITUE & LONGITUDE DETAILS

For Tamil Nadu

S.No.	Machine ID	HTSC No.	Latitude	Logitude
1	KOO - 518	DRA 001	10.695026 N	77.570779 E
2	KOO - 1359	DRA 003	10.688039 N	77.592838 E
3	APY - 241	DRA 004	10.696430 N	77.655525 E
4	APY - 416	DRA 005	10.693031 N	77.653586 E
5	PAR - 9	DRA 006	10.678811 N	77.553641 E
6	PON - 534	DRA 008	10.676050 N	77.571935 E
7	PON - 1043	DRA 009	10.729955 N	77.576547 E
8	NAL-119	DRA 012	10.652837 N	77.545505 E
9	NAL - 81	DRA 013	10.664993 N	77.528386 E
10	NAL - 57	DRA 015	10.763263 N	77.625708 E
11	MAN - 210	DRA 017	10.727352 N	77.585324 E
12	MAN - 898	DRA 018	10.713748 N	77.629144 E
13	MAN - 802	DRA 021	10.657353 N	77.553426 E
14	KON - 556	DRA 022	10.650216 N	77.649013 E
15	KON - 563	DRA 023	10.699483 N	77.688256 E
16	KON - 590	DRA 024	10.684740 N	77.608212 E
17	KON - 640	DRA 025	10.738135 N	77.688168 E
18	KON - 658	DRA 026	10.670208 N	77.629071 E
19	KON - 621	DRA 027	10.667608 N	77.611546 E
20	KON - 501	DRA 031	10.694380 N	77.634057 E
21	ALA - 1639	DRA 043	10.665640 N	77.659623 E
22	ALA - 1946	DRA 044	10.663297 N	77.566886 E
23	NAL - 434	DRA 049	10.648711 N	77.550586 E

24	KON - 234	DRA 054	10.658922 N	77.561651 E
25	PAR - 50	DRA 007	10.737605 N	77.627596 E
26	MAN - 625	DRA 032	10.662515 N	77.557552 E
27	MAN - 604	DRA 033	10.644345 N	77.515043 E
28	ALA-2301/2304	DRA 046	10.720840 N	77.587169 E
29	ALA - 1569	DRA 047	10.759444 N	77.604996 E
30	ALA-2352	DRA 048	10.763189 N	77.616268 E
31	KOO - 1157	DRA 002	10.669956 N	77.554773 E
32	PON - 1081	DRA 010	10.660363 N	77.617842 E
33	MAN - 940	DRA 019	10.668934 N	77.569253 E
34	PON - 1565	DRA 037	10.673908 N	77.529976 E
35	PON - 1568	DRA 038	10.646536 N	77.555893 E
36	VEL - 1936	DRA 039	10.677837 N	77.535691 E
37	ALA - 1618	DRA 042	10.66492 N	77.547432 E
38	PON - 908	DRA 050	10.718534 N	77.615573 E
39	PON - 1203	DRA 052	10.71890 N	77.581396 E
40	MAN - 963	DRA 055	10.683484 N	77.617876 E
41	PON - 1021	DRA 011	10.773698 N	77.61412 E
42	KUL - 652	DRA 014	10.68742 N	77.616146 E
43	PON - 4	DRA 016	10.692721 N	77.615369 E
44	MAN-828	DRA 020	10.692721 N	77.615369 E
45	KON - 618	DRA 028	10.710023 N	77.646516 E
46	KON-395	DRA 029	10.77361 N	77.639413 E
47	KON-451	DRA 030	10.754682 N	77.62652 E
48	APA-84	DRA 034	10.689743 N	77.610703 E
49	PUN-270	DRA 035	10.66565 N	77.517593 E
50	PUN - 34	DRA 036	10.673745 N	77.54778 E

51	VEL-1702	DRA 040	10.681788 N	77.689854 E
52	KAL-93	DRA 041	10.649539 N	77.51747 E
53	ALA-2290	DRA 045	10.654515 N	77.559157 E
54	PON - 775	DRA 051	10.65057 N	77.580673 E
55	ALA - 2260	DRA 053	10.620784 N	77.564648 E
56	MET 1664	DRA 065	10.630660 N	77.569115 E
57	NAL - 445	DRA 061	10.684400 N	77.563052 E
58	KOO-1036	DRA 056	10.667224 N	77.539641 E
59	VEL-1540	DRA 060	10.683467 N	77.536761 E
60	KOO-1174	DRA 058	10.677765 N	77.616831 E
61	KOO-1000	DRA 057	10.714956 N	77.67510 E
62	PON-1304	DRA 059	10.659904 N	77.651955 E
63	APY-247	DRA 064	10.656300 N	77.62939 E
64	KON-411	DRA 67	10.765864 N	77.633324 E
65	KOO - 581	DRA 062	10.709670 N	77.627337 E
66	VEL - 2119	DRA 063	10.753168 N	77.683129 E
67	ALA 1385	DRA 066	10.762752 N	77.680226 E

