



**Verified Carbon
Standard**

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



**INFINITE
SOLUTIONS**

Project title	Bundled Wind Power Project in Rajasthan by Orange Renewable Power Private Limited
Project ID	VCS 1465
Crediting period	31-March-2023 till 30-March-2033 (inclusive of both the dates)
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Prepared by	Infinite Environmental Solutions Limited Registered Address: Plot Number 128 FB, Ring Road, Sector F, Scheme Number 94, Indore-452016 (Madhya Pradesh), India Email: jimmy@infisolutions.org Website: www.infisolutions.org

CONTENTS

1	PROJECT DETAILS.....	4
1.1	Summary Description of the Project	4
1.2	Audit History.....	6
1.3	Sectoral Scope and Project Type	7
1.4	Project Eligibility	7
1.5	Project Design	8
1.6	Project Proponent	8
1.7	Other Entities Involved in the Project	8
1.8	Ownership.....	9
1.9	Project Start Date	9
1.10	Project Crediting Period	9
1.11	Project Scale and Estimated GHG Emission Reductions or Removals	10
1.12	Description of the Project Activity.....	10
1.13	Project Location	14
1.14	Conditions Prior to Project Initiation	15
1.15	Compliance with Laws, Statutes and Other Regulatory Frameworks.....	15
1.16	Double Counting and Participation under Other GHG Programs	15
1.17	Double Claiming, Other Forms of Credit, and Scope 3 Emissions.....	16
1.18	Sustainable Development Contributions	16
1.19	Additional Information Relevant to the Project	19
2	SAFEGUARDS AND STAKEHOLDER ENGAGEMENT	19
2.1	Stakeholder Engagement and Consultation.....	19
2.2	Risks to Stakeholders and the Environment.....	23
2.3	Respect for Human Rights and Equity	24
2.4	Ecosystem Health	26
3	APPLICATION OF METHODOLOGY.....	28
3.1	Title and Reference of Methodology	28
3.2	Applicability of Methodology.....	28
3.3	Project Boundary	36
3.4	Baseline Scenario	37

3.5	Additionality	40
3.6	Methodology Deviations	42
4	QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS.....	43
4.1	Baseline Emissions	43
4.2	Project Emissions	48
4.3	Leakage Emissions	48
4.4	Estimated GHG Emission Reductions and Carbon Dioxide Removals.....	48
5	MONITORING	50
5.1	Data and Parameters Available at Validation	50
5.2	Data and Parameters Monitored	51
5.3	Monitoring Plan	53
	APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION.....	60
	APPENDIX 2: CALIBRATION DETAILS	61

1 PROJECT DETAILS

1.1 Summary Description 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 “Greenko Renewable Power Private Limited”¹ & “Greenko Jaisalmer Wind Energy Private Limited”² of which the “Greenko Renewable Power Private Limited”³ 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 “Greenko Jaisalmer Wind Energy Private Limited” (GJWEPL). 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 “Greenko Renewable Power Private Limited” (GRPPL). It consists of 13 WTGs of 1.5 MW class ReGen V82 make.

The electricity generated by the project is exported to the Indian electricity grid. Over the 10 years of the 2nd crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 100,520 tCO_{2e} per year, thereon displacing 107,485.20 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 purpose of the project activity is to generate energy electricity by the utilization of wind velocity and further selling the generated energy to the respective Grid. In this process there is no consumption of any fossil fuel and hence it does not lead to any greenhouse gas emissions. Thus, electricity would be generated through sustainable means without causing any negative impact on the environment.

Scenario existing prior to the implementation of project activity:

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

¹ The name of the company Orange Renewable Power Private Limited has been changed to Greenko Renewable Power Private Limited. The supporting for the same has been provided to VVB.

² The name of the company Orange Jaisalmer Wind Energy Private Limited has been changed to Greenko Jaisalmer Wind Energy Private Limited. The supporting for the same has been provided to VVB.

³ Thus, the representative of promoter of this bundled project has been changed from Orange Renewable Power Private Limited to Greenko Renewable Power Private Limited. The supporting for the same has been provided to VVB.

addition of new generation sources, as reflected in the Combined Margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

The project is promoted by individual sub project investors, the details of which are as follows

Wind Project Investor	Capacity (MW)	Technology	State	Connection with Grid	Name of Substation	Use of electricity
Greenko Jaisalmer Wind Energy Private Limited (Site 1 – Bhesada)	19 x 2.1 = 39.9 MW	Wind	Rajasthan	INDIAN Grid	400 KV Akal (Bhesada)	Sale to Grid
Greenko Renewable Power Private Limited (Site 2 – Dalot)	13 x 1.5 = 19.5 MW				132 KV RVPNL Dalot	
Total capacity of Wind projects	59.4 MW					

There was no activity at the site prior to implementation of the project activity (Greenfield). All the WTGs in the project activity were commissioned on 31-March-2013 and have been operational since then. Moreover, a comprehensive list of the of the commissioning of the WTGs has been provided in the table below and the plant is in operational condition.

Wind Project Investor	Capacity (MW)	Machine ID	Commissioning Date
Greenko Jaisalmer Wind Energy Private Limited (Site 1 – Bhesada)	2.1	RSA231	31-March-2013
	2.1	RSA271	31-March-2013
	2.1	RSA274	31-March-2013
	2.1	RSA275	31-March-2013
	2.1	RSA293	31-March-2013
	2.1	RSA294	31-March-2013
	2.1	RSA341	31-March-2013
	2.1	RSA343	31-March-2013
	2.1	RSA345	31-March-2013
	2.1	RSA204	31-March-2013
	2.1	RSA207	31-March-2013
	2.1	RSA225	31-March-2013
	2.1	RSA226	31-March-2013
	2.1	RSA276	31-March-2013
	2.1	RSA277	31-March-2013

	2.1	RSA278	31-March-2013
	2.1	RSA289	31-March-2013
	2.1	RSA348	31-March-2013
	2.1	RSA349	31-March-2013
Greenko Renewable Power Private Limited (Site 2 – Dalot)	1.5	RDP2_01	31-March-2013
	1.5	RDP2_02	31-March-2013
	1.5	RDP2_03	31-March-2013
	1.5	RDP2_04	31-March-2013
	1.5	RDP2_05	31-March-2013
	1.5	RDP2_06	31-March-2013
	1.5	RDP2_07	31-March-2013
	1.5	RDP2_08	31-March-2013
	1.5	RDP2_09	31-March-2013
	1.5	RDP2_10	31-March-2013
	1.5	RDP2_11	31-March-2013
	1.5	RDP2_12	31-March-2013
	1.5	RDP2_13	31-March-2013
Total Capacity of Wind Projects	59.4 MW		

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	31-March-2013 to 30-March-2023 (Inclusive of both days)	VCS	TÜV Rheinland (China) Ltd.	10 years
Verification	31-March-2013 to 31-March-2015 (Inclusive of both days)	VCS	EPIC Sustainability Services Private Limited	02 Years, 00 Months, 01 Days
Verification	01-April-2015 to 31-March-2016 (Inclusive of both days)	VCS	KBS Certification Services Private Limited	01 Years, 00 Months, 00 Days
Verification	01-April-2016 to 31-March-2017 (Inclusive of both days)	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

	(Inclusive of both days)			
Verification	01-April-2018 to 30-April-2019 (Inclusive of both days)	VCS	LGA Technological Center S.A. (Applus+ Certification)	01 Year, 01 Month, 00 Days
Verification	01-May-2019 to 30-April (Inclusive of both days)	VCS	LGA Technological Center S.A. (Applus+ Certification)	01 Year, 00 Month, 00 Days
Verification	01-May-2020 to 30-March-2023 (Inclusive of both days)	VCS	VKU CERTIFICATIO N PVT. LTD.	02 years 10 months 30 days
Validation (Renewal)	31-March-2023 to 30-March-2033 (inclusive of both the dates)	VCS	RINA Services S.p.A.	10 Years
Total	Crediting Period 01: 31-March-2013 to 30-March-2023 (inclusive of both the dates) Crediting Period 02: 31-March-2023 to 30-March-2033 (inclusive of both the dates)	VCS		Crediting Period 01 and 02: 20 Years

1.3 Sectoral Scope and Project Type

Sectoral scope ⁴	01 – Energy industries (renewable/non-renewable sources)
Project activity type	I - Renewable Energy Projects

1.4 Project Eligibility

1.4.1 General eligibility

⁴ Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

This is renewable of crediting period of the project activity; Project is registered as per VCS standard. Hence this criterion is not applicable while renewing of crediting period.

1.4.2 AFOLU project eligibility

Not Applicable, as the project does not come under AFOLU category.

1.4.3 Transfer project eligibility

Not Applicable, as the project has not been transferred from any other registry.

1.5 Project Design

The project is not a grouped project and relevant check box is marked.

- ☐ Single location or installation
- ☒ Multiple locations or project activity instances (but not a grouped project)
- ☐ Grouped project

1.5.1 Grouped project design

Not Applicable as this is not grouped project.

1.6 Project Proponent

Organization name	Greenko 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

1.7 Other Entities Involved in the Project

Organization name	Infinite Environmental Solutions Limited
Role in the project	Project Consultant
Contact person	Mr. Jimmy Sah
Title	Chief Operating Officer

Address	Plot Number 128 FB, Ring Road, Sector F, Scheme Number 94, Indore-452016 (Madhya Pradesh), India
Telephone	+91-731-4050174
Email	jimmy@infisolutions.org

1.8 Ownership

The project is promoted by “Greenko Renewable Power Private Limited” & “Greenko Jaisalmer Wind Energy Private Limited”. However, it is owned by “Greenko Renewable Power Private Limited” which is the project participant of this bundled project. The right to use the project is completely entrusted to the individual PPs, who are the sole owner of project activity which can be cross verified by following evidences:

- Power Purchase Agreement

1.9 Project Start Date

Project start date	31-March-2013
Justification	The project start date is the earliest commissioning date amongst all the individual projects which are part of this project activity which is 31-March-2013.

1.10 Project Crediting Period

Crediting period	☐ Seven years, twice renewable ☐ Ten years, fixed ☒ Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)
Start and end date of first or fixed crediting period	Crediting Period Start Date: 31-March-2023 Crediting Period End Date: 30-March-2033 The project activity adopts renewable crediting period of 10 years' period which can be renewed for maximum 2 times. Estimated lifetime of the project: 20 Years, 00 Months, 00 Days - For Wind Projects

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

The estimated annual GHG emission reductions/removals (ERRs) of the project:

☒ < 300,000 tCO₂e/year (project)

☐ ≥ 300,000 tCO₂e/year (large project)

Hence for the current project activity Estimated GHG emission reduction is less than the 300,000 tCO₂e, thus the current project activity falls under the Projects category.

The table below for the first (if renewable) or fixed crediting period:

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO ₂ e)
31-March-2023 to 31-December-2023	75,390
01-January-2024 to 31-December-2024	100,520
01-January-2025 to 31-December-2025	100,520
01-January-2026 to 31-December-2026	100,520
01-January-2027 to 31-December-2027	100,520
01-January-2028 to 31-December-2028	100,520
01-January-2029 to 31-December-2029	100,520
01-January-2030 to 31-December-2030	100,520
01-January-2031 to 31-December-2031	100,520
01-January-2032 to 31-December-2032	100,520
01-January-2033 to 30-March-2033	25,130
Total estimated ERRs during the first or fixed crediting period	1,005,200
Total number of years	10 years
Average annual ERRs	100,520

1.12 Description of the Project Activity

The project activity implemented of 59.4 MW wind power project consisting of 19 WTGs of individual capacity 2.1 MW (project 1) & 13 WTGs of individual capacity 1.5 MW (Project 2) located at Rajasthan in India. 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 project is promoted by individual sub project investors, the details of which are as follows:

Wind Investor	Project	Capacity (MW)	Technology	State	Connection with Grid	Name of Substation	Use of electricity
Greenko Jaisalmer Wind Energy Private Limited (Site 1 – Bhesada)		19 x 2.1 = 39.9 MW	Wind	Rajasthan	INDIAN Grid	400 KV Akal (Bhesada)	Sale to Grid
Greenko Renewable Power Private Limited (Site 2 – Dalot)		13 x 1.5 = 19.5 MW				132 KV RVPNL Dalot	
Total capacity of Wind projects		59.4 MW					

The electricity generated by the project will be 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 project proponent plans to avail VERs benefits for the project.

The project activity is in line with the sustainable development priorities of the country. The electricity generated from the wind farm will be exported to the Indian grid and sold to the state electricity utility, thereby marginally contributing to reducing the energy demand supply gap in the state of Rajasthan.

The life time of a Wind Electric Generator is 20 years.

Technology

The project activity uses:

Project 1: Suzlon's wind energy technology by implementing S88 model⁵ 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

⁵ <https://en.wind-turbine-models.com/turbines/95-suzlon-s.88-2100>

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	
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 V82model⁶ 1500kW WTGs.

POWER	
Rated power	1500 kW
Cut-in wind speed (10 min. mean)	3 m/s

⁶ <https://en.wind-turbine-models.com/turbines/484-regen-powertech-vensys-82>

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
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

Emission Reductions from anthropogenic sources:

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

1.13 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:

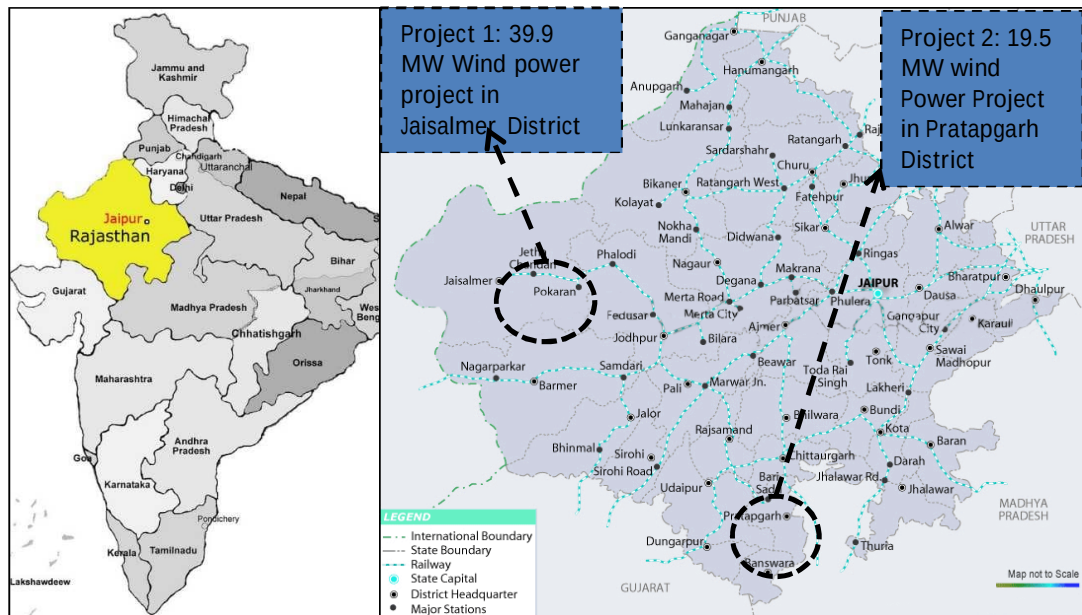
1.“Project 1”: Geo-coordinates of 39.9 MW Wind power project in Jaisalmer (Bhesada)

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: -



1.14 Conditions Prior to Project Initiation

The pre project scenario is same as baseline scenario. Please refer section 3.4 for the description of baseline scenario.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

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

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.16.2 Registration in Other GHG Programs

Has the project registered under any other GHG programs?

☐ Yes ☒ No

Is the project active under the other program?

☐ Yes ☒ No

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 01-12 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

1.18 Sustainable Development Contributions

The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GOI) under the Ministry of Environment and Forests (MoEF), has mentioned four indicators for the sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India. Thus, the project's contribution towards sustainable development has been addressed based on the following sustainable development aspects:

Economic well-being:

- The project activity generates employment in the local areas.
- The project activity leads to investment to a developing region which otherwise would not have happened in the absence of project activity. The generated electricity will be fed into grid, thereby improving the grid frequency and availability of electricity which will provide new opportunities for industries and economic activities for greater local employment and

development. The project activity also leads to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

- Use of renewable energy source (wind energy) also helps in conservation of natural resources (like coal) in the country & thus less GHG emissions in the atmosphere.
- The project contributes to the economic sustainability around the plant sites, which is promotion of decentralization of economic power.

Social well-being:

- The plant sites are isolated rural areas which are the victims of unemployment, poverty and other social backwardness. The project would lead to the development of these regions.
- The project would enhance availability of power to the local industries, agriculture and commercial activities in the vicinity of the project area by augmenting power supply to the INDIAN Grid, thereby improving quality of power supplied to various users by stabilizing the grid.
- During civil works, a lot of construction work took place, which generated employment for local people around the plant site.
- Other than these, there are various kinds of mechanical work, which would generate employment opportunity on regular and permanent basis
- Frequency of visits by skilled, technical personnel and industrialists increases due to installation / site visit / operation and maintenance work related to WTGs projects. This directly and indirectly positively effects the social behaviour & economy of villages and nearby area.

Environmental well-being:

- The Wind power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions.
- There is no impact on land, water, air and soil due to the installation of WTGs projects. Thus, the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.

Technological well-being:

- The project activity is step forward in harnessing the untapped wind potential and further diffusion of the technology in the region.
- The project activity leads to the promotion of WTGs and demonstrates the success of wind turbines in the region which further motivate more investors to invest in wind power projects. Hence, the project activity leads to technological well-being.

Therefore, 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 and 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.

However, the project activity is contributing toward fulfilling three SDG goals:

SDG target	SDG indicator	Description	Contributions over crediting period
13.0 	Tons of greenhouse gas emissions avoided or removed	The wind power project is Green House Gas (GHG) emissions free, the power generated will prevent the anthropogenic GHG emissions generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas. The estimation of GHG reductions by this project is limited to carbon dioxide (CO ₂) only.	It supports sustainable development and, over 10 years of the second crediting period, it is expected to avoid 100,520 tons of CO ₂ emission reductions per year and 1,005,200 tons of CO ₂ emissions reductions during the whole crediting period. Thus, the project will contribute towards fulfilling SDG 13.0.
8.5 	Number of People Employed and number of trainings provided	The project activity will create both direct and indirect job opportunities for local people thus promotes the local economic development and improve the level of people's life by providing potential job opportunities to residents. Thus, the project activity supports decent work and economic growth of the local people.	The employees are provided training, a decent work and atmosphere, and fair pay. Over 10 years of the crediting period, the project is expected to retain minimum 25 peoples during the crediting period and conduct 1 training per year thus, fulfilling SDG 8.5

7.2 	Renewable energy share in the total final energy consumption	The project utilizes renewable energy (wind energy) and generates electricity as a substitute for thermal/fossil fuel-based power plant and thus, contributing to the creation of accessible, renewable, and sustainable energy.	Over 10 years of the crediting period, the project is expected to generate 107,485.20 MWh/year and 1,074,852 MWh during the whole crediting period. As a result, the project aligns with and contributes to the fulfillment of SDG 7.2.
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1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

Not applicable since leakage emissions from the project activity is zero as per ACM0002 methodology.

1.19.2 Commercially Sensitive Information

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

1.19.3 Further Information

There are no information or incidents that is bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification

All the stakeholders have been invited through submission of the invitation letter and Public Notice to attend the stakeholders meeting during validation of the project activity. Following

	stakeholders have been identified for this project activity those who are likely to be impacted by this project are as follows: 1. Local community members 2. Local village administration 3. Government officials 4. Panchayat officials 5. Local NGOs 6. Employees
Legal or customary tenure/access rights	There is no legal or customary tenure/access rights to territories and resources, including collective and conflicting rights, held by stakeholders, indigenous people (IPs), local communities (LCs), and customary rights holders. Not Applicable
Stakeholder diversity and changes over time	Based on the continuous interactions and ongoing communication with the stakeholders it is identified that the social, economic, and cultural diversity within stakeholder groups remained stable over time and there are no significant changes in the composition of each group observed.
Expected changes in well-being	Expected changes 1. Economic well-being – The project activity is likely to provide employments to the locality thus economic well beings are expected. 2. Environmental well-being – The project activity reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion and thus preserve limited fossil fuel resources. Along with CO₂ reductions, the project activity also helps in avoiding significant amount of GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.
Location of stakeholders	1. Jaisalmer, Rajasthan 2. Pratapgarh, Rajasthan
Location of resources	All the resources and the territories associated with the project did not result in rehabilitation and resettlement. There is no settlement

	on the land acquired. Therefore, no territories and resources of stakeholders directly intersect with the project area.
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2.1.2 Stakeholder Consultation and Ongoing Communication

Date of stakeholder consultation	1. Greenko Jaisalmer Wind Energy Private Limited (Project site, Rajasthan): 19-January-2013 2. Greenko Renewable Power Private Limited (Project site, Rajasthan): 19-January-2013
Stakeholder engagement process	All the stakeholders were invited through submission of the invitation letter and Public Notice to attend the stakeholders meeting on 04-January-2013 and this invitation was posted in multiple locations in the regional language within the vicinity of all project instances.
Consultation outcome	Project representatives explained the project's associated benefits with respect to CO₂ emission reductions and explained the purpose of conducting the stakeholder meeting in order to gather the views and comments of the local stakeholders on the project activity and no negative comments were received during the local stakeholder meeting. The PP also placed a grievance register onsite in where the stakeholder can put down his/her complain and the same if found genuine will be addressed in a reasonable time period. Also, regular stakeholder engagement is one the key focus at the site. The local stakeholders' consultation was well attended, with a number of participants coming from the village's local bodies and local residents around the project area.
Ongoing communication	Stakeholder's consultation is a continuous process and hence a grievance register is kept in the communication room of the company gate where any stakeholder can come and share his/her feedback. The feedback received is taken care by PP with utmost priority. No negative comments from local or nearby stakeholders were received.
Stakeholder input	Stakeholder's consultation is a continuous process and hence a feedback register is kept at the project site office where any stakeholder can come and share his/her feedback. The feedback irrespective of the type is taken care by PP with outmost priority. No negative comments were received from any of the stakeholders.

2.1.3 Free Prior and Informed Consent

Obtaining consent	Consent from concerned parties, including local communities (LCs) was obtained through a transparent and inclusive process. This involved engaging in meaningful dialogue, providing relevant information in accessible formats, and addressing any concerns or questions raised. Agreements were reached through consensus-building and ensuring that all parties had the opportunity to express their views and negotiate terms. Transparency was maintained by documenting the process and agreements reached and ensuring that all stakeholders understood the implications of their consent.
Outcome of FPIC	The outcome of the Free, Prior, and Informed Consent (FPIC) process resulted in a transparent agreement between the project proponent and all concerned parties, including local communities (LCs) during validation of the project activity. Prior to establishing this agreement, comprehensive information regarding the project's scope, potential impacts and mitigation measures was disclosed to stakeholders in accessible formats and local languages during the LSC. There are no ongoing or unresolved conflicts and the project neither exacerbate nor influence the outcomes of unresolved conflicts. PP hereby declares that the project has not encroached on any land, and does not relocate people, or forced physical or economic displacement. All activities have been conducted in accordance with the regulatory norms and terms outlined in the transparent agreement, ensuring the protection of rights and interests of all stakeholders involved.

2.1.4 Grievance Redress Procedure

Development process	Feedback register is kept at project site office where any stakeholder can come and register his/her feedback
Grievance redress procedure	Stakeholder's feedback is monitored daily and any grievance if found, resolved immediately.

2.1.5 Public Comments

Comments received	Actions taken
No comments received	There were no comments received, no actions were taken and there are no updates to project design.

There were no other major comments or protests raised by the stakeholders till now. The local stakeholders were totally in support of setting up of the project in the region.

2.2 Risks to Stakeholders and the Environment

2.2.1 Management Experience

The management teams are well equipped with the extensive expertise and experience in implementing similar project activities and engaging communities effectively.

2.2.2 Risk Assessment

	Risks identified	Mitigation or preventative measure taken
Natural and human-induced risks to stakeholders' wellbeing	No risk identified	No risk is identified regarding natural and human induced risks to stakeholder wellbeing.
Risks to stakeholder participation	No risk identified	Input/Grievance Register is maintained at company gate and a transparent grievance mechanism is followed at all the site where any stakeholder can give their inputs/comments which will be further resolved.
Working conditions	No risk identified	Greenko Renewable Power Private Limited has initiated a customized training program for their engineers and plant operators. The above Program is started as part of the health and safety measures. Also, the PP is providing the good working conditions to work at site.
Safety of women and girls	No risk identified	No risk is identified to safety of women and girls due to project activity and has No Discrimination Policy and following it strictly.
Safety of minority and marginalized groups, including children	No risk identified	No risk is identified to safety of minority and marginalized groups, including children and is following Child Labor (Prohibition & Regulation) Act, 1986 prohibits employment of children.

Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	No risk identified	No risk is identified to Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials).
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2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

	Risks identified ⁷	Mitigation or preventative measure(s) taken
Discrimination	No risk identified	Discrimination based on gender is prohibited, and strict rules are in place to address sexual harassment.
Sexual harassment	No risk identified	The project proponent provides employee's equal pay for equal work and maintains a workplace free from sexual harassment. Thus, PP do not involve and promote any discrimination about the gender differences.
Equal pay for equal work	No risk identified	The project proponent provides employee's equal pay for equal work.
Gender equity in labor and work	No risk identified	PP is committed to providing equal opportunities for all individuals, regardless of gender, by ensuring equitable pay and fair treatment in the workplace. This dedication to gender equity extends across all aspects of labor and work within the organization. However, the project site is on remote location. Hence, currently some women are employed.
Forced labor	No risk identified	PP strongly opposes and actively fights against forced labor in every aspect of its operations. The company is committed to maintaining ethical standards and ensuring that its supply chain and business practices are free from any form of exploitation.

⁷ The identified risks and commensurate mitigation or preventative measure(s) for forced labor, child labor, and human trafficking, must be inclusive of staff and contracted workers employed by third parties.

Child labor	No risk identified	PP opposes and actively combats child labor in all aspects of its operations. The company is dedicated to upholding ethical standards and ensuring that its supply chain and business practices are free from any form of exploitation.
Human trafficking	No risk identified	PP is vehemently opposed to and actively combats human trafficking in all aspects of its operations. The company is dedicated to upholding ethical standards and ensuring that its supply chain and business practices are free from any form of exploitation.

2.3.2 Human Rights

Risks identified	Mitigation or preventative measure(s) taken
No risks identified	No human rights are violated in the installation and operation of project activity. The project activity is following anti-discrimination practices and follow the Human rights moral principles and PP prepared Anti-discrimination Policy before implementation of the project activity. Facility employees are hired and contracted without discrimination based on gender, race, caste, national origin, religion, age, disability, marital status, sexual orientation, cooperative membership, or political affiliation.

2.3.3 Indigenous Peoples and Cultural Heritage

Risks identified	Mitigation(s) or preventative measure taken
No risks identified	PP is committed to protect regional as well as national cultural heritage and the project activity is not affecting the any regional or national cultural heritage.

2.3.4 Property Rights

Risks identified	Mitigation or preventative measure(s) taken
No risks identified	No risks have been identified. Regular consultations and grievance mechanisms are maintained to address any concerns promptly if any.

2.3.5 Benefit Sharing

Process used to design the benefit sharing plan	There is no benefit sharing in the project, all the environmental rights are exclusive to the PP. Therefore, this section is not applicable.
Summary of the benefit sharing plan	Not Applicable
Approval and dissemination of benefit sharing plan	Not Applicable
Benefit sharing during the monitoring period	Not Applicable

2.4 Ecosystem Health

	Risks identified	Mitigation or preventative measure(s) taken
Impacts on biodiversity and ecosystems	No risk identified	The O&M team maintains a Bird strike register. As per the record, there are no observed carcasses in vicinity of the WTGs. The death of birds by other reasons including prey and accidents has been observed however as this is not caused by the project activity and its ancillary; it is not recorded. The impact of parameter is neutral as there is no impact observed.
Soil degradation and soil erosion	No risk identified	Re-vegetation has been taken up as necessary after construction and the project proponent has planted number of trees wherever possible in the project's land, in order to reduce the risk of soil degradation and soil erosion. Also, the project activity is renewable project so there are no hazardous materials used at site and does not lead to release of any hazardous substances that pose threat to the environment i.e., soil degradation and soil erosion. In case if any hazardous waste is release than the waste

		is disposed to the waste handlers and the firm complies with all the local laws for monitoring and disposal.
Water consumption and stress	No risk identified	This is a wind power project thus no water is not released to any natural water receiving body and no fresh water consumption is there at site. Hence, not applicable.

2.4.1 Rare, Threatened, and Endangered Species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☐ Yes ☒ No

	Risks identified	Mitigation or preventative measure(s) taken
Habitats for rare, threatened, and endangered species	No risk identified	The project is located in Rajasthan and there are no rare, threatened or endangered species found. Hence not applicable.
Areas for habitat connectivity	No risk identified	The project has not adversely impacted areas needed for habitat connectivity.

2.4.2 Introduction of Species

The project activity is a renewable project hence the section is not applicable.

Species introduced	Classification	Justification for use	Adverse effects and mitigation
Not applicable	Not applicable	Not applicable	Not applicable

Existing invasive species	Mitigation measures to prevent the spread or continued existence of invasive species
Not applicable	Not applicable

	Risks identified	Mitigation or preventative measure(s) taken
Invasive species	No risks identified	Not applicable

2.4.3 Ecosystem Conversion

Ecosystem conversion is justified by the transition to renewable energy sources, mitigating climate change, reducing reliance on fossil fuels, and fostering sustainable development for future generations. Hence no ecosystem conversion is applicable.

	Risks identified	Mitigation or preventative measure(s) taken
Ecosystem conversion	No risks identified	Not applicable

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	ACM0002	Grid-connected electricity generation from renewable sources	22.0 ⁸
Tool	Tool 01	Tool for the demonstration and assessment of additionality	07.0.0 ⁹
Tool	Tool 07	Tool to calculate the emission factor for an electricity system	07.0 ¹⁰
Tool	Tool 11	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	3.0.1 ¹¹

3.2 Applicability of Methodology

Methodology ID	Applicability condition	Justification of compliance
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⁸ <https://cdm.unfccc.int/UserManagement/FileStorage/R0IJ1X9LQ7W2GOYHSMBFCPE3VKZ685>

⁹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

¹⁰ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.0.pdf>

¹¹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>

ACM0002	1) This methodology is applicable to grid connected renewable energy power generation project activities that: a) Install a Greenfield power plant; b) Involve a capacity addition to (an) existing plant(s); c) Involve a retrofit of (an) existing operating plants/units; d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or e) Involve a replacement of (an) existing plant(s)/unit(s). f) Install a Greenfield power plant together with a grid-connected Greenfield pumped storage power plant. The greenfield power plant may be directly connected to the PSP or connected to the PSP through the grid. 2) In case the project activity involves the integration of a BESS, the methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Integrate BESS with a Greenfield power plant; (b) Integrate a BESS together with implementing a capacity addition to (an) existing solar photovoltaic or wind power plant(s)/unit(s); (c) Integrate a BESS to (an) existing solar photovoltaic or wind power plant(s)/unit(s) without implementing any other changes to the existing plant(s); (d) Integrate a BESS together with implementing a retrofit of (an) existing solar photovoltaic or wind power plant(s)/unit(s). (e) Integrate a BESS together with a Greenfield power plant that is operating in coordination with a PSP. The BESS is located at site	The project activity is installation of a new grid connected wind power plant at a site where no renewable power plant was operated prior to the implementation of the project activity. Thus, it falls under applicability criteria option 1 (a) i.e., "Install a Greenfield power plant" and hence this criterion is applicable. The project activity does not have a battery energy storage system. Thus, this criterion is not applicable.
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	of the greenfield renewable power plant.	
	3) The methodology is applicable under the following conditions: (a) Hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity; (c) In case of Greenfield project activities applicable under paragraph 5 (a) above, the project participants shall demonstrate that the BESS was an integral part of the design of the renewable energy project activity (e.g., by referring to feasibility studies or investment decision documents); (d) The BESS should be charged with electricity generated from the associated renewable energy power plant(s). Only during exigencies may the BESS	The project activity is not a Hydro power project, and it does not have BEES. Hence not applicable.

	be charged with electricity from the grid or a fossil fuel electricity generator. In such cases, the corresponding GHG emissions shall be accounted for as project emissions following the requirements under section 5.4.4 below. The charging using the grid or using fossil fuel electricity generator should not amount to more than 2 per cent of the electricity generated by the project renewable energy plant during a monitoring period. During the time periods (e.g., week(s), months(s)) when the BESS consumes more than 2 per cent of the electricity for charging, the project participant shall not be entitled to issuance of the certified emission reductions for the concerned periods of the monitoring period. (e) In case the project activity involves PSP, the PSP shall utilize the electricity generated from the renewable energy power plant(s) that is operating in coordination with the PSP during pumping mode.	
	4) In case of hydro power plants, one of the following conditions shall apply: (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (7), is greater than 4 W/m²; or	The project activity is a grid connected wind power project and not a hydro power plant. Therefore, these criteria are not relevant for the project activity.

	(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m²; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m², all of the following conditions shall apply: (i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.	
	5) In the case of integrated hydro power projects, project participants shall: (a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or	The project activity is a grid connected wind power project and not a hydro power plant. Therefore, these criteria are not relevant for the project activity.

	(b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum of five years prior to the implementation of the CDM project activity.	
	6) The methodology is not applicable to: (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units	a) The project activity is installation of a new grid connected wind power project and does not involve switching from fossil fuel to renewable energy and hence this criterion is not relevant to the project activity. b) This is a wind power plant and not a biomass fired plant and hence this criterion is not applicable to the project activity.
	7) In the case of PSP, the project participants shall demonstrate in the PDD that the project is not using water which would have been used to generate electricity in the baseline.	The project is not a hydro power project. Hence, this criterion is not applicable.
	8) In the case of retrofits, rehabilitations, replacements, or	The project activity is a new grid connected wind power plant and

	capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.	not a retrofits, replacement or capacity additions and therefore this criterion is not applicable to the project activity
Tool 01	1) The use of the “Tool for the demonstration and assessment of additionality” is not mandatory for project participants when proposing new methodologies. Project participants may propose alternative methods to demonstrate additionality for consideration by the Executive Board. They may also submit revisions to approved methodologies using the additionality tool.	The project is not proposing any new methodologies, hence the use of the “Tool for the demonstration and assessment of additionality” is mandatory. Refer to section 3.5 for details where additionality of the project activity is demonstrated using TOOL 1.
	2) Once the additionally tool is included in an approved methodology, its application by project participants using this methodology is mandatory.	This document is related to Renewable of crediting period hence the steps are not required in this document the Steps of this tool are applied in the section 2.5 of registered PDD please refer it.
Tool 07	1) This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g., demand-side energy efficiency projects).	The project is a grid connected Greenfield wind power project and thus the tool is applicable.

	2)Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e., option II a and option IIb. If option II a is chosen, the conditions specified in “Appendix 1: Procedures related to off-grid power generation” should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	Steps involved in calculation of Emission Factor is included in PDD as per the requirement of the tool. This project uses ACM0002, which refers this tool, the project emissions refer to this tool. Emission factor has been sourced from CENTRAL ELECTRICITY AUTHORITY: CO₂ BASELINE DATABASE, VERSION 19.0 dated December-2023¹².
	3)In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	Project is located in non-Annex I country and hence the tool is applicable
	4)Under this tool, the value applied to the CO₂ emission factor of biofuels is zero.	The project is a Wind project and there is no involvement of biofuels. Therefore, this criterion is not applicable.
Tool 11	1)This tool provides a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period, as required by	The project activity adopts renewable crediting period of 10 years' period which can be renewed for maximum 2 times and now performing renewable of crediting

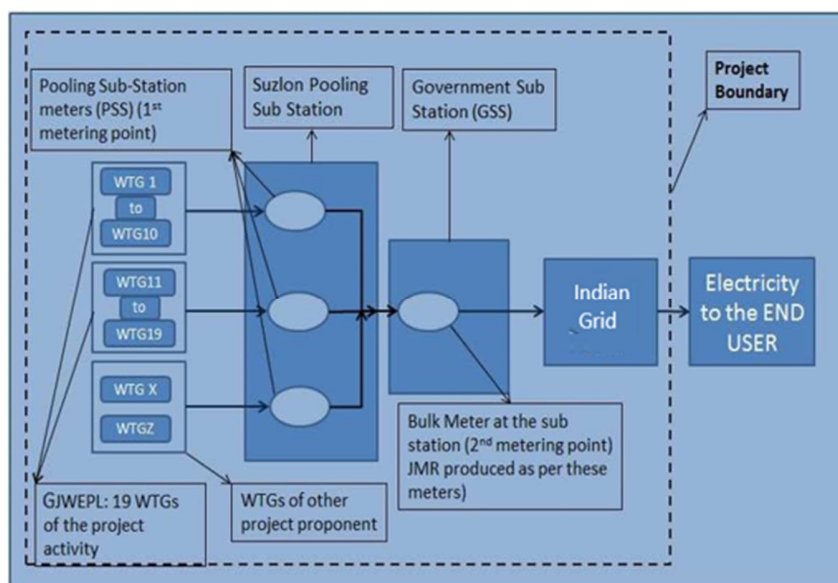
¹² https://cea.nic.in/wp-content/uploads/baseline/2024/04/User_Guide_Version_19.0.pdf

	paragraph 49 (a) of the modalities and procedures of the clean development mechanism.	period for next 10 years (31-March-2023 to 30-March-2033).
	2)The tool consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.	The baseline scenario remains unchanged. Only the approach used to calculate the baseline emission factor is updated as per the latest version (Version 19.0 of CEA data base ¹³) of database available at the time of PDD submission for renewal.

3.3 Project Boundary

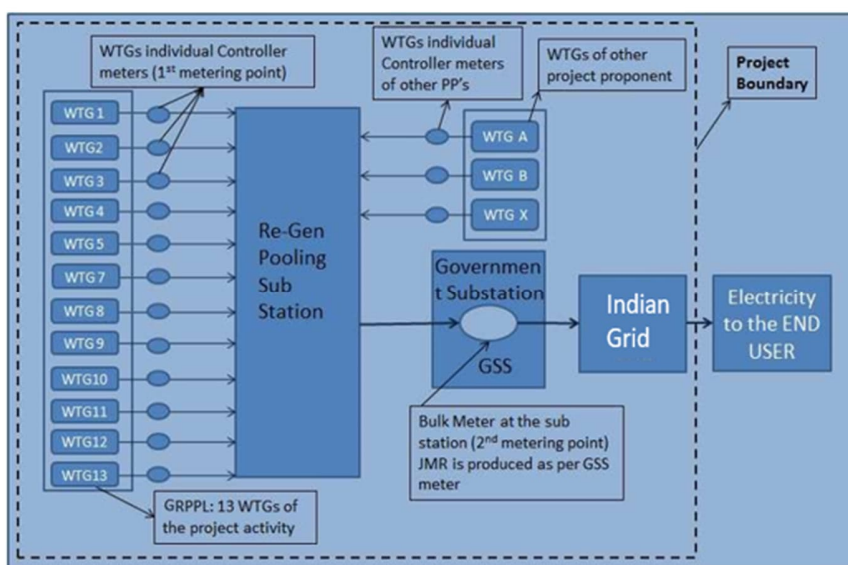
As per methodology ACM0002 version 22, the project boundary includes wind generation system and all other power plants connected physically to the local grid to which the project supplies renewable electricity to avoid GHG emissions. The project is located in Indian grids of the Electricity system. The following diagram explains the project boundary for the project activity.

Project Boundary: Greenko Jaisalmer Wind Energy Private Limited (GJWEPL)



¹³ https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide_Version_19.0.pdf

Project Boundary: Greenko Renewable Power Private Limited (GRPPL)



Source		Gas	Included?	Justification/Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity	CO ₂	Yes	Major emission sources.
		CH ₄	No	Excluded for simplification. This is conservative
		N ₂ O	No	Excluded for simplification. This is conservative
Project	Grid Connected wind power-based electricity generation	CO ₂	No	Electricity generation by using WEGs does not generate any emissions.
		CH ₄	No	No methane generation is expected to be emitted.
		N ₂ O	No	No nitrous oxide generation is expected to be emitted.

3.4 Baseline Scenario

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

- ⇒ As per tool 11 (Version 3.1) step 1.1 If the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period. The project is voluntary and the project is not claiming any carbon benefits in any other mechanism like REC and not a part of compliance with NDC target. There are no new relevant national and/or sectoral policies and/or circumstances in the electricity sector applicable to the Project Activity, in comparison to the time of the submission of the project activity for validation, which could impact the validity of the current baseline for the next crediting period. Therefore, the current baseline scenario does not need to be updated for this crediting period. Thus, the baseline scenario remains unchanged and is in compliance with all the relevant mandatory national and/or sectoral policies so we can go to Step 1.2.

Step 1.2: Assess the impact of circumstances

- ⇒ The baseline scenario identified at the validation of the project activity was the 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 into the grid. Thus, this project activity was a voluntary investment which intends to replace equivalent amount of electricity at grid from renewable source. PP was not bound to incur this investment; hence absence of project activity (i.e., the investment) does not lead to any continued baseline practice for PP within their scope whereas the continued operation of the project activity would continue to replace equivalent amount of electricity at grid. Hence, the same baseline as identified in the previous crediting period is still valid for the project. Therefore, the assessment of the changes in market characteristics is not required for the renewal of the project's crediting period.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

- ⇒ As explained in step 1.2, the baseline scenario was the electricity import/generation from the power plants connected to the electricity grid. The project activity in green field project and there is not any baseline equipment or investment involved in project activity. Therefore, this condition is not applicable to the project activity.

Step 1.4: Assessment of the validity of the data and parameters

- ⇒ This step stipulates that “Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the

site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.” In the context of the present project activity the emission factor has been updated along with the approach used to calculate the emission factor.

Step 2: Update the current baseline and data & parameters

- ⇒ As evident from the explanation provided above the baseline scenario remains unchanged. Only the approach used to calculate the baseline emission factor is updated as per the latest version (Version 19.0 of CEA data base¹⁴) of database available at the time of PDMR submission for renewal. In line with the principles and requirements version 1.2, the impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant EB guidance with regard to renewal of the crediting period at the time of requesting renewal of crediting period; and the correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.

Methodological Reference:

As per para 24 of the approved consolidated Methodology ACM0002 (Version 22.0)

“If the project activity is the installation of a Greenfield power plant with or without a BEES, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

Scenario existing prior to the implementation of project activity (Baseline scenario):

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, as reflected in the Combined Margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

The project activity involved setting up of wind turbines for generating the power of wind to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied to the electricity grid by the operation of grid-connected power plants (mainly by fossil fuel fired plants) and by the addition of new generation sources, as reflected in the combined margin (CM) calculations.

Hence, the baseline for the project activity is the equivalent amount of power from the INDIAN grid.

The combined margin ($EF_{grid,CM,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM), in

¹⁴ <https://cea.nic.in/cdm-co2-baseline-database/?lang=en>

accordance with the Tool to calculate the emission factor for an electricity system - Version 7.0. Calculations for this combined margin must be based on data from an official source (where available) and made publicly available. In India, Central Electricity Authority (CEA), Government of India provides this data, and accordingly the same latest available data at the time of PDD submission to VVB has been used and considered for emission factor calculations.

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

Parameter	Value	Nomenclature	Source
EF _{grid,CM,y}	0.9352 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 19.0, December 2023 published by Central Electricity Authority (CEA) ¹⁵ , Government of India
EF _{grid,OM,y}	0.9580 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3-year (2020-21, 2021-22 and 2022-23) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 19.0 ¹⁶ , December 2023 published by Central Electricity Authority (CEA), Government of India
EF _{grid,BM,y}	0.8670 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 19.0 ¹⁷ , December 2023 published by Central Electricity Authority (CEA), Government of India

The project replaces anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 100,520 tCO₂e per year, thereon displacing 107,485.20 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.

3.5 Additionality

The project is seeking for renewal of crediting period and hence this section is not required. This project is already registered under VCS and hence this section can also be checked from registered PDD through below mentioned link.¹⁸

¹⁵ https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide_Version_19.0.pdf

¹⁶ https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide_Version_19.0.pdf

¹⁷ https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide_Version_19.0.pdf

¹⁸ <https://registry.verra.org/app/projectDetail/VCS/1465>

3.5.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

- ☐ Annex 1 country ☒ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

- ☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

- ☐ Yes ☒ No

The project is located in non-Annex 1 country. However, the project activities are mandated by a law, statute, or other regulatory framework. There are no enforced laws, statutes, regulations, court orders, environmental-mitigation agreements, permitting conditions or other legally-binding mandates requiring its implementation, or requiring the implementation of a similar technology/measure that would achieve equivalent levels of GHG emission reductions.

Below is the list if the key policies, national laws and regulations applicable to develop a wind power project in India:

- Electricity Act 2003¹⁹: The act provides a framework for the overall growth of the electricity sector in India. It gives provisions for preferential tariff and quotas for opting for renewable energy. Mandatory procurement of renewable energy for distribution licensees and facilitation of grid connectivity were incorporated.
- National Electricity Policy 2005²⁰: The policy allows preferential tariffs for power produced from renewable energy sources. It aimed to provide access to electricity to all and increase the minimum per capita availability to 1000 kWh per year by 2012.
- Integrated Energy Policy, 2006²¹: This integrated policy recommended a particular focus on renewable energy development and set specific targets for capacity addition.
- Tariff Policy 2006²²: (As per the national tariff policy, the central and the state electricity regulatory commissions must purchase a certain percentage of grid-based power from renewable sources.)

¹⁹ <https://powermin.gov.in/en/content/electricity-act-2003>

²⁰ <https://powermin.gov.in/en/content/national-electricity-policy>

²¹

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwin5ficpuGDAxWK6KA-CHZghCPAQFnoECBUQAO&url=https%3A%2F%2Fclimate-laws.org%2Fdocument%2Fintegrated-energy-policy_9159&usq=AOvVaw0Mr9B7feKCZb-AOYXJ9dFG&opi=89978449

²² https://cdn.climatepolicyradar.org/navigator/IND/2006/tariff-policy_1e5003e88610d4fdd5efd66738f13dab.pdf

- Renewable Energy Certificates (RECs), 2011²³: RECs are a market-based mechanism. It was introduced to enhance renewable energy capacity. It levels the inter-state divergences of renewable energy generation and the requirement of the obligated entities to meet their RPOs with a differentiated price for Wind and non-wind.
- The Factories Act 1948²⁴: All persons working under the Organizations.
- Environmental (Protection) Act, 1986 and amendment(s)²⁵: The Environment (Protection) Act, 1986 authorizes the central government to protect and improve environmental quality, control and reduce pollution from all sources, and prohibit or restrict the setting and /or operation of any industrial facility on environmental grounds.
- The Air (Prevention and Control of Pollution) Act, 1981²⁶ including Rules 1982 and 1983 and amendment(s).
- The Water (Prevention and Control of Pollution) Cess Act 1977²⁷ including Rules 1978 and 1991.
- Solid Waste Management Rules, 2016/ E-waste (Management) Rules 2016²⁸ and amendment(s) / Batteries (Management and Handling) Rules, 2001²⁹ and amendment in 2010³⁰(Solid waste/E waste/Batteries management program should be prepared with thrust on reuse and recycling as per the CPCB guidelines).

3.5.2 Additionality Methods

The project is seeking for renewal of crediting period and hence this section is not required. This project is already registered under VCS and hence this section can also be checked from registered PDD through below mentioned link.³¹

3.6 Methodology Deviations

²³

https://www.recregistryindia.nic.in/pdf/Others/Renewable_Energy_Certificate_Mechanism_in_India_16th_NATIONAL_POWER_SYSTEMS_CONFERENCE.pdf

²⁴ https://labour.gov.in/sites/default/files/factories_act_1948.pdf

²⁵ <https://cpcb.nic.in/env-protection-act/>

²⁶ <https://cpcb.nic.in/air-pollution/>

²⁷ <https://cpcb.nic.in/water-pollution/>

²⁸ https://cpcb.nic.in/uploads/MSW/SWM_2016.pdf

²⁹ <https://cpcb.nic.in/uploads/hwmd/battery%20management%20&%20handling%20rules%202001.pdf>

³⁰ <https://cpcb.nic.in/uploads/hwmd/battery%20management%20&%20handling%20rules%202001.pdf>

³¹ <https://registry.verra.org/app/projectDetail/VCS/1465>

There has been no methodology deviation applied for the project activity. Hence, not applicable.

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The baseline emission calculation for the project activity is attributable to the CO₂ Emission that could have been produced by the fossil fuel-based power plants in absence of the project activity. Therefore, the amount electricity supplied to the Indian grid is multiplied by the grid emission factor of Indian grid to calculate the baseline emissions reduced by the project activity.

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

Where:

BE_y = Baseline emissions in year y (tCO₂/ year)

$EG_{PJ,y}$ = 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/ year)

$EF_{grid,CM,y}$ = 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)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for

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

The project activity is the installation of wind plant, and it is a green field project. So, the formula in option (a) i.e., greenfield plants is used to calculate the value of $EG_{PJ,y}$. In accordance with para 49 of the applied methodology.

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

Where:

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

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

Project Investors	Capacity (MW)	PLF	Net Generation (MWh/year)
Greenko Jaisalmer Wind Energy Private Limited (GJWEPL)	39.9	20.00%	69,904.80
Greenko Renewable Power Private Limited (GRPPL)	19.5	22.00%	37,580.40
Total	59.4		107,485.20

Therefore, $EG_{PJ,y} = 107,485.20$

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

The methodology ACM0002 (Version 22.0) requires that the combined margin for the grid be calculated in accordance with the procedure provided in the “Tool to calculate the emission factor for an electricity system”.

As per tool 07: “Tool to calculate the emission factor for an electricity system, Version 7.0.0”; The baseline emission factor ($EF_{grid,y}$) is calculated as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors.

The methodology provides following approaches for emission factor calculations:

- (a) Combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology “Tool to calculate the emission factor for an electricity system”. OR
- (b) The weighted average emissions (in t CO₂/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Option (a) has been considered to calculate the grid emission factor as per the “Tool to calculate the emission factor for an electricity system” since data is available from an official source i.e., CO₂ Baseline Database for the Indian Power Sector, Version 19, December 2023³², published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.

The project activity falls under INDIAN Grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation. Emission reductions due to the project activity are considered to be equivalent to the baseline emissions, since the wind/solar project does not lead to any project emission and leakage emissions. Emission reductions are related to the electricity exported by the project and the emission coefficient of the grid system.

Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin and build margin factors according to the procedures prescribed in the latest tool for calculating the emission factor for an electricity system. The steps of calculation are as follows:

STEP 1: Identify the relevant electricity systems;

³² https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide_Version_19.0.pdf

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

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

STEP 4: Calculate the operating margin emission factor according to the selected method;

STEP 5: Calculate the build margin (BM) emission factor;

STEP 6: Calculate the combined margin (CM) emission factor.

Step 1: Identify the relevant electricity systems

As described in tool “For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems”. It also states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used”.

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

Option I is opted for the project activity i.e., only grid connected power plants are included in the calculation.

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

According to the tool, the calculation of the operating margin emission factor is based on one of the following methods:

- a) Simple OM; or
- b) Simple adjusted OM; or
- c) Dispatch data analysis OM; or
- d) Average OM.

The data required to calculate Simple adjusted OM and Dispatch data analysis OM is not possible due to lack of availability of data to project developers.

The choice of other two options for calculating operating margin emission factor depends on generation of electricity from low-cost/ must-run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, Wind, low-cost biomass, nuclear and Wind generation.

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

	2018-19	2019-20	2020-21	2021-22	2022-23
India	14.5%	17.0%	16.5%	15.8%	15.3%

The above data clearly shows that the percentage of total grid generation by low-cost/ must-run plants (on the basis of average of five most recent years) for the INDIAN grid is less than 50 % of the total generation.

Thus, the Average OM method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

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

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

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

OR

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

PP has chosen ex-ante option for calculation of Simple OM emission factor using a 3-year generation weighted average, based on the most recent data available at the time of submission of the RCP-PD to the DOE for validation.

Step 4: Calculate the operating margin emission factor according to the selected method

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

Net Generation in Operating Margin (GWh) (incl. Imports)			
	2020-21	2021-22	2022-23
Indian Grid	958,218	1,035,672	1,117,846

Simple Operating Margin (tCO ₂ /MWh) (incl. Imports)			
	2020-21	2021-22	2022-23
Indian Grid	0.9402	0.9605	0.9710
Weighted Generation Operating Margin			
Indian Grid	0.9580		

Step 5: Calculate the build margin (BM) emission factor

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 07.0, EB 100, Annex 4) para 72:

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

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

already built at the time of submission of the request for renewal of the crediting period to the VVB.

(b) Option 2 - For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available.

Option 1 as described above is chosen to calculate the build margin emission factor for the project activity.

BM is calculated ex-ante based on the most recent information available at the time of submission of PD and is fixed for the entire crediting period.

Build Margin (tCO ₂ /MWh) (not adjusted for imports)	
	2022-23
Indian Grid	0.8670

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

As per Methodological tool: “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4) para 81:

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

(a) Weighted average CM; or

(b) Simplified CM.

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

The combined margin emissions factor is calculated as follows:

$$EF_y = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$$

Where:

EF_{grid,BM,y} = Build margin CO₂ emission factor in year y (t CO₂/MWh)

EF_{grid,OM,y} = Operating margin CO₂ emission factor in year y (t CO₂/MWh)

W_{OM} = Weighting of operating margin emissions factor (per cent)

W_{BM} = Weighting of build margin emissions factor (per cent)

According to “Tool to calculate the emission factor for an electricity system” the weights for OM and BM are 0.75 and 0.25 respectively.

Therefore, EF_{grid,CM,y} = 0.9580 * 0.75 + 0.8670 * 0.25

= 0.9352 tCO₂/MWh

As per the latest CEA database and Tool to calculate the emission factor for an electricity system', version 7, the weights for OM and BM are 0.75 and 0.25 respectively. Using the values for operating and build margin emission factor provided in the CEA database version 19.0 and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) was calculated: 0.9352 tCO₂e/ MWh. Therefore, the value of baseline carbon emission factor (CM) has been taken as 0.9352 tCO₂e/MWh.

4.2 Project Emissions

As per the ACM0002 version-22.0, Project Emission for most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

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

Where:

PE_y = Project emissions in year y (tCO₂e/ year)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO₂/ year)

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO₂e/ year)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (tCO₂e/ year).

The project activity involves the generation of electricity from the installation Wind and Solar power plant. Hence, as per ACM0002, Version 22, there is no project emission for wind/solar power projects. Therefore, project emissions are zero.

$$PE_y = 0$$

4.3 Leakage Emissions

As per of ACM0002 version 22, no leakage emissions are considered in the project activity. The emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g., extraction, processing, transport) are neglected. $LE_y = 0$.

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

As per the approved consolidated Methodology ACM0002 (Version 22.0), Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year y (tCO₂e/year)

BE_y = Baseline emissions in year y (tCO₂/ year)

PE_y = Project emissions in year y (tCO₂e/ year)

Vintage period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated reduction VCUs (tCO ₂ e)	Estimated removal VCUs (tCO ₂ e)	Estimated total VCUs (tCO ₂ e)
31-March-2023 to 31-December-2023	75,390	0	0	75,390	0	75,390
01-January-2024 to 31-December-2024	100,520	0	0	100,520	0	100,520
01-January-2025 to 31-December-2025	100,520	0	0	100,520	0	100,520
01-January-2026 to 31-December-2026	100,520	0	0	100,520	0	100,520
01-January-2027 to 31-December-2027	100,520	0	0	100,520	0	100,520
01-January-2028 to 31-December-2028	100,520	0	0	100,520	0	100,520
01-January-2029 to 31-December-2029	100,520	0	0	100,520	0	100,520
01-January-2030 to 31-December-2030	100,520	0	0	100,520	0	100,520
01-January-2031 to 31-December-2031	100,520	0	0	100,520	0	100,520
01-January-2032 to 31-December-2032	100,520	0	0	100,520	0	100,520

01-January-2033 to 30-March-2033	25,130	0	0	25,130	0	25,130
Total	1,005,200	0	0	1,005,200	0	1,005,200

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	EF _{grid,OM,y}
Data unit	tCO ₂ /MWh
Description	Operating Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 19, December 2023 ³³
Value applied	0.9580 (INDIAN Grid)
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07.0.0” as 3-year generation weighted average using data for the years 2020-2021, 2021-2022 & 2022-2023. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 19.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period

Data / Parameter	EF _{grid,BM,y}
Data unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 19, December 2023 ³⁴
Value applied	0.8670 (INDIAN Grid)
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 04.0.0” for the year 2022-2023. The data is obtained from “CO ₂ Baseline Database for Indian Power Sector” version 19.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	For the calculation of the Baseline Emission

³³ https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide_Version_19.0.pdf

³⁴ https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide_Version_19.0.pdf

Comments	This parameter is fixed ex-ante for the entire crediting period
Data / Parameter	EF _{grid,CM,y}
Data unit	tCO ₂ /MWh
Description	Combines Margin CO ₂ emission factor in year y
Source of data	Calculated from CEA database, Version 19, December 2023 ³⁵
Value applied	0.9352 (INDIAN Grid)
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: EF_{grid,BM,y} = Build margin CO₂ emission factor in year y (tCO₂/MWh) EF_{grid,OM,y} = Operating margin CO₂ emission factor in year y (tCO₂/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM} = Weighting of build margin emissions factor (%) = 25%
Purpose of data	For the calculation of the Baseline Emission
Comments	This parameter is fixed ex-ante for the entire crediting period

5.2 Data and Parameters Monitored

Data / Parameter	EG _{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 (Joint Meter 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

³⁵ https://cea.nic.in/wp-content/uploads/baseline/2024/01/User_Guide_Version_19.0.pdf

	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	107,485.20 MWh
Monitoring equipment	Greenko 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 Greenko 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. Greenko 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	GJWEPL: First the difference between the readings of PSS and GSS is derived: $\text{GSS Export} - \text{PSS Total Export} = \text{Export Difference}$ $\text{PSS Import} - \text{GSS Total Import} = \text{Import Difference}$ Then Net Export & Net Import by the project is derived by accounting losses by the project: $\text{Net Export by Project} = \text{PSS Project Export} - [(\text{Export Difference} / \text{PSS Total Export}) \times \text{PSS Project Export}]$ $\text{Net Import by Project} = \text{PSS Project Import} + [(\text{Import Difference} / \text{PSS Total Import}) \times \text{PSS Project Import}]$ $\text{Net Electricity Supplied to the Grid by the Project (GJWEPL)} = \text{Net Export by Project} - \text{Net Import by Project}$ GRPPL Then Net Export & Net Import by the project is derived by accounting losses by the project: $\text{Net Export by Project} = (\text{GSS Export} / \text{All WTGs Total Controller Export}) \times \text{Project WTGs Controller Export}$ $\text{Net Import by Project} = (\text{GSS Import} / \text{All WTGs Total Controller Export}) \times \text{Project WTGs Controller Export}$ $\text{Net Electricity Supplied to the Grid by the Project (GRPPL)} = \text{Net Export by Project} - \text{Net Import by Project}$
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.

5.3 Monitoring Plan

The monitoring methodology specified in the methodology requires that the project- monitoring plan to consist of monitoring of quantity of net electricity supplied to the grid in the year y. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to grid by the project activity multiplied by emission factor for regional grid, would form the baseline for the project activity.

Since the baseline emission factor is based on an ex-ante determination, monitoring of this parameter is not required. The sole parameter for monitoring is the net electricity exported to the grid.

Aim of monitoring:

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

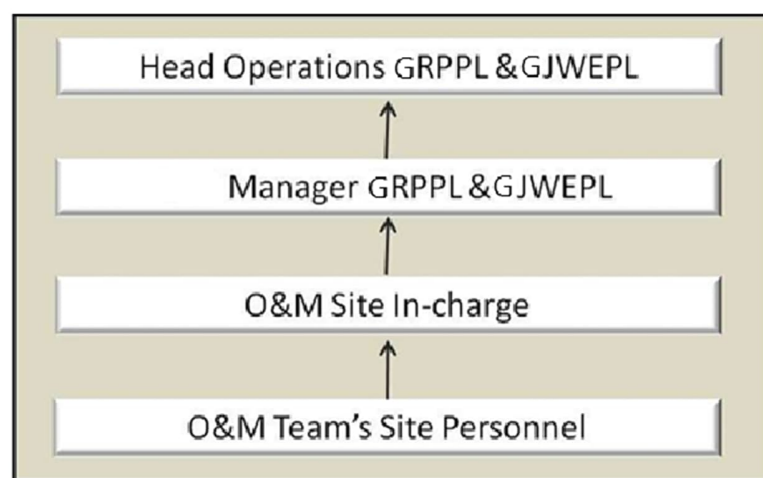
The monitoring shall include all the equipment's that contribute towards reduction in GHG emissions. Since the project activity focuses mainly on the generation of renewable power, it is important to monitor all the equipment's involved in the metering of all the necessary instruments.

The project investor has a well-defined management structure for monitoring the project activity.

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 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.

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

(Greenko Jaisalmer Wind Energy Private Limited) GJWEPL:

In GJWEPL, 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 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.

(Greenko Renewable Power Private Limited) GRPPL:

In GRPPL, the electricity is monitored at 132 kV 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 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 132kV 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

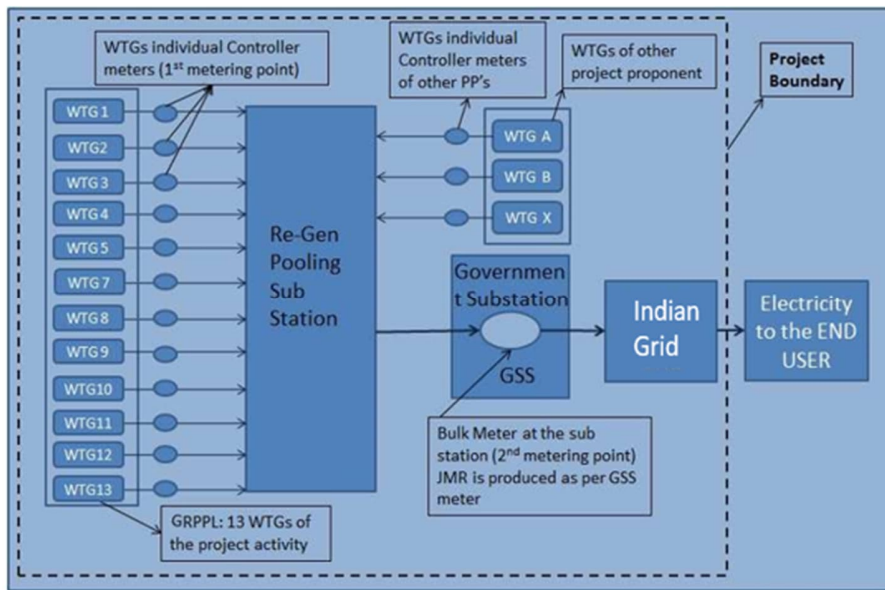
PSS Project Import & PSS Total Import

GSS Export & GSS Import

