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

Document Prepared ByEKI Energy Services Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status 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 (Now INDIAN Grid).

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 (112 WTGs) and Andhra Pradesh (44 WTGs) 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 commissioning dates of the project activity is mentioned in APPENDIX 1: Date of Commissioning.

The power produced displaces an equivalent amount of power from the grid, which is fed mainly by fossil fuel fired power plants. Hence, as per VCS PD, it results in total electricity generation of 488,385.45 MWh/yearandof GHG emission reductions of 479,448 tonnes of CO_2/year.

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**is 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.

The total emission reductions achieved during current monitoring period is 487,697 tons of CO_2e.

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 / nonrenewable 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 (subsidiary of Mytrah Vayu Krishna Private Limited and Mytrah Vayu (Manjira) Private Limited)
Contact person	Mr. Rahul Kumar
Title	Deputy Manager
Address	1st Floor, Prestige Meridian-II, No. 30 M.G Road, Bangalore – 560 001.
Telephone	-
Email	rahul.kumar@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.

1.6 Project Crediting Period

Crediting Period Start date: 21-February -2014[2]
Crediting Period End date: 20-February-2024
The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times.

1.7 Project Location

For Tamil Nadu

S.No.	Machine ID	HTSC No.	Latitude	Longitude
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

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

[2] Start date of crediting period is 21/02/2014, as on this day 1st set of WTGs associated to the project activity starts its commercial operations. Accordingly end date of the crediting period is 20-February -2024

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)	Longitude (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"

1.8 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, Annex8, 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

1.9 Other Programs

- Emission Trading Programs and Other Binding Limits: The PP has not applied this project in any Emission Trading Programs and other Binding Limits.
- Other Forms of Environmental Credit: The PP has not applied this project in any other form of environmental credits other than Tamil Nadu 45 MW WTGs. The electricity generated from 45 MW REC component of Tamil Nadu are not included for VCU

calculations to avoid any double accounting. The HTSC numbers DRA-01,03,04,05,06,07,08,09,12,13,15,17,18,21,22,23,24,25,26,27,31,32,33,43,44,46,47,48,49,54 (TOTAL 30 WTGs of 1.5 MW from Tamil Nadu site) are availing REC. Thus electricity generated from these WTGs having REC component are not considered for VCU calculations for current complete monitoring period.

- Participation under Other GHG Programs: The PP has not participated under any other GHG program with this project activity.

1.10 Sustainable Development

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 leads 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 also helps to reduce the demand supply gap in the state.
- **Technological well-being:** The successful operation of project activity would lead to promotion of windbased power generation and would encourage other entrepreneurs to participate in similar projects
- **Environmental well-being**: The project activity 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.The project activity generates 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.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The Project Activity envisages implementation of a 233.1 MW wind power project consisting of 156 Wind Electric Generators (WEGs) of individual capacity 0.85 MW in Andhra Pradesh and Karnataka state of India by Mytrah Vayu Krishna Private Limited. And another 67 Wind Electric Generators of individual capacity 1.5 MW in Tamil Nadu state of India by Mytrah Vayu (Majira) Private Limited. All the 223 Wind Electric Generators (WEGs) which are part of the project activity are commissioned.

The project has been under operation since commissioning without any major breakdowns. Though normal breakdowns due to O&M measures are continuously being worked upon by the

dedicated O&M contractor for the projects WEGs. There has been no event that may have an impact on the GHG emissions or removals during the current monitoring period.

Further, there are no changes to the project participant for the project activity during themonitoring period.

2.2 Deviations

2.2.1 Methodology Deviations

There has not been any methodology deviation during the aforesaid monitoring period.

2.2.2 Project Description Deviations

No Project description during current monitoring period.

2.3 Grouped Project

The project is not a grouped project.

2.4 Safeguards

2.4.1 No Net Harm

As per VCS guidelines, the contract for validation is prior to the 19th April 2017, hence No Net Harm is not mandatory.

2.4.2 Local Stakeholder Consultation

As per VCS guideline, the contract for validation is prior to the 19th April 2017, hence the local stake holder consultation is not mandatory.

