

BUNDLED WIND POWER PROJECT BY MYTRAH GROUP

Mytrah Energy (India) Pvt. Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Project and its Implementation Status

The purpose of the project activity is to generate electrical energy using renewable energy source (wind) and selling the generated electrical energy to the respective state 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 Indian grid of India.

The details of the project activity bundle have been mentioned below.

SI No.	Project Site	Location (State)	Name of the SPVs	Project Capacity (MW)
1	Bhesada	Rajasthan	Mytrah Vayu (Indravati) Pvt. Ltd.	8.4
2	Pottipadu	Andhra Pradesh	Mytrah Vayu (Indravati) Pvt. Ltd.	105
3	Nidhi ¹	Rajasthan	Mytrah Vayu (Som) Pvt. Ltd.	90
4	Nipaniya	Madhya Pradesh	Mytrah Vayu (Som) Pvt. Ltd.	30
5	Nazeerabad	Telangana	Mytrah Vayu (Godavari) Pvt. Ltd.	100.8
6	Burgula-II	Andhra Pradesh	Mytrah Vayu (Krishna) Pvt. Ltd.	10.4
7	Aspari	Andhra Pradesh	Mytrah Vayu (Tungabhadra) Pvt. Ltd.	148.9
	Total			493.5

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 921,296 tonnes of CO₂ and total GHG emission reductions for the chosen 10 year crediting period will be 9,212,960 tonnes of CO₂.

The total emission reductions achieved during the current monitoring period are 1,271,028 tCO₂.

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 the project to the respective state utilities under the Indian Grid.

The total capacity of the project activity is 493.5 MW out of which 457.6 MW has been commissioned till date. The commissioning of the balance 35.9 MW is under process. The commissioning details of the WTGs have been mentioned in the section 1.5 of this document.

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.

¹ As per PPA, Project activity capacity restricts as 90 MW though total capacity comes as 90.10 MW (53 WTGs of 1.7 MW each), thus project activity capacity is considered as 90 MW, however conservatively total capacity of 90.10 MW based on individual rated WTG capacity is considered for IRR calculation

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.

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 17.0²

The project is not a grouped project activity.

1.3 Project Proponent

Organization name	Mytrah Vayu (Indravati) Pvt. Ltd.
Contact person	Ms. Mangaljyoti Meena
Title	Manager
Address	8001, 8th Floor, Q-City, Nanakramguda, Gachibowli, Hyderabad 500032, Telangana, India
Telephone	-
Email	-

Organization name	Mytrah Vayu (Som) Pvt. Ltd.
Contact person	Ms. Mangaljyoti Meena
Title	Manager
Address	8001, 8th Floor, Q-City, Nanakramguda, Gachibowli, Hyderabad 500032, Telangana, India
Telephone	-
Email	-

Organization name	Mytrah Vayu (Godavari) Pvt. Ltd.
Contact person	Ms. Mangaljyoti Meena
Title	Manager

² <http://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN>

Address	8001, 8th Floor, Q-City, Nanakramguda, Gachibowli, Hyderabad 500032, Telangana, India
Telephone	-
Email	-

Organization name	Mytrah Vayu (Krishna) Pvt. Ltd.
Contact person	Ms. Mangaljyoti Meena
Title	Manager
Address	8001, 8th Floor, Q-City, Nanakramguda, Gachibowli, Hyderabad 500032, Telangana, India
Telephone	-
Email	-

Organization name	Mytrah Vayu (Tungabhadra) Pvt. Ltd.
Contact person	Ms. Mangaljyoti Meena
Title	Manager
Address	8001, 8th Floor, Q-City, Nanakramguda, Gachibowli, Hyderabad 500032, Telangana, India
Telephone	-
Email	-

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the project	Project Consultant
Contact person	Mr. Ramkrishna Patil
Title	General Manager
Address	Office No. 201, EnKing Embassy, Plot No. 48, Scheme No. 78, Part II, Vijay Nagar INDORE – 452010, India.
Telephone	+91-9096562065
Email	NA

1.5 Project Start Date

Project Start Date: 30-December-2015

The project start date is the date on which first WTG was commissioned under the Project activity.

The commissioning details for the Bhesada project site is given below:

Location No	Commissioning Date
RSA 126	30-12-15
RSA 128	30-12-15
RSA 286	30-12-15
RSA 280	30-12-15

The commissioning details for the Pottipadu project site is given below:

Location No	Commissioning Date
PPD-045	31-12-15
PPD-046	31-12-15
PPD-047	31-12-15
PPD-058	31-12-15
PPD-076	31-12-15
PPD-077	31-12-15
PPD-078	31-12-15
PPD-081	31-12-15
PPD-082	31-12-15
PPD-084	31-12-15
PPD-085	31-12-15
PPD-052	05-03-16
PPD-055	05-03-16
PPD-056	05-03-16
PPD-057	05-03-16
PPD-001	06-03-16
PPD-002	06-03-16
PPD-005	06-03-16
PPD-006	06-03-16
PPD-011	06-03-16
PPD-012	06-03-16
PPD-013	06-03-16
PPD-014	06-03-16
PPD-015	06-03-16
PPD-016	06-03-16
PPD-038	06-03-16
PPD-039	06-03-16
PPD-040	06-03-16
PPD-060	06-03-16
PPD-061	06-03-16
PPD-062	06-03-16
PPD-063	06-03-16
PPD-064	06-03-16
PPD-073	06-03-16

PPD-074	06-03-16
PPD-075	06-03-16
PPD-049	26-03-16
PPD-050	26-03-16
PPD-053	26-03-16
PPD-054	26-03-16
PPD-027	27-03-16
PPD-028	27-03-16
PPD-029	27-03-16
PPD-030	27-03-16
PPD-031	27-03-16
PPD-032	27-03-16
PPD-033	27-03-16
PPD-034	27-03-16
PPD-035	27-03-16
PPD-044	27-03-16

The commissioning details for the Nidhi project site is given below:

Location No	Commissioning Date
NDH 01	31-03-2016
NDH 02	31-03-2016
NDH 03	31-03-2016
NDH 04	31-03-2016
NDH 05	31-03-2016
NDH 06	31-03-2016
NDH 07	31-03-2016
NDH 21	31-03-2016
NDH 22	31-03-2016
NDH 23	31-03-2016
NDH 24	31-03-2016
NDH 25	31-03-2016
NDH 26	31-03-2016
NDH 08	31-03-2016
NDH 09	31-03-2016
NDH 10	31-03-2016
NDH 11	31-03-2016
NDH 12	31-03-2016
NDH 16	31-03-2016
NDH 17	31-03-2016
NDH 18	31-03-2016

NDH 19	31-03-2016
NDH 20	31-03-2016
NDH 27	31-03-2016
NDH 28	31-03-2016
NDH 29	31-03-2016
NDH 30	31-03-2016
NDH 31	31-03-2016
NDH 32	31-03-2016
NDH 33	31-03-2016
NDH 34	31-03-2016
NDH 35	31-03-2016
NDH 36	31-03-2016
NDH 37	31-03-2016
NDH 38	31-03-2016
NDH 39	31-03-2016
NDH 44	31-03-2016

The commissioning details for the Nipaniya project site is given below:

Location No	Commissioning Date
NPY-P-58	19-03-16
NPY-P3-41	19-03-16
NPY-P3-114	19-03-16
NPY-P3-116	19-03-16
NPY-P3-117	19-03-16
NPY-P3-120	20-01-16
NPY-P3-127	19-03-16
NPY-P-59	19-03-16
NPY-P3-157	19-03-16
NPY-P3-112	27-03-16
NPY-P3-124	29-03-16
NPY-P3-154	29-03-16
NPY-P3-119	19-03-16
NPY-P-51	29-03-16
NPY-P3-128	27-03-16

The commissioning details for the Nazeerabad project site is given below:

Location No	Commissioning Date
NRB-2	27-03-16
NRB-3	27-03-16
NRB-4	27-03-16
NRB-5	27-03-16
NRB-6	27-03-16

NRB-15	27-03-16
NRB-14	27-03-16
NRB-16	27-03-16
NRB-17	27-03-16
NRB-26	27-03-16
NRB-28	27-03-16
NRB-31	27-03-16
NRB-34	27-03-16
NRB-40	27-03-16
NRB-41	27-03-16
NRB-43	27-03-16
NRB-35	27-03-16
NRB-72	27-03-16
NRB-49	27-03-16
NRB-56	27-03-16
NRB-58	27-03-16
NRB-57	27-03-16
NRB-54	31-03-16
NRB-30	31-03-16
NRB-62	31-03-16
NRB-07	31-03-16
NRB-44	31-03-16
NRB-71	31-03-16
NRB-36	31-03-16
NRB-63	31-03-16
NRB-19	31-03-16
NRB-69	31-03-16
NRB-23	31-03-16
NRB-22	31-03-16
NRB-01	31-03-16
NRB-64	31-03-16
NRB-27	31-03-16
NRB-11	31-05-16
NRB-39	31-05-16
NRB-24	31-05-16
NRB-29	31-05-16
NRB-18	31-05-16
NRB-66	31-05-16
NRB-60	31-05-16
NRB-68	31-05-16
NRB-67	31-05-16

NRB-20	31-05-16
NRB-48	06-03-17

The commissioning details for the Burgula-II project site is given below:

Location No	Commissioning Date
BRG-552	30-03-17
BRG-553	30-03-17

The commissioning details for the Aspari-I project site is given below:

Location No	Commissioning Date
ASP-5	15-10-16
ASP-6	15-10-16
ASP-7	15-10-16
ASP-8	15-10-16
ASP-9	15-10-16
ASP-10	15-10-16
ASP-11	15-10-16
ASP-12	15-10-16
ASP-13	15-10-16
ASP-14	15-10-16
ASP-15	15-10-16
ASP-16	15-10-16
ASP-17	15-10-16
ASP-18	15-10-16
ASP-19	15-10-16
ASP-21	15-10-16
ASP-22	15-10-16
ASP-23	15-10-16
ASP-24	15-10-16
ASP-25	15-10-16
ASP-26	15-10-16
ASP-27	15-10-16
ASP-28	15-10-16
ASP-29	15-10-16
ASP-61	15-10-16
ASP-62	15-10-16
ASP-63	15-10-16
ASP-64	15-10-16
ASP-65	15-10-16
ASP-66	15-10-16
ASP-31	20-10-16
ASP-30	20-10-16

ASP-87	20-10-16
ASP-33	20-10-16
ASP-90	20-10-16
ASP-32	20-10-16
ASP-88	20-10-16
ASP-89	20-10-16
ASP-43	20-10-16
ASP-36	20-10-16
ASP-42	20-10-16
ASP-35	20-10-16
ASP-37	20-10-16
ASP-91	20-10-16
ASP-92	20-10-16
ASP-38	20-10-16
ASP-39	20-10-16

The commissioning details for the Aspari-II project site is given below:

Location No	Commissioning Date
ASP-1	16-03-17
ASP-2	16-03-17
ASP-3	16-03-17
ASP-44	16-03-17
ASP-139	16-03-17
ASP-93	16-03-17
ASP-94	16-03-17
ASP-95	16-03-17
ASP-53	25-03-17
ASP-54	25-03-17
ASP-50	25-03-17
ASP-40	25-03-17
ASP-71	25-03-17
ASP-72	25-03-17
ASP-46	25-03-17
ASP-73	25-03-17
ASP-81	25-03-17
ASP-86	25-03-17
ASP-84	25-03-17
ASP-55	25-03-17
ASP-130	25-03-17
ASP-138	25-03-17
ASP-131	25-03-17
ASP-132	25-03-17

ASP-82	25-03-17
ASP-83	25-03-17
ASP-47	25-03-17
ASP-48	25-03-17
ASP-74	25-03-17
ASP-52	25-03-17

1.6 Project Crediting Period

Crediting Period Start date: 30-December-2015³

Crediting Period End date: 29-December-2025

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

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Indicate the scale of the project (project or large project) and the estimated annual GHG emission reductions or removals for the project crediting period.

Project Scale	
Project	-
Large project	✓

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	921,296
Year 2	921,296
Year 3	921,296
Year 4	921,296
Year 5	921,296
Year 6	921,296

³ Start date of crediting period is 30/12/2015, as on this day 1st set of WTGs associated to the one of the bundle Bhesada project activity starts its commercial operations. Accordingly end date of the crediting period is also been revised

Year 7	921,296
Year 8	921,296
Year 9	921,296
Year 10	921,296
Total estimated ERs	9,212,960
Total number of crediting years	10
Average annual ERs	921,296

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 493.5 MW. The project is promoted by **Mytrah Energy (India) Pvt. Limited with different SPVs**. Details of the installation of project in respective state is as follows:-

SI No.	Name of the SPVs	Project Site	Location (State)	Project Capacity (MW)	Commissioned Capacity (MW)
1	Mytrah Vayu (Indravati) Pvt. Ltd.	Bhesada	Rajasthan	8.4	8.4
2	Mytrah Vayu (Indravati) Pvt. Ltd.	Pottipadu	Andhra Pradesh	105	105
3	Mytrah Vayu (Som) Pvt. Ltd.	Nidhi	Rajasthan	90	62.9
4	Mytrah Vayu (Som) Pvt. Ltd.	Nipaniya	Madhya Pradesh	30	30
5	Mytrah Vayu (Godavari) Pvt. Ltd.	Nazeerabad	Telangana	100.8	100.8
6	Mytrah Vayu (Krishna) Pvt. Ltd.	Burgula-II	Andhra Pradesh	10.4	1.6
7	Mytrah Vayu (Tungabhadra) Pvt. Ltd.	Aspari	Andhra Pradesh	148.9	148.9
	Total			493.5	457.6

The Project activity is a new facility (Greenfield) and the electricity generated by the Project will be exported to the Indian Grid. 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 921,296 tCO₂e per year, thereon displacing 954,418 MWh/year amount of electricity from the grid.