For Andhra Pradesh

S. No.	Location No.	Latitude	Longitude
1	508	15.154461 N	77.922135 E
2	510	15.157268 N	77.921522 E
3	511	15.158979 N	77.923322 E
4	513	15.161872 N	77.923761 E
5	514	15.163549 N	77.923292 E
6	515	15.165388 N	77.922815 E
7	516	15.166574 N	77.921892 E

8	517	15.167997 N	77.920787 E
9	518	15.16929 N	77.919977 E
10	519	15.170968 N	77.918066 E
11	520	15.172449 N	77.918783 E
12	528	15.185218 N	77.923655 E
13	529	15.186921 N	77.923976 E
14	530	15.189489 N	77.925118 E
15	531	15.190881 N	77.925026 E
16	532	15.206692 N	77.937622 E
17	533	15.208101 N	77.938972 E
18	534	15.209818 N	77.940958 E
19	535	15.211871 N	77.942781 E
20	536	15.215178 N	77.947515 E
21	537	15.216917 N	77.949166 E
22	538	15.218416 N	77.950564 E
23	539	15.221591 N	77.953603 E
24	540	15.225099 N	77.957372 E
25	541	15.226569 N	77.958248 E
26	542	15.228387 N	77.959399 E
27	543	15.229998 N	77.960501 E
28	545	15.223820 N	77.956471 E
29	546	15.213598 N	77.946804 E
30	547	15.204944 N	77.93730 E
31	551	15.188055 N	77.924987 E
32	509	15.155886 N	77.920862 E
33	512	15.160386 N	77.923416 E
34	521	15.174326 N	77.91959 E
35	522	15.175897 N	77.92030 E
36	523	15.177475 N	77.921177 E
37	524	15.179081 N	77.921943 E

38	525	15.180875 N	77.922916 E
39	526	15.182457 N	77.923515 E
40	527	15.183845 N	77.923022 E
41	544	15.231485 N	77.961368 E
42	548	15.202938 N	77.936743 E
43	549	15.201556 N	77.936035 E
44	550	15.192441 N	77.927995 E

For Karnataka

S.No.	Machine ID	Latitude (N)	Logitude (E)
1	MVKPL_01-03	17° 09' 49.3"	75° 43' 2.6"
2	MVKPL_01-04	17° 09' 37.1"	75° 43' 1.5"
3	MVKPL_01-05	17° 09' 31.4"	75° 43' 1.1"
4	MVKPL_01-06	17° 9' 29.4"	75° 43' 18.8"
5	MVKPL_01-07	17° 9' 24.3"	75° 43' 21.4"
6	MVKPL_01-08	17° 9' 16.6"	75° 43' 26.9"
7	MVKPL_01-09	17° 09' 11.2"	75° 43' 28.3"
8	MVKPL_01-10	17° 9' 3.6"	75° 44' 26.9"
9	MVKPL_01-11	17° 8' 59.1"	75° 44' 31"
10	MVKPL_01-12	17° 8' 51.9"	75° 44' 34.5"
11	MVKPL_01-13	17° 8' 38.9"	75° 44' 20.9"
12	MVKPL_01-14	17° 8' 34.3"	75° 44' 26.1"
13	MVKPL_01-15	17° 8' 26.2"	75° 44' 26.7"
14	MVKPL_02-01	17° 09' 02.4"	75° 42' 49.2"
15	MVKPL_02-02	17° 08' 57.4"	75° 42' 44.3"
16	MVKPL_02-03	17° 08' 51.0"	75° 42' 39.8"

