



RENEWABLE POWER PROJECT BY DEVARAHIPPARIGI WIND POWER PRIVATE LIMITED



Document Prepared by Infinite Solutions

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The main purpose of this project activity is to generate clean form of electricity through renewable wind energy sources. The project activity involves installation of a 100 MW_{AC} wind power project in Karnataka state of India.

Over the 10 years of first crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 195,052 tCO_{2e} per year, thereon displacing 205,860 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel-based power plant.

The details of the project and their location of installation are mentioned in the table below: -

Name of Investor	Capacity in MW	COD	Connection with Grid	State	Usage
Devarahipparigi Wind Power Private Limited	100 MW	25-March-2017	Indian Grid	Karnataka	Sale to State DISCOM

Total emission reductions achieved in this monitoring period:

During the Current Monitoring Period from 01-January-2021 to 31-December-2022 (Inclusive both dates), the project activity has supplied 502,377 MWh of electricity, and thus contributing to the GHG reductions 476,001 tCO_{2e}.

Audit Type	Period	Program	VVB Name	Number of years
Validation+ Verification	(25-March-2017 to 31-July-2018)	VCS	LGAI Technological Center S.A. (Applus+ Certification)	01 year 04 months 06 days
Verification	(01-August-2018 to 01-October-2019)	VCS	Earthood Services Private Limited	01 year 02 months 00 days
Verification	(02-October-2019 to 31-December-2020)	VCS	Earthood Services Private Limited	01 year 02 months 30 days
Verification	(01-January-2021 to 31-December-2022)	VCS	VKU Certification Private Limited	02 years 00 months 00 days
Total	25-March-2017 to 31-December-2022 (Inclusive of both the days)	VCS	-	05 years 09 months 06 days

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: Grid-connected electricity generation from renewable sources ACM0002- Version 18.1 ¹

The project is not a grouped project activity.

1.3 Project Proponent

Organization name	Devarahipparigi Wind Power Private Limited
Contact person	Murali Krishnam Raju M
Title	Sr Manager- CDM & GIMS
Address	Sy. No. 552/1B, 552/1A, 551/2A, 551/2B, 552/3, Bijapur to Devarahipparigi Road, Shivanagi Village, Bijapur Taluk, Karnataka, India
Telephone	+91 40 40300100
Email	muraliraju.m@greenkogroup.com

1.4 Other Entities Involved in the Project

Organization name	Infinite Solutions
Role in the Project	Project Consultant
Contact person	Mr. Jimmy Sah
Title	Head – Sustainability
Address	214-215 Milinda Manor, Opp. Next Treasure Island, 2 RNT Marg, Indore – 452001
Telephone	+91-9644130430

¹ CDM: Grid-connected electricity generation from renewable sources --- Version 18.1 (unfccc.int)

Email jimmy@infisolutions.org

1.5 Project Start Date

Start date of the project activity is the earliest date of interconnection with the grid i.e. 25-March-2017. This is the date of commissioning of 100 MW Wind Project activity by Devarahipparigi Wind Power Private Limited.

1.6 Project Crediting Period

Crediting Period Start date: 25-March-2017

Crediting Period End date: 24-March-2027

The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times. The current monitoring period is 4th verification under 1st crediting period.

1.7 Project Location

The details of the project locations² (PSS end) are mentioned in the table below:

Name of Investor	Capacity (MW)	Village(s)	Tehsil /Mandal	District	State	Latitude	Latitude
Devarahipparigi Wind Power Private Limited	100 MW	Shivanagi, Hadagali & Negini	Vijayapur	Vijayapur	Karnataka	16° 48'39.72 96"	75° 58'50.17 80"

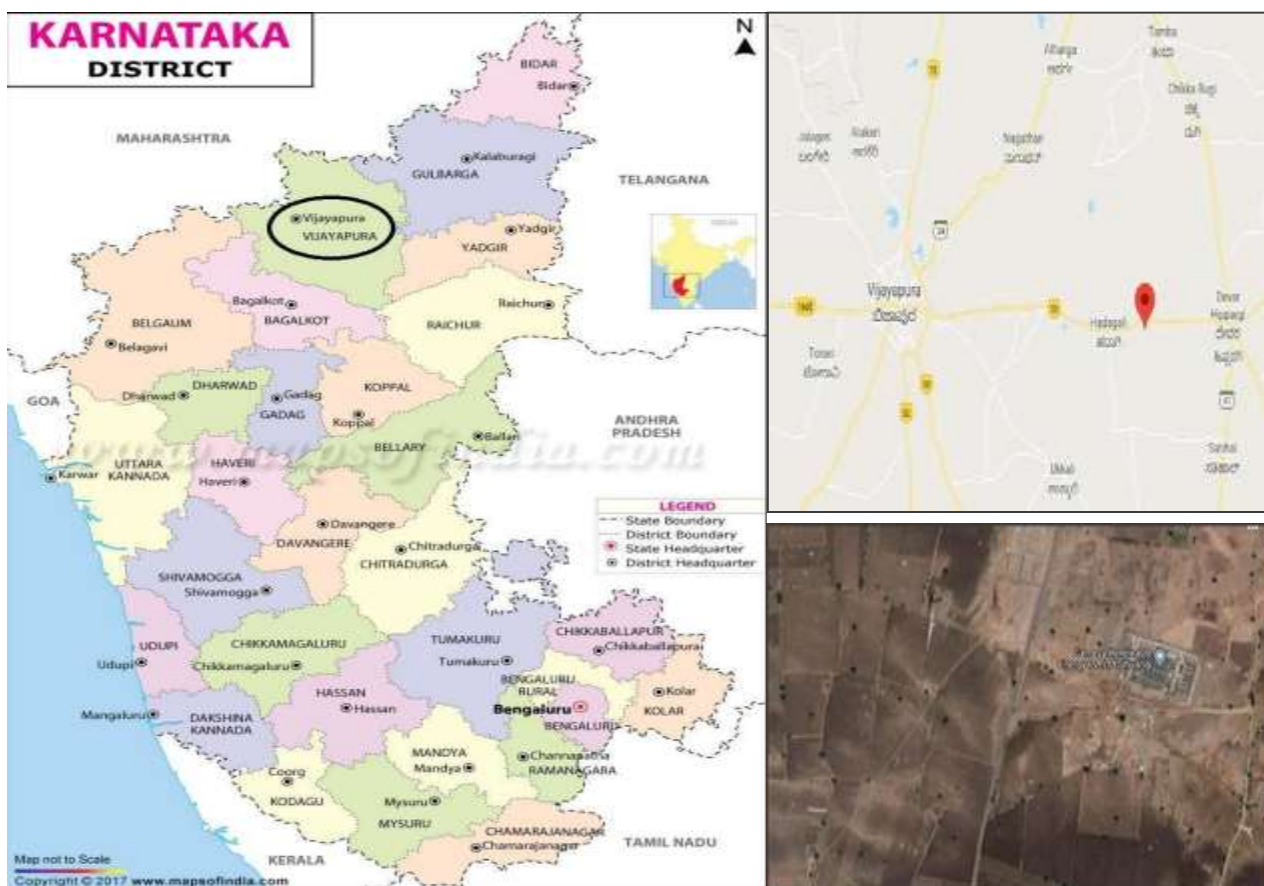
The Geo-Coordinates of all the Wind Turbine Generators involved in the project activity is provided in the table below:

S. No	Site	Location ID	Commissioning date	Latitude	Longitude
1	DWPPL	VSL-01	25-Mar-17	16° 49'54.0"N	75° 56'44.0"E
2	DWPPL	VSL-02	25-Mar-17	16° 49'42.1"N	75° 56'52.3"E
3	DWPPL	VSL-03	25-Mar-17	16° 49'30.6"N	75° 56'49.0"E
4	DWPPL	VSL-04	25-Mar-17	16° 49'14.0"N	75° 57'00.0"E
5	DWPPL	VSL-05	25-Mar-17	16° 49'03.0"N	75° 57'04.5"E
6	DWPPL	VSL-06	25-Mar-17	16° 48'40.5"N	75° 57'21.5"E
7	DWPPL	VSL-07	25-Mar-17	16° 48'21.5"N	75° 57'29.1"E
8	DWPPL	VSL-08	25-Mar-17	16° 48'57.1"N	75° 56'17.2"E
9	DWPPL	VSL-09	25-Mar-17	16° 45'40.3"N	75° 56'50.2"E

² The project locations are mentioned as per registered joint PD&MR version 3.0

10	DWPPL	VSL-10	25-Mar-17	16°45'30.1"N	75°56'47.3"E
11	DWPPL	VSL-28A	25-Mar-17	16°46'00.8"N	75°58'49.7"E
12	DWPPL	VSL-13	25-Mar-17	16°49'55.5"N	75°58'19.2"E
13	DWPPL	VSL-14	25-Mar-17	16°49'47.5"N	75°58'08.7"E
14	DWPPL	VSL-15	25-Mar-17	16°49'27.5"N	75°58'18.2"E
15	DWPPL	VSL-16	25-Mar-17	16°49'15.0"N	75°58'14.2"E
16	DWPPL	VSL-19	25-Mar-17	16°48'29.5"N	75°58'57.8"E
17	DWPPL	VSL-20	25-Mar-17	16°48'14.3"N	75°58'54.0"E
18	DWPPL	VSL-21	25-Mar-17	16°47'57.9"N	75°58'52.2"E
19	DWPPL	VSL-22	25-Mar-17	16°47'37.5"N	75°59'05.7"E
20	DWPPL	VSL-23	25-Mar-17	16°47'25.5"N	75°58'50.8"E
21	DWPPL	VSL-24	25-Mar-17	16°47'06.6"N	75°58'43.7"E
22	DWPPL	VSL-26	25-Mar-17	16°46'46.9"N	75°58'50.9"E
23	DWPPL	VSL-27	25-Mar-17	16°46'27.8"N	75°58'48.3"E
24	DWPPL	VSL-28	25-Mar-17	16°46'12.4"N	75°58'50.8"E
25	DWPPL	VSL-29	25-Mar-17	16°45'51.6"N	75°58'38.2"E
26	DWPPL	VSL-30	25-Mar-17	16°45'42.2"N	75°58'26.8"E
27	DWPPL	VSL-31	25-Mar-17	16°49'54.1"N	75°59'05.8"E
28	DWPPL	VSL-36	25-Mar-17	16°49'59.8"N	75°59'52.5"E
29	DWPPL	VSL-37	25-Mar-17	16°49'49.0"N	75°59'42.1"E
30	DWPPL	VSL-38	25-Mar-17	16°49'29.9"N	75°59'40.5"E
31	DWPPL	VSL-39	25-Mar-17	16°49'18.0"N	75°59'38.8"E
32	DWPPL	VSL-40	25-Mar-17	16°48'58.2"N	75°59'41.3"E
33	DWPPL	VSL-41	25-Mar-17	16°48'43.8"N	75°59'54.5"E
34	DWPPL	VSL-42	25-Mar-17	16°48'32.7"N	75°59'51.8"E
35	DWPPL	VSL-43	25-Mar-17	16°48'22.4"N	75°59'54.3"E
36	DWPPL	VSL-44	25-Mar-17	16°48'08.7"N	75°59'52.1"E
37	DWPPL	VSL-45	25-Mar-17	16°47'55.9"N	75°59'56.5"E
38	DWPPL	VSL-46	25-Mar-17	16°47'41.5"N	75°59'54.7"E
39	DWPPL	VSL-47	25-Mar-17	16°46'10.5"N	75°59'44.2"E
40	DWPPL	VSL-48	25-Mar-17	16°45'59.2"N	75°59'41.0"E
41	DWPPL	VSL-49	25-Mar-17	16°45'49.1"N	75°59'33.1"E
42	DWPPL	VSL-50	25-Mar-17	16°45'31.1"N	75°59'37.5"E
43	DWPPL	VSL-46A	25-Mar-17	16°46'34.5"N	75°59'46.7"E
44	DWPPL	VSL-46B	25-Mar-17	16°46'23.8"N	75°59'45.8"E
45	DWPPL	VSL-46C	25-Mar-17	16°47'29.2"N	75°59'47.4"E
46	DWPPL	VSL-46D	25-Mar-17	16°47'17.7"N	75°59'47.1"E
47	DWPPL	VSL-46E	25-Mar-17	16°47'06.9"N	75°59'45.1"E
48	DWPPL	VSL-46F	25-Mar-17	16°46'49.3"N	75°59'47.4"E
49	DWPPL	VSL-34	25-Mar-17	16°48'44.8"N	75°58'30.4"E
50	DWPPL	VSL-50B	25-Mar-17	16°45'08.6"N	75°59'43.0"E