3 DATA AND PARAMETERS

3.1 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
Value applied	0.9887
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 the 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
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 the data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid,CM,y}$
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
Value applied	0.9817
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 the data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

3.2 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	Quantity of net electricity generation supplied by the project (Wind)

measurement methods and procedures to be applied	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 &Adjustment reports (in case of captive utility). Net electricity supplied to is 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 3.3
Frequency of monitoring/recording	Continuous monitoring, hourly measurement and at least monthly recording
Value monitored	496,789.00
Monitoring equipment	Monitoring: Tri vector meter is 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 is undertaken at required intervals and faulty meters are duly replaced immediately. The meters are of accuracy class 0.2. The meter accuracy class and calibration interval is under purview of state electricity board and PP does 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 is cross checked against the invoice raised by the PP towards the DISCOM and Adjustment Reports in case of captive consumption.
Purpose of the data	Calculation of Baseline emissions
Calculation method	-
Comments	The data would be archived electronically and maintained for the entire crediting period plus two years.

3.3 Monitoring Plan

Aim of monitoring:

The monitoring procedure sets 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 equipment's 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 equipment's 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.

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…+Xn)-Y)/((X1+X2+X3…+Xn)) x 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 = $EG_{Export,}$ – 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 = $EGImport+15\%*EG_{Import}$
$= 115\%* EG_{import}$

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.

$EG_{BL,KN,y}$ = EG– 115%*EG– 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 (TE,KN) between 33 kV metering point and 220 kVmetering point
4. Net Electricity supplied to the Grid [$EG_{BL,KN,y}$= $EG_{Export,KN}$-115%* $EGI_{mport,KN}$–$TE_{,KN}$]

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 is recorded in the logbooks (manual / electronic) of the O&M contractor / Investors representative on a daily basis. This data ispreserved both in paper & electronic form. The summary of the generation is submitted by the O&M contractor / Investors representative to the investor on the monthly basis.

The TNEB meter is 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 is recorded by the engineers of the SEB in presence of the O & M contractor/ Investors representative. Subsequently the Tamil Nadu Electricity Board statements is 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 are calibrated once in a five year and faulty meters are 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 is 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 are 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

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.

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.[3]

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 gives net export and net import. The difference between the net export and net import is recorded as Net Generation.

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

[3] http://www.cea.nic.in/reports/regulation/meter_reg.pdf

Monitoring Plan at Andhra Pradesh

Metering system and monitoring plan:

- The reading is 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 raises 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 are maintained by the PP.
- Calibration and Testing of Meters are done once in 5 years.

Calculation of data:

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

QA and QC Procedures

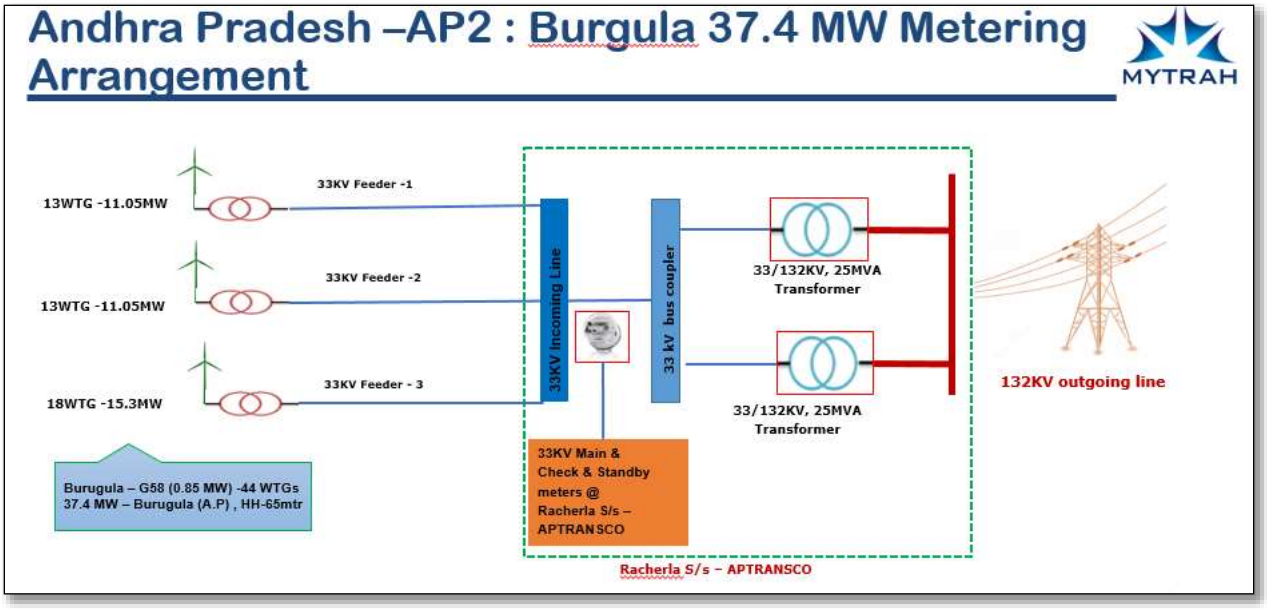
The electricity meter with accuracy class 0.2s at substation end (i.e. one main and one check meter) are installed.