17	MVKPL_02-04	17° 08' 52.5"	75° 42' 31.9"
18	MVKPL_02-05	17° 08' 45.7"	75° 42' 41.7"
19	MVKPL_02-06	17° 08' 36.2"	75° 42' 37.6"
20	MVKPL_02-07	17° 08' 31.4"	75° 42' 31.1"
21	MVKPL_02-08	17° 08' 22.3"	75° 42' 23.2"
22	MVKPL_02-09	17° 08' 20.5"	75° 42' 46.8"
23	MVKPL_02-10	17° 08' 40.9"	75° 42' 53.7"
24	MVKPL_02-11	17° 08' 35.6"	75° 42' 59"
25	MVKPL_02-12	17° 08' 29.4"	75° 42' 59.9"
26	MVKPL_02-13	17° 08' 22.0"	75° 43' 00.1"
27	MVKPL_02-14	17° 08' 12.4"	75° 43' 03.0"
28	MVKPL_02-15	17° 08' 06.8"	75° 43' 04.7"
29	MVKPL_02-16	17° 08' 17.9"	75° 44' 29.8"
30	MVKPL_02-17	17° 07' 59.4"	75° 43' 53.5"
31	MVKPL_02-18	17° 07' 53.6"	75° 43' 50.9"
32	MVKPL_02-19	17° 07' 49.5"	75° 43' 36.0"
33	MVKPL_02-20	17° 07' 24.0"	75° 44' 02.4"
34	MVKPL_03-01	17° 07' 03.4"	75° 41' 51.5"
35	MVKPL_03-02	17° 07' 10.6"	75° 42' 08.1"
36	MVKPL_03-03	17° 07' 52.0"	75° 42' 09.8"
37	MVKPL_03-04	17° 07' 03.2"	75° 42' 21.6"
38	MVKPL_03-05	17° 07' 29.2"	75° 42' 37.1"
39	MVKPL_03-06	17° 07' 44.7"	75° 43' 03.3"
40	MVKPL_03-07	17° 07' 48.5"	75° 42' 58.7"
41	MVKPL_03-08	17° 07' 18.6"	75° 43' 03.0"
42	MVKPL_03-09	17° 07' 11.3"	75° 43' 01.4"
43	MVKPL_03-10	17° 07' 04.4"	75° 42' 57.3"
44	MVKPL_03-11	17° 06' 58.5"	75° 42' 58.1"

45	MVKPL_03-12	17° 07' 34.2"	75° 43' 37.7"
46	MVKPL_03-13	17° 07' 18.1"	75° 43' 24.2"
47	MVKPL_03-14	17° 07' 12.3"	75° 43' 25.2"
48	MVKPL_03-15	17° 07' 06.2"	75° 43' 36.3"
49	MVKPL_03-16	17° 06' 51.9"	75° 42' 0.1"
50	MVKPL_03-17	17° 6' 46.2"	75° 43' 59.9"
51	MVKPL_03-18	17° 06' 37.9"	75° 43' 55.5"
52	MVKPL_03-19	17° 06' 31.1"	75° 43' 49.7"
53	MVKPL_04-01	17° 06' 35.1"	75° 42' 52.8"
54	MVKPL_04-02	17° 06' 01.9"	75° 42' 29.4"
55	MVKPL_04-03	17° 05' 54.7"	75° 42' 21.6"
56	MVKPL_04-04	17° 05' 51.3"	75° 42' 46.6"
57	MVKPL_04-05	17° 05' 46.4"	75° 42' 41.3"
58	MVKPL_04-06	17° 05'39.9"	75° 42' 41.6"
59	MVKPL_04-07	17° 06' 35.9"	75° 43' 23.6"
60	MVKPL_04-08	17° 06' 28.8"	75° 43' 24.4"
61	MVKPL_04-09	17° 06' 23.9"	75° 43' 47.1"
62	MVKPL_04-10	17° 06' 15.6"	75° 43' 39.4"
63	MVKPL_04-11	17° 05' 59.5"	75° 43' 31.8"
64	MVKPL_04-12	17° 05' 27.3"	75° 43' 30.0"
65	MVKPL_04-13	17° 06' 04.5"	75° 43' 55.5"
66	MVKPL_04-14	17° 05' 59.0"	75° 43' 54.1"
67	MVKPL_04-15	17° 05' 51.0"	75° 43' 53.2"
68	MVKPL_04-16	17° 05' 38.9"	75° 43' 45.7"
69	MVKPL_04-17	17°05' 30.6"	75° 43' 49.0"
70	MVKPL_04-18	17° 06' 02.7"	75° 44' 32.2"
71	MVKPL_04-19	17° 05' 53.1"	75° 44' 20.5"
72	MVKPL_04-20	17° 05' 48.0"	75° 44' 11.2"

