



**Verified Carbon
Standard**

BUNDLED WIND POWER PROJECT IN RAJASTHAN BY ORANGE RENEWABLE POWER PRIVATE LIMITED



INFINITE
SOLUTIONS

Document Prepared by Infinite Solutions

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Prepared By	Infinite Solutions
Contact	214-215 Milinda Manor, Opp. Next Treasure Island, 2 RNT Marg, Indore - 452001, India Website: www.infisolutions.org

CONTENTS

1	PROJECT DETAILS	4
1.1	Summary Description of the Implementation Status of the Project	4
1.2	Sectoral Scope and Project Type	6
1.3	Project Proponent	6
1.4	Other Entities Involved in the Project	6
1.5	Project Start Date	7
1.6	Project Crediting Period	7
1.7	Project Location	7
1.8	Title and Reference of Methodology	8
1.9	Participation under other GHG Programs	9
1.10	Other Forms of Credit and Supply Chain (Scope 3) Emissions	9
1.11	Sustainable Development Contributions	10
2	SAFEGUARDS	13
2.1	No Net Harm	13
2.2	Local Stakeholder Consultation	13
2.3	AFOLU-Specific Safeguards	15
3	IMPLEMENTATION STATUS	15
3.1	Implementation Status of the Project Activity	15
3.2	Deviations	18
3.3	Grouped Projects	19
4	DATA AND PARAMETERS.....	19
4.1	Data and Parameters Available at Validation	19
4.2	Data and Parameters Monitored.....	21
4.3	Monitoring Plan.....	23
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	28
5.1	Baseline Emissions	28
5.2	Project Emissions	29
5.3	Leakage.....	29
5.4	Net GHG Emission Reductions and Removals.....	30
	APPENDIX 1 METER CALIBRATION DETAILS	32

APPENDIX 2 BREAKDOWN DETAILS.....	34
APPENDIX 3: SDG CONTRIBUTION	35

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity is a 59.4 MW_{AC} (39.9 MW in Bhesada & 19.5 MW in Dalot) bundled wind power project consisting in of 32 Wind Turbine Generators (WTGs). The project is promoted by Orange Renewable Power Private Limited & Orange Jaisalmer Wind Energy Private Limited of which the “Orange Renewable Power Private Limited” is the representative of promoter of this bundled project. The purpose of the project activity is to generate clean electricity with utilization of wind energy.

This is a bundle Wind power project of capacity 59.4 MW_{AC} in the bundle one project is having capacity of 39.9 MW_{AC} and it is located to near village Bhesada, close to the city of Jaisalmer in state of Rajasthan, hereafter call “Project 1”. It is developed by “Orange Jaisalmer Wind Energy Private Limited” (OJWEPL). It consists of 19 machines of 2.1 MW class Suzlon S88 make.

The other project in the bundle is 19.5 MW_{AC} wind Power Project located near village Dalot, close to the city of Pratapgarh in state of Rajasthan, here after called “Project 2”. It is developed by “Orange Renewable Power Private Limited” (ORPPL). It consists of 13 WTGs of 1.5 MW class ReGen V82 make.

There was no activity at the site prior to implementation of the project activity (Greenfield). The electricity generated by the project is exported to the Indian electricity grid. The project activity will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The estimated emission reduction by the project activity was 102,870 tCO_{2e} annually and 1.028,700 tCO_{2e} for the crediting period. Since wind power is Greenhouse Gas (GHG) emissions free, the power generated will prevent the anthropogenic gas emissions generated by fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas.

All the WTGs in the project activity were commissioned on 31-March-2013 and have been operational since then. The details of all the WTGs are provided under section 1.7 of this document. The details of the projects and the state of installation are mentioned in the table:

Project Site's Name	Capacity	Technology	State	Connection with Grid	Name of substation	Use of Electricity
Site 1 – Bhesada	19x2.1 39.9MW	Suzlon S88	Rajasthan	Indian	400 KV AKAL (BHESADA)	Sale to Grid
Site 2 – Dalot	13x1.5 19.5 MW	ReGen V82	Rajasthan	Indian	132 KV RVPNL Dalot	Sale to Grid

This is the seventh verification of the project and the GHG reductions by this project activity in the current monitoring period (01-May-2020 to 30-March-2023) is 264,474 tCO₂e and the project activity has supplied 270,812.65 MWh of electricity.

Audit Type	Period	Program	VVB Name	Number of years ¹
Validation	31-March-2013 to 30-March-2023	VCS	TÜV Rheinland (China) Ltd.	10 years
Verification	31-March-2013 to 31-March-2015	VCS	EPIC Sustainability	02 years 00 months 01 days
Verification	01-April-2015 to 31-March-2016	VCS	KBS Certification Services Private Limited	01years 00 months 00 days
Verification	01-April-2016 to 31-March-2017	VCS	LGAI Technological Center S.A. (Applus+ Certification)	01 years 00 months 00 days
Verification	01-April-2017 to 31-March-2018	VCS	LGAI Technological Center S.A. (Applus+ Certification)	01 years 00 months 00 days
Verification	01-April-2018 to 30-April-2019	VCS	LGAI Technological Center S.A. (Applus+ Certification)	01 years 01 month 00 days
Verification	01-May-2019 to 30-April-2020	VCS	LGAI Technological Center S.A. (Applus+ Certification)	01 years 00 months 00 days
Verification (Current Monitoring period)	01-May-2020 to 30-March-2023 (Current monitoring period)	VCS	VKU CERTIFICATIO N PVT. LTD.	02 years 10 months 30 days
Total	(31-March-2013 to 30-March-2023) (Inclusive of both days)	VCS		10 Years

¹ <https://registry.terra.org/app/projectDetail/VCS/1465>

1.2 Sectoral Scope and Project Type

The project activity under consideration is a bundled project activity. The project activity have following parameters.

Sectoral Scope:	01 - Energy industries (renewable / non-renewable sources)
Project Type:	I - Renewable Energy Projects
Methodology:	ACM002: Grid-connected electricity generation from renewable sources (EB 81, Version 16) ²

The project is a bundled project activity. The project is neither a grouped project nor an AFOLU project activity.