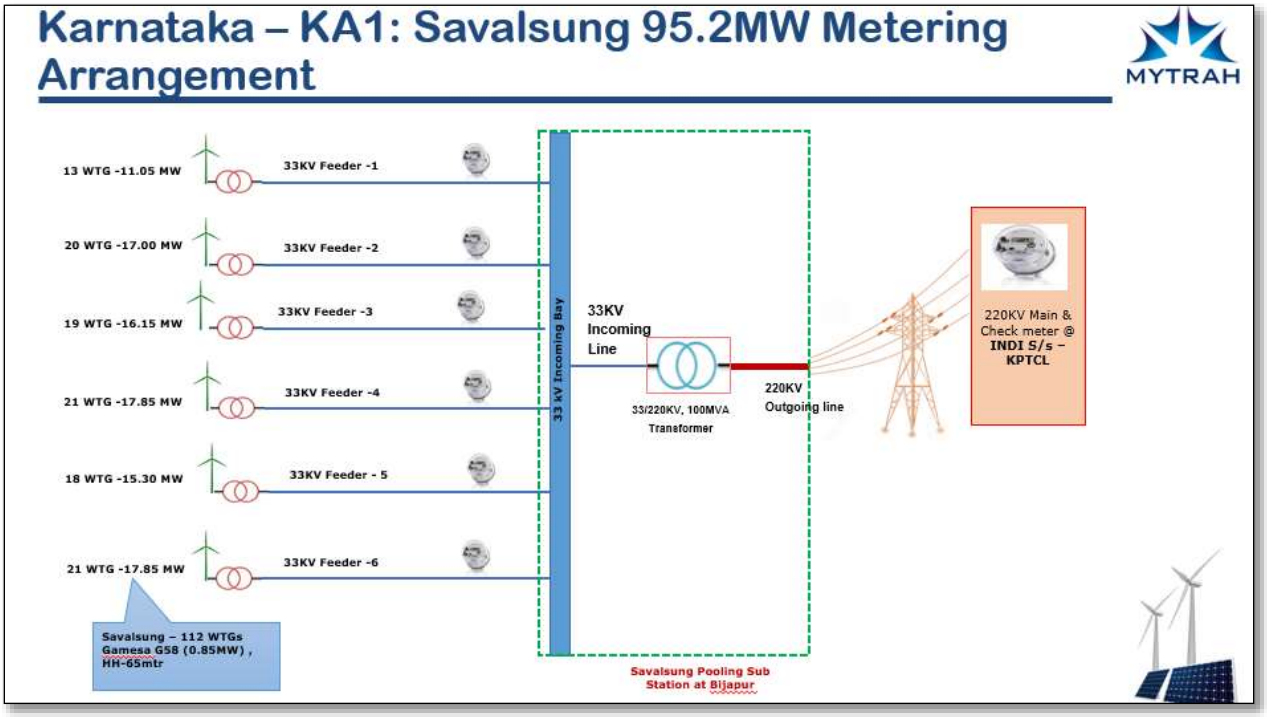
Data Storage and Archiving All the data items monitored under the monitoring plan will be kept for 2 years after the end of crediting period or till the last issuance of CERs for this project activity, whichever occurs later. The data will be archived both electronically and manually, and kept in safe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