73	MVKPL_04-21	17° 05' 42.7"	75° 44' 20.2"
74	MVKPL_05-01	17° 05' 54.8"	75° 40' 38.6"E
75	MVKPL_05-02	17° 05' 49.1"	75° 40' 40.6"
76	MVKPL_05-03	17° 05' 43.2"	75° 40' 40"
77	MVKPL_05-04	17° 05' 37.5"	75° 40' 39.2"
78	MVKPL_05-05	17° 05' 31.7"	75° 40' 38.1"
79	MVKPL_05-06	17° 5' 26.1"	75° 40' 34"
80	MVKPL_05-07	17° 05' 20.1"	75° 40' 30.9"
81	MVKPL_05-08	17° 05' 13.9"	75° 40' 32.7"
82	MVKPL_05-09	17° 05' 44.4"	75° 41' 52.6"
83	MVKPL_05-10	17° 05' 29.6"	75° 41' 42.6"
84	MVKPL_05-11	17° 05' 25.2"	75° 41' 26.4"
85	MVKPL_05-12	17° 05' 23.1"	75° 41' 49"
86	MVKPL_05-13	17° 05' 16.5"	75° 41' 48"
87	MVKPL_05-14	17° 05' 12.5"	75° 41' 59.3"
88	MVKPL_05-15	17° 05' 3.4"	75° 41' 57.6"
89	MVKPL_05-16	17° 05' 52.3"	75° 41' 36.9"
90	MVKPL_05-17	17° 05' 45.3"	75° 41' 33"
91	MVKPL_05-18	17° 05' 34.7"	75° 41' 32.7"
92	MVKPL_06-01	17° 04' 51.4"	75° 42' 53.2"
93	MVKPL_06-02	17° 04' 43.4"	75° 42' 58.2"
94	MVKPL_06-03	17° 04' 31.8"	75° 43' 01.3"
95	MVKPL_06-04	17° 04' 25.3"	75° 43' 0.4"
96	MVKPL_06-05	17° 05' 9.3"	75° 43' 42.7"
97	MVKPL_06-06	17° 05' 5.6"	75° 43' 49.8"
98	MVKPL_06-07	17° 04' 53"	75° 43' 54.7"
99	MVKPL_06-08	17° 04' 45.3"	75° 44' 0.8"
100	MVKPL_06-09	17° 04' 28"	75° 44' 9.1"

101	MVKPL_06-10	17° 04' 20.3"	75°44'12.4"
102	MVKPL_06-11	17° 04' 12.7"	75° 44' 13.8"
103	MVKPL_06-12	17° 03' 48.9"	75° 44' 23.9"
104	MVKPL_06-13	17° 03' 55.5"	75° 44' 22.7"
105	MVKPL_06-14	17° 04' 57.8"	75° 42' 49.1"
106	MVKPL_06-15	17° 04' 9.1"	75° 44' 22.6"
107	MVKPL_06-16	17° 04' 5.2"	75° 43' 45.8"
108	MVKPL_06-17	17° 04' 1.3"	75° 45' 0"
109	MVKPL_06-18	17° 03' 41.6"	75° 44' 49.5"
110	MVKPL_06-19	17° 03' 55"	75° 43' 44.1"
111	MVKPL_06-20	17° 03' 44.1"	75° 44' 49"
112	MVKPL_06-21	17° 03' 50.6"	75° 44' 48.9"

APPENDIX III: INPUT PARAMETERS FOR ALL THREE SITE

For Karnataka

Assumption and financial of the project			
Details of the project		**Source**	**Link**
State where the project is situated	**Karnataka**	**As Per DPR**	
No. of machines	**118**	**As Per DPR**	
Capacity /machine (MW)	**0.85**	**As Per DPR**	
Total Capacity (MW)	**100.30**	**Calculated Value**	
Expected Date of Commissioning	**30-Jun-13**	**Assumption**	
Life of the plant (Yrs.)	**20**	**As per WTG manufacturer specifications**	
Offer letter Date	**19-Apr-13**	**As per DPR**	
Descision Date	**25-Apr-13**	**As per Board Resolution**	
Generation of electricity			
PLF (%)	**22.00%**	**As Per DPR**	
Annual generation (kWh)	**193,298,160**	**Calculated Value**	
Deration after 10th year	**5.00%**	**As per TERI report, Page 19**	
Tariff rate at the decision making (INR/kWh)	**3.70**	**As Per Tariff order dated 11.12.2009**	http://202.138.101.165/kerc/ARCHIEVES/ARCHIEVE-2010/OrderonNCETarifffinaldt11.12.2009.pdf