1.3 Project Proponent

Organization name	Orange Renewable Power Private Limited
Contact person	Mr. Murali Krishnam Raju M
Title	AGM
Address	301B, 3rd Floor, D-21 Corporate Park, Sector-21, Dwarka, New Delhi- 110077
Telephone	+91995955670
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, India - 452001
Telephone	+91-9644130430
Email	jimmy@infisolutions.org

² <https://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHLAR6MJ6VEU83>

1.5 Project Start Date

The start date of the project activity is 31-March-2013. It is the date on which all the WTGs in the project activity were commissioned.

1.6 Project Crediting Period

The project activity has opted for 10 years crediting period which can be renewed for maximum twice. The current monitoring falls under the 1st crediting period which is from 31-March-2013 to 30-March-2023. The project activity started generating emission reduction from 31-March-2013.

1.7 Project Location

The project activity is located at Jaisalmer and Pratapgarh districts of Rajasthan State, India. The geo- coordinates of the project location are as follows:

1. "Project 1": Geo-coordinates of 39.9 MW Wind power project in Jaisalmer (Bhesada)

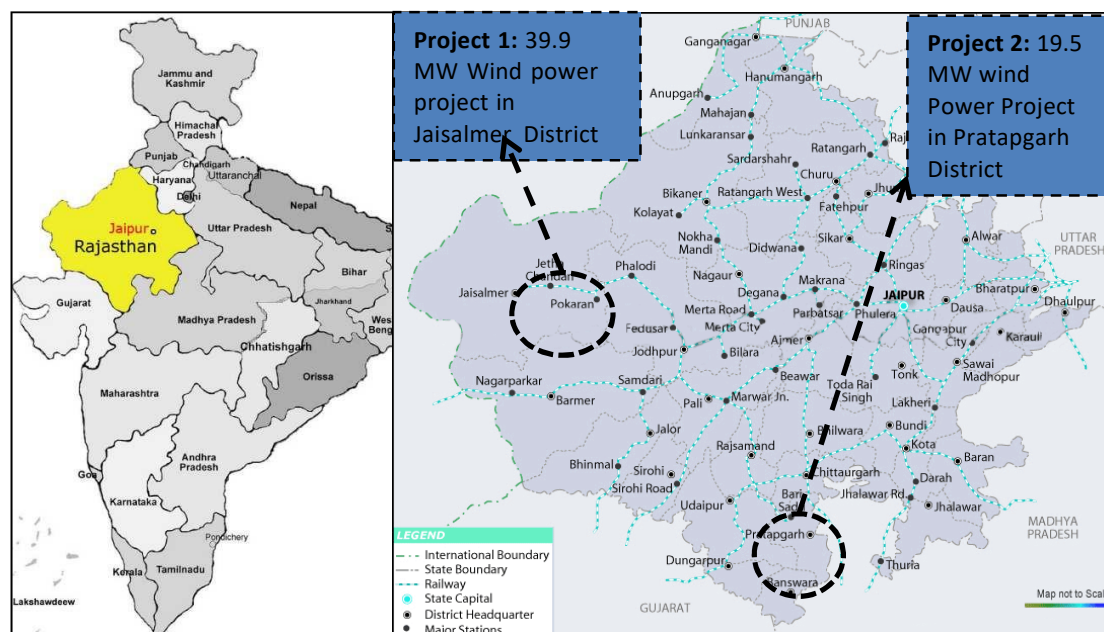
S.No	WTG No	Village	Taluk	District	Latitude	Longitude
1	RSA204	Luna Kala	Pokaran	Jaisalmer	26.6477	71.55631
2	RSA231	Luna Kala	Pokaran	Jaisalmer	26.65686	71.56304
3	RSA271	Luna Kala	Pokaran	Jaisalmer	26.65871	71.57321
4	RSA225	Naya Luna kala	Pokaran	Jaisalmer	26.62153	71.58829
5	RSA226	Naya Luna kala	Pokaran	Jaisalmer	26.62558	71.58246
6	RSA274	Naya Luna kala	Pokaran	Jaisalmer	26.64083	71.58605
7	RSA275	Naya Luna kala	Pokaran	Jaisalmer	26.63274	71.59008
8	RSA276	Naya Luna kala	Pokaran	Jaisalmer	26.62773	71.59484
9	RSA277	Naya Luna kala	Pokaran	Jaisalmer	26.62148	71.59838
10	RSA278	Naya Luna kala	Pokaran	Jaisalmer	26.61782	71.60192
11	RSA289	Naya Luna kala	Pokaran	Jaisalmer	26.61714	71.62101
12	RSA293	Motisar	Bhaniyana	Jaisalmer	26.63957	71.60723
13	RSA294	Motisar	Bhaniyana	Jaisalmer	26.64486	71.59981
14	RSA341	Motisar	Bhaniyana	Jaisalmer	26.65391	71.60882
15	RSA343	Motisar	Bhaniyana	Jaisalmer	26.64118	71.61789
16	RSA345	Motisar	Bhaniyana	Jaisalmer	26.62983	71.62431
17	RSA348	Motisar	Bhaniyana	Jaisalmer	26.61089	71.63743
18	RSA349	Motisar	Bhaniyana	Jaisalmer	26.60612	71.64224
19	RSA207	Naya Luna kala	Pokaran	Jaisalmer	26.62894	71.56688

2. "Project 2": Geo-coordinates of 19.5 MW Wind power project in Pratapgarh (Dalot)

S. No	WTG No	Village	Taluk	District	Latitude	Longitude
1	RDP2_01	Ambirama	Arnod	Pratapgarh	23.5622	74.837
2	RDP2_02	Ambirama	Arnod	Pratapgarh	23.5653	74.8353

3	RDP2_03	Ambirama	Arnod	Pratapgarh	23.5674	74.8357
4	RDP2_04	Ambirama	Arnod	Pratapgarh	23.5708	74.841
5	RDP2_05	Ambirama	Arnod	Pratapgarh	23.5713	74.8352
6	RDP2_06	Ambirama	Arnod	Pratapgarh	23.5747	74.8396
7	RDP2_07	Ambirama	Arnod	Pratapgarh	23.5773	74.8426
8	RDP2_08	Ambirama	Arnod	Pratapgarh	23.5602	74.8371
9	RDP2_09	Ambirama	Arnod	Pratapgarh	23.5946	74.8387
10	RDP2_10	Ambirama	Arnod	Pratapgarh	23.5946	74.8387
11	RDP2_11	Ambirama	Arnod	Pratapgarh	23.5872	74.8486
12	RDP2_12	Ambirama	Arnod	Pratapgarh	23.5884	74.8428
13	RDP2_13	Ambirama	Arnod	Pratapgarh	23.5919	74.841

The geographical location of the project site is as shown below: -



1.8 Title and Reference of Methodology

The methodology applied for the project is ACM0002 of version 16.0³ titled “Grid-connected electricity generation from renewable sources” ACM0002 draws upon the following tools which have been used in the VCS PD:

- Tool to Calculate the Emission Factor for an Electricity System (Version 04.0)

<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v4.0.pdf>

³ <https://cdm.unfccc.int/methodologies/DB/EY2CL7RTEHRC9V6YQHLAR6MJ6VEU83>

- ii) Tool for Demonstration and Assessment of Additionality (Version 7.0)

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

1.9 Participation under other GHG Programs

The project activity is not registered/participated under any other GHG programs and has not intended to pursue credits from other GHG program for the for the concerned monitoring period. The project is not registered under the REC mechanism of India⁴.