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 of WTG's of Suzlon Energy Limited Model No. S97, WTG's of GE India Industrial Pvt Limited GE 1.7 & 2.3, WTGs of Inox Wind Limited Model No. DF-100 and WTGs of Wind World India Limited Model No. WW-53. The commissioning of these WTGs of the project activity is completed and details are mentioned in section 1.5.

The Specification of 50 WTG (105 MW at Pottipadu site), 4 WTG (8.4 MW at Bhesada site) and 48 WTG (100.8 MW at Nazeerabad site) Suzlon Energy Limited's model: S-97/2100 kW at Pottipadu Site, Bhesada site and Nazeerabad site respectively are as follows:

Power	
Rated power:	2,100.0 kW
Cut-in wind speed:	3.5 m/s
Rated wind speed:	11.0 m/s
Cut-out wind speed:	20.0 m/s
Survival wind speed:	60.0 m/s
Rotor	
Diameter:	97.0 m
Swept area:	7,386.0 m ²
Number of blades:	3
Power density 1:	284.3 W/m ²
Power density 2:	3.5 m ² /kW
Generator	
Type:	Asynchronous
Number:	1
Voltage:	690.0 V
Grid connection:	DFIG
Grid frequency:	50/60 Hz
Hub height:	80/90/100/120 m
Type:	Steel tube
Shape:	conical
Corrosion protection:	painted

The Specification of 47 WTG (79.9 MW at Aspari I) and 90 MW at Nidhi site of GE India Industrial Pvt. Ltd. model: GE 1.7 at Aspari-I Site and Nidhi site respectively are as follows:

Power	
Rated power:	1,700.0 kW
Cut-in wind speed:	3.0 m/s
Rated wind speed:	10.0 m/s
Cut-out wind speed:	23.0 m/s
Wind class (IEC):	S
Rotor	
Diameter:	103.0 m
Swept area:	8,332.0 m ²
Number of blades:	3

Type:	50.2m
Material:	GFRP
Power density 1:	204.0 W/m ²
Power density 2:	4.9 m ² /kW
Gear box	
Type:	spur/planetary
Generator	
Type:	Double Fed Asyn
Number:	1
Grid connection:	IGBT
Grid frequency:	50/60 Hz
Tower	
Hub height:	80/96 m
Type:	steel tube
Shape:	conical
Corrosion protection:	painted

The Specification of 30 WTG (69 MW) GE India Industrial Pvt. Ltd. model- GE 2.3 at Aspari-II are as follows:

Rated Power (MW):	2.3
Wind Class:	IIIs
Cut-In Wind Speed:	3
Nominal Wind speed (8 m/s):	14m/s
Cut-Out Wind Speed:	23
Annual Output (8 m/s) in MWh:	10,887 @ 8.5m/s
Nominal Rotor Diameter (m):	107
Hub Height (m):	80,94
Swept Area (m ²):	8,992
Gearbox Ratio :	130.4 (50hz)
Generator Type:	DFIG
Turbine Output (V):	690
Frequency (HZ):	50

The Specification of 15 WTG (30 MW) Inox Wind Ltd. model: DF 100 at Nipaniya are as follows:

Power	
Rated power:	2,000.0 kW
Cut-in wind speed:	3.0 m/s
Rated wind speed:	11.0 m/s
Cut-out wind speed:	20.0 m/s
Survival wind speed:	52.5 m/s

Wind class (IEC):	IIIb
Rotor	
Diameter:	100.0 m
Swept area:	7,894.0 m ²
Number of blades:	3
Rotor speed, max:	15.7 U/min
Tipspeed:	82 m/s
Material:	Epoxy glass fibre
Power density 1:	253.4 W/m ²
Power density 2:	3.9 m ² /kW
Gear box	
Type:	spur/planetary
Stages:	3
Ratio:	0.121528
Generator	
Type:	doubly fed induction
Number:	1
Speed, max:	1,800.0 U/min
Voltage:	690.0 V
Grid connection:	IGBT
Grid frequency:	50.0 Hz
Tower	
Hub height:	80/92 m
Type:	steel tube
Shape:	conical
Corrosion protection:	painted

The Specification of 10.4 MW Wind World India Limited's model: WW-53 at Burgula-II are as follows:

Power	
Rated power:	800.0 kW
Cut-in wind speed:	3.0 m/s
Rated wind speed:	11.5 m/s
Cut-out wind speed:	28.0 m/s
Rotor	
Diameter:	52.9 m
Swept area:	2,007.0 m ²
Number of blades:	3
Rotor speed, max:	29.5 U/min
Tipspeed:	82 m/s
Material:	fiberglass-epoxy

	resin
Manufacturer:	WindWorld India
Power density 1:	398.6 W/m ²
Power density 2:	2.5 m ² /kW
Gear box	
Type:	direct drive
Generator	
Type:	synchronous
Number:	1
Speed, max:	29.5 U/min
Grid connection:	inverters
Hersteller:	WindWorld India
Tower	
Hub height:	74 m
Type:	concrete
Shape:	conical

Emission Reductions from anthropogenic sources:

The wind power generated from the Project will be displacing the electricity generated from thermal power stations feeding into Indian 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

The project activity is located in the states of Rajasthan, Madhya Pradesh, Andhra Pradesh and Telangana. The site wise location details of the project is given below.

The location details for the Bhesada project site:

WTG Location No	Village	District	Latitude (N)	Longitude (E)
RSA 126	Naya luna kalan	Jaisalmer	26.6985	71.4897
RSA 128	Naya luna kalan	Jaisalmer	26.6859	71.4923
RSA 286	Pratap pura	Jaisalmer	26.5989	71.6356
RSA 280	Khuda	Jaisalmer	26.6027	71.6137

The location details for the Pottipadu project site:

WTG Location No	Village	District	Latitude (N)	Longitude (E)
PPD-045	Pottipadu	Anantapur	15.0403	77.3681
PPD-046	Pottipadu	Anantapur	15.0442	77.3645

PPD-047	Pottipadu	Anantapur	15.0483	77.3662
PPD-058	Pottipadu	Anantapur	15.0478	77.3818
PPD-076	Pottipadu	Anantapur	15.0515	77.4067
PPD-077	Pottipadu	Anantapur	15.0559	77.3951
PPD-078	Pottipadu	Anantapur	15.0602	77.3949
PPD-081	Pottipadu	Anantapur	15.0731	77.3780
PPD-082	Pottipadu	Anantapur	15.0793	77.3781
PPD-084	Pottipadu	Anantapur	15.0720	77.4075
PPD-085	Pottipadu	Anantapur	15.0673	77.4060
PPD-052	Gulyapalyam	Anantapur	15.0712	77.3578
PPD-055	Gulyapalyam	Anantapur	15.0603	77.3668
PPD-056	Vajrakarur	Anantapur	15.0567	77.3694
PPD-057	Vajrakarur	Anantapur	15.0532	77.3721
PPD-001	Gadehothur	Anantapur	15.0324	77.3214
PPD-002	Gadehothur	Anantapur	15.0274	77.3169
PPD-005	Gadehothur	Anantapur	15.0123	77.3205
PPD-006	Gadehothur	Anantapur	15.0086	77.3231
PPD-011	Pottipadu	Anantapur	15.0308	77.3411
PPD-012	Pottipadu	Anantapur	15.0354	77.3414
PPD-013	Pottipadu	Anantapur	15.0393	77.3407
PPD-014	Pottipadu	Anantapur	15.0442	77.3287
PPD-015	Pottipadu	Anantapur	15.0520	77.3317
PPD-016	Vajrakarur	Anantapur	15.0378	77.3228
PPD-038	Ganjikunta	Anantapur	15.0150	77.3756
PPD-039	Tatrakallu	Anantapur	15.0078	77.3709
PPD-040	Vajrakarur	Anantapur	15.0014	77.3654
PPD-060	Vajrakarur	Anantapur	15.0378	77.3899
PPD-061	Vajrakarur	Anantapur	15.0347	77.3933
PPD-062	Vajrakarur	Anantapur	15.0266	77.3957
PPD-063	Vajrakarur	Anantapur	15.0304	77.3946
PPD-064	Vajrakarur	Anantapur	15.0206	77.3980
PPD-073	Vajrakarur	Anantapur	15.0366	77.4091
PPD-074	Vajrakarur	Anantapur	15.0416	77.4102
PPD-075	Kamalapadu	Anantapur	15.0462	77.4074
PPD-049	Konakondla	Anantapur	15.0811	77.3511
PPD-050	Konakondla	Anantapur	15.0768	77.3517
PPD-053	Gulyapalyam	Anantapur	15.0669	77.3609
PPD-054	Gulyapalyam	Anantapur	15.0659	77.3696
PPD-027	Gulyapalyam	Anantapur	15.0637	77.3432
PPD-028	Gulyapalyam	Anantapur	15.0577	77.3453
PPD-029	Vajrakarur	Anantapur	15.0537	77.3471

PPD-030	Vajrakarur	Anantapur	15.0492	77.3496
PPD-031	Vajrakarur	Anantapur	15.0446	77.3500
PPD-032	Vajrakarur	Anantapur	15.0361	77.3539
PPD-033	Vajrakarur	Anantapur	15.0319	77.3562
PPD-034	Vajrakarur	Anantapur	15.0272	77.3528
PPD-035	Vajrakarur	Anantapur	15.0207	77.3548
PPD-044	Vajrakarur	Anantapur	15.0322	77.3748

The location details for the Nidhi project site for all 53 WTGs:

WTG Location No	Village	District	Latitude (N)	Longitude (E)
NDH-001	Habur	Jaisalmer	27.1770	70.6009
NDH-002	Habur	Jaisalmer	27.1712	70.6035
NDH-003	Habur	Jaisalmer	27.1687	70.6069
NDH-004	Habur	Jaisalmer	27.1646	70.6093
NDH-005	Habur	Jaisalmer	27.1606	70.6123
NDH-006	Habur	Jaisalmer	27.1562	70.6147
NDH-007	Habur	Jaisalmer	27.1520	70.6182
NDH-008	Habur	Jaisalmer	27.1480	70.6210
NDH-009	Habur	Jaisalmer	27.1426	70.6231
NDH-010	Habur	Jaisalmer	27.1403	70.6258
NDH-011	Habur	Jaisalmer	27.1340	70.6296
NDH-012	Habur	Jaisalmer	27.1306	70.6328
NDH-013	Habur	Jaisalmer	27.1264	70.6457
NDH-014	Habur	Jaisalmer	27.1303	70.6428
NDH-015	Habur	Jaisalmer	27.1401	70.6367
NDH-016	Habur	Jaisalmer	27.1439	70.6337
NDH-017	Habur	Jaisalmer	27.1484	70.6290
NDH-018	Habur	Jaisalmer	27.1540	70.6268
NDH-019	Habur	Jaisalmer	27.1575	70.6242
NDH-020	Habur	Jaisalmer	27.1616	70.6214
NDH-021	Habur	Jaisalmer	27.1657	70.6191
NDH-022	Habur	Jaisalmer	27.1701	70.6160
NDH-023	Habur	Jaisalmer	27.1741	70.6130
NDH-024	Habur	Jaisalmer	27.1792	70.6095
NDH-025	Habur	Jaisalmer	27.1827	70.6066
NDH-026	Habur	Jaisalmer	27.1856	70.6040
NDH-027	Habur	Jaisalmer	27.1531	70.6382
NDH-028	Habur	Jaisalmer	27.1490	70.6412
NDH-029	Habur	Jaisalmer	27.1437	70.6439
NDH-030	Habur	Jaisalmer	27.1409	70.6470
NDH-031	Habur	Jaisalmer	27.1359	70.6493
NDH-032	Habur	Jaisalmer	27.1321	70.6526

NDH-033	Habur	Jaisalmer	27.1283	70.6552
NDH-034	Habur	Jaisalmer	27.1242	70.6571
NDH-035	Habur	Jaisalmer	27.1139	70.6741
NDH-036	Habur	Jaisalmer	27.1174	70.6718
NDH-037	Habur	Jaisalmer	27.1216	70.6693
NDH-038	Habur	Jaisalmer	27.1256	70.6667
NDH-039	Habur	Jaisalmer	27.1287	70.6636
NDH-040	Habur	Jaisalmer	27.1337	70.6390
NDH-041	Habur	Jaisalmer	27.1331	70.6707
NDH-042	Habur	Jaisalmer	27.1289	70.6744
NDH-043	Habur	Jaisalmer	27.1266	70.6777
NDH-044	Habur	Jaisalmer	27.1192	70.6606
NDH-045	Habur	Jaisalmer	27.1351	70.6808
NDH-046	Habur	Jaisalmer	27.1407	70.6771
NDH-047	Habur	Jaisalmer	27.1431	70.6942
NDH-048	Habur	Jaisalmer	27.1398	70.6974
NDH-049	Habur	Jaisalmer	27.1357	70.7002
NDH-050	Habur	Jaisalmer	27.1306	70.7023
NDH-051	Habur	Jaisalmer	27.1267	70.7054
NDH-052	Habur	Jaisalmer	27.1358	70.7070
NDH-053	Habur	Jaisalmer	27.1430	70.7026

The location details for the Nipaniya project site:

WTG Location No	Village	District	Latitude (N)	Longitude (E)
NPY-P-58	Jamuniya	Mandsaur	24.2041	75.6108
NPY-P3-41	Dhamniya Diwan	Mandsaur	24.1484	75.6209
NPY-P3-114	Nariya Bujurg	Mandsaur	24.2625	75.6194
NPY-P3-116	Manpura	Mandsaur	24.2537	75.6161
NPY-P3-117	Nariya Bujurg	Mandsaur	24.2484	75.6159
NPY-P3-120	Aakli Shivdas	Mandsaur	24.2349	75.6133
NPY-P3-127	Sagoriya	Mandsaur	24.2197	75.6075
NPY-P-59	Sagoriya	Mandsaur	24.2145	75.6107
NPY-P3-157	Jamuniya	Mandsaur	24.2073	75.6093
NPY-P3-112	Bardiya Amra	Mandsaur	24.2740	75.6223
NPY-P3-124	Jamuniya	Mandsaur	24.2257	75.5991
NPY-P3-154	Guradiyamata	Mandsaur	24.2361	75.6432
NPY-P3-119	Manpura	Mandsaur	24.2300	75.5993
NPY-P-51	Barkheda Uda	Mandsaur	24.1654	75.6055
NPY-P3-128	Sagoriya	Mandsaur	24.2174	75.6098

The location details for the Nazeerabad project site:

WTG Location No	Village	District	Latitude (N)	Longitude (E)
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NRB01	Nazeerabad	Rangareddy	17.2224	77.9471
NRB02	Nazeerabad	Rangareddy	17.2187	77.9479
NRB03	Nazeerabad	Rangareddy	17.2162	77.9491
NRB04	Nazeerabad	Rangareddy	17.2129	77.9502
NRB05	Nazeerabad	Rangareddy	17.2099	77.9513
NRB06	Nazeerabad	Rangareddy	17.2068	77.9510
NRB07	Nazeerabad	Rangareddy	17.2040	77.9518
NRB11	Nazeerabad	Rangareddy	17.1909	77.9314
NRB14	Nazeerabad	Rangareddy	17.1886	77.9362
NRB15	Nazeerabad	Rangareddy	17.1844	77.9300
NRB16	Nazeerabad	Rangareddy	17.1788	77.9233
NRB17	Nazeerabad	Rangareddy	17.1752	77.9234
NRB18	Nazeerabad	Rangareddy	17.1716	77.9242
NRB19	Nazeerabad	Rangareddy	17.1700	77.9295
NRB20	Nazeerabad	Rangareddy	17.1675	77.9230
NRB22	Nazeerabad	Rangareddy	17.1617	77.9171
NRB23	Nazeerabad	Rangareddy	17.1598	77.9247
NRB24	Nazeerabad	Rangareddy	17.1554	77.9300
NRB26	Nazeerabad	Rangareddy	17.1506	77.9221
NRB27	Nazeerabad	Rangareddy	17.1480	77.9295
NRB28	Nazeerabad	Rangareddy	17.1473	77.9220
NRB29	Nazeerabad	Rangareddy	17.1442	77.9128
NRB30	Nazeerabad	Rangareddy	17.1443	77.9282
NRB31	Nazeerabad	Rangareddy	17.1420	77.9208
NRB34	Nazeerabad	Rangareddy	17.1352	77.9174
NRB35	Nazeerabad	Rangareddy	17.1328	77.9273
NRB36	Nazeerabad	Rangareddy	17.1299	77.9436
NRB39	Nazeerabad	Rangareddy	17.1307	77.9328
NRB40	Nazeerabad	Rangareddy	17.1247	77.9443
NRB41	Nazeerabad	Rangareddy	17.1267	77.9321
NRB43	Nazeerabad	Rangareddy	17.1223	77.9303
NRB44	Nazeerabad	Rangareddy	17.1203	77.9405
NRB48	Nazeerabad	Rangareddy	17.1189	77.9478
NRB49	Nazeerabad	Rangareddy	17.1155	77.9566
NRB54	Nazeerabad	Rangareddy	17.1047	77.9537
NRB56	Nazeerabad	Rangareddy	17.0990	77.9548
NRB57	Nazeerabad	Rangareddy	17.0960	77.9551
NRB58	Nazeerabad	Rangareddy	17.0895	77.9509
NRB60	Nazeerabad	Rangareddy	17.1978	77.9525
NRB62	Nazeerabad	Rangareddy	17.1431	77.9875
NRB63	Nazeerabad	Rangareddy	17.1390	77.9877

NRB64	Nazeerabad	Rangareddy	17.1354	77.9894
NRB66	Nazeerabad	Rangareddy	17.1292	77.9909
NRB67	Nazeerabad	Rangareddy	17.1248	77.9920
NRB68	Nazeerabad	Rangareddy	17.1214	77.9941
NRB69	Nazeerabad	Rangareddy	17.1153	77.9932
NRB71	Nazeerabad	Rangareddy	17.1042	77.9862
NRB72	Nazeerabad	Rangareddy	17.0866	77.9500

The location details for the Burgula-II project site:

WTG Location No	Village	District	Latitude (N)	Longitude (E)
BRG-552	Burugula	Kurnool	15.19516	77.93793
BRG-553	Burugula	Kurnool	15.19682	77.93758

The location details for the Aspari-I project site:

WTG Location No	Village	District	Latitude (N)	Longitude (E)
ASP-005	Aspari	Kurnool	15.4721	77.3977
ASP-006	Aspari	Kurnool	15.4685	77.3975
ASP-007	Aspari	Kurnool	15.4651	77.3981
ASP-008	Aspari	Kurnool	15.4613	77.3984
ASP-009	Aspari	Kurnool	15.4561	77.3998
ASP-010	Aspari	Kurnool	15.4527	77.3985
ASP-011	Aspari	Kurnool	15.4491	77.4002
ASP-012	Aspari	Kurnool	15.4455	77.4004
ASP-013	Aspari	Kurnool	15.4424	77.3998
ASP-014	Aspari	Kurnool	15.4383	77.3990
ASP-015	Aspari	Kurnool	15.4350	77.3975
ASP-016	Aspari	Kurnool	15.4315	77.3978
ASP-017	Aspari	Kurnool	15.4280	77.3981
ASP-018	Aspari	Kurnool	15.4228	77.4094
ASP-019	Aspari	Kurnool	15.4191	77.4079
ASP-021	Aspari	Kurnool	15.4149	77.4068
ASP-022	Aspari	Kurnool	15.4093	77.4092
ASP-023	Aspari	Kurnool	15.4057	77.4099
ASP-024	Aspari	Kurnool	15.4011	77.4110
ASP-025	Aspari	Kurnool	15.4455	77.4124
ASP-026	Aspari	Kurnool	15.4413	77.4126
ASP-027	Aspari	Kurnool	15.4369	77.4140
ASP-028	Aspari	Kurnool	15.4319	77.4140
ASP-029	Aspari	Kurnool	15.4266	77.4136
ASP-061	Aspari	Kurnool	15.3893	77.4220
ASP-062	Aspari	Kurnool	15.3856	77.4186
ASP-063	Aspari	Kurnool	15.3826	77.4137

ASP-064	Aspari	Kurnool	15.3792	77.4111
ASP-065	Aspari	Kurnool	15.3754	77.4103
ASP-066	Aspari	Kurnool	15.3721	77.4079
ASP-030	Aspari	Kurnool	15.4416	77.4269
ASP-031	Aspari	Kurnool	15.4379	77.4272
ASP-032	Aspari	Kurnool	15.4339	77.4278
ASP-033	Aspari	Kurnool	15.4305	77.4279
ASP-035	Aspari	Kurnool	15.4242	77.4302
ASP-036	Aspari	Kurnool	15.4200	77.4328
ASP-037	Aspari	Kurnool	15.4165	77.4356
ASP-038	Aspari	Kurnool	15.4124	77.4365
ASP-039	Aspari	Kurnool	15.4089	77.4376
ASP-042	Aspari	Kurnool	15.4211	77.4504
ASP-043	Aspari	Kurnool	15.4159	77.4571
ASP-087	Aspari	Kurnool	15.4340	77.4495
ASP-088	Aspari	Kurnool	15.4406	77.4480
ASP-089	Aspari	Kurnool	15.4444	77.4465
ASP-090	Aspari	Kurnool	15.4474	77.4443
ASP-091	Aspari	Kurnool	15.4518	77.4434
ASP-092	Aspari	Kurnool	15.4553	77.4430

The location details for the Aspari-II project site:

WTG Location No	Village	District	Latitude (N)	Longitude (E)
ASP-001	Aspari	Kurnool	15.4834	77.4121
ASP-002	Aspari	Kurnool	15.4791	77.4161
ASP-003	Aspari	Kurnool	15.4745	77.4177
ASP-040	Aspari	Kurnool	15.3942	77.4422
ASP-044	Aspari	Kurnool	15.4117	77.4612
ASP-046	Aspari	Kurnool	15.4053	77.4667
ASP-047	Aspari	Kurnool	15.3907	77.4695
ASP-048	Aspari	Kurnool	15.3969	77.4698
ASP-050	Aspari	Kurnool	15.4208	77.4773
ASP-052	Aspari	Kurnool	15.4161	77.4829
ASP-053	Aspari	Kurnool	15.4096	77.4789
ASP-054	Aspari	Kurnool	15.4059	77.4797
ASP-055	Aspari	Kurnool	15.3993	77.4840
ASP-071	Aspari	Kurnool	15.3902	77.4451
ASP-072	Aspari	Kurnool	15.3864	77.4443
ASP-073	Aspari	Kurnool	15.3826	77.4443
ASP-074	Aspari	Kurnool	15.3779	77.4442
ASP-081	Aspari	Kurnool	15.3792	77.4878
ASP-082	Aspari	Kurnool	15.3758	77.4913

ASP-083	Aspari	Kurnool	15.3722	77.4924
ASP-084	Aspari	Kurnool	15.3688	77.4934
ASP-086	Aspari	Kurnool	15.3616	77.4953
ASP-093	Aspari	Kurnool	15.4658	77.4388
ASP-094	Aspari	Kurnool	15.4705	77.4381
ASP-095	Aspari	Kurnool	15.4740	77.4383
ASP-130	Aspari	Kurnool	15.4631	77.4228
ASP-131	Aspari	Kurnool	15.4528	77.4126
ASP-132	Aspari	Kurnool	15.4492	77.4123
ASP-138	Aspari	Kurnool	15.4570	77.4138
ASP-139	Aspari	Kurnool	15.4758	77.3987

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 project activity, the equivalent amount of electricity would have been drawn from grid connected or new power plants, in Indian Grid. The grid is predominantly coal based and therefore is a major source of carbon di oxide emissions in India. The main emission in the pre project scenario is the power plants connected to the Indian Grid, and main GHG involved is CO₂. The baseline identified in section 2.4 is same as the pre-project scenario.

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.

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.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The Project is owned by Mytrah Energy (India) Pvt. Limited having different SPVs, 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 (Indravati) Pvt. Ltd., Mytrah Vayu (Som) Pvt. Ltd., Mytrah Vayu (Godavari) Pvt. Ltd., Mytrah Vayu (Krishna) Pvt. Ltd. and Mytrah Vayu (Tungabhadra) Pvt. Ltd. issued by respective state nodal agencies/authorities of the Rajasthan, Madhya Pradesh, Telangana & Andhra Pradesh States of India. These companies are the subsidiary of the Mytrah Energy (India) Pvt. Limited.
- 2) Power Purchase Agreement with respective State Electricity Board for sale of electricity by the Mytrah Vayu (Indravati) Pvt. Ltd., Mytrah Vayu (Som) Pvt. Ltd., Mytrah Vayu (Godavari) Pvt. Ltd., Mytrah Vayu (Krishna) Pvt. Ltd. and Mytrah Vayu (Tungabhadra) Pvt. Ltd.

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

Not 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.

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 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 SO_x, NO_x, 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.

Further Information

Not Applicable.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Title : Grid-connected electricity generation from renewable sources

Reference : The project activity meets the eligibility criteria of large scale project as it is more than 15 MW

Methodology : ACM0002: Grid-connected electricity generation from renewable sources - Version 17.0⁴

Type I : Energy industries (renewable / non-renewable sources)

Category : Approved Consolidated Methodology (ACM0002)

Tools referred with above methodology and applicable for project activity are:

- Tool to calculate the emission factor for an electricity system⁵ - Version 06.0 (EB 97, Annex 07)
- Methodological Tool- Tool for the demonstration and assessment of additionality⁶ - Version 07.0.0 (EB 70, Annex 08)

2.2 Applicability of Methodology

The project activity involves generation of grid connected electricity from renewable wind energy. The project activity has a proposed capacity of 493.5 MW which will qualify for a large scale CDM project activity under Type-I of the large scale methodologies. The project status is corresponding to the methodology ACM0002 version 17.0 and applicability of methodology are discussed below.

⁴ <http://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN>

⁵ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf>

⁶ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

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 a Renewable Energy Project i.e. Wind Power Project which falls under applicability criteria option 1 (a) i.e., "Install a Greenfield power plant". Hence the project activity meets the given applicability criterion.
2. The methodology is applicable under the following conditions: (a) 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; (b) 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 option (a) of applicability criteria 2 is applicable as project is renewable energy wind power plant/unit.
3. In case of hydro power plants, one of the following conditions shall apply:⁷ (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	The project is installation of new wind based electricity generation plants (not a hydro power plant). Hence this criteria is not applicable.

⁷ Project participants wishing to undertake a hydroelectric project activity that result in a new reservoir or an increase in the volume of an existing reservoir, in particular where reservoirs have no significant vegetative biomass in the catchments area, may request a revision to the approved consolidated methodology.