The project locations have been shown in the map below



1.8 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 18.1³

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

Category: Approved Consolidated Methodology (ACM0002)

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

³ <http://cdm.unfccc.int/methodologies/DB/5725LCHYPYM41V8OD9SFYVAMFFWNP>

- Tool to calculate the emission factor for an electricity system⁴ - Version 07.0 (EB 100, Annex 04)
- Methodological Tool- Tool for the demonstration and assessment of additionality⁵- Version 07.0.0 (EB 70, Annex 08)

1.9 Participation under other GHG Programs

The project proponent hereby confirms that the project has not participated under other GHG Programs.

The undertaking from PP has been submitted for no any double accounting for current monitoring period and project activity is not participated any other GHG program other than VCS.

1.10 Other Forms of Credit and Supply Chain (Scope 3) Emissions

VCUs used for voluntary carbon market purposes don not require Paris Agreement Article 6 mechanism and other Paris-related program VCU labels, though labeled VCUs may be used for voluntary market transactions if desired. Since for this project activity the VCUs for this monitoring period are only to be used for the voluntary carbon market purposes, so project proponent is not required to demonstrate adherence to any of such requirements.

India is non-annex1 country and there is no compliance with an emission trading program or to meet binding limits on GHG emissions for this project activity.

The emission reductions or removals generated during this monitoring period have not been used for compliance under an emissions trading program or any other mechanism that includes GHG allowance trading (as identified in the project description, or where such programs or mechanisms have subsequently emerged). The Project is used for compliance with an emission trading program or to meet binding limits on GHG emissions.

Other Forms of Environmental Credit: The project activity has not availed any other form of environmental credit as confirmed by the project proponent through the declaration of no double counting.

Also, the project is not claiming any benefits from CDM/GS/GCC/UCR/RECs mechanism which can be confirmed from the link below –

⁴ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

⁵ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

- https://www.recregistryindia.nic.in/index.php/publics/accredited_regens
- <https://cdm.unfccc.int/>
- <https://www.goldstandard.org/>
- <https://projects.globalcarboncouncil.com/>
- <https://www.ucarbonregistry.io/>
- https://www.recregistryindia.nic.in/index.php/publics/accredited_regens

The project Activity is a wind power project and does not involve any supply chain involved in the project such as manufacturers, wholesalers, distributors and retailers. So, indirect upstream and downstream GHG emissions are not involved in the project activity. Thus, the Scope 3 emissions are not applicable in this project activity.

1.11 Sustainable Development Contributions

Contribution to sustainable development:

Ministry of Environment, Forests and Climate Change, GoI, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development⁶.

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 energy-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 power generation and would encourage other entrepreneurs to participate in similar projects.

⁶ https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%202023%20refinement_Eng.pdf

- **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.

The wind Project is located at villages in Shivanagi, Hadagali & Neginal villages, Vijayapur district in the state of Karnataka in India. The main purpose of this project activity is to generate clean form of electricity through renewable wind energy sources. The project activity involves installation of a 100 MW wind power project in Karnataka state of India.

The project is contributing in sustainable development by generating electricity and reduction of CO₂ emissions due to implementation of project activity. Through Project activity economic development has been achieved in the project location by creating opportunities of employment during the project lifetime. Project owner monitors the carbon emission with help of the record of electricity generated. This is a voluntary project activity doesn't contribute to achieving any nationally stated sustainable development priorities. There is no compliance for monitoring and reporting the emission reduction and SDG contribution from the project activity

The project is wind power project, it has generated 502,377 MWh electricity and avoided 476,001 tons of greenhouse gas emissions in the atmosphere during the current monitoring period. So, the project will contribute to the sustainable development, and it is fulfilling SDG 07 and SDG 13.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.2	7.2.1 Renewable energy share in the total final energy consumption	Implemented activities to increase	About 502,377 MWh renewable electricity has supplied to Indian electricity grid during the reported period that helps to increase the renewable energy share in the energy mix.	About 1,155,770.59 MWh (369,904.59 + 283,489 + 502,377) ⁷ renewable electricity has supplied to Indian electricity grid throughout the project lifetime that helps to increase the renewable energy share in the energy mix.
2)	13.0	13.0 Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	By supplying 502,377 MWh clean electricity (generated through Wind Power) to the Indian electricity grid, the project avoided release of 476,001 tCO ₂ e into the atmosphere during the reporting period.	Overall Prevented the release of 1,095,089 tCO ₂ e (350,484 + 268,604 + 476,001) into the atmosphere since project commissioning ⁸ .

⁷ <https://registry.terra.org/app/projectDetail/VCS/1793>

⁸ <https://registry.terra.org/app/projectDetail/VCS/1793>

2 SAFEGUARDS

2.1 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 same⁹.

There are no negative environmental and/or social-economic impacts due to the project. 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.

2.2 Local Stakeholder Consultation

The project has already been registered under VCS mechanism. The Local stakeholder consultation process was conducted during the validation stage¹⁰.

The details of the Stakeholder Meetings are:

Date of Invitation – 10-February-2016

Date of Meeting – 17-February-2016

Location of Meeting – Project Site, Karnataka

In the introductory speech, the representative of Devarahipparigi Wind Power Private Limited (Project Investor), welcomed the gathering and given a brief about the climate mitigation project activity. Subsequent to the introductory speech, stakeholders were explained about the electricity generation from wind project is an environmentally friendly power generation technology contributing to reduction in GHG emissions. They were also explained about the benefits of the wind power projects like, increasing energy availability and improving quality of power and its assistance to the local population by providing employment opportunities to both skilled & unskilled labors.