A declaration certificate for no other participation in any other GHG Programs for the monitoring period have been submitted for the assessment.

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

- Emission Trading Programs and Other Binding Limits: The project is not a part of any emission trading program as confirmed by the project proponent through the declaration of no double counting certificate.
- 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. Furthermore, the project activity is not availing any benefits from CDM/GS/GCC/UCR/RECs mechanism which can be confirmed from the link below:

https://www.recregistryindia.nic.in/index.php/publics/accredited_regens

[CDM: CDM-Home \(unfccc.int\)](https://www.unfccc.int/)

<https://www.goldstandard.org/>

<https://projects.globalcarboncouncil.com/>

<https://www.ucarbonregistry.io/>

[Registries | I-REC Standard \(irecstandard.org\)](https://www.irecstandard.org/)

- The project Activity is a wind power project and does not involve any supply chain in the project such as manufacturers, wholesalers, distributors and retailers. So, no indirect upstream and downstream GHG emissions are involved in the project activity. Thus, the Scope 3 emissions are not applicable in this project activity.

⁴ https://www.recregistryindia.nic.in/index.php/publics/registered_regens

1.11 Sustainable Development Contributions

Sustainable Development Contributions:

The project is contributing in sustainable development by generating electricity and reduction of CO₂ emissions due to implementation of project activity and generates employment to the local stakeholders. Through Project activity economic development has been achieved in the project location by creating opportunities of employment during the project lifetime. 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 270,812.65 MWh electricity and avoided 264,474 tons of greenhouse gas emissions in the atmosphere during the current monitoring period. So, the project contributes 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 renewable energy share in the energy mix	About 270,812.65 MWh, renewable electricity has supplied to Indian Grid during current monitoring period that helps to increase the renewable energy share in the energy mix	Since Commissioning, about 1,008,167.65 MWh (233,065+101,584+97,728+92,273+109,805+102,900+270,812.65) ⁵ renewable electricity has supplied to Indian Grid that helps to increase the renewable energy share in the energy mix.
2)	8.5	8.5.1: Average hourly earnings of employees, by sex, age, occupation and persons with disabilities	The project activity will result in temporary and primary employment opportunity during the construction and operation phase.	Project has contributed directly to achieve the SDG target, because the project activity has created 34 jobs.	34 people were employed since start date of the project activity. Which will also upgrade employee's knowledge and capacity over and above the commonly used technology in the energy sector of India.

⁵ <https://registry.terra.org/app/projectDetail/VCS/1465>

2)	13.0	13.2.2 Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase reduction of greenhouse gas emissions	By installation of 59.4 MW wind Energy Power Plant, project has prevented the release of 264,474 tCO ₂ e into the atmosphere during the monitoring period.	Overall Prevented the release of 984,558 tCO ₂ e (227,611+99,205+95,440+90,107+107,230+100,491+264,474) ⁶ into the atmosphere since project commissioning.
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⁶ <https://registry.verra.org/app/projectDetail/VCS/1465>

2 SAFEGUARDS

2.1 No Net Harm

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

The report on “Development Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013. This report clearly mentioned that wind energy project activity operations do not result in direct air pollution, noise pollution⁷.

There are no negative environmental impacts due to the project. Thus, there is no any significant impact 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 Local stakeholder consultation process was conducted during the validation stage⁸.

The details of the Stakeholder Meetings are:

Date of Invitation – 04-January-2013

Date of Meeting – 19-January-2013

Location of Meeting – Project site, Rajasthan

Discussions with Local stakeholders are being carried out at periodic intervals. There are no negative comments received for the project. In line with VCS requirements the following process has been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals.

Methods	Details	Reason for Selection
Communication Book or Register	Communication Register is maintained at Admin office at project site office. Any comments/inputs/grievance received shall be processed in line with the procedure.	The administrative office is located at the site office. Thus, it is appropriate publicly accessible location at which local stakeholders can provide their feedback on the project.

⁷ https://odishainnovationcell.nic.in/Content/SIC/Articles/RE_Development_Impacts_in_India.pdf

⁸ <https://registry.verra.org/app/projectDetail/VCS/1789>

Process Book	Any comments/inputs/grievance received shall be processed in line with the procedure	The local stakeholders are informed about the Communication Register. Further, a public notice has been posted at the site informing the stakeholders about the communication procedure.
Telephone access	+91 9959556707	Phone number of the contact person is circulated and discussed in the stakeholder meeting
Internet/email access	muraliraju.m@greenkogroup.com	Email ID of the contact person is circulated and discussed in the stakeholder meeting.

In the introductory speech, the representative of Orange Renewable 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 labours.

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.

The stakeholders are requested to share their experiences and grievances on continuous basis. PP is open for the continuous stakeholder interaction and formed a grievance/suggestion register placed at the project site for the comments at any point of time during the project crediting period. PP has explained this mechanism for on- going communication to the local stakeholders and transparently kept the notice mentioning the grievance register at the project site. Furthermore, the project team maintains regular communication with stakeholders by participating in community meetings and other relevant events in nearby village where all the panchayat meetings/social events/ festivals are organized. During these interactions, they facilitate a

feedback exchange and assess any stakeholder requirements to ensure project alignment and address community needs. Thus, maintaining the on-going communication with the stakeholders.

During the current monitoring period, no feedbacks had been received regarding site operation, therefore no mitigation action is required.