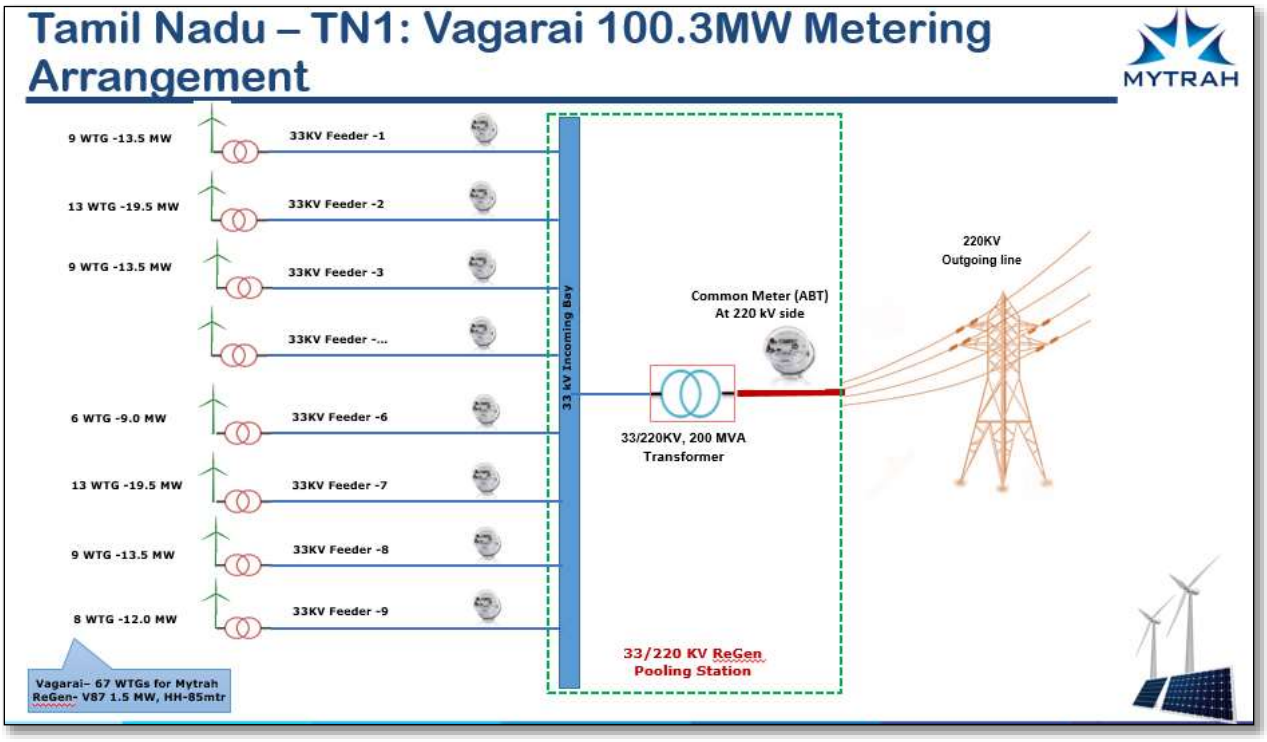
In the event when the individual verification period dates and billing cycle dates of the various WTGs in the project activity do not coincide, then the monitoring procedure will be as-

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)

Metering Arrangements at respective project sites:


Andhra Pradesh –AP2 : Burgula 37.4 MW Metering Arrangement
MYTRAH
13WTG -11.05MW
33KV Feeder -1
13WTG -11.05MW
33KV Feeder -2
18WTG -15.3MW
33KV Feeder - 3
33KV Incoming Line
33 kV bus coupler
33/132KV, 25MVA Transformer
33/132KV, 25MVA Transformer
132KV outgoing line
33KV Main & Check & Standby meters @ Racherla S/s – APTRANSCO
Burugula – G58 (0.85 MW) -44 WTGs 37.4 MW – Burugula (A.P) , HH-65mtr
Racherla S/s – APTRANSCO


Karnataka – KA1: Savalsung 95.2MW Metering Arrangement
MYTRAH
13 WTG -11.05 MW
33KV Feeder -1
20 WTG -17.00 MW
33KV Feeder -2
19 WTG -16.15 MW
33KV Feeder -3
21 WTG -17.85 MW
33KV Feeder -4
18 WTG -15.30 MW
33KV Feeder - 5
21 WTG -17.85 MW
33KV Feeder -6
33 kV Incoming Bay
33KV Incoming Line
33/220KV, 100MVA Transformer
220KV Outgoing line
220KV Main & Check meter @ INDI S/s – KPTCL
Savalsung – 112 WTGs Gamesa G58 (0.85MW) , HH-65mtr
Savalsung Pooling Sub Station at Bijapur



4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

As per para 46 of ACM0002 version 16.0, Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity 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:

BE_y= Baseline emissions in year y (tCO_2)

$EG_{PJ,y}$ = 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 CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

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

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

$EG_{PJ,\,y}$	=	**496,789MWh**
$EF_{grid,\,CM,\,y}$	=	**0.9817 tCO_{2e}**
BE_y	=	**496,789* 0.9817**
	=	**487,697 tCO_{2e}**

4.2 Project Emissions

The project activity involves in harnessing wind power. So the emissions from the project are zero.