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.	
4. In the case of integrated hydro power projects, project proponent shall:	The project is wind power project and thus the criterion is not applicable to this project activity.
5. Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or	The project is wind power project and thus the criterion is not applicable to this project activity.
6. 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.	The project is wind power project and thus the criterion is not applicable to this project activity.

7.	The methodology is not applicable to: (a) 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; (b) Biomass fired power plants/units.	(a) The project activity is Greenfield and there is no switching of fossil fuel to renewable energy. Hence the criteria is not applicable to the project activity (b) The project is not a biomass fired power plant. Hence the criteria is not applicable to the project activity.
8.	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”.	Not applicable, the wind project is a Green field project activity and this project is not the enhancement or up gradation project.
9.	In addition, the applicability conditions included in the tools referred to below apply. ⁸	Please refer tables below.

Tool to calculate the emission factor for an electricity system⁹ - Version 06.0 (EB 97, Annex 07)

Applicability Criterion	Project Case
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The project is a grid connected Greenfield wind power project and thus the tool is applicable.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in “Appendix 2: Procedures related to off-grid power generation” should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity	Steps involved in calculation of Emission Factor is included in section B.6.3 of the PDD as per the requirement of the tool

⁸ The condition in the “Combined tool to identify the baseline scenario and demonstrate additionality” that all potential alternative scenarios to the proposed project activity must be available options to project participants; does not apply to this methodology, as this methodology only refers to some steps of this tool.

⁹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v6.pdf>

Applicability Criterion	Project Case
of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	Project is located in non-Annex I country and hence the tool is applicable
Under this tool, the value applied to the CO2 emission factor of biofuels is zero.	The project is a wind project and there is no involvement of biofuels.

- Methodological Tool- Tool for the demonstration and assessment of additionality- Version 07.0.0 (EB 70, Annex 08)

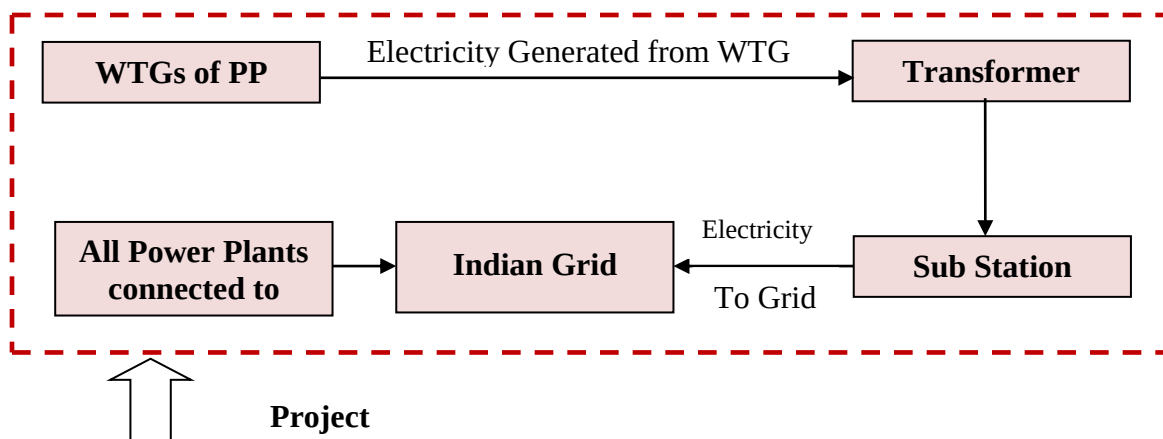
Applicability Criteria has been demonstrated in section on additionality below.

The project activity qualifies as Type I during every year of the crediting period in accordance with applicable provisions for project activity eligibility as discussed above. Also the total installed capacity of project activity is 493.5 MW which is applicable as per large scale project activities methodology ACM0002: Grid-connected electricity generation from renewable sources Version 17.0. The project capacity will be always remain the same and hence the project activity will always be large scale project activities throughout the crediting period and thereafter.

2.3 Project Boundary

As per ACM0002 version 17 - "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".

The project boundary includes the wind project, sub-stations, grid and all power plants connected to grid. The proposed project activity will evacuate power to the Indian grid. Therefore the entire Indian grid and all connected power plants have been considered in the project boundary for the proposed VCS project activity.



The GHG emission sources considered for the project boundary and their explanations are as follows:

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	No CO ₂ emissions are emitted from the project
Project	Greenfield Wind Power Project Activity.	CO ₂	No	No CO ₂ emissions are emitted from the project
		CH ₄	No	Project activity does not emit CH ₄
		N ₂ O	No	Project activity does not emit N ₂ O
		Other	No	Project activity does not emit other forms of GHG emissions

2.4 Baseline Scenario

As per the approved consolidated Methodology ACM0002 (Version 17.0, EB 89, Annex 1) para 24: *“If the project activity is the installation of a Greenfield power plant, the baseline scenario is 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”.*

The project activity involves setting up of wind projects to harness the power of sun to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants.

In the absence of the project activity, the equivalent amount of power would have been drawn from the Indian grid. Hence, the baseline for the project activity is the equivalent amount of power from the Indian grid.

The combined margin ($EF_{grid, CM, y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM). Calculations for this combined margin must be based on data from an official source (where available) and made publically available. The CEA database version 12 is the latest available data at the time of PD submission to DOE for validation, hence same is considered for emission factor calculations.

The combined margin of the Indian grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
$EF_{grid, y}$	0.9653 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 12.0, May 2017 published by Central Electricity Authority (CEA), Government of India
$EF_{grid, OM, y}$	0.9843 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2013-14, 2014-15, 2015-16) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 12.0, May 2017 published by Central Electricity Authority (CEA), Government of India
$EF_{grid, BM, y}$	0.9083 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 12.0, May 2017 published by Central Electricity Authority (CEA), Government of India

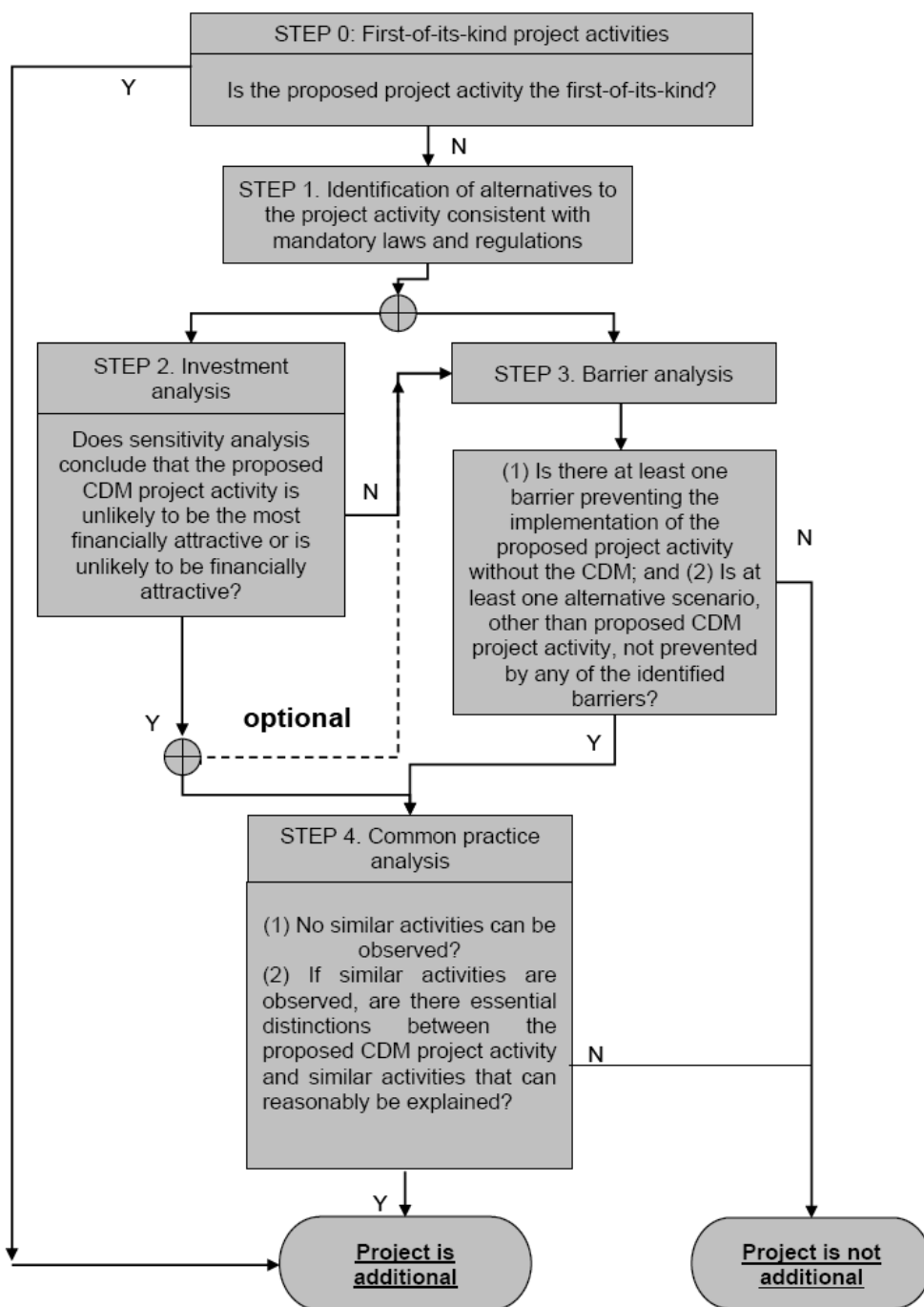
2.5 Additionality

The table below is only applicable if the proposed project activity is a type of project activity which is deemed automatically additional, as defined by the applied approved methodology or standardized baseline.

Specify the methodology or standardized baseline that establish automatic additionality for the proposed project activity (including the version number and the specific paragraph, if applicable).	NA
Describe how the proposed project activity meets the criteria for automatic additionality in the relevant methodology or standardized baselines.	NA

The present VCS project generates power using wind energy which is a renewable, zero emission source of energy. Baseline considerations for the project are based on approved consolidated baseline methodology ACM0002 (Version 17.0). The methodology requires the project investor to determine the additionality based on "Methodological Tool- Tool for the

demonstration and assessment of additionality”, Version 7.0.0. The step-wise approach to establish additionality of the project activity has been followed, details of which are provided in the following paragraphs:



In line with VCS Standard version 3.7, 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

The proposed project activity is not the first-of-its-kind. Hence not applicable.

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.

The purpose of the project activity is to generate electrical power using wind energy and feed the electricity generated to the grid. Hence, the following alternatives are considered:

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.

Thus though two alternatives are mentioned above as per step of additionality tool, the first alternative is not possible as project activity is not viable without carbon credit benefits and second alternative is the baseline scenario for the project activity as per methodology as mentioned in section 2.4 of joint VCS PD & MR.

It is to be noted that being the green field project activity, “the baseline scenario is 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”.

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 Indian 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 (Option I) 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.

In the absence of the project activity grid electricity would have been the obvious choice for the Project which requires no investment. Hence investment comparison analysis (Option II) is also not appropriate for the project activity.

After eliminating Option I and Option II, 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 Investment Analysis tool, Required/expected returns on equity are appropriate benchmarks for an equity IRR. The Equity IRR is considered as the financial indicator and the benchmarks used is cost of equity. Hence the benchmarks used are applicable to the project activity and the type of IRR calculation presented

At the time of decision made of project activity, Version 06 of methodological tool "Investment Analysis" (EB 85 Annex 12) was the latest available tool to PP, hence PP has considered the same tool for default value of return on equity. The default value of Return on Equity for Group-1 projects in India is 11.10%.

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”.

Default Value Benchmark:

As per para 20 of EB 85, Annex 12 the cost of equity is determined by selecting the values provided in the Appendix, i.e. Default values for cost of equity (expected return on equity) is presented below:

Appendix in EB 85, Annex 12 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = **11.10%**

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

$$\text{Nominal Benchmark}^{10} = \{(1 + \text{Real Benchmark}) * (1 + \text{Inflation rate})\} - 1$$

¹⁰ As per Fisher Equation, https://en.wikipedia.org/wiki/Fisher_equation

Where:

- Default value for Real Benchmark = 11.10% (as per Appendix of EB 85, Annex 12)
- Inflation Rate forecast for by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India & in case where RBI Inflation forecast was not available Average Inflation rate forecast for India has been sourced from IMF web site.

Benchmark estimation:

Appendix in EB 92, Annex 5 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = **11.10%**

Inflation Forecast for India as per RBI website is considered for benchmark calculation.

Since RBI publishes the inflation forecast for 5 years and 10 years, PP has considered the maximum 10 year inflation considering the renewable crediting period of total 21 years.

Mytrah Energy (India) Pvt. Ltd has decided to implement the projects considered under this bundle on 30/07/2015, thus benchmark is determined based on this decision made date. Since the decision making date, default value for India as per UNFCCC guidelines and Inflation forecast as per RBI for 10 years are same therefore the benchmark calculation are same

Benchmark Calculations	Value	Sources Link or Title	Document Date
Default Value for India as per UNFCCC guidelines	11.10%	EB 85 Annex 12, Version 06 of methodological tool "Investment Analysis" Table 1 Appendix	24-Jul-15
Inflation forecast (WPI Mean) as per RBI for 10 Yrs	3.80%	Table A.9: Annual Average Percentage Change ¹¹	3-Jun-15
Benchmark (with 10 Yrs Forecast)	15.32%		

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

The Post tax Equity IRR is evaluated for the entire lifetime of the project activity, i.e. 25 years. It is calculated based on the cash outflows from and cash inflows into the project activity.

The IRR and Benchmark analysis are calculated in excel spreadsheet and same is submitted to DOE during validation of project activity.