GBI Benefit (INR/kWh)	**0.50**	**As per MNRE scheme dt. 04.09.2013,**	**http://mnre.gov.in/file-manager/grid-wind/gbi-scheme.pdf**
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	**-**	**As Per DPR**	
O & M Expenses for WTG in Year 2 (INR Mn.)	**-**	**As Per DPR**	
O & M Expenses for WTG in Year 3 (INR Mn.)	**-**	**As Per DPR**	
O & M Expenses for WTG in Year 4 (INR Mn.)	**90.16**	**As Per DPR**	
Escalation in the operational expenses (%)	**5.00%**	**As Per DPR**	
Insurance (INR Mn.)	**8.66**	**As per TAC order 2001, Sheet No. 31**	**http://iib.gov.in/IRDA/tac/tariffs/AIFT2001.pdf**
Financial parameters			
TOTAL COST (INR Mn.)	**5,771.40**	**As Per DPR**	
Loan Amount (INR Mn.)	**3,578.27**	**As Per DPR**	**As Per DPR**
Equity Investment (INR Mn.)	**2,193.13**	**Calculated Value**	
Term loan			
Loan Amount (INR Mn.)	**3,578.27**	**As Per DPR**	
Interest rate (%)	**12.50%**	**As Per DPR**	
Loan Tenure (Qtr.)	**52**	**As Per DPR**	
Moratorium Period (Qtr.)	**4**	**As Per DPR**	
Repayment Period (Qtr.)	**48**	**Calculated Value**	
Repayment instalments value (INR Mn.)	**74.547**	**Calculated Value**	
1st instalment from (Qtr. end)	**30-Jun-14**	**Considered from the next Quarter End**	
Book Depreciation (SLM Method)			

Land	**-**		
Gross Depreciable Value (INR Mn.)	**5,771.40**	**Calculated Value**	
Salvage Value (%)	**10.00%**	**Standard accounting practise**	-
Salvage value (INR Mn.)	**577.14**	**Calculated Value**	
Net Depreciable Value (INR Mn.)	**5,194.26**	**Calculated Value**	
Residual Value (INR Mn.)	**577.14**	**Calculated Value**	-
IT Depreciation			
IT Depreciation (WDV Method) (%)	**7.69%**	**As Per IREDA Operational Guidelines, Pg 5**	http://www.ireda.gov.in/writereaddata/OPERATIONAL_GUIDELINES%20for%20Wind%20GBI%20Extension%20Scheme%20%282012-2017%29%281%29.pdf
Income Tax			
Financial Year	**FY 2013-14**		
Income tax rate (%)	**30.00%**	**As Per Income Tax Rule, Pg 30 Para E(I)**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
MAT (%)	**18.50%**	**As Per IT rule Pg 4**	http://indiabudget.nic.in/ub2012-13/mem/mem1.pdf
Service Tax (%)	**12.00%**	**As Per Income Tax Rule**	http://pib.nic.in/newsite/erelease.aspx?relid=47885
Surcharge (%)	**10.00%**	**As Per Income Tax Rule, Pg 30**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
Education cess (%)	**3.00%**	**As Per Income Tax Rule, Pg 5, 11 and 12**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
Final Tax rates			

Income tax rate (%)	**33.99%**	**Calculated Value**	
MAT (%)	**20.96%**	**Calculated Value**	
Service Tax (%)	**12.36%**	**Calculated Value**	

For Andhra Pradesh

Details of the project		**Source**	**Link**
State where the project is situated	**Andhra Pradesh**	**As Per DPR**	
No. of machines	**44**	**As Per DPR**	
Capacity /machine (MW)	**0.85**	**As Per DPR**	
Total Capacity (MW)	**37.40**	**Calculated Value**	
Expected Date of Commissioning	**1-Jul-13**	**Assumption**	
Life of the plant (Yrs.)	**25**	**As per WTG manufacturer specifications**	
Offer letter Date	**19-Apr-13**	**As per DPR**	
Descision Date	**25-Apr-13**	**As per Board Resolution**	
Generation of electricity			
PLF (%)	**21.00%**	**As Per DPR**	
Annual generation (kWh)	**68,801,040**	**Calculated Value**	
Deration after 10th year	**5.00%**	**As per TERI report, Page 19**	
Tariff rate at the decision making (INR/kWh)	**4.70**	**As per tariff order dated 15.11.2012**	http://www.aperc.gov.in/OtherOrders/2012/Wind_Tariff_Order_15-11-2012.pdf

GBI Benefit (INR/kWh)	**0.50**	**As per MNRE scheme dt. 04.09.2013,**	**http://mnre.gov.in/file-manager/grid-wind/gbi-scheme.pdf**
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	**-**	**As Per DPR**	
O & M Expenses for WTG in Year 2 (INR Mn.)	**-**	**As Per DPR**	
O & M Expenses for WTG in Year 3 (INR Mn.)	**-**	**As Per DPR**	
O & M Expenses for WTG in Year 4 (INR Mn.)	**37.82**	**As Per DPR**	
Escalation in the operational expenses (%)	**5.00%**	**As Per DPR**	
Insurance (INR Mn.)	**3.14**	**As per TAC order 2001, Sheet No. 31**	**http://iib.gov.in/IRDA/tac/tariffs/AIFT2001.pdf**
Financial parameters			
TOTAL COST (INR Mn.)	**2,095.00**	**As Per DPR**	
Loan Amount (INR Mn.)	**1,529.35**	**As Per DPR**	**As Per DPR**
Equity Investment (INR Mn.)	**565.65**	**Calculated Value**	
Term loan			
Loan Amount (INR Mn.)	**1,529.35**	**As Per DPR**	
Interest rate (%)	**12.50%**	**As Per DPR**	
Loan Tenure (Qtr.)	**54**	**As Per DPR**	
Moratorium Period (Qtr.)	**6**	**As Per DPR**	
Repayment Period (Qtr.)	**48**	**Calculated Value**	

Repayment instalments value (INR Mn.)	**31.861**	**Calculated Value**	-
1st instalment from (Qtr. end)	**31-Mar-15**	**Considered from the next Quarter End**	-
Book Depreciation (SLM Method)			
Land	**-**		
Gross Depreciable Value (INR Mn.)	**2,095.00**	**Calculated Value**	
Salvage Value (%)	**10.00%**	**Standard accounting practise**	-
Salvage value (INR Mn.)	**209.50**	**Calculated Value**	
Net Depreciable Value (INR Mn.)	**1,885.50**	**Calculated Value**	
Residual Value (INR Mn.)	**209.50**	**Calculated Value**	-
IT Depreciation			
IT Depreciation (WDV Method) (%)	**7.69%**	**As Per IREDA Operational Guidelines, Pg 5**	http://www.ireda.gov.in/writereaddata/OPERATIONAL_GUIDELINES%20for%20Wind%20GBI%20Extension%20Scheme%20%282012-2017%29%281%29.pdf
Income Tax			
Financial Year	**FY 2013-14**		
Income tax rate (%)	**30.00%**	**As Per Income Tax Rule, Pg 30 Para E(I)**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
MAT (%)	**18.50%**	**As Per IT rule Pg 4**	http://indiabudget.nic.in/ub2012-13/mem/mem1.pdf

Service Tax (%)	**12.00%**	**As Per Income Tax Rule**	http://pib.nic.in/newsite/erelease.aspx?relid=47885
Surcharge (%)	**10.00%**	**As Per Income Tax Rule, Pg 30**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
Education cess (%)	**3.00%**	**As Per Income Tax Rule, Pg 5, 11 and 12**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
Final Tax rates			
Income tax rate (%)	**33.99%**	**Calculated Value**	
MAT (%)	**20.96%**	**Calculated Value**	
Service Tax (%)	**12.36%**	**Calculated Value**	

For Tamil Nadu

Assumption and financial of the project			
Details of the project		**Source**	**Link**
State where the project is situated	**Tamilnadu**	**As Per Term Sheet**	
No. of machines	**67**	**As Per Term Sheet**	
Capacity /machine (MW)	**1.50**	**As Per Term Sheet**	
Total Capacity (MW)	**100.50**	**Calculated Value**	
Expected Date of Commissioning	**1-Jun-13**	**Assumption**	
Life of the plant (Yrs.)	**20**	**As per WTG manufacturer specifications**	

Offer letter date	**3-Aug-12**	**As per Term Sheet**	-
Descision Date	**10-Aug-12**	**As per Board resolution**	-
Generation of electricity			
PLF (%)	**26.82%**	**As per Third Party Report**	-
Annual generation (kWh)	**236,117,916**	**Calculated Value**	
Wheeling & transmission losses	**5.00%**	**As per TNRE tariff order dated 31/07/2012, page 26**	http://tnerc.tn.nic.in/orders/Tariff%20Order%202009/2012/T.R%20No.6%20of%202012%20dated%2031-07-2012-Wind.pdf
Deration after 10th year	**5.00%**	**As per TERI report, Page 19**	https://cdm.unfccc.int/filestorage/1/J/T/1JTFVQI70384BP6R9EYGZLDSKAWXM2/9.%20Wind%20Energy%20Information%20by%20TERI?t=YWV8bzI0NHNxfDB0RiiFyzdhrHvfU_0ptvO4
Tariff rate for HT 1 A consumner (INR/kWh)	**3.50**	**As per TNRE teriff order dated 16/03/2003, page 183**	http://tnerc.tn.nic.in/tarorder/chapter7.pdf
Electricity tax for HT 1 A consumer	**5.00%**	**As per TNRE teriff order dated 31/03/2003, page 183**	http://tnerc.tn.nic.in/tarorder/chapter7.pdf
Effective tariff rate	**3.68**	**Calculated Value**	-

GBI Benefit (INR/kWh)	-	**As per MNRE scheme dt. 04.09.2013,**	http://mnre.gov.in/file-manager/grid-wind/gbi-scheme.pdf
Operation and maintenance cost and Insurance			
O & M Expenses (INR Mn.)	**92.76**	**As Per Term Sheet**	
Escalation in the operational expenses (%)	**5.00%**	**As Per Term Sheet**	
Insurance (INR Mn.)	**8.35**	**As per TAC order 2001, Sheet No. 31**	http://iib.gov.in/IRDA/tac/tariffs/AIFT2001.pdf
Financial parameters			
TOTAL COST (INR Mn.)	**5,567.70**	**As Per Term Sheet**	
Loan Amount (INR Mn.)	**4,175.78**	**As Per Term Sheet**	
Equity Investment (INR Mn.)	**1,391.93**	**Calculated Value**	
Term loan			
Loan Amount (INR Mn.)	**4,175.78**	**PP assumption**	
Interest rate (%)	**12.00%**	**PP assumption**	
Loan Tenure (Qtr.)	**53**	**PP assumption**	
Moratorium Period (Qtr.)	**6**	**PP assumption**	
Repayment Period (Qtr.)	**47**	**Calculated Value**	
Repayment instalments value (INR Mn.)	**88.846**	**Calculated Value**	
1st instalment from (Qtr. end)	**31-Dec-14**	**Considered from the next Quarter End**	

Book Depreciation (SLM Method)			
Land	-		
Gross Depreciable Value (INR Mn.)	**5,567.70**	**Calculated Value**	
Salvage Value (%)	**10.00%**	**Standard accounting practise**	
Salvage value (INR Mn.)	**556.77**	**Calculated Value**	
Net Depreciable Value (INR Mn.)	**5,010.93**	**Calculated Value**	
Residual Value (INR Mn.)	**556.77**	**Calculated Value**	
IT Depreciation			
IT Depreciation (WDV Method) (%)	**7.69%**	**As Per IREDA Operational Guidelines, Pg 5**	http://www.ireda.gov.in/writereaddata/OPERATIONAL_GUIDELINES%20for%20Wind%20GBI%20Extension%20Scheme%20%282012-2017%29%281%29.pdf
Income Tax			
Financial Year	**FY 2013-14**		
Income tax rate (%)	**30.00%**	**As Per Income Tax Rule, Pg 30 Para E(I)**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
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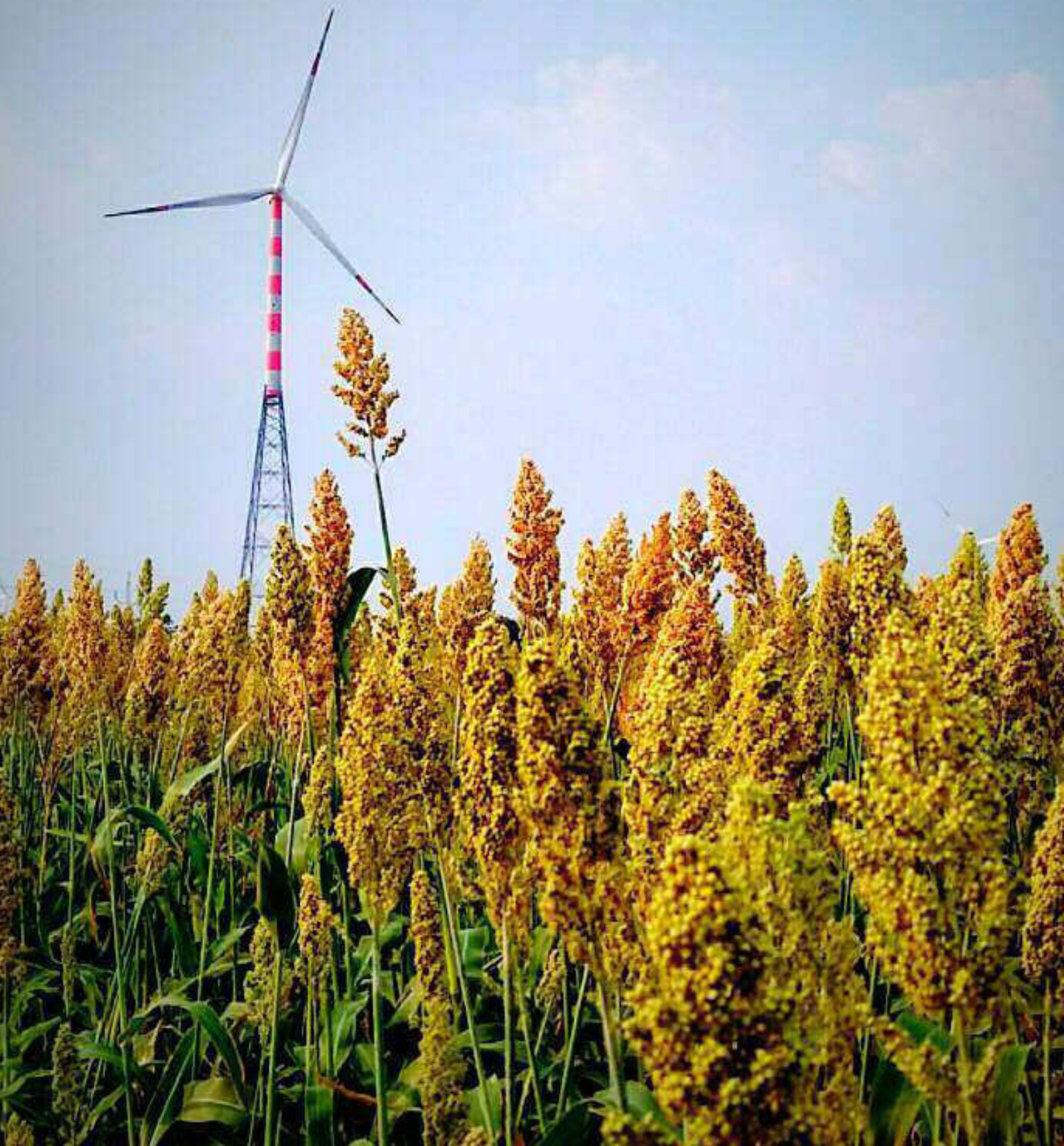
Surcharge (%)	**10.00%**	**As Per Income Tax Rule, Pg 30**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
Education cess (%)	**3.00%**	**As Per Income Tax Rule, Pg 5, 11 and 12**	http://indiabudget.nic.in/ub2014-15/fb/bill1.pdf
Final Tax rates			
Income tax rate (%)	**33.99%**	**Calculated Value**	
MAT (%)	**20.96%**	**Calculated Value**	
Service Tax (%)	**12.36%**	**Calculated Value**	

MYTRAH'S CARBON AND WATER FOOT PRINT

APRIL'18 – SEPT'18 REPORT



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1. INTRODUCTION

1.1 About The Company

Mytrah Energy (India) Private Limited (MEIPL) with its all Special Purpose Vehicles (SPVs) is collectively one of the largest wind based independent Power producers in India with an operating portfolio of more than 1.5 GW of Wind and solar energy assets located in nine states of India. The wind assets are spread across 19 wind farms in the states of Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu and Telangana. Solar plants located in the states of Telangana, Karnataka and Punjab.

Being sensitive to the Environment, Health and Safety performance, the Company is focused to cater the electricity needs of the public by supplying eco-friendly, safe power with a commitment of reduction of greenhouse gas emission locally, which ultimately creates a positive impact globally.