4.3 Leakage

No leakage emissions have been considered and hence the leakage emission is zero.

4.4 NetGHG Emission Reductions and Removals

As per equation number (13) of the applied methodology, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y \quad (7)$$

Where:

ER_y	:	Emission reductions in year y (tCO_2e/yr)
BE_y	:	Baseline emissions in year y (tCO_2e/yr)
PE_y	:	Project emissions in year y (tCO_2e/yr)

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
02/05/2018 to 31/12/2018	284,418	0	0	284,418
01/01/2019 to 01/08/2019	203,279	0	0	203,279

Total	**487,697**	**0**	**0**	**487,697**

Considering the annual average emission reductions as per registered PD which is 479,448 tonnes of CO_2 per year, the number of days covered during this monitoring period comes out to be 457 days, based upon which the estimated emission reductions attributed to this monitoring period comes out to be 600,295 tCO_2. The unit generated is 18.76% lower than the estimated value which is conservative.

APPENDIX 1: DATE OF COMMISSIONING

Date of Commissioning of WTGs for Tamil Nadu

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[4]**
1	KOO - 518	DRA 001	1-Jun-14
2	KOO - 1359	DRA 003	1-Jun-14
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

[4]Date Of commissioning

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

Date of commissioning of WTG at Karnataka

Savalsang@ Karnataka - 95.20 MW (0.85*112)		
Gamesa Make WTG model G53/850 kW		
S. No.	**Machine ID**	**DOC[5]**
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

[5]Date Of commissioning

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

Date of Commissioning at Andhra Pradesh

Burugula @ Andhra Pradesh - 37.40MW (0.85* 44)		
Gamesa Make WTG model G53/850 kW		
S. No.	**Machine ID**	**DOC[6]**
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
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

[6]Date Of commissioning

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

APPENDIX 2: CALIBRATION DETAILS

VagaraiTamil Nadu state55.5 MW (37*1.5 MW WTGs)[7]

S. No.	HTSC No.	Old meter S. No.	Calibration date	Meter change date	New meter S. No.	Due date of calibration
1.	DRA 002	12092331	01/06/2014	25-05-2017	4321945	24-05-2022
2.	DRA 010	14190323	01/06/2014	23-05-2017	4322515	22-05-2022
3.	DRA 019	12091451	01/06/2014	22-05-2017	4322252	21-05-2022
4.	DRA 037	12091997	23/06/2014	20-05-2017	4322069	19-05-2022
5.	DRA 038	12092349	23/06/2014	20-05-2017	4321884	19-05-2022
6.	DRA 039	12092267	23/06/2014	05-05-2017	4322063	04-05-2022
7.	DRA 042	12092317	23/06/2014	20-05-2017	4321949	19-05-2022
8.	DRA 050	12092323	23/06/2014	20-05-2017	4322064	19-05-2022
9.	DRA 052	14190336	23/06/2014	20-05-2017	4321888	19-05-2022
10.	DRA 055	14190278	16/06/2014	22-05-2017	4322067	21-05-2022
11.	DRA 011	14190249	01/06/2014	23-05-2017	4322519	22-05-2022
12.	DRA 014	14190299	01/06/2014	23-05-2017	4322517	22-05-2022
13.	DRA 016	14190312	01/06/2014	23-05-2017	4322521	22-05-2022
14.	DRA 020	14190301	01/06/2014	23-05-2017	4322433	22-05-2022
15.	DRA 028	14190333	01/06/2014	22-05-2017	4322566	21-05-2022
16.	DRA 029	14190313	01/06/2014	22-05-2017	4322574	21-05-2022
17.	DRA 030	14190294	01/06/2014	22-05-2017	4322374	21-05-2022
18.	DRA 034	14190337	01/06/2014	23-05-2017	4321977	22-05-2022
19.	DRA 035	14190331	01/06/2014	22-05-2017	4322581	21-05-2022
20.	DRA 036	14190316	04/06/2014	22-05-2017	4322582	21-05-2022
21.	DRA 040	14190292	23/06/2014	25-05-2017	4322160	24-05-2022
22.	DRA 041	14190257	23/06/2014	25-05-2017	4321952	24-05-2022
23.	DRA 045	14190319	23/06/2014	20-05-2017	4321943	19-05-2022
24.	DRA 051	14190325	23/06/2014	20-05-2017	4322065	19-05-2022
25.	DRA 053	14190267	23/06/2014	20-05-2017	4321944	19-05-2022