Based on result of IRR excel spreadsheets, equity IRR is less than Benchmark.

This substantiates that the investment is not financially attractive (Equity IRR for the project activity is less than the Benchmark). Thus it can be easily concluded that project activity is additional & is not business as usual scenario.

For input assumptions and IRR calculations, please refer Annexure -1.

¹¹ <https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=16402>

Sub-step 2d: Sensitivity Analysis

Addressing Guidance 28 & 29 of EB92, Annex 5, following factors has been subjected to sensitivity analysis:

1. PLF
2. O&M Cost
3. Project Cost
4. Tariff

The rationale of sensitivity is, "The ultimate objective of the sensitivity analysis is to determine the likelihood of the occurrence of a scenario other than the scenario presented, in order to provide a cross-check on the suitability of the assumptions used in the development of the investment analysis."

The Appendix 1 mentioned the result of IRR, Benchmark and sensitivity analysis.

The results of sensitivity analysis show that even with a variation of +10% & -10% in project cost, O&M cost, PLF and Tariff Rate Equity IRR is significantly lower than the benchmark. And it is evident from the results given above; the project remains additional even under the most favourable conditions.

Probability to breach the benchmark:
Sensitivity Parameter 1 : PLF
PLF considered in financials for is as per Third Party PLF report in line with “ Guidelines for the reporting and validation of Plant load factors ” stated in EB48 Annex11 option 3(b) .
Hence, variation in PLF of more than 10% is unlikely to happen as the PLF has been reported as per the Third Party Report based on long term data.
Sensitivity Parameter 2 : O&M
The sensitivity analysis reveals that O&M will breach the benchmark at negative values and is hypothetical case. Since the O&M cost is subject to escalation (as evidence by the O&M agreement) and also subject to inflationary pressure, any reduction in the O&M costs is highly unlikely. Hence, the reduction in the O&M cost is highly unlikely.
Sensitivity Parameter 3 : Project Cost
Project Cost for financial analysis is considered from DPR of the project activity, being available at the time of investment making decision to go ahead with the project activity. The actual project cost is lower than the DPR cost. Since the Purchase Order cost is firm, there is no possibility of project cost going below this level. However, Sensitivity is carried out for threshold level below which benchmark is not breached.
Sensitivity Parameter 4 : Tariff Rate
The tariff is determined by PPA which is fixed for entire lifetime of the project activity. Hence, there is no probability to get variation for the same. However, Sensitivity is carried out for +/-10% even then the benchmark is not breached.

Outcome of Step 2:

This substantiates that the investment is not financially attractive (Equity IRR for the project activity is less than the Benchmark Equity IRR) for any of the investor. Thus it can be easily concluded that project activity is additional & is not business as usual scenario.

Step 3: Barrier analysis

Barrier analysis has not been used.

Step 4: Common practice analysis

For the concerned project activity, the Common Practice Analysis has been carried out.

The project activity involves generation of electricity from Wind energy. The project activity is located in the state of Andhra Pradesh, Telengana, Madhya Pradesh, Rajhsthan in India and the policy applicable for the Wind power projects is regulated by State Electricity regulation Commission (SERC) of the respective state. The policies/tariff for each state is regulated by State Electricity Regulatory Commissions of respective states and they differ for respective states. The project implemented in different states are claimed as different since the policies and regulations differ in each state. Hence Andhra Pradesh, Telengana, Madhya Pradesh, Rajhsthan state is considered as Geographical area for the project activity.

Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB84, Annex 7:

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

Range	Capacity	Unit
+50%	740.25	MW
Capacity of the proposed project activity	493.5	MW
-50%	246.75	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) As the projects are located in Rajasthan, Andhra Pradesh, Madhya Pradesh and Telangana state of India, therefore, projects in the geographical area of Rajasthan, Andhra Pradesh, Madhya Pradesh and Telangana have been chosen for analysis. The project activity involves generation of electricity from wind energy. The project activity is located in the different states in India and the policy applicable for the wind projects is regulated by respective state policy. The policies/tariff for each state is regulated by State Electricity Regulatory Commissions of respective

states and they differ for respective states. The project implemented in different states are claimed as different since the policies and regulations differ in each state. Each state have different policies regarding renewable energy, hence Rajasthan, Andhra Pradesh, Madhya Pradesh and Telangana state is considered as geographical region for common practise analysis.

b) The project activity is a green-field wind power project and uses measure (b) "Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies". Therefore, projects applying same measure (b) are candidates for similar projects.

c) The energy source used by the project activity is wind energy. Hence, only wind energy projects have been considered for analysis.

d) The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.

e) The capacity range of the projects is within the applicable capacity range from 246.75 MW to 740.25 MW.

f) The start date of the project activity is 30-Dec-2015. Therefore projects, which have started commercial operation before 30-Dec-2015, have been considered for analysis.

Numbers of Similar projects identified, which fulfil above-mentioned conditioned are
 $N_{\text{wind}} = 0$

The Indian Wind Power Directory- 2016, 16th Edition was considered to determine the similar projects.

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} .

CDM project activities, which have got registered or are under validation have been excluded in this step. The list of the wind projects identified is provided to the DOE.

$N_{\text{all}} = 0$

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 N_{diff} .

As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis two criteria:

1. Size of Installation – Since project activity is large scale project, small and micro scale projects are considered as different technology project. Based on this criteria, there are no any different technology project out of similar identified projects.
2. Investment climate on the date of the investment decision – For proposed project activity, there are no any different technology project considered out of similar identified projects.

Hence, projects where either of the conditions is satisfied those projects are counted for calculating N_{diff} projects.

$N_{\text{diff}} = 0$

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.

$$\begin{aligned}\text{Calculate } F &= 1 - N_{diff}/N_{all} \\ F &= 1 - (0/0) = 0\end{aligned}$$

As per methodological tool “common practise” 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 $N_{all}-N_{diff}$ is greater than 3.

Thus if both conditions are fulfilled, then project activity will be a common practise otherwise, the project activity is treated as not a common practise.

Outcome of Common Practise analysis:

As,

- i. $F = 0$; is less than 0.2
- ii. $N_{all}-N_{diff} = 0$; is not greater than 3

The project activity does not satisfy any of the above condition. Hence, project activity is not a common practice.

Thus, the proposed project activity is not a “common practice” within a sector in the applicable geographical area.

The above discussions show that wind power development is not a common practice and the project activity is not financially attractive; hence the project activity is additional.

2.6 Methodology Deviations

There is no methodology deviation.

3 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

As per the approved consolidated Methodology ACM0002 (Version 17.0, EB 89, Annex 1) para 44:

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:

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

Where:

BE_y = Baseline emissions in year y (t CO₂/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 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” (t CO₂/MWh)

As per methodology, combined grid emission factor as per the “Tool to calculate the emission factor for an electricity system” version 06 is calculated as below.

CO₂ Baseline Database for the Indian Power Sector, Version 12, May 2017¹² published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.

As per Methodological tool: Tool to calculate the emission factor for an electricity system (Version 06.0, EB 97, Annex 7), following six steps have been followed:

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

Step 1: Identify the relevant electricity systems

As described in tool “For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems”. It also states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used”. Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern.

However since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO₂ Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table: Geographical Scope of Indian Electricity Grid

Northern	Eastern	Western	North-Eastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka

¹² http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver12.pdf

Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Puducherry
Punjab	Andaman & Nicobar	Maharashtra	Nagaland	Lakshadweep
Rajasthan		Goa	Tripura	Telangana
Uttar Pradesh				
Uttarakhand				

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

Project participants may choose 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)

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 and Dispatch data analysis OM is not possible due to lack of availability of data to project developers. The choice of other two options for calculating operating margin emission factor depends on 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)

	2011-12	2012-13	2013-14	2014-15	2015-16
India	19.6%	16.9%	18.6%	16.8%	15.1%

Data Source: Central Electricity Authority (CEA) database Version 12, May'2017¹³

The above data clearly shows that the percentage of total grid generation by low-cost/ must-run plants (on the basis of average of five most recent years) for the Indian grid is less than 50 % of the total generation. Thus the Average OM method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

¹³ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver12.pdf

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

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:

- (a) **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

- (b) **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 calculation of Simple OM emission factor using a 3-year generation-weighted average, based on the most recent data available at the time of submission of the 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 ($EF_{grid,OMSimple,y}$) according to the selected method

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

Net Generation in Operating Margin (GWh) (incl. Imports)			
	2013-14	2014-15	2015-16
INDIAN Grid	7,25,037	8,10,011	8,71,740

Simple Operating Margin (tCO ₂ /MWh) (incl. Imports)			
	2013-14	2014-15	2015-16
INDIAN Grid	1.00	0.99	0.96

Weighted Generation Operating Margin	
INDIAN Grid	0.9843

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

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 06.0, EB 97, Annex 7) para 73:

In terms of vintage of data, project participants can choose between one of the following two options:

- (a) **Option 1** - for the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of PD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the

DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

(b) **Option 2** - For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Option 1 as described above is chosen by PP 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 PD and is fixed for the entire crediting period.

Build Margin (tCO ₂ /MWh) (not adjusted for imports)	
	2015-16
INDIAN Grid	0.9083

Step 6: Calculate the combined margin (CM) emission factor ($EF_{grid,CM,y}$)

As per Methodological tool: “Tool to calculate the emission factor for an electricity system” (Version 06.0, EB 97, Annex 7) para 82:

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y}$) is based on one of the following methods:

- (a) Weighted average CM; or
- (b) Simplified CM.

PP has chosen option (a) i.e weighted average CM to calculate the combined margin emission factor for the project activity.

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 CO₂ emission factor in year y (t CO₂/MWh)
- $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (t CO₂/MWh)
- W_{OM} = Weighting of operating margin emissions factor (per cent)
- W_{BM} = Weighting of build margin emissions factor (per cent)

The following default values should be used for W_{OM} and W_{BM} :

Wind and solar power generation project activities: $W_{OM} = 0.75$ and $W_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods. Since project activity is of wind power generation, the above weightage has been considered for OM and BM.

$$\begin{aligned} \text{Therefore, } EF_{grid,CM,y} &= 0.9843 * 0.75 + 0.9083 * 0.25 \\ &= 0.9653 \text{ t CO}_2/\text{MWh} \end{aligned}$$

Baseline emission factor (EF_y):

The baseline emission factor is calculated using the combined margin approach as described in Step 6 above:

Therefore, $EF_y = EF_{grid,CM,y} = 0.9653 \text{ t CO}_2/\text{MWh}$.

$$BE_y = 1,062,432 \times 0.9653 = 1,025,562 \text{ tCO}_2$$

3.2 Project Emissions

As per the approved consolidated Methodology ACM0002 (Version 17.0, EB 89, Annex 1) para 36: "For most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

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

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 dry, flash steam or binary geothermal power plants in year y (t CO₂e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO₂e/yr)

As the project activity is the installation of a new grid-connected Wind Power plant and does not involve any project emissions from fossil fuel, operation of dry, flash steam or binary geothermal power plants, and from water reservoirs of hydro power plants. Therefore $PE_{FF,y}$, $PE_{GP,y}$, $PE_{HP,y}$ are equal to zero and thus, $PE_y = 0$.

3.3 Leakage

No other leakage emissions are considered. The emissions potentially arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport etc.) are neglected.

3.4 Estimated Net GHG Emission Reductions and Removals

Reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y	=	Emission reductions in year y (t CO ₂ e/yr)
BE_y	=	Baseline emissions in year y (t CO ₂ /yr)
PE_y	=	Project emissions in year y (t CO ₂ e/yr)

Therefore, Net GHG Emission Reductions and Removals are calculated as follows:

$$ER_y = BE_y - PE_y$$

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 1	921,296	0	0	921,296
Year 2	921,296	0	0	921,296
Year 3	921,296	0	0	921,296
Year 4	921,296	0	0	921,296
Year 5	921,296	0	0	921,296
Year 6	921,296	0	0	921,296
Year 7	921,296	0	0	921,296
Year 8	921,296	0	0	921,296
Year 9	921,296	0	0	921,296
Year 10	921,296	0	0	921,296
Total	9,212,960	0	0	9,212,960

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 12, May 2017 ¹⁴
Value applied	0.9843
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” as 3-year generation weighted average using data for the years 2013-14, 2014-15 & 2015-16. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 12, 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}
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¹⁴ http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver12.pdf

Data unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 12, May 2017 ¹⁴
Value applied	0.9083
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" as per the latest data available for the most recent year 2015-16. The data is obtained from "CO ₂ Baseline Database for Indian Power Sector" version 12, 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}
Data unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 12, May 2017 ¹⁴
Value applied	0.9653
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 CO₂ emission factor in year y (tCO₂/MWh) EF_{grid,OM,y}= Operating margin CO₂ emission factor in year y (tCO₂/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/ monthly generation report from respective state electricity board/DISCOMa
Description of measurement methods	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;