2.3 AFOLU-Specific Safeguards

Not Applicable to the project activity as this is not an AFOLU project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity implemented of 59.4 MW wind power project consisting of 19 WTGs of individual capacity 2100 kW (project 1) & 13 WTGs of individual capacity 1500 kW (Project 2).

All the WTGs in the bundled project activity were commissioned on the same date; 31- March-2013. A comprehensive list of WEGs commissioning dates is provided under section 1.1 of the document. All the WTGs involved in the project activity are already operational.

The electricity generated by the project has been exported to the Indian electricity grid. The project activity has therefore displaced an equivalent amount of electricity which have otherwise been generated by fossil fuel dominant electricity grid.

The WTGs are under operation including scheduled shutdowns during the current monitoring period. The breakdown occurred is for a total of 1.01% 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 detailed analysis of the same has been provided in Appendix 2 of the MR.

S.No.	Plant Site	Total Hours	Net operational Hours	Breakdown Hours
1	Orange Renewable Power Private Limited	817,920 hours ⁹	809,623 hours/ 98.98% of total hours	8,297 hours/ 1.01% of total hours

⁹ Total hours = 25,560 (i.e., 1065*24) *Number of WTGs (i.e., 32). So, 17520*50 = 817,920

The nearest WTG is RSA204 from PSS is at approx. 3 km, and the longest distance of WTG no RSA348 from PSS is approx. 15 km for the Bhesada site, Jaisalmer and similarly the nearest WTG no RDP2_01 from PSS is at approx. 7 km, and the longest distance of WTG no RDP2_13 from PSS is approx. 13 km for the Dalot site. A total of 03 dedicated Feeders are Present in the substation and the energy generation is measured in respective feeder by use of Tri vector meters. Internal available automatic metering system recently installed.

The details of the feeder's connected WTGs are as follows:

Feeder No.	Site	WTG No.
3	Bhesada	RSA231, RSA271, RSA274, RSA275, RSA293, RSA294, RSA341, RSA343, RSA345
4	Bhesada	RSA204, RSA207, RSA225, RSA226, RSA276, RSA277, RSA278, RSA289, RSA348, RSA349
7	Dalot	RDP2_01, RDP2_02, RDP2_03, RDP2_04, RDP2_05, RDP2_06, RDP2_07, RDP2_08, RDP2_09, RDP2_10, RDP2_11, RDP2_12, RDP2_13

Technical Specifications of all WTGs as per registered PD, Version 2.0.

Project 1: Suzlon's wind energy technology by implementing S88 model¹⁰ 2100kW WTGs.

OPERATING DATA	
Rated power	2.1 MW
Cut-in wind speed	4m/s
Rated wind speed	14m/s
Cut-out wind speed	25m/s
50 years gust wind speed	59.5m/s
Hub height	80 m & 100 m
Wind Class	IIA
Rotational Speed	15.1 - 17.7 RPM
ROTOR	
Pitch system	Electric drive with electric brake, gearbox, frequency converter & batteries.
Diameter	88 m
Swept area	6,082 m ²
Blade material type	Fiberglass / Epoxy
GENERATOR	

¹⁰ <https://en.wind-turbine-models.com/turbines/95-suzlon-s.88-2100>

Type	Induction generator with slip rings, variable rotor resistance with Suzlon Flexi slip control system
Rated power	2,100 kW
Rated voltage	690 / 600V
Frequency	50 / 60Hz
Protection	IP54 & IP23 (for slip rings)
Cooling system	Air cooled (IC6A1A6)
Insulation	Class H
Slip control	Flexi-Slip providing slip up to 16.7%
BAKING SYSTEM	
Aerodynamic brake	3 independent systems with blade pitching
Mechanical brake	Hydraulic disc brake, activated by hydraulic pressure
GEARBOX	
Type	3 stages (1 planetary & 2 helical)
Ratio	1:98.8 (±0.5%)
Nominal load	2,310 kW
YAW SYSTEM	
Type	Electric motors with brake, gearbox & pinion
Bearings	Friction bearing with gear rim
TOWER	
Type	Tubular in 4 sections
TRANSFORMER	
Make	Suzlon Energy Pvt. Ltd.
Voltage	690/33kV
Rated Power	2.5 MVA

Project 2: ReGen's wind energy technology by implementing V82model¹¹ 1500kW WTGs.

POWER	
Rated power	1500 kW
Cut-in wind speed (10 min. mean)	3 m/s
Rated wind speed (10 min. mean)	approx. 12.5 m/s
Cut-out wind speed (10min. mean)	22 m/s
Survival wind speed	52.5 m/s
Generator	Variable Speed, Multi-pole Synchronous with Permanent Magnet Excitation

¹¹ <https://en.wind-turbine-models.com/turbines/484-regen-powertech-vensys-82>

ROTOR	
Diameter	82 m
Swept area	5,325 sq.m
Speed range (variable)	9 to 17.3 RPM
TOWER AND FOUNDATION	
Hub height	85 m
Design	Tubular, Four sections
Foundation type	Floating foundation
CONTROL AND SAFETY SYSTEMS	
Control of output	Pitch Regulation
Speed control	Variable, Micro-controller based
Low Voltage Ride Through (LVRT)	3 seconds
Primary brake system	Aerodynamic Brake, Single Pitch Control/triple redundant
Pitch System	Electromechanical, Maintenance Free Toothed Belt Drive (Patented)
Remote Monitoring	VPN, Visualization via web-browser
TYPE CLASSES	
Wind turbine type class	GL III A
TRANSFORMER	
Make	Kamath Pvt Ltd
Voltage	620/33kV
Rated Power	1.7 MVA

The total breakdown is approx. 8,297 hrs. and the breakdown occurred is for a total of 1.01% 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. Though normal breakdowns due to O&M measures are continuously being worked upon by a dedicated O&M contractor for the projects' WTGs. The details of breakdown are provided in [Appendix 02](#) of this report.

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

3.2 Deviations

3.2.1 Methodology Deviations

There are no methodology deviations applied during this monitoring period.

3.2.2 Project Description Deviations

In the 1st monitoring period (31-March-2013 to 31-March-2015), there were three deviations from the project description as described in the registered PD.