[7]PP is claiming VCS benefits for only 37 WTGs out of 67 WTGs. Rest 30 WTGs are availing Renewable Energy Certificate (REC) benefits. Meter calibration of the 37 WTGs claiming VCS benefits was done at the date of commissioning. Later on these meters were changed in the year 2017 (respective dates are mentioned in the table above). The calibration records of newly installed meters have been submitted to the DOE and the due date of calibration for the respective meters are mentioned in the above table

26.	DRA 065	14190268	09/01/2015	22-05-2017	4322579	21-05-2022
27.	DRA 061	13197046	03/12/2014	20-05-2017	4322154	19-05-2022
28.	DRA 056	14190263	31/10/2014	25-05-2017	4321973	24-05-2022
29.	DRA 060	14190320	03/12/2014	20-05-2017	4321948	19-05-2022
30.	DRA 058	14190273	31/10/2014	23-05-2017	4322514	22-05-2022
31.	DRA 057	14190341	31/10/2014	23-05-2017	4322513	22-05-2022
32.	DRA 059	14190315	31/10/2014	20-05-2017	4322068	19-05-2022
33.	DRA 064	14190279	06/01/2015	20-05-2017	4322066	19-05-2022
34.	DRA 067	14190276	26/02/2015	22-05-2017	4322573	21-05-2022
35.	DRA 062	14190280	18/12/2014	25-05-2017	4321892	24-05-2022
36.	DRA 063	14190338	24/12/2014	20-05-2017	4322158	19-05-2022
37.	DRA 066	14190269	04/02/2015	20-05-2017	4321947	19-05-2022

Old meter numbers are of make L&T with accuracy 0.2s while the new meters are of make-Genus with accuracy class 0.2s.

Calibration details for Karnataka site WTGs 95.2 MW (112*0.85 MW WTGs)

Location	Meter Type	Meter Serial Number	Make	Accuracy Class	Calibration Date	Calibration Date	Due date of Calibration
Feeder 1	Main Meter	13191120	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191121	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 2	Main Meter	13191094	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191095	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 3	Main Meter	13191100	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191104	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 4	Main Meter	13191096	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191097	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 5	Main Meter	13191114	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191122	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 6	Main Meter	13191159	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191380	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Sub Station	Main Meter	13194679	L & T	0.2s	24/12/2014	20/05/2017	19/05/2022
	Check Meter	13194671	L & T	0.2s	24/12/2014	20/05/2017	19/05/2022

Calibration details for Andhra Pradesh site WTGs 37.4 MW (44*0.85 MW WTGs)

Meter Type	Meter Serial Number	Make	Accuracy Class	Calibration Date	Calibration Date	Due Date
Main Meter	16538864	Elster	0.2s	02/03/2015	15/12/2018	14/12/2023
Check Meter	16538867	Elster	0.2s	02/03/2015	15/12/2018	14/12/2023
Standby Meter	16538885	Elster	0.2s	02/03/2015	15/12/2018	14/12/2023

APPENDIX 3: MAJOR BREAKDOWN DETAILS

Breakdown details of Burgula- Andhra Pradesh Site:

Date	Loc.No	Duration	Description
12-May-18	BRG 518	9:12	Preventive Maintenance
13-May-18	BRG 519	7:30	Preventive Maintenance
14-May-18	BRG 521	8:29	Preventive Maintenance
04-Jun-18	BRG 528	6:58	24 Month Preventive Maintenance
05-Jun-18	BRG 529	7:10	24 Month Preventive Maintenance
06-Jun-18	BRG 551	6:40	24 Month Preventive Maintenance
07-Jun-18	BRG 530	6:47	24 Month Preventive Maintenance
19-Jun-18	BRG 534	13:34	Manual stop
20-Jun-18	BRG 519	13:26	Manual stop
22-Jun-18	BRG 518	16:32	Manual stop
23-Jun-18	BRG 517	13:31	Manual stop
24-Jun-18	BRG 517	16:21	Manual stop
25-Jun-18	BRG 511	17:19	Manual stop
26-Jun-18	BRG 520	13:30	Manual stop
12-Aug-18	BRG 535	10:16	Encoder Slope ok
13-Aug-18	BRG 528	5:39	High brake temp
9-Sep-18	BRG 508	6:04	Manual stop
10-Sep-18	BRG 509	6:35	Manual stop
11-Sep-18	BRG 510	5:53	Manual stop
12-Sep-18	BRG 511	7:51	Manual stop
13-Sep-18	BRG 512	5:57	Manual stop
14-Sep-18	BRG 515	8:13	Manual stop
15-Sep-18	BRG 516	6:40	Manual stop
17-Oct-18	BRG 536	21:20	Line Protection Triggered Manual stop Synchronization timeout
27-Feb-19	BRG 518	20:32	Manual Stop Controlled emergency series battery failure
3-Mar-19	BRG520	12:42	Manual Stop
4-Mar-19	BRG521	9:11	Manual Stop
31-Apr-19	BRG 538	20:11	Manual stop
19-June-19	BRG 529	12:58	Low Yaw Brake pressure Manual Stop
20-June-19	BRG 551	8:47	Manual Stop Synchronization timeout

Breakdown Details of Salvasang- Karnataka Site

Date	Loc No	Duration	Description
27-Jun-18	SVG51	21:43	Authoriz. person in turbine
17-Jul-18	SVG51	23:12	Authoriz. person in turbine

25-Jul-18	SVG51	20:59	Authoriz. person in turbine
05-sep-18	SVG29	23:59	Authoriz. person in turbine
10-sep-18	SVG29	21:23	Authoriz. person in turbine
23-sep-18	SVG29	22:43	Authoriz. person in turbine
07-Oct-18	SVG29	23:59	Authoriz. person in turbine
15-Oct-18	SVG29	23:59	Authoriz. person in turbine
23-Oct-18	SVG29	23:59	Authoriz. person in turbine
30-Oct-18	SVG29	23:55	Authoriz. person in turbine
4-Dec-18	SVG16	23:59	Authoriz. person in turbine
16-Jan-19	SVG108	21:14	Authoriz. person in turbine
21-Jan-19	SVG74	12:43	Authoriz. person in turbine
9-Mar-19	SVG174	24:27	Authoriz. person in turbine
30-May-19	SVG165	20:03	Authoriz. person in turbine

Major Breakdown Details of Vagarai- Tamil Nadu Site

Date	Loc.No	Duration	Description
24-May-18	MVMPR-20	24.13	error_pitch_converter_ok_2
15-Jun-18	MVMPR-22	24	error_converter_generator_contactor
20-Jun-18	MVMPR-49	24	error_safety_system_safety_system_ok_from_pitch
24-Jun18	MVMPR-22	24	error_converter_generator_contactor
5-Aug-18	MVMPR-32	24	error_safety_system_safety_system_ok_from_pitch
20-Sep-18	MVMPR-49	23.9	error_safety_system_safety_system_ok_from_pitch
24-Sep-18	MVMPR-32	22:58	error_safety_system_safety_system_ok_from_pitch
24-Sep-18	MVMPR-62	24	error_pitch_power_supply_2
24-Sep-18	MVMPR-09	24	Preventive Action : Failure Rectification
12-Nov-18	MVMPR-32	24	error_converter_signal_chopper_overcurrent
13-Nov-18	MVMPR-49	24	error_safety_system_safety_system_ok_from_pitch
21-Nov-18	MVMPR-54	24	error_profi_node_41_diag
01-Jan-19	MVMPR-58	24	error_safety_system_safety_system_ok_from_pitch
02-Jan-19	MVMPR-60	24	error_pitch_capacitor_voltage_hi_2
27-Jan-19	MVMPR-62	23.9	error_converter_temperature_rectifier
10-Feb-19	MVMPR-01	24	error_profi_node_20_diag
16-Apr-19	MVMPR-05	24	error_converter_chopper_IGBT
18-April-19	MVMPR-06	23:37	error_converter_step_up_IGBT
30-May-19	MVMPR-07	24	error_converter_grid_IGBT
20-Jun-19	MVMPR-08	24	error_safety_system_safety_system_ok_from_pitch
1-Jul-19	MVMPR-10	23.99	error_grid_voltage_global
23-Jul-19	MVMPR-17	24	error_pitch_power_supply_1
24-Jul-19	MVMPR-18	20:55	error_safety_system_safety_system_ok_from_pitch