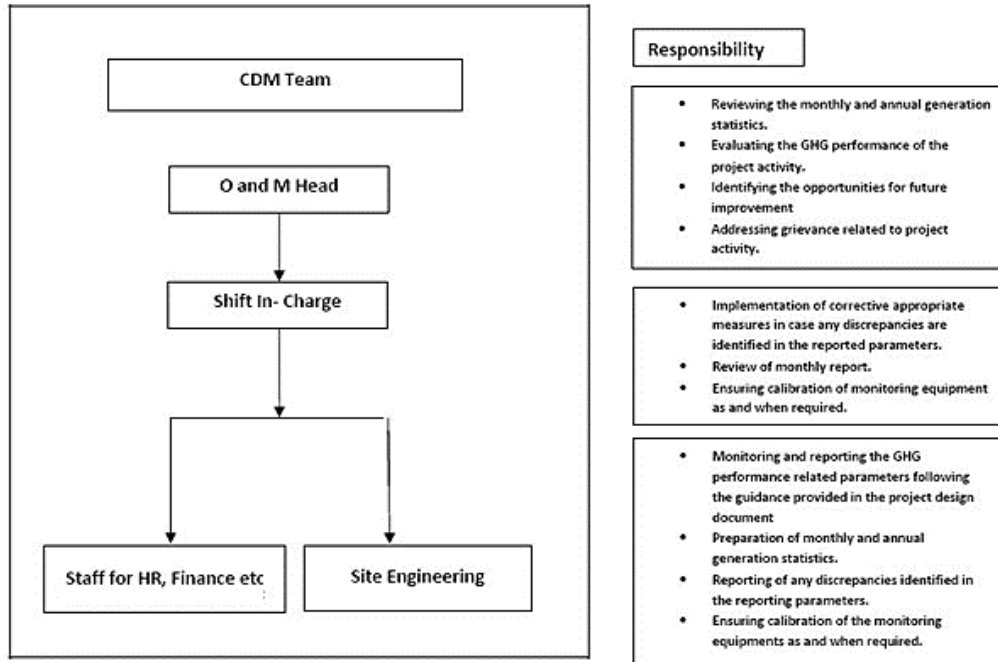
and procedures applied	which can be cross checked from the invoice raised to DISCOM. Net electricity supplied to grid will be calculated as the difference of the measured values of “export” and “import” of electricity through the dedicated SEB energy meter installed at the delivery point. Monthly meter 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
Frequency of monitoring/recording	Continuous monitoring, hourly measurement and at least monthly recording
Value applied:	954,418 MWh
Monitoring equipment	Monitoring: Bidirectional 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 applied	The calibration of all the meters will be undertaken at required intervals (once is five years as per CEA notification) 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
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

The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected wind power project. The monitoring plan, which will be implemented by the project participant describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participant. PP proposed the following structure for

data monitoring, collection, data archiving and calibration of equipments for this project activity. The team comprises of the following members:



Data Measurement

The export and import energy will be measured continuously using above mentioned Main and Check meters located at the substations. Readings of meters shall be taken on monthly basis by authorized officer of SEB in the presence of PP or representative of PP. Based on the Meter Reading Statement, invoices will be raised. These invoices can be used for cross checking the meter readings taken for the respective project activity.

Data collection and archiving

Readings from meters will be collected in the presence of the plant in-charge. Export and Import data would be recorded and stored in logs as well as in electronic form on a daily basis. The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of VERs for the project activity whichever occurs later.

Emergency preparedness

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized.

Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

5 SAFEGUARDS

5.1 No Net Harm

The project activity does not involve any major construction activity. It primarily requires the installation of the WTGs, interfacing the generators with the State Electricity Board by setting up HT transmission lines and installation of other accessories.

The report on “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013. This report clearly mentioned that wind project activity operations do not result in direct air pollution, noise pollution. Please refer below web link for the same¹⁵.

Thus there are no any significant impacts due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

5.2 Environmental Impact

The project activity has no significant impact on the environment. Wind projects are not included in the Schedule I of the EIA notification S.O.1533 (E) dated 14th September 2006¹⁶ and thus an EIA is not required.

5.3 Local Stakeholder Consultation

The local stakeholder consultation for all the project activity instances have been carried out. The details of which are as follows: The Local Stakeholder consultation will be provided to DOE during validation of project activity.

Sr. No.	Project Activity Name	Notice Date	Stakeholder Consultation date
1.	Mytrah Vayu (Indravati) Pvt. Ltd.	10/11/2015	21/11/2015
2.	Mytrah Vayu (Indravati) Pvt. Ltd.	11/08/2015	22/08/2015
3.	Mytrah Vayu (Som) Pvt. Ltd.	08/02/2016	20/02/2016
4.	Mytrah Vayu (Som) Pvt. Ltd.	28/01/2016	06/02/2016
5.	Mytrah Vayu (Godavari) Pvt. Ltd.	15/02/2016	22/02/2016
6.	Mytrah Vayu (Krishna) Pvt. Ltd.	10/01/2017	18/01/2017
7.	Mytrah Vayu (Tungabhadra) Pvt. Ltd.	12/09/2016	20/09/2016

There are no any negative comments received for the project activity.

¹⁵ <http://mnre.gov.in/file-manager/UserFiles/report-on-developmental-impacts-of-RE.pdf>

¹⁶ <http://envfor.nic.in/legis/eia/so1533.pdf>

The Minutes of meeting with commenting sheet from LSH, invitation letter receipt copy shall be submitted to the DOE for further check.

Few queries raised during local stakeholder consultation are addressed satisfactorily.

There were no other major comments or protest raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region. The PP also placed an grievance register onsite in where the stakeholder can put down his/her complain and the same if found genuine will be addressed immediately.

5.4 Public Comments

The project activity was published for public comment and few comments were received during the one month commenting period. The comments are discussed as below

1. There are many individual project participants described, thus I am assuming it's a bundled project, which should have been specified in the PD, but I think it has purposefully not been written.

PP Response – The project title itself has mentioned that it is bundled project. However this is large scale project and it is not required any bundling form. The VCS PD clearly mentioned bundle word in section 1.1 of VCS PD.

2. How it is that the contact details of the project proponent have not been described.

PP Response – The listed VCS PD has mentioned the PP name, contact person and address and minimum listing requirement is met. Please refer this web link for PP address <http://www.mytrah.com/contact-us.php>. The VCS PD mentioned the same address as “8001, 8th Floor, Q-City, Nanakramguda, Gachibowli, Hyderabad 500032, Telangana, India”

3. The communications agreement mentions EKI as the consultant why has that not been mentioned in the other entities involved?

PP Response – The project is listed through client VCS account and also communication agreement does not mention any name of EKI.

4. Under the Additionality sections it is mentioned “Financial spread sheets for the key assumptions (web links & sources of input parameters) supporting the financial projections would be submitted and updated to the DOE.

PP Response – As per VCS guideline, minimum listing requirement is met. Thus we think this comment is not relevant. The additionality related information is mentioned in final PDD. DOE has validated the same.

5. Common practice analysis, where are the projects what is source, EKI does not this? Since the projects are bundled together each bundle has to be assessed separately as per the CDM guidelines. I hope the DOE and VCS will take this into account.

EKI Response – The final VCS PD have all information of common practise analysis. This is bundled large scale project activity and as per tool of common practise analysis, the project activity capacity need to be considered for the common practise analysis. Please refer CDM registered projects like UN0968 (<https://cdm.unfccc.int/Projects/DB/SGS-UKL1374066912.42/view>),

UN9735 (<https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1378973294.94/view>),

UN8459 (<https://cdm.unfccc.int/Projects/DB/PJR%20CDM1354186685.85/view>),

UN7560 (<https://cdm.unfccc.int/Projects/DB/RWTUV1349092273.88/view>),

UN7099 (<https://cdm.unfccc.int/Projects/DB/RWTUV1346067870.82/view>), and

UN9534 (<https://cdm.unfccc.int/Projects/DB/PJR%20CDM1359094049.33/view>)

6. The LSC meeting details are not provided at all?

Looks like the consultant does not want to share any information with the stakeholders on which they give comments.

PP Response – The final VCS PD have all information of LSC meeting. The main purpose of LSC is to take concerns of stakeholders and to check if project design need to be update. The project activity has taken local and state government approvals.

The PP have established the mechanisms for ongoing communication with local stakeholders to allow stakeholders to raise concerns about potential negative impacts during project implementation. There are no any negative comments received from local stakeholders.

The revised VCS PD has been submitted to DOE with mention of Public comments and PP response. There is no changes required in VCS PD due to public comments other than discussion of comments as above.

This VCS PD was revised on 05/01/2018 to include an assessment of how the project proponent took comments received during the public comment period into account, which were not forwarded by VCS until 02/01/2018. No changes were necessary to the project documentation, and the comments have no effect on the project. Therefore, the official date of VCS PD remains 20/12/2017

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 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
Value applied:	1,290,068
Comments	The data would be archived electronically and maintained for the entire crediting period plus two years. The net electricity generation is cross checked with invoices while determining the emission reductions. The Net Electricity Value is first sourced from the primary source i.e. as per the Credit note/ JMR/Form B reports/ of the respective state. The same is as per the criteria mentioned in the PD. The Net electricity value from the primary source is then cross-checked with the invoices raised to respective state Electricity grid and it is observed that the Values (= Net electrcy exported to the grid) are correct. The requirement of cross check is as per the criteria of the methodology and PD.

6.2 Baseline Emissions

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

Where:

BE_y : Baseline emissions in year y (tCO₂e/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 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” (tCO₂e/MWh)

Parameter	Unit	Value
$EG_{PJ, y}$	MWh	1,290,068
$EF_{grid, CM, y}$	tCO ₂ e	0.9653
	=	1,290,068*0.9653
	=	1,271,028

6.3 Project Emissions

As per methodology, for renewable energy projects, there is no any project emissions occurred.

Hence, $PE_y = 0$

6.4 Leakage

As per methodology, for renewable energy projects, there is no any leakage emissions occurred.

Hence, $LE_y = 0$

6.5 Net GHG Emission Reductions and Removals

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y	=	Emission reductions in year y (t CO ₂ e/yr)
BE_y	=	Baseline emissions in year y (t CO ₂ /yr)
PE_y	=	Project emissions in year y (t CO ₂ e/yr)

Therefore, Net GHG Emission Reductions and Removals are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

$$ER_y = 1,271,028 - 0 - 0$$

$$= 1,271,028 \text{ tCO}_2$$

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
------	---	--	--	--

Year 2015	0	0	0	0
Year 2016	492,610	0	0	492,610
Year 2017	778,418	0	0	778,418
Total	1,271,028	0	0	1,271,028

The current monitoring period for this project activity is 30/12/2015 to 24/11/2017. The actual emission reduction is -38.21% less than the estimated value.

APPENDIX 1: INPUT PARAMETERS FOR ADDITIONALITY ASSESSMENT FOR RESPECTIVE PROJECT ACTIVITIES:

1. Assumptions and Values considered for Financial and Sensitivity Analysis of Mytrah Vayu (Indravati) Pvt. Ltd (8.4 MW) are as follows:

Details of the project		Source
State where the project is situated	Rajasthan	DPR
No. of machines	4	DPR
Capacity /machine (MW)	2.10	DPR
Total Capacity (MW)	8.40	Calculated Value
Expected Date of Commissioning	1-Oct-15	DPR
Life of the plant (Yrs.)	25	DPR
Generation of electricity		
PLF (%)	19.90%	DPR
Annual generation (kWh)	14,643,216	Calculated Value
Tariff rate at the decision making (INR/kWh)	5.63	DPR
GBI Benefit (INR/kWh)	0.50	As per MNRE scheme dt. 04.09.2013, ¹⁷
Deration after 10 years of opertaion	5%	Wind Energy Information by TERI
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	10.16	DPR
Escalation in the operational expenses (%)	5.00%	DPR
O & M free for (Yr.)	2	DPR
Overheads	0.40	DPR
Escalation in the overheads (%)	5.00%	DPR
Insurance (INR Mn.)	0.92	As per TAC order 2001, Sheet No. 31 ¹⁸
Financial parameters		
TOTAL COST (INR Mn.)	614.48	DPR
Loan Amount (INR Mn.)	460.86	Calculated Value
Equity Investment (INR Mn.)	153.62	Calculated Value
Term loan		
Loan Amount (INR Mn.)	460.86	DPR
Interest rate (%)	13.00%	
Loan Tenure (Qtr.)	52	
Moratorium Period (Qtr.)	4	

¹⁷ <http://mnre.gov.in/file-manager/grid-wind/gbi-scheme.pdf>

¹⁸ <http://iib.gov.in/IRDA/tac/tariffs/AIFT2001.pdf>

Repayment Period (Qtr.)	48	Calculated Value
Repayment instalments value (INR Mn.)	9.601	Calculated Value
1st instalment from (Qtr. end)	December-16	Considered from the next Quarter End
Book Depreciation (SLM Method)		
Land	13.48	DPR
Gross Depreciable Value (INR Mn.)	614.48	Calculated Value
Salvage Value (%)	10.00%	Page 15 of CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 ¹⁹
Salvage value (INR Mn.)	61.45	Calculated Value
Net Depreciable Value (INR Mn.)	553.04	Calculated Value
Residual Value (INR Mn.)	61.45	Calculated Value
IT Depreciation		
IT Depreciation (WDV Method) (%)	12.73%	As per companies act 2013 ²⁰
Income Tax		
Financial Year	FY 2015-16	
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 30 Para E(I) ²¹
MAT (%)	18.50%	As Per IT rule Pg 4 ²²
Service Tax (%)	15.00%	As Per Income Tax Rule ²³
Surcharge (%)	12.00%	As Per Income Tax Rule, Pg 30 ²¹
Education cess (%)	3.00%	As Per Income Tax Rule, Pg 5, 11 and 12 ²¹
Final Tax rates		
Income tax rate (%)	34.61%	Calculated Value

¹⁹ http://www.cercind.gov.in/2012/regulation/CERC_RE-Tariff-Regualtions_6_2_2012.pdf

²⁰ <http://taxadda.com/companies-act-2013/depreciation-rates-as-per-companies-act-2013/>

²¹ <http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html>

²² <http://taxguru.in/income-tax/income-tax-slab-financial-year-201516.html>

²³ <http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html>

MAT (%)	21.34%	Calculated Value
Service Tax (%)	15.45%	Calculated Value

Sensitivity Analysis:

Final Results	Equity IRR without CDM	Benchmark (Equity IRR)
	8.81%	15.32%

Sensitivity Analysis	Equity IRR
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Variation %	-10%	Normal	10%	Breaching Value
PLF	5.82%	8.81%	11.72%	22.00%
O&M	9.23%	8.81%	8.30%	-166.00%
Project Cost	11.56%	8.81%	6.55%	-19.97%
Tariff Rate	5.96%	8.81%	11.56%	23.10%

2. Assumptions and Values considered for Financial and Sensitivity Analysis of Mytrah Vayu (Indravati) Pvt. Ltd (105 MW) are as follows:

Details of the project		Source
State where the project is situated	Andhra Pradesh	DPR
No. of machines	50	DPR
Capacity /machine (MW)	2.10	DPR
Total Capacity (MW)	105.00	Calculated Value
Expected Date of Commissioning	1-Oct-15	DPR
Life of the plant (Yrs.)	25	DPR
Generation of electricity		
PLF (%)	21.90%	DPR
Annual generation (kWh)	201,436,200	Calculated Value
Tariff rate at the decision making (INR/kWh)	4.70	DPR
GBI Benefit (INR/kWh)	0.50	As per MNRE scheme dt. 04.09.2013, ¹⁷
Deration after 10 years of operation	5%	Wind Energy Information by TERI
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	127.00	DPR
Escalation in the operational expenses (%)	5.00%	DPR
O & M free for (Yr.)	2	DPR
Overheads	5.00	DPR

Escalation in the overheads (%)	5.00%	DPR
Insurance (INR Mn.)	10.71	As per TAC order 2001, Sheet No. 31 ¹⁸
Financial parameters		
TOTAL COST (INR Mn.)	7,139.83	DPR
Loan Amount (INR Mn.)	5,354.87	Calculated Value
Equity Investment (INR Mn.)	1,784.96	Calculated Value
Term loan		
Loan Amount (INR Mn.)	5,354.87	DPR
Interest rate (%)	13.00%	
Loan Tenure (Qtr.)	52	
Moratorium Period (Qtr.)	4	
Repayment Period (Qtr.)	48	Calculated Value
Repayment instalments value (INR Mn.)	111.560	Calculated Value
1st instalment from (Qtr. end)	December-16	Considered from the next Quarter End
Book Depreciation (SLM Method)		
Land	238.70	DPR
Gross Depreciable Value (INR Mn.)	7,139.83	Calculated Value
Salvage Value (%)	10.00%	Page 15 of CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 ¹⁹
Salvage value (INR Mn.)	713.98	Calculated Value
Net Depreciable Value (INR Mn.)	6,425.85	Calculated Value
Residual Value (INR Mn.)	713.98	Calculated Value
IT Depreciation		
IT Depreciation (WDV Method) (%)	12.73%	As per companies act 2013
Income Tax		
Financial Year	FY 2015-16	
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 30 Para E(I) ²⁴

²⁴ <http://taxguru.in/income-tax/income-tax-rate-chart-slabs-for-ay-2017-18-fy-2016-17.html>

MAT (%)	18.50%	As Per IT rule Pg 4 ²⁵
Service Tax (%)	15.00%	As Per Income Tax Rule ²⁶
Surcharge (%)	12.00%	As Per Income Tax Rule, Pg 30 ²⁴
Education cess (%)	3.00%	As Per Income Tax Rule, Pg 5, 11 and 12 ²⁴
Final Tax rates		
Income tax rate (%)	34.61%	Calculated Value
MAT (%)	21.34%	Calculated Value
Service Tax (%)	15.45%	Calculated Value

Sensitivity Analysis:

Final Results	Equity IRR without CDM	Benchmark (Equity IRR)
	8.36%	15.32%

Sensitivity Analysis	Equity IRR
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Variation %	-10%	Normal	10%	Breaching Value
PLF	5.41%	8.36%	11.22%	23.63%
O&M	8.89%	8.36%	7.84%	-160.60%
Project Cost	11.16%	8.36%	6.12%	-20.88%
Tariff Rate	5.56%	8.36%	11.18%	24.30%

3. Assumptions and Values considered for Financial and Sensitivity Analysis of Mytrah Vayu (Som) Pvt. Ltd. (90 MW) are as follows:

Details of the project		Source
State where the project is situated	Madhya Pradesh	DPR
No. of machines	53	DPR
Capacity /machine (MW)	1.70	DPR
Total Capacity (MW)	90.10	Calculated Value
Expected Date of Commissioning	1-Jan-16	DPR
Life of the plant (Yrs.)	25	DPR
Generation of electricity		

²⁵ <http://taxguru.in/income-tax/income-tax-slab-financial-year-201516.html>

²⁶ <http://taxguru.in/service-tax/service-tax-rate-chart-effect-01062016.html>

PLF (%)	20.70%	DPR
Annual generation (kWh)	163,380,132	Calculated Value
Tariff rate at the decision making (INR/kWh)	5.74	DPR
GBI Benefit (INR/kWh)	0.50	As per MNRE scheme dt. 04.09.2013, ¹⁷
Deration after 10 years of operation	5%	Wind Energy Information by TERI
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	48.95	DPR
Escalation in the operational expenses (%)	5.00%	DPR
O & M free for (Yr.)	2	DPR
Overheads	5.30	DPR
Escalation in the overheads (%)	5.00%	DPR
Insurance (INR Mn.)	11.35	As per TAC order 2001, Sheet No. 31 ¹⁸
Financial parameters		
TOTAL COST (INR Mn.)	7,566.40	DPR
Loan Amount (INR Mn.)	5,674.80	Calculated Value
Equity Investment (INR Mn.)	1,891.60	Calculated Value
Term loan		
Loan Amount (INR Mn.)	5,674.80	DPR
Interest rate (%)	12.75%	
Loan Tenure (Qtr.)	68	
Moratorium Period (Qtr.)	8	
Repayment Period (Qtr.)	60	Calculated Value
Repayment instalments value (INR Mn.)	94.580	Calculated Value
1st instalment from (Qtr. end)	March-18	Considered from the next Quarter End
Book Depreciation (SLM Method)		
Land	45.60	DPR
Gross Depreciable Value (INR Mn.)	7,566.40	Calculated Value
Salvage Value (%)	10.00%	Page 15 of CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 ¹⁹
Salvage value (INR Mn.)	756.64	Calculated Value
Net Depreciable Value (INR Mn.)	6,809.76	Calculated Value
Residual Value (INR Mn.)	756.64	Calculated Value
IT Depreciation		
IT Depreciation (WDV Method) (%)	12.73%	As per companies act 2013 ²⁰
Income Tax		
Financial Year	FY 2015-16	

Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 30 Para E(I) ²¹
MAT (%)	18.50%	As Per IT rule Pg 4 ²²
Service Tax (%)	15.00%	As Per Income Tax Rule ²³
Surcharge (%)	12.00%	As Per Income Tax Rule, Pg 30 ²¹
Education cess (%)	3.00%	As Per Income Tax Rule, Pg 5, 11 and 12 ²¹
Final Tax rates		
Income tax rate (%)	34.61%	Calculated Value
MAT (%)	21.34%	Calculated Value
Service Tax (%)	15.45%	Calculated Value

Sensitivity Analysis:

Final Results	Equity IRR without CDM	Benchmark (Equity IRR)
	9.58%	15.32%

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	6.36%	9.58%	12.94%	16.80%
O&M	9.78%	9.58%	9.38%	-297.50%
Project Cost	13.13%	9.58%	6.87%	-14.98%
Tariff Rate	6.52%	9.58%	12.78%	17.55%

4. Assumptions and Values considered for Financial and Sensitivity Analysis of Mytrah Vayu (Som) Pvt. Ltd. (30 MW) are as follows:

Details of the project		Source
State where the project is situated	Madhya Pradesh	
No. of machines	15	
Capacity /machine (MW)	2.00	
Total Capacity (MW)	30.00	Calculated Value
Expected Date of Commissioning	1-Jan-16	Assumption
Life of the plant (Yrs.)	25	As per MPERC order dt. 26.03.2013, Pg 7 ²⁷

²⁷ <http://www.mperc.nic.in/26032013-Wind-tariff-order.pdf>

Generation of electricity		
PLF (%)	19.70%	As per MPERC order dt. 26.03.2013, Pg 6 ²⁷
Annual generation (kWh)	51,771,600	Calculated Value
Tariff rate at the decision making (INR/kWh)	5.92	As per MPERC order dt. 26.03.2013, Pg 10 ²⁷
GBI Benefit (INR/kWh)	0.50	As per MNRE scheme dt. 04.09.2013, ¹⁷
Deration after 10 years of opertaion	5%	Wind Energy Information by TERI
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	31.17	DPR
Escalation in the operational expenses (%)	5.00%	DPR
O & M free for (Yr.)	2	DPR
Overheads	1.50	DPR
Escalation in the overheads (%)	5.00%	DPR
Insurance (INR Mn.)	3.60	As per TAC order 2001, Sheet No. 31 ¹⁸
Financial parameters		
TOTAL COST (INR Mn.)	2,400.80	As Per DPR
Loan Amount (INR Mn.)	1,800.60	Calculated Value
Equity Investment (INR Mn.)	600.20	Calculated Value
Term loan		
Loan Amount (INR Mn.)	1,800.60	As per MPERC order dt. 26.03.2013, Pg 7,8 ¹⁸
Interest rate (%)	12.75%	
Loan Tenure (Qtr.)	68	
Moratorium Period (Qtr.)	8	Calculated Value
Repayment Period (Qtr.)	60	
Repayment instalments value (INR Mn.)	30.010	Calculated Value
1st instalment from (Qtr. end)	March-18	Considered from the next Quarter End
Book Depreciation (SLM Method)		
Land	39.00	As Per DPR
Gross Depreciable Value (INR Mn.)	2,400.80	Calculated Value
Salvage Value (%)	10.00%	Page 15 of CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 ¹⁹
Salvage value (INR Mn.)	240.08	Calculated Value
Net Depreciable Value (INR Mn.)	2,160.72	Calculated Value
Residual Value (INR Mn.)	240.08	Calculated Value
IT Depreciation		

IT Depreciation (WDV Method) (%)	12.73%	As per companies act 2013 ²⁰
Income Tax		
Financial Year	FY 2015-16	
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 30 Para E(I) ²¹
MAT (%)	18.50%	As Per IT rule Pg 4 ²²
Service Tax (%)	15.00%	As Per Income Tax Rule ²³
Surcharge (%)	12.00%	As Per Income Tax Rule, Pg 30 ²¹
Education cess (%)	3.00%	As Per Income Tax Rule, Pg 5, 11 and 12 ²¹
Final Tax rates		
Income tax rate (%)	34.61%	Calculated Value
MAT (%)	21.34%	Calculated Value
Service Tax (%)	15.45%	Calculated Value

Sensitivity Analysis:

Final Results	Equity IRR without CDM	Benchmark (Equity IRR)
	8.38%	15.32%

Sensitivity Analysis	Equity IRR
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Variation %	-10%	Normal	10%	Breaching Value
PLF	4.95%	8.38%	12.00%	18.90%
O&M	8.83%	8.38%	7.93%	-172.00%
Project Cost	11.88%	8.38%	5.71%	-17.37%
Tariff Rate	5.10%	8.38%	11.76%	19.85%

5. Assumptions and Values considered for Financial and Sensitivity Analysis of Mytrah Vayu (Godavari) Pvt. Ltd. (100.8 MW) are as follows:

Details of the project		Source
State where the project is situated	Andhra Pradesh	DPR
No. of machines	48	DPR
Capacity /machine (MW)	2.10	DPR

Total Capacity (MW)	100.80	Calculated Value
Expected Date of Commissioning	31-Mar-16	DPR
Life of the plant (Yrs.)	25	DPR
Generation of electricity		
PLF (%)	25.50%	DPR
Annual generation (kWh)	225,167,040	Calculated Value
Tariff rate at the decision making (INR/kWh)	4.70	DPR
GBI Benefit (INR/kWh)	0.50	As per MNRE scheme dt. 04.09.2013, ¹⁷
Deration after 10 years of opertaion	5%	Wind Energy Information by TERI
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	105.29	DPR
Escalation in the operational expenses (%)	5.00%	DPR
O & M free for (Yr.)	1	DPR
Overheads/admin expenses	15.50	DPR
Escalation in the overheads (%)	5.00%	DPR
Insurance (INR Mn.)	11.95	As per TAC order 2001, Sheet No. 31 ¹⁸
Financial parameters		
TOTAL COST (INR Mn.)	7,965.15	DPR
Loan Amount (INR Mn.)	5,973.86	Calculated Value
Equity Investment (INR Mn.)	1,991.29	Calculated Value
Term loan		
Loan Amount (INR Mn.)	5,973.86	DPR
Interest rate (%)	13.00%	
Loan Tenure (Qtr.)	56	
Moratorium Period (Qtr.)	4	
Repayment Period (Qtr.)	52	Calculated Value
Repayment instalments value (INR Mn.)	114.882	Calculated Value
1st instalment from (Qtr. end)	March-17	Considered from the next Quarter End
Book Depreciation (SLM Method)		
Land	31.01	DPR
Gross Depreciable Value (INR Mn.)	7,965.15	Calculated Value
Salvage Value (%)	10.00%	Page 15 of CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 ¹⁹
Salvage value (INR Mn.)	796.52	Calculated Value
Net Depreciable Value (INR Mn.)	7,168.64	Calculated Value
Residual Value (INR Mn.)	796.52	Calculated Value
IT Depreciation		