⁹ <https://smartnet.niua.org/sites/default/files/resources/report-on-developmental-impacts-of-RE.pdf>

¹⁰ <https://registry.verra.org/app/projectDetail/VCS/1793>

As a part of continual improvement process, feedback from the associated stakeholders is vital, therefore a dedicated Visitor register cum grievance register has been placed at the project site which is accessible to stakeholders to provide their feedback on the project. It is appropriate publicly accessible location at which local stakeholders can provide their feedback on the project. This location is also conducive to continuous and regular checks for stakeholder comments.

There were some comments received during the meeting and the stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions but all are been resolved.

For ongoing Stakeholder communication, the PP has also placed a grievance register onsite (main gate) of the project site (line 1 and line 2) where in the stakeholder can put down his/her complain. The mentioned grievance is being monitored by the site person and all the grievances should be necessarily addressed through the grievances cell of the company and shared with concern department and redressed as soon as possible in the Organisation if found genuine.

Some comments are as follows which was recorded in the current monitoring period:

1. VSL-29&30 WTG approach road damaged due to rain.

Reply: The road has been reconstructed in the year 2021 itself which is been resolved by this monitoring period only.

2. Feeder-7 33 KV line nearby trees cutting.

Reply: The PP has done plantation in the nearby places in year 2021 and 2022.

Thus, there are some comments reported but are also been resolved within this monitoring period only.

2.3 AFOLU-Specific Safeguards

Not applicable to this as this is not an AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity involves the installation of Wind project. The total installed capacity of the project is 100 MW Wind project located in Karnataka state in India. The project is promoted by Devarahipparigi Wind Power Private Limited.

The Project activity is a new facility (Greenfield) and the electricity generated by the project will be exported to the Indian electricity 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. The plant was commissioned on 25-March-2017 and it running smoothly with specific schedule maintenance works. In the Pre-project scenario, the entire 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.

The WTGs are under operation including scheduled shutdowns during the current monitoring period. The breakdown occurred is for a total of 1.17% of total hours of all WTGs and is beyond the control of PP. Therefore, due to this percentage variations of breakdown identified in the current monitoring period also it has no impact in the GHG emissions reductions. The summary of breakdown details in the current monitoring period has been described in the below table and a detailed analysis of the same has been provided in APPENDIX 2.

S.No.	Plant Site	Total Hours	Net operational Hours	Breakdown Hours
1	Devarahipparigi Wind Power Private Limited	876,000 hours ¹¹	865,690 hours/ 98.82% of total hours	10,310 hours/ 1.17% of total hours

The Voltage generated at the generator is 690V and it is stepped up to 33 kV voltage and the same is connected to PSS. From PSS again, the 33 kV is stepped up to 220 kV and synchronized to the grid. The nearest distance from PSS is at approx. 500 meters. ABT meters are available on 220/33kV side in PSS- Kumatagi for Billing purpose.

The technical specification for 100 MW Wind project shall be provided at the time of validation.

WTG Make and Model No.	Gamesa G114¹²
Generator Type & Rating	Doubly-Fed Induction generator, 2000 kW
WTG configuration	50 X 2000 kW
Rotor Diameter	114 m

¹¹ Total hours = 17520 (i.e., 730*24) *Number of WTGs (i.e., 50). So, 17520*50 = 876,000

¹² Gamesa G114-2.0MW - 2,00 MW - Wind turbine (wind-turbine-models.com)

Hub Height	93
Tower Type & Shape	Conical Tubular Steel
Cut-in-wind speed	2.5 m/s
Rated wind speed	10.0 m/s
Cut-out wind speed	25.0 m/s
Survival wind speed	60.0m/s
Technical specifications of WTG Transformer	
Make	ABB
Voltage	33kV/690 V
Rated Power	2350 KVA
Technical specifications of Power Transformer	
Make	Prime Meiden
Voltage	220/33kV
Rated Power	3 X 60/80 MVA

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviation is applied during the monitoring period.

3.2.2 Project Description Deviations

Project deviation applicable:

Deviation 1: In the registered VCS Joint PD&MR, formula used in the calculation net electricity supplied to the grid was not mentioned correctly, hence the same is corrected in line with the JMRs (Form-B). This correction was considered as project deviation in the previous monitoring reports therefore it is mentioned in this monitoring period. The formula used in the monitoring plan for calculating the net electricity supplied to the grid is based on the B-Form values provided by KPTCL is as follows:-

$$EG_{PJ,y} = \text{Export (KWh)} - \text{Import (KWh)} - \text{Transmission losses (KWh)}$$

As per PPA clause 5.4 the net electricity supplied to the grid is calculated as $EG_{PJ, y} = \text{Export (KWh)} - 115\% \text{Import (KWh)}^{13} - \text{Transmission losses (KWh)}$. This equation is used for accounting/invoicing purpose & calculating emission reductions (ERs) in ER sheet.

This is in line with the actual monitoring procedure followed on the project activity.

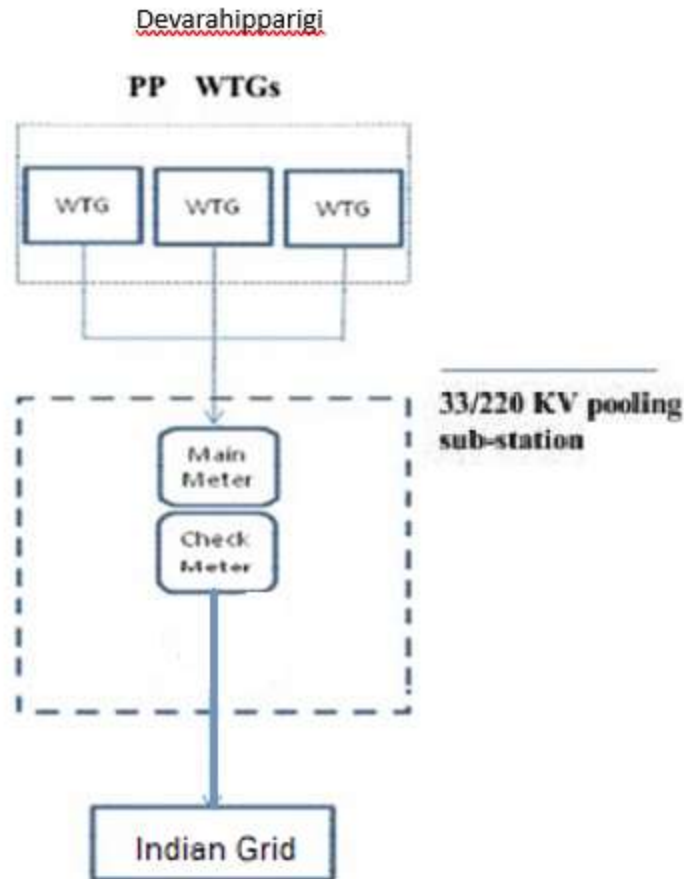
The Project deviation is in line with the guidance provided under Section 3.21.2 para no. 2 of the VCS standard, Version 4.5.