1. In the registered PD, the monitoring method for Net Electricity ($EG_{\text{facility},y}$) was described in a very simplified manner. It described that, ($EG_{\text{facility},y}$) will be calculated based on the difference in “export”, “import” and “transmission loss”, however, the PD did not explain the exact method of calculations. In the current monitoring report the detailed method of calculating ($EG_{\text{facility},y}$) has been described under section 3.2 “Data and Parameters Monitored” (Now section 4.2 of this report).
2. The registered PD also described the source of data to be “JMRs”, which is correct. However, it has been clarified that the source of data is JMR along with “share certificate” provided by the O&M contractor. The above change in no way impact the project’s Additionality, Baseline and applicability of methodology.
3. Apart from the above, the registered PD also describes the voltage of Substation to be 220kV. However, it is corrected in the MR as the voltage of OJWEPL PSS is 220kV, OJWEPL GSS is 400kV and ORPPL GSS is 132kV. This change in the description as well does not impact the project’s Additionality, Baseline and applicability of methodology in any way.

There are no Project Description Deviations applied during this monitoring period

3.3 Grouped Projects

The project is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{\text{grid,OM,simple},y}$
Data unit	tCO ₂ /MWh
Description	Operating margin CO ₂ emission factor of NEWNE Grid (Now Indian grid)
Source of data	Central Electricity Authority: CO ₂ Emission Database CEA CO ₂ Baseline database Version 10 ¹²
Value applied	0.9857
Justification of choice of data or description of measurement methods and procedures applied	The data has been considered in accordance to the Tool to calculate emission factor of an electricity system.

¹² Microsoft Word - Final User Guide ver 10.0OK.doc (cea.nic.in)

Purpose of Data	Baseline Emission calculation
Comments	The operating margin emission factor is a 3-year generation weighted average (2011-14) Data calculated to be 0.9857. The operating Margin is calculated ex ante and fixed during the crediting period.

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO ₂ /MWh
Description	Build margin CO ₂ emission factor of NEWNE grid (Now Indian grid)
Source of data	Central Electricity Authority: CO ₂ Emission Database CEA CO ₂ Baseline database Version 10 ¹³
Value applied	0.9495
Justification of choice of data or description of measurement methods and procedures applied	The data has been considered in accordance to the Tool to calculate emission factor of an electricity system.
Purpose of Data	Baseline Emission calculation
Comments	The Build Margin would be calculated ex ante and fixed during the crediting period. For ex ante calculation the most recent data (2013- 14) available has been used and the build margin thus calculated is 0.9495.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor of NEWNE grid (Now Indian grid)
Source of data	Central Electricity Authority: CO ₂ Emission Database CEA CO ₂ Baseline database Version 10 ¹⁴
Value applied	0.9766
Justification of choice of data or description of measurement methods and procedures applied	The date has been considered in accordance to the Tool to calculate emission factor of an electricity system. The tool guides to take 75% weightage of $EF_{grid,OMsimple}$, & 25% weightage of $EF_{grid,BM,y}$

¹³ [Microsoft Word - Final User Guide ver 10.0.doc \(cea.nic.in\)](#)

¹⁴ [Microsoft Word - Final User Guide ver 10.0.doc \(cea.nic.in\)](#)

Purpose of Data	Baseline Emission calculation
Comments	The combined margin would be calculated ex-ante and fixed for the entire crediting period and the combined margin thus calculated is 0.9766.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{\text{facility}, y}$
Data unit	MWh
Description	Quantity of net electricity supplied to the grid during the year y.
Source of data	Monthly billing records issued by EB. These are called JMR (JointMeter Reading).
Description of measurement methods and procedures to be applied	Net electricity supplied is calculated based on the difference between calculated values of “export” (which already accounts for losses during transmission) and “import” on the EB energy meter at the Government substation. Transmission loss is accounted in Net export at substation based on the readings of Government substation & “primary metering Point”.
Frequency of monitoring/recording	Net Electricity = Net Export – Import Measurement: Continuous Recording: Monthly Monitoring Method: recording in Joint Meter Reading (GSS meter reading) and in Share certificate (PSS meter/controller reading). The JMR includes, monthly recording of electricity export & import of GSS meter and Share certificate includes apportioned export & import of each project owner.
Value monitored	270,812.65 MWh
Monitoring equipment	Orange Jaisalmer Wind Energy Private Limited: PSS (Pooling Sub Station): Main Meter Number (Feeder 3): RJB78194 Check Meter Number (Feeder 3): RJB78200 Main Meter Number (Feeder 4): RJB78201 Check Meter Number (Feeder 4): RJB78203 Orange Jaisalmer Wind Energy Private Limited: GSS (Government Sub Station): Main Meter Number: RJB90214

	Check Meter Number: RJB90215 All Meter Type: Trivector, 3 Phases 4 wire Both Accuracy Class: 0.2s. Orange Renewable Power Private Limited: GSS (Government Sub Station): Main Meter Number: RJB79226 Check Meter Number: APMB3516 All Meter Type: Electronic Tri-vector, 3 Phase 4 wire Both Accuracy Class: 0.2s.
QA/QC procedures to be applied	Net electricity supplied to the grid by the project activity is cross checked with invoices submitted to EB. The meter(s) shall be calibrated and maintained by the state utility as per their own schedule, and this frequency of meter calibration is not within the control of the Project Proponent. Calibration of electricity meters is carried out in-line with the Nation standard which recommends at least once in 5-year calibration or whenever abnormal difference/inconsistency is observed between main meter and check meter. The calibration details of the meters in included in the Appendix 1 of this document.
Purpose of the data	Calculation of baseline emissions.
Calculation method	OJWEPL: First the difference between the readings of PSS and GSS is derived: GSS Export – PSS Total Export = Export Difference PSS Import – GSS Total Import = Import Difference Then Net Export & Net Import by the project is derived by accounting losses by the project: Net Export by Project= PSS Project Export – [(Export Difference/PSS Total Export) x PSS Project Export] Net Import by Project = PSS Project Import + [(Import Difference/PSS Total Import) x PSS Project Import] Net Electricity Supplied to the Grid by the Project (OJWEPL) = Net Export by Project - Net Import by Project ORPPL Then Net Export & Net Import by the project is derived by accounting losses by the project: Net Export by Project = (GSS Export/ All WTGs Total Controller

	Export) x Project WTGs Controller Export Net Import by Project = (GSS Import/ All WTGs Total Controller Export) x Project WTGs Controller Export Net Electricity Supplied to the Grid by the Project (ORPPL) = Net Export by Project - Net Import by Project
Comments	The data will be archived on electronic media as well as on paper and will be kept for the period up to two years after the completion of the crediting period or the last issuance of VERs for the project activity, whichever occurs later.