IT Depreciation (WDV Method) (%)	12.73%	As per companies act 2013 ²⁰
Income Tax		
Financial Year	FY 2015-16	
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 30 Para E(l) ²¹
MAT (%)	18.50%	As Per IT rule Pg 4 ²²
Service Tax (%)	15.00%	As Per Income Tax Rule ²³
Surcharge (%)	12.00%	As Per Income Tax Rule, Pg 30 ²¹
Education cess (%)	3.00%	As Per Income Tax Rule, Pg 5, 11 and 12 ²¹
Final Tax rates		
Income tax rate (%)	34.61%	Calculated Value
MAT (%)	21.34%	Calculated Value
Service Tax (%)	15.45%	Calculated Value

Sensitivity Analysis:

Final Results	Equity IRR without CDM	Benchmark (Equity IRR)
	8.90%	15.32%

Sensitivity Analysis	Equity IRR			
Variation %	-10%	Normal	10%	Breaching Value
PLF	5.93%	8.90%	11.91%	20.95%
O&M	9.36%	8.90%	8.47%	-168.50%
Project Cost	11.87%	8.90%	6.50%	-18.80%
Tariff Rate	5.96%	8.90%	11.86%	21.47%

6. Assumptions and Values considered for Financial and Sensitivity Analysis of Mytrah Vayu (Krishna) Pvt. Ltd. (10.4 MW) are as follows:

Details of the project		Source
State where the project is situated	Andhra Pradesh	DPR
No. of machines	13	DPR
Capacity /machine (MW)	0.80	DPR
Total Capacity (MW)	10.40	Calculated Value

Expected Date of Commissioning	1-Apr-16	DPR
Life of the plant (Yrs.)	25	DPR
Generation of electricity		
PLF (%)	19.50%	DPR
Annual generation (kWh)	17,765,280	Calculated Value
Tariff rate at the decision making (INR/kWh)	4.70	DPR
GBI Benefit (INR/kWh)	0.50	As per MNRE scheme dt. 04.09.2013, ¹⁷
Deration after 10 years of operation	5%	Wind Energy Information by TERI
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	6.00	DPR
Escalation in the operational expenses (%)	5.00%	DPR
O & M free for (Yr.)	2	DPR
Overheads	1.30	DPR
Escalation in the overheads (%)	5.00%	DPR
Insurance (INR Mn.)	1.01	As per TAC order 2001, Sheet No. 31 ¹⁸
Financial parameters		
TOTAL COST (INR Mn.)	670.80	DPR
Loan Amount (INR Mn.)	503.10	Calculated Value
Equity Investment (INR Mn.)	167.70	Calculated Value
Term loan		
Loan Amount (INR Mn.)	503.10	DPR
Interest rate (%)	13.00%	
Loan Tenure (Qtr.)	56	
Moratorium Period (Qtr.)	4	
Repayment Period (Qtr.)	52	Calculated Value
Repayment instalments value (INR Mn.)	9.675	Calculated Value
1st instalment from (Qtr. end)	June-17	Considered from the next Quarter End
Book Depreciation (SLM Method)		
Land	6.60	DPR
Gross Depreciable Value (INR Mn.)	670.80	Calculated Value
Salvage Value (%)	10.00%	Page 15 of CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 ¹⁹
Salvage value (INR Mn.)	67.08	Calculated Value
Net Depreciable Value (INR Mn.)	603.72	Calculated Value
Residual Value (INR Mn.)	67.08	Calculated Value
IT Depreciation		

IT Depreciation (WDV Method) (%)	12.73%	As per companies act 2013 ²⁰
Income Tax		
Financial Year	FY 2016-17	
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 30 Para E(l) ²¹
MAT (%)	18.50%	As Per IT rule Pg 4 ²²
Service Tax (%)	15.00%	As Per Income Tax Rule ²³
Surcharge (%)	12.00%	As Per Income Tax Rule, Pg 30 ²¹
Education cess (%)	3.00%	As Per Income Tax Rule, Pg 5, 11 and 12 ²¹
Final Tax rates		
Income tax rate (%)	34.61%	Calculated Value
MAT (%)	21.34%	Calculated Value
Service Tax (%)	15.45%	Calculated Value

Sensitivity Analysis:

Final Results	Equity IRR without CDM	Benchmark (Equity IRR)
	8.69%	15.32%

Sensitivity Analysis	Equity IRR
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Variation %	-10%	Normal	10%	Breaching Value
PLF	5.85%	8.69%	11.49%	23.83%
O&M	8.96%	8.69%	8.45%	-309.00%
Project Cost	11.52%	8.69%	6.35%	-20.32%
Tariff Rate	6.00%	8.69%	11.35%	25.07%

7. Assumptions and Values considered for Financial and Sensitivity Analysis of Mytrah Vayu (Tungabhadra) Pvt. Ltd. (148.9 MW) are as follows:

Details of the project		Source
State where the project is situated	Andhra Pradesh	DPR
No. of machines	47	DPR
Capacity /machine (MW)	1.70	DPR
No. of machines	30	DPR

Capacity /machine (MW)	2.30	DPR
Total Capacity (MW)	148.90	Calculated Value
Expected Date of Commissioning	1-Oct-16	DPR
Life of the plant (Yrs.)	25	DPR
Generation of electricity		
PLF (%)	21.50%	DPR
Annual generation (kWh)	280,438,260	Calculated Value
Tariff rate at the decision making (INR/kWh)	4.83	DPR
GBI Benefit (INR/kWh)	0.50	As per MNRE scheme dt. 04.09.2013, ¹⁷
Deration after 10 years of opertaion	5%	Wind Energy Information by TERI
Operation and maintenance cost and Insurance		
O & M Expenses (INR Mn.)	74.58	DPR
Escalation in the operational expenses (%)	5.00%	DPR
O & M free for (Yr.)	2	DPR
Overheads	7.70	DPR
Escalation in the overheads (%)	5.00%	DPR
Insurance (INR Mn.)	16.56	As per TAC order 2001, Sheet No. 31 ¹⁸
Financial parameters		
TOTAL COST (INR Mn.)	11,039.08	DPR
Loan Amount (INR Mn.)	8,389.70	Calculated Value
Equity Investment (INR Mn.)	2,649.38	Calculated Value
Term loan		
Loan Amount (INR Mn.)	8,389.70	DPR
Interest rate (%)	13.00%	
Loan Tenure (Qtr.)	59	
Moratorium Period (Qtr.)	3	
Repayment Period (Qtr.)	56	Calculated Value
Repayment instalments value (INR Mn.)	149.816	Calculated Value
1st instalment from (Qtr. end)	September-17	Considered from the next Quarter End
Book Depreciation (SLM Method)		
Land	324.40	DPR
Gross Depreciable Value (INR Mn.)	11,039.08	Calculated Value
Salvage Value (%)	10.00%	Page 15 of CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 ¹⁹
Salvage value (INR Mn.)	1,103.91	Calculated Value
Net Depreciable Value (INR Mn.)	9,935.17	Calculated Value

Residual Value (INR Mn.)	1,103.91	Calculated Value
IT Depreciation		
IT Depreciation (WDV Method) (%)	12.73%	As per companies act 2013 ²⁰
Income Tax		
Financial Year	FY 2016-17	
Income tax rate (%)	30.00%	As Per Income Tax Rule, Pg 30 Para E(l) ²¹
MAT (%)	18.50%	As Per IT rule Pg 4 ²²
Service Tax (%)	15.00%	As Per Income Tax Rule ²³
Surcharge (%)	12.00%	As Per Income Tax Rule, Pg 30 ²¹
Education cess (%)	3.00%	As Per Income Tax Rule, Pg 5, 11 and 12 ²¹
Final Tax rates		
Income tax rate (%)	34.61%	Calculated Value
MAT (%)	21.34%	Calculated Value
Service Tax (%)	15.45%	Calculated Value

Sensitivity Analysis:**Final Results**

Equity IRR without CDM	Benchmark (Equity IRR)
9.11%	15.32%

Sensitivity Analysis	Equity IRR
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Variation %	-10%	Normal	10%	Breaching Value
PLF	6.35%	9.11%	11.77%	22.63%
O&M	9.31%	9.11%	8.90%	-376.00%
Project Cost	11.98%	9.11%	6.76%	-18.80%
Tariff Rate	6.50%	9.11%	11.70%	23.50%

APPENDIX 2: METER DETAILS

Since metering arrangement, monitoring practice, accuracy class, calibration interval is under control of state electricity board, the PP do not have any control on monitoring practice and calibration of meters.

Being Green field project activity and commissioned within 2 years, all meters are used for monitoring purpose are pre calibrated before installation as per state electricity board regulations, thus installed pre calibrated meters have validity of calibration till 5 years of commissioning date. The current monitoring period is within 2 years of commissioning date, thus all meters initial calibration is valid for current monitoring period. The meters are tested by state electricity board during commissioning, thus all meters have valid calibration period during current monitoring period.

The below mentioned meter and calibration details are for current monitoring period, and the same will be changed in future.

The Energy Meters details used for commissioned project activity is as below.

The Main and Check meter details of Nazeerabad Site are as follows:

Main Meter		Check Meter	
Make	L & T	Make	L & T
Meter Sl. No	15624894	Meter Sl. No	15624896
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	22-08-17	Calibration Date	22-08-17

The Main and Check meter details of Pottipadu Site are as follows:

For- 65.1 MW					
PPD- 06 (21 MW)					
Main Meter		Check Meter		Backup Meter	
Make	Secure	Make	Secure	Make	Secure
Meter Sl. No	XC559930	Meter Sl. No	XC559931	Meter Sl. No	XC559924
Accuracy Class	0.2 s	Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	20-11-17	Calibration Date	20-11-17	Calibration Date	20-11-17

PPD- 40 (23.1 MW)					
Main Meter		Check Meter		Backup Meter	
Make	Secure	Make	Secure	Make	Secure
Meter Sl. No	XC559921	Meter Sl. No	XC559922	Meter Sl. No	XC559923
Accuracy Class	0.2 s	Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	20-11-17	Calibration Date	20-11-17	Calibration Date	20-11-17

PPD- 35 (21 MW)					
Main Meter		Check Meter		Backup Meter	

Make	Secure	Make	Secure	Make	Secure
Meter Sl. No	XC559932	Meter Sl. No	XC559933	Meter Sl. No	XC559934
Accuracy Class	0.2 s	Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	22-11-17	Calibration Date	22-11-17	Calibration Date	22-11-17

For- 39.9 MW					
Feeder- 01					
Main Meter		Check Meter		Backup Meter	
Make	Elster	Make	Elster	Make	Elster
Meter Sl. No	13720861	Meter Sl. No	13720862	Meter Sl. No	13720866
Accuracy Class	0.2 s	Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	21-11-17	Calibration Date	21-11-17	Calibration Date	21-11-17

Feeder- 02					
Main Meter		Check Meter		Backup Meter	
Make	Elster	Make	Elster	Make	Elster
Meter Sl. No	13720867	Meter Sl. No	13720868	Meter Sl. No	13720872
Accuracy Class	0.2 s	Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	21-11-17	Calibration Date	21-11-17	Calibration Date	21-11-17

The Main and Check meter details of Nidhi Site are as follows:

Feeder- 09			
Main Meter		Check Meter	
Make	Genus	Make	Genus
Meter Sl. No	A 3015605	Meter Sl. No	A 3015606
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	29-05-17	Calibration Date	29-05-17
Feeder- 10			
Main Meter		Check Meter	
Make	Genus	Make	Genus
Meter Sl. No	A 3015607	Meter Sl. No	A 3015608
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	29-05-17	Calibration Date	29-05-17

The Main and Check meter details of Bhesada Site are as follows:

Feeder- 12 (SEL- 197)			
Main Meter		Check Meter	
Make	Secure	Make	Secure
Meter Sl. No	RJB 781888	Meter Sl. No	RJB 78189
Accuracy Class	0.2 s	Accuracy Class	0.2 s

Calibration Date	28-04-16	Calibration Date	28-04-16
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Feeder- 03 (SEL- 195)			
Main Meter		Check Meter	
Make	Secure	Make	Secure
Meter Sl. No	RJB 78194	Meter Sl. No	RJB 78200
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	28-04-16	Calibration Date	28-04-16

Feeder- 04 (SEL- 04)			
Main Meter		Check Meter	
Make	Secure	Make	Secure
Meter Sl. No	RJB 78201	Meter Sl. No	RJB 78203
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	28-04-16	Calibration Date	28-04-16

The Main and Check meter details of Aspari Site are as follows:

Aspari- I			
Main Meter		Check Meter	
Make	Secure	Make	Secure
Meter Sl. No	APX01010	Meter Sl. No	APX01011
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	13-10-2017	Calibration Date	13-10-2017

Aspari- II			
Main Meter		Check Meter	
Make	Secure	Make	Secure
Meter Sl. No	APX01012	Meter Sl. No	APX01013
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	13-10-2017	Calibration Date	13-10-2017

The Main and Check meter details of Burgula Site are as follows:

Burgula- II			
Main Meter		Check Meter	
Make	Secure	Make	Secure
Meter Sl. No	APX01021	Meter Sl. No	APX01022
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	30-03-2017	Calibration Date	30-03-2017

The Main and Check meter details of Nipaniya Site are as follows:

Nipaniya			
Main Meter		Check Meter	
Make	Secure	Make	Secure
Meter Sl. No	MPC70479	Meter Sl. No	MPC70480
Accuracy Class	0.2 s	Accuracy Class	0.2 s
Calibration Date	10-01-2016	Calibration Date	10-01-2016

The main meter MPC70479 is replaced by MPC70481 on 09/05/2016 and calibrated on 09/05/2016