However, it does not impact the existing applicability conditions of the methodology, additionality or the appropriateness of the baseline scenario.

Deviation 2: The Line diagram with metering arrangement for the wind project activity is different from the registered VCS Joint PD&MR and previously it was a typo error and now has been corrected as per actual practice followed at site. In actual there are only 2 meters main and check which is provided by the State DISCOM and there is no standby meter provided. Thus, it has been corrected as per the actual scenario and the same has been described below in detail in monitoring plan section 4.3. The mentioned deviation is followed since Start date of project activity but applicable from this current monitoring period.

However, it does not impact the existing applicability conditions of the methodology, additionality or the appropriateness of the baseline scenario.

¹³ In the state of Karnataka, India the total import values is 115% of actual import value as per clause 5.4 of PPA which states that “115% of energy provided by the HESCOM for startup purposes shall be deducted from the Delivered Energy by the Company for determining the amount to be paid by the HESCOM to the Company”. This means for invoicing purpose 115% of import value need to be considered which is followed by PP and same is mentioned in ER sheet and net is calculated taking same approach under consideration.



Deviation 3: Some of the geo coordinates for the wind project activity are different from the registered joint PD&MR and previously it was a typo error and now has been corrected as per actual scenario at site.

The mentioned deviation is followed since commissioning of the project activity but it has been corrected in this monitoring period so applicable from current monitoring period.

S.No.	Site	Location ID	Commissioning date	Latitude	Longitude
1	DWPPL	VSL-04	25-March-17	16° 49'14.0"N	75° 57'00.0"E
2	DWPPL	VSL-06	25-March-17	16° 48'40.5"N	75° 57'21.5"E
3	DWPPL	VSL-07	25-March-17	16° 48'21.5"N	75° 57'29.1"E
4	DWPPL	VSL-13	25-March-17	16° 49'55.5"N	75° 58'19.2"E
5	DWPPL	VSL-14	25-March-17	16° 49'47.5"N	75° 58'08.7"E
6	DWPPL	VSL-15	25-March-17	16° 49'27.5"N	75° 58'18.2"E
7	DWPPL	VSL-19	25-March-17	16° 48'29.5"N	75° 58'57.8"E
8	DWPPL	VSL-36	25-March-17	16° 49'59.8"N	75° 59'52.5"E

9	DWPPL	VSL-40	25-March-17	16° 48' 58.2"N	75° 59' 41.3"E
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3.3 Grouped Projects

The project is not a grouped thus this is not applicable.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _{grid, OM, y}
Data unit	tCO ₂ e/MWh
Description	Operating margin CO ₂ e emission factor for the project electricity system in year y
Source of data	Calculated from CEA database, Version 13, June 2018 ¹⁴
Value applied	0.9726
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 07” as 3-year generation weighted average using data for the years 2014-15, 2015-16 & 2016-17. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 13, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	EF _{grid, BM, y}
Data unit	tCO ₂ e/MWh
Description	Build margin CO ₂ emission factor for the project electricity system in year y
Source of data	Central Electricity Authority (CEA) of India Database Version 07 ¹⁵
Value applied	0.8723
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 07” as per the latest data available for the most recent year 2016-17. The data is obtained from “CO ₂ Baseline Database for Indian Power Sector “version 13, published by

¹⁴ https://cea.nic.in/old/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf

¹⁵ https://cea.nic.in/old/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf

	the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	Calculation of baseline emissions
Comments	The above value is fixed and it is same for the entire crediting period

Data / Parameter	$EF_{grid, CM, y}$
Data unit	tCO ₂ e/MWh
Description	Combined margin CO ₂ e emission factor for the project electricity system in year y
Source of data	Calculated from CEA database, Version 13, June 2018 ¹⁶
Value applied	0.9475
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 (tCO₂e/MWh) $EF_{grid, OM, y}$ = Operating margin CO₂ emission factor in year y (tCO₂e/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM} = Weighting of build margin emissions factor (%) = 25%
Purpose of Data	Calculation of baseline emissions
Comments	The above value is fixed and it is same for the entire crediting period

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{PJ, y}$
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)
Source of data	Credit note/ JMR/Form B reports/ monthly generation report from respective state electricity board/DISCOM

¹⁶ https://cea.nic.in/old/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf

Description of measurement methods and procedures to be applied	The difference of final value of export, import and transmission loss is used for monthly values of net electricity supplied to the grid by the project activity and same value will be considered for ER calculations. Thus, for calculating the net electricity supplied to the grid is based on the B-Form values provided by KPTCL is as follows: $EG_{PJ, y} = \text{Export (KWh)} - 115\% \text{Import (KWh)}^{17} - \text{Transmission losses (KWh)}$
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value monitored	502,377 MWh
Monitoring equipment	The electricity exported / supplied by the plant to pooling substation and further to substation. This meter also measures electricity imported by the plant from the grid. There are meters used in this project activity and the details including Meter serial number, Make, accuracy class and the calibration dates are mentioned APPENDIX 1: Calibration Records.
QA/QC procedures to be applied	The meters are approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is once in 5 years¹⁸. The monthly electricity supplied/exported by the project activity in the JMR report is cross checked with the monthly invoices of sale. In the absence or delay in the meter calibration appropriate Guidelines will be applied appropriately to confirm the conservativeness of metering. The metering arrangement, accuracy class of meters, calibration frequency is under control of state electricity board and PP does not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered the monitoring parameter. The billing is raised based on substation meters.
Purpose of the data	Calculation of baseline emissions
Calculation method	Thus, Net electricity supplied to the grid by the project plant in a given month = Export, kWh - 115%Import, kWh - Transmission loss, kWh
Comments	Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of VCU for this project activity, whichever occurs later.