4.3 Monitoring Plan

The project proponent has entered into agreement with the WTG Suppliers (Suzlon Energy Limited & ReGen) for the operation and maintenance of WTGs. The WTG supplier has dedicated and technically well-equipped O&M team for day-to-day Operation and maintenance of each WTG. O&M contractor will provide a monthly report, which includes generation data, major breakdown events and machine availability. Project manager is responsible for recording of monthly meter readings of export and import. Monthly power export and import data will be sent regularly to site in charge of each project separately.

Data Measurement

The export and import energy are 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 to PP, invoices are raised. These invoices can be used for cross checking the meter readings taken for the respective project activity.

Monitoring Procedure:

In both OJWEPL and ORPPL, JMR reading at substation contains electricity generation from “project WTGs” and “non-project WTGs”. Hence, it is the responsibility of the Developer (Suzlon for OJWEPL and ReGen in case of ORPPL) to apportion and provide the exact share of electricity supplied by the “Project WTGs”. To arrive at the electricity, share both the projects have adopted the following method as described below:

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.

In case Main meter or Check meter is found to be outside the acceptable limits of accuracy or faulty or not functioning properly, it will be repaired, recalibrated or replaced as soon as possible. In the event that the Main meter is not in service as a result of maintenance, repairs or testing, the Check meter will be used for readings and in the event that the Main meter and check meter both are not in service as a result of maintenance, repairs or testing, the Standby meter will be used for readings. During the monitoring period the main meter and check meter were operating in the acceptable limits of accuracy and there were no issues identified during the monitoring period.

Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff is 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**¹⁵. 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 is 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 in the monitoring parameter. The billing is raised based on 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 VCU for this project activity, whichever occurs later. The data is archived both electronically and manually, and kept in safe storage by PP.

(Orange Jaisalmer Wind Energy Private Limited) OJWEPL:

In OJWEPL, the electricity is monitored at two points, one being the 220kV Pooling Substation and other being the 400kV Government Substation (GSS). At the main meter of GSS there are both "Project WTGs" and "Non-Project WTGs" connected. Hence, the value at GSS meter consists

¹⁵ http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

of generation from “non-Project WTGs” as well. The reading from the GSS meter is the considered to be the actual electricity fed to grid. The reading at the 220kV is out of interest for the DISCOM and is used solely by the O&M contractor for apportioning of the electricity share from the project activity.

The below parameters are monitored for apportioning JMR values:

PSS Project Export & PSS Total Export

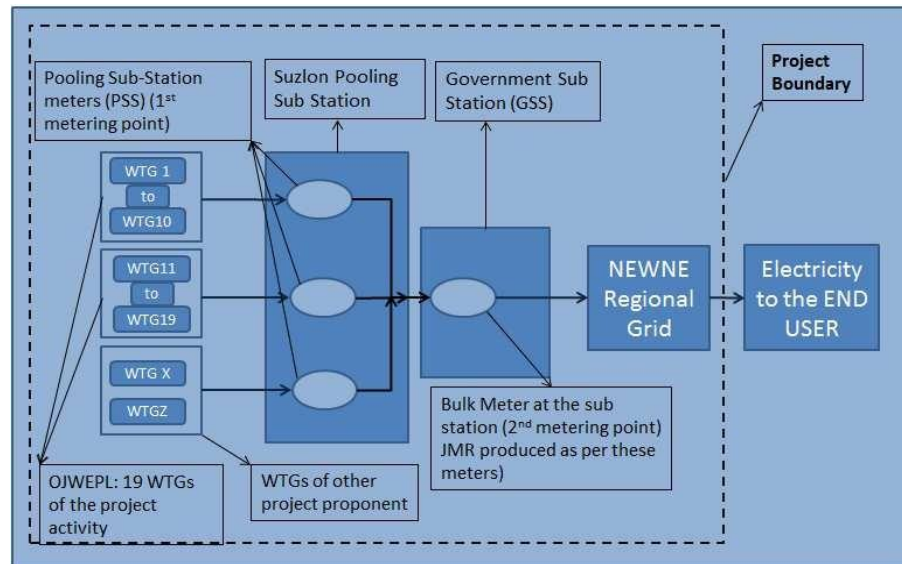
PSS Project Import & PSS Total Import

GSS Export & GSS Import

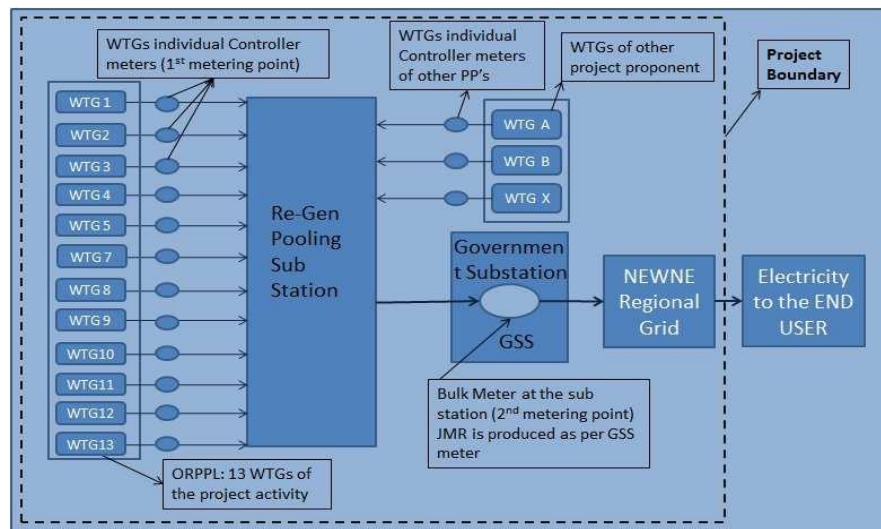
At the respective sub-station, the total export & import to this feeder is monitored using the main meter & the backup meter, which are electronic tri-vector meters. The total export at this meter is generally arrived at by multiplying the monthly meter reading to the multiplying factor of the meter concerned. The monthly meter reading is arrived at as the difference between the current meter reading and the previous meter reading. The period between these two readings is usually a period of one month which may vary. In a similar fashion, total import at this meter is also calculated. All the project investors raise the invoice for the electricity export to the grid. The allocation of electricity or apportion procedure is executed as per the aforesaid procedure:

A schematic diagram indicating the metering system is provided below:

OJWEPL: Metering System



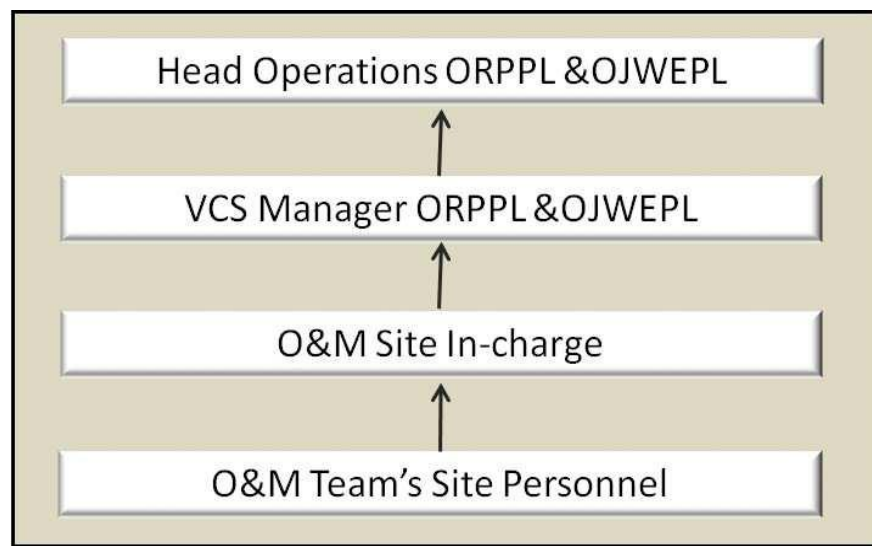
ORPPL Metering System:



Methods:

Monitoring roles and responsibilities:

The operational and management structure implemented for data monitoring is as follows: The Project activity is operated by the O&M contractor for the project activity and managed by the PP. Suppliers follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project. The data for the project is compiled by the O&M Contractor and subsequently stored by the PP, the data flows as per the below mentioned flow chart starting from Site O&M team which monitors day to day operational data and monthly recording. The roles and responsibilities for the project are described as below;



Responsibilities Head operation: Overall functioning and maintenance of the project activity, the Site in charge shall coordinate with the O&M operator as well as the Head operation.

Responsibilities of VCS manager: Co-ordination between Site in charge of the O&M team site personnel as well as the project participant and further report to PP head office.

Responsibilities of O&M Site In-charge: Responsibility for maintaining the data records, ensures completeness of data, and reliability of data (calibration of equipment) as well as data recording for all the parameters.

Responsibilities of O&M team site personnel: Responsibility for day-to-day data collection and maintains day-to-day monitored data.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

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:

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

Where:

BE_y= Baseline emissions in year y (tCO₂)

EG_{PJ, y}= Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the current 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” (tCO₂/MWh) (i.e, 0.9766 tCO₂/MWh).

Vintage	Generation (MWh)
2020 (01-May-2020 to 31-December-2020)	61,767.44
2021 (01-January-2021 to 31-December-2021)	100,985.60
2022 (01-January-2022 to 31-December-2022)	90,961.35
2023 (01-January-2021 to 31-March-2021)	17,098.27
Total	270,812.65

Vintage	Emission reductions (tCO ₂ e)
2020 (01-May-2020 to 31-December-2020)	60,322
2021 (01-January-2021 to 31-December-2021)	98,622
2022 (01-January-2022 to 31-December-2022)	88,832
2023 (01-January-2021 to 31-March-2021)	16,698
Total	264,474

Therefore,

$$\begin{aligned} BE_y &= 61,767.44 \times 0.9766 \text{ (For vintage 2020)} \\ &= 60,322 \text{ tCO}_2\text{e (Round down values)} \end{aligned}$$

$$\begin{aligned} BE_y &= 100,985.60 \times 0.9766 \text{ (For vintage 2021)} \\ &= 98,622 \text{ tCO}_2\text{e (Round values)} \end{aligned}$$

$$\begin{aligned} BE_y &= 90,961.35 \times 0.9766 \text{ (For vintage 2022)} \\ &= 88,832 \text{ tCO}_2\text{e (Round values)} \end{aligned}$$

$$\begin{aligned} BE_y &= 17,098.27 \times 0.9766 \text{ (For vintage 2023)} \\ &= 16,698 \text{ tCO}_2\text{e (Round values)} \end{aligned}$$

$$\begin{aligned} \text{Total } BE_y &= 270,812.65 \times 0.9766 \\ &= 264,474 \text{ tCO}_2\text{e (Round down values)} \end{aligned}$$

5.2 Project Emissions

Not Applicable, since emissions from the project activity is zero as per ACM0002 (Version 16.0) methodology. Hence, $PE_y = 0$.

5.3 Leakage

Not Applicable, since leakage emissions from the project activity is zero as per ACM0002 (Version 16.0) methodology. Hence, $LE_y = 0$.

5.4 Net GHG Emission Reductions and Removals

Emission reductions:

As per para 62 of methodology ACM0002 (Version 16.0) Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year y (t CO₂e/year)

BE_y = Baseline emissions in year y (t CO₂e /year)

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

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

$$BE_y = 264,474 \text{ tCO}_2\text{e}$$

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

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

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)
01-May-2020 to 31-December -2020	60,322	0	0	60,322
01- January-2021 to 31- December -2021	98,622	0	0	98,622
01- January-2022 to 31- December -2022	88,832	0	0	88,832
01- January-2023 to 30- March -2023	16,698	0	0	16,698
Total	264,474	0	0	264,474 (Round down)

<u>Ex-ante emissions reductions/removals</u>	<u>Achieved emissions reductions/removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
<u>60,594.66 tCO₂e (For vintage year 2020)</u>	60,322 tCO ₂ e	-0.45%	It is to be noted here that as per the estimated emission reduction estimated from the project activity for the current monitoring period is 299,873 tCO₂e, whereas actual emission reductions achieved are 264,474 tCO₂e, which is approximately 11.80 % lower than the estimated emission reductions. The generation of electricity depends upon many other climatic conditions, and not within the control of the project participant. The PLF for (OJWEPL) has 20.29% wrt to registered PD. However, the breaching value for PLF is 29.90% as per PD and the project IRR remain within the benchmark with the said decrease for OJWEPL and the PLF for (ORPPL) has 1.07% wrt to registered PD. However, the breaching value for PLF is 31.60% as per PD and the project IRR remain within the benchmark with the said decrease for ORPPL. The PLF of overall plant bundled wind power project in Rajasthan by Orange Renewable Power Private Limited (59.4 MW) has 11.80% wrt to registered PD. However, the breaching value for PLF is 31.60% as per PD and the project IRR remain within the benchmark with the said decrease for overall plant. Therefore, the decrease GHG accounting is acceptable.
<u>94,414.93 tCO₂e (For vintage year 2021)</u>	98,622 tCO ₂ e	+4.46%	
<u>94,414.93 tCO₂e (For vintage year 2022)</u>	88,832 tCO ₂ e	-5.91%	
<u>16,910.14 tCO₂e (For vintage year 2023)</u>	16,698 tCO ₂ e	-1.25%	
<u>299,873 tCO₂e (For total monitoring period)</u>	264,474 tCO ₂ e	-11.80%	

APPENDIX 1 METER CALIBRATION DETAILS

* As per the registered PD, Calibration of all the meters will be undertaken at least once in 5 years.

Project	Meter and Location	Meter number	Make	Model	Accuracy class	Previous Calibration Date	Previous Calibration Validity*	Current Calibration Date*	Current Calibration Validity*
OJWEPL Jaisalmer	400KV GSS AKAL, RRVPNL (Main meter)	RJB90214	SECURE	PRIMER 300	0.2s	17-April-2017	16-April-2022	23-January-2020	22-January-2025
	400KV GSS AKAL, RRVPNL (Backup meter)	RJB90215	SECURE	PRIMER 300	0.2s	17-April-2017	16-April-2022	23-January-2020	22-January-2025
	FEEDER-3 At 220KV PSS Bhesada Jaisalmer (Main meter)	RJB78194	SECURE	PRIMER	0.2s	19-August-2017	18-August-2022	12-April- 2020	11-April- 2025
	FEEDER-3 At 220KV PSS Bhesada Jaisalmer (Backup meter)	RJB78200	SECURE	PRIMER	0.2s	19-August-2017	18-August-2022	12-April- 2020	11-April- 2025
	FEEDER-4 At 220KV PSS Bhesada Jaisalmer (Main meter)	RJB78201	SECURE	PRIMER	0.2s	19-August-2017	18-August-2022	12-April- 2020	11-April- 2025

	FEEDER-3 At 220KV PSS Bhesada Jaisalmer (Backup meter)	RJB78203	SECURE	PRIMER	0.2s	19-August-2017	18-August-2022	12-April- 2020	11-April- 2025
ORPPL Pratapgarh	GSS Main Meter At 132kV GSS RVPNL, Dalot	RJB79226	SECURE	PRIMER	0.2s	26-February- 2020	25- February- 2025	12-April-2020	11-April-2025
	GSS Check Meter, At 132kV GSS RVPNL, Dalot	APMB3516							

APPENDIX 2 BREAKDOWN DETAILS¹⁶

Month	Breakdowns Duration (Hours)
May-20	502.2
June-20	258.1
July-20	350.1
August-20	348.6
September-20	74.6
October-20	201.1
November-20	183.4
December-20	330.9
January-21	109.4
February-21	77.3
March-21	242.3
April-21	132.7
May-21	240.3
June-21	582.4
July-21	388.8
August-21	234.2
September-21	357.2
October-21	337.8
November-21	265.4
December-21	314.1
January-22	275.8
February-22	83.9
March-22	302.6
April-22	365.3
May-22	269.5
June-22	221.1
July-22	159.5
August-22	164
September-22	131.7
October-22	103.3
November-22	54.8
December-22	31.00
January-23	222.1
February-23	153.7
March-23	228
Total	8297.2

Therefore, the total breakdown is approx. 8,297 hrs. and the breakdown occurred is for a total of 1.01% of total hours of all WTGs.

¹⁶ The detailed breakdowns sheet is provided to VVB.

APPENDIX 3: SDG CONTRIBUTION

SDG Contribution of 59.4 MW wind power project by Orange Renewable Power Private Limited & Orange Jaisalmer Wind Energy Private Limited.

Months	Total Net Generation (MWh)	Emission Factor(tCO ₂ /MWh)	Emission Reductions(tCO ₂)
	SGD 7		SGD 13
May-20	11155.42	0.9766	10894.38
June-20	11112.14	0.9766	10852.12
July-20	9737.32	0.9766	9509.47
August-20	8671.82	0.9766	8468.90
September-20	3728.85	0.9766	3641.60
October-20	4790.66	0.9766	4678.56
November-20	4685.63	0.9766	4575.98
December-20	7885.60	0.9766	7701.07
Vintage 2020	61,767.44		60322.00
January-21	7630.79	0.9766	7452.23
February-21	4238.58	0.9766	4139.39
March-21	7963.74	0.9766	7777.39
April-21	7152.15	0.9766	6984.79
May-21	11685.50	0.9766	11412.06
June-21	13376.79	0.9766	13063.77
July-21	14179.06	0.9766	13847.27
August-21	12969.38	0.9766	12665.89
September-21	4315.15	0.9766	4214.17
October-21	4646.84	0.9766	4538.10
November-21	5712.58	0.9766	5578.90
December-21	7115.06	0.9766	6948.57
Vintage 2021	100,985.00		98622.00
January-22	5166.41	0.9766	5,045.51
February-22	6119.98	0.9766	5,976.78
March-22	7079.86	0.9766	6,914.19
April-22	8005.90	0.9766	7,818.56
May-22	16344.80	0.9766	15,962.33
June-22	14908.19	0.9766	14,559.34
July-22	6662.00	0.9766	6,506.11
August-22	7201.44	0.9766	7,032.93
September-22	6457.64	0.9766	6,306.53
October-22	3877.53	0.9766	3,786.80
November-22	3228.51	0.9766	3,152.96
December-22	5909.08	0.9766	5,770.81
Vintage 2022	90,961.35		88,832.00

January-23	8705.67	0.9766	8,501.96
February-23	3768.97	0.9766	3,680.77
March-23	4623.63	0.9766	4,515.44
Vintage 2023	17,098.27		16,698.00
Total	270,812.65		264,474 (Vintage wise round down)