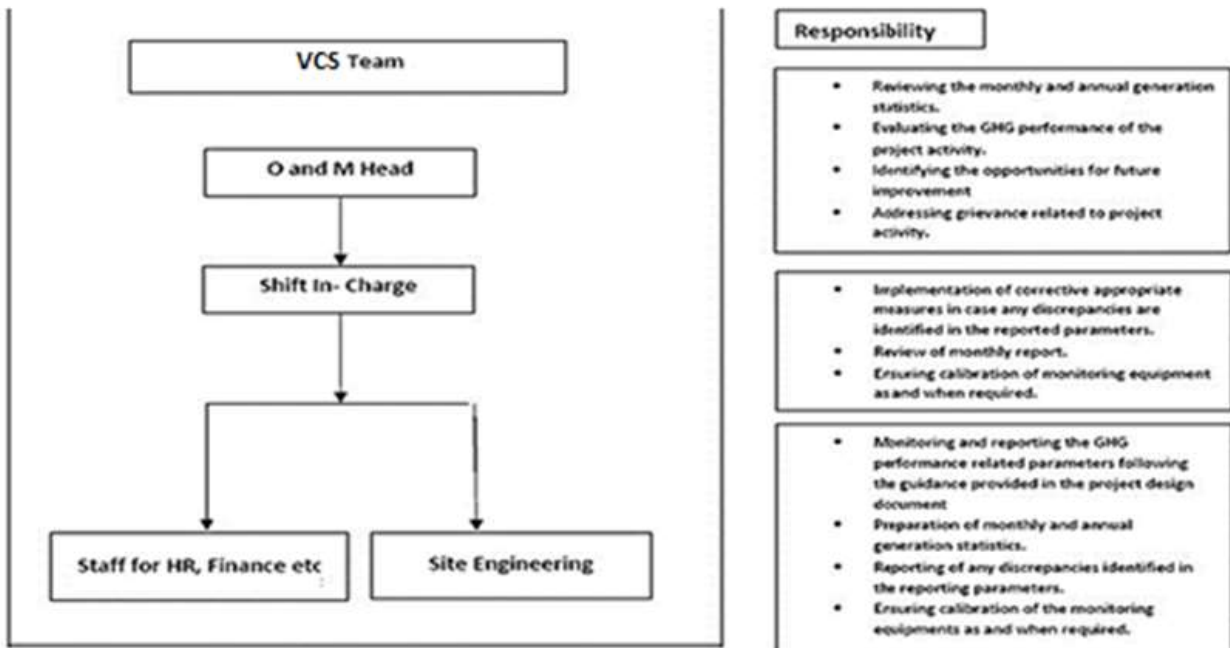
¹⁷ In the state of Karnataka, India the total import values is 115% of actual import value as state of Karnataka is adding transmission loss on import value. The same is mentioned in PPA as per clause 5.4.

¹⁸ [CEA Metering Regulations Summarydocx.pdf \(cbip.org\)](#)

4.3 Monitoring Plan

The monitoring plan is developed in accordance with the modalities and procedures for Carbon project activities and is proposed for grid-connected wind power project being implemented. The monitoring plan, which is implemented by the project participant describes about the monitoring organization, 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 equipment's for this project activity. The team comprises of the following members:



Data Measurement

The export, import energy & transmission losses are measured continuously using above mentioned Main and Check meters located at the Pooling sub-station at Kumataji. Readings of meters are taken on monthly basis (FORM -B) by authorized officer of KPTCL in the presence of PP or representative of PP. Based on the Meter Reading Statement to PP, invoices will be raised. These invoices are used for cross checking the meter readings (FORM -B) taken for the respective project activity. The Net Electricity generation is calculated after deducting the Imports & transmission loss from the Export i.e., Net Electricity supplied to the grid = Export – 115%Import – Transmission loss.

In the state of Karnataka, the current value for assessment of Transmission loss is calculated based on the actual line losses assessed each month and the value is sourced from the B-form.

Further the import value is also sourced from B-form however the grid considers 115% of import value (taking into the transmission losses) while considering the financial transactions (invoicing). These values (import and Transmission losses) are regulated by KPTCL and may be revised upon discretion of the KPTCL. Thus, they shall be revised considering the latest applicable guideline at the time of monitoring.

Data collection and archiving

Readings from meters are collected in the presence of the plant in-charge. Export, Import & transmission loss data are 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 VCUs for the project activity whichever occurs later.

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 are trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

QA/QC procedures

The meters are approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. Calibration of all the meters is undertaken at required intervals and faulty meters are duly replaced immediately based on CEA guidelines which specifies calibration, and the frequency of calibration is once in 5 years.¹⁹ The monthly electricity supplied/exported by the project activity in the JMR report is cross checked with the monthly invoices of sale. In the absence or delay in the meter calibration appropriate Guidelines will be applied appropriately to confirm the conservativeness of metering the error factor would be applied.

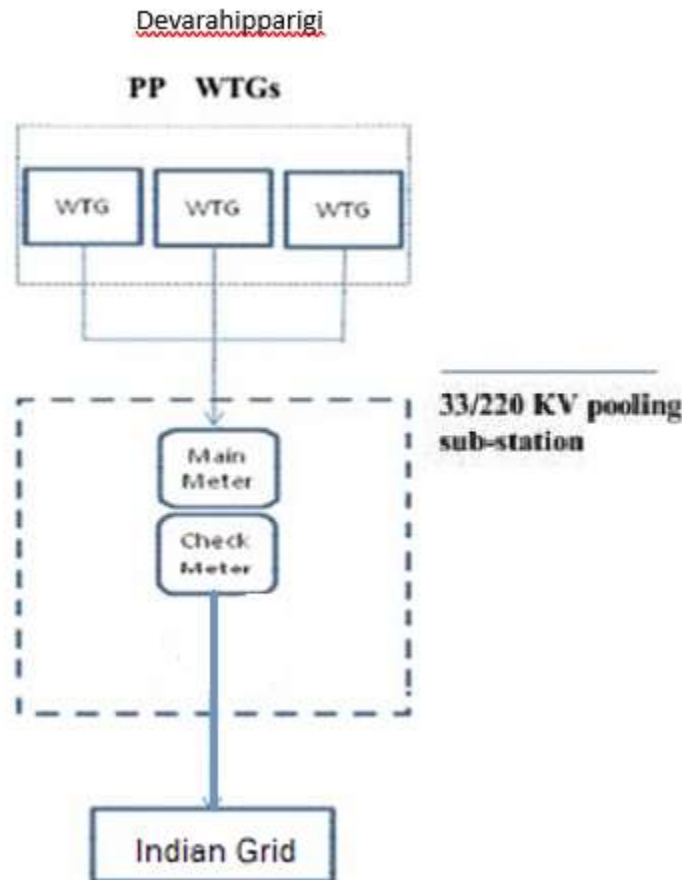
The metering arrangement, accuracy class of meters, calibration frequency is under control of state electricity board and PP does not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered in the monitoring parameter. The billing is raised based on pooling substation meters.

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

¹⁹ [CEA Metering Regulations Summarydocx.pdf \(cbip.org\)](#)

Metering Arrangement

Line diagram with metering arrangement for the wind project activity is shown below.



The wind plants have their own dedicated metering arrangement at the substation end. The metering arrangement is under control of state electricity board and may change in future. In actual there are only two meters i.e main and check which is provided by the State DISCOM and no standby meter is there at the metering location site. Therefore, it is as per actual scenario which is followed at the site and the same part has been described in the deviation section 3.2.2 above.

Apportioning Procedure for (Wind) Power Project

The net electricity supplied to the grid would be reported as the difference between the net export and import from the WTG. The electricity export and import data are monitored via main, check and standby meters connected to feeders at the respective sub-station.

Data Adjustment in case of monitoring period different from billing period:

In case the dates of a particular monitoring period do not match with the dates of the billing period, the net electricity exported to the grid would be calculated as follows:

$$D = (A/B) * C$$

Where:

A = Difference of number of days which are not matching of billing period and monitoring period.

B = Number of days of the billing period/ month which was not matched with the monitoring period.

C = Net Electricity supplied to the grid for that given billing period/ month

The calculated value after apportioning would be used for calculation of emission reductions during that period. The apportioning is not applied in the current monitoring period as the billing months cover the complete dates mentioned in the monitoring period and there is no mismatch with the dates of the billing period.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

As per the approved consolidated Methodology ACM0002 (Version 18.1) para 42: 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 (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 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)

Calculation of EG_{PJ, y}²⁰

²⁰ <https://cdm.unfccc.int/methodologies/DB/5725LCHYPYM4I1V8OD9SFYVAMFFWNP>

If the project activity is the installation of a Greenfield power plant, then:

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

Where:

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

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

Vintage-wise calculation	Site 01 (Generation, MWh)	Site 02 (Generation, MWh)
Year		
2021 (01-January-2021 to 31-December-2021)	126,951	128,380
2022 (01-January-2022 to 31-December-2022)	123,313	123,733
Total	250,264	252,113

Thus, $EG_{PJ,y} = 502,377$ MWh

Grid Emission Factor

The GEF is fixed ex-ante in the joint PD&MR as given below:

Parameter	Value
OM	0.9726 tCO ₂ /MWh
BM	0.8723 tCO ₂ /MWh
CM	0.9475 tCO ₂ /MWh

Therefore,

$$BE_y = 502,377 \times 0.9475$$

$$= 476,001 \text{ tCO}_2\text{e (Round-down values at vintage level)}$$

5.2 Project Emissions

Not Applicable, since emissions from the project activity is zero as per para 34 of ACM0002 methodology. Hence, $PE_y = 0$.

5.3 Leakage

Not Applicable, since leakage emissions from the project activity is zero as per section 5.6 of ACM0002 methodology. Hence, $LE_y = 0$.

5.4 Net GHG Emission Reductions and Removals

The Formula used to calculate the net emission reduction for the project activity is

$$ER_y = BE_y - PE_y$$

Where,

ER_y = Emission Reduction in tCO₂e/year

BE_y = Baseline emission in tCO₂e/year

PE_y = Project emissions in tCO₂e/year

For the project activity during the current monitoring period, as per section 5.1

$$BE_y = 476,001 \text{ tCO}_2\text{e}$$

$$PE_y = 0 \text{ tCO}_2\text{e}$$

$$LE_y = 0 \text{ tCO}_2\text{e}$$

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 2021 (01-January-2021 to 31-December-2021)	241,925	0	0	241,925
Year 2022 (01-January-2022 to 31-December-2022)	234,076	0	0	234,076
Total	476,001	0	0	476,001

The achieved GHG emission is 22.02% higher than the estimated value. This is due to the higher wind flow pattern at the site which is not in the control of the project proponent. Therefore, the higher GHG accounting is acceptable.

<u>Ex-ante emissions reductions /removals</u>	<u>Achieved emissions reductions /removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>

390,104 (tCO ₂ e)	476,001 tCO ₂ e	22.02%	It is to be noted here that as per the estimated emission reduction to be achieved from the project activity for the current monitoring period is 390,104 tCO₂e, whereas actual emission reductions achieved are 476,001 tCO₂e. Thus, the actual achieved GHG emission is approximately 22.02% is higher than the estimated than the estimated value. This is because of higher wind velocity at the site which is not in the control of the project proponent. The achieved GHG emission is higher than the estimated value. The PLF has increased to 22.02% w.r.t. to registered VCS joint PD&MR. However, the breaching value for PLF is 47.56% as per VCS Joint PD & MR and the project IRR remains within the benchmark with the said increase. Therefore, the higher GHG accounting is acceptable.
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APPENDIX 1: CALIBRATION RECORDS

The calibration details²¹ of the meters are as follows:

For Line-01		
Metering point at 220/33 KV Pooling Sub Station – Kumatagi		
Meter Details	Main Meter	Check Meter
Meter Serial No	16196503	16196514
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Previous Date of Calibration	24-August-2020	24-August-2020
Subsequent date of calibration	15-November-2021	15-November-2021
Latest Date of Calibration	06-August-2022	06-August-2022
Due date of Calibration	05-August-2027	05-August-2027

For Line-02		
Metering point at 220/33 KV Pooling Sub Station – Kumatagi		
Meter Details	Main Meter	Check Meter
Meter Serial No	16196510	16196508
Meter Make	L & T	L & T
Accuracy Class	0.2s	0.2s
Previous Date of Calibration	24-August-2020	24-August-2020
Subsequent date of calibration	15-November-2021	15-November-2021
Latest Date of Calibration	06-August-2022	06-August-2022
Due date of Calibration	05-August-2027	05-August-2027

²¹ As per the registered join PD, Calibration of all the meters will be undertaken at least once in 5 years. However, the calibration is carried out by BESCO in every six months which is a conservative approach, but it is to be noted that calibration of meters is not in control of PP.

APPENDIX 2: BREAKDOWN DETAILS

The breakdown details²² of all the WTGs for the entire monitoring period is described as below

S. No.	WTG no	Total BD in HH:MM: SS in 2021	Total BD in HH:MM: SS in 2022	Total BD in HH:MM: SS in current MP (01-January- 2021 to 31-December- 2022)
1	VSL-01	77:47:00	117:50:00	195:37:00
2	VSL-02	131:05:00	109:27:00	240:32:00
3	VSL-03	76:14:00	87:59:00	164:13:00
4	VSL-04	50:03:00	96:28:00	146:31:00
5	VSL-05	74:38:00	62:45:00	137:23:00
6	VSL-06	88:40:00	108:55:00	197:35:00
7	VSL-07	62:19:00	107:56:00	170:15:00
8	VSL-08	78:01:00	85:29:00	163:30:00
9	VSL-09	48:07:00	80:45:00	128:52:00
10	VSL-10	39:26:00	91:43:00	131:09:00
11	VSL-28A	59:10:00	103:26:00	162:36:00
12	VSL-13	36:41:00	66:45:00	103:26:00
13	VSL-14	64:48:00	48:06:00	112:54:00
14	VSL-15	52:58:00	316:13:00	369:11:00
15	VSL-16	82:50:00	81:41:00	164:31:00
16	VSL-19	90:02:00	47:41:00	137:43:00
17	VSL-20	59:18:00	41:11:00	100:29:00
18	VSL-21	133:35:00	85:35:00	219:10:00
19	VSL-22	39:15:00	115:46:00	155:01:00
20	VSL-23	35:06:00	79:28:00	114:34:00
21	VSL-24	296:57:00	53:30:00	350:27:00
22	VSL-26	55:24:00	104:36:00	160:00:00
23	VSL-27	97:12:00	102:27:00	199:39:00
24	VSL-28	31:55:00	97:34:00	129:29:00
25	VSL-29	66:55:00	123:15:00	190:10:00
26	VSL-30	93:30:00	171:43:00	265:13:00
27	VSL-31	40:08:00	121:33:00	161:41:00
28	VSL-36	169:07:00	50:29:00	219:36:00
29	VSL-37	68:23:00	115:47:00	184:10:00

²² The breakdown details have been revised and the summary of the same is provided in the appendix. For detailed breakdown analysis covering the current monitoring period a excel sheet is provided in the supporting document.

30	VSL-38	33:55:00	522:29:00	556:24:00
31	VSL-39	1379:42:59	118:44:00	1498:26:59
32	VSL-40	54:19:00	175:02:00	229:21:00
33	VSL-41	84:16:00	66:13:00	150:29:00
34	VSL-42	29:33:00	123:13:00	152:46:00
35	VSL-43	72:34:59	83:24:00	155:58:59
36	VSL-44	31:17:00	59:57:00	91:14:00
37	VSL-45	56:40:00	83:52:00	140:32:00
38	VSL-46	56:20:00	61:10:00	117:30:00
39	VSL-47	63:54:00	73:49:00	137:43:00
40	VSL-48	110:34:00	59:03:00	169:37:00
41	VSL-49	70:16:00	96:37:00	166:53:00
42	VSL-50	41:58:00	153:06:00	195:04:00
43	VSL-46A	57:09:00	139:59:00	197:08:00
44	VSL-46B	89:50:00	65:51:00	155:41:00
45	VSL-46C	35:04:00	83:40:00	118:44:00
46	VSL-46D	143:07:00	88:38:00	231:45:00
47	VSL-46E	40:59:00	92:44:00	133:43:00
48	VSL-46F	38:12:00	78:45:00	116:57:00
49	VSL-34	72:40:00	145:14:00	217:54:00
50	VSL-50B	84:43:00	116:30:00	201:13:00
Total Hours	1-January-2021 to 31-December-2022	4946:37:58	5364:03:00	10310:40:58

APPENDIX 3: SDG CONTRIBUTION

For Line-01 and Line-02

Months	Total Net Generation (MWh)	Emission Factor(tCO ₂ /MWh)	Emission Reductions(tCO ₂)
	SGD 7		SGD 13
January-2021	14,891.73	0.9475	14,109.91
February-2021	12,935.56	0.9475	12,256.44
March-2021	13,902.56	0.9475	13,172.67
April-2021	12,741.63	0.9475	12,072.70
May-2021	27,450.02	0.9475	26,008.90
June-2021	36,446.07	0.9475	34,532.66
July-2021	43,615.69	0.9475	41,325.87
August-2021	29,170.35	0.9475	27,638.90
September-2021	28,985.83	0.9475	27,464.07
October-2021	10,101.90	0.9475	9,571.55
November-2021	13,472.12	0.9475	12,764.83
December-2021	11,617.33	0.9475	11,007.42
Vintage 2021	255,330.78	0.9475	241,925
January-2022	12,154.97	0.9475	11,516.83
February-2022	12,194.74	0.9475	11,554.51
March-2022	13,321.68	0.9475	12,622.29
April-2022	12,831.60	0.9475	12,157.94
May-2022	28,952.75	0.9475	27,432.73
June-2022	32,179.25	0.9475	30,489.84
July-2022	43,338.52	0.9475	41,063.25
August-2022	35,496.53	0.9475	33,632.96
September-2022	21,352.28	0.9475	20,231.29
October-2022	10,724.67	0.9475	10,161.62
November-2022	11,493.20	0.9475	10,889.80
December-2022	13,005.92	0.9475	12,323.11
Vintage 2022	247,046.09	0.9475	234,076
Total	502,376.87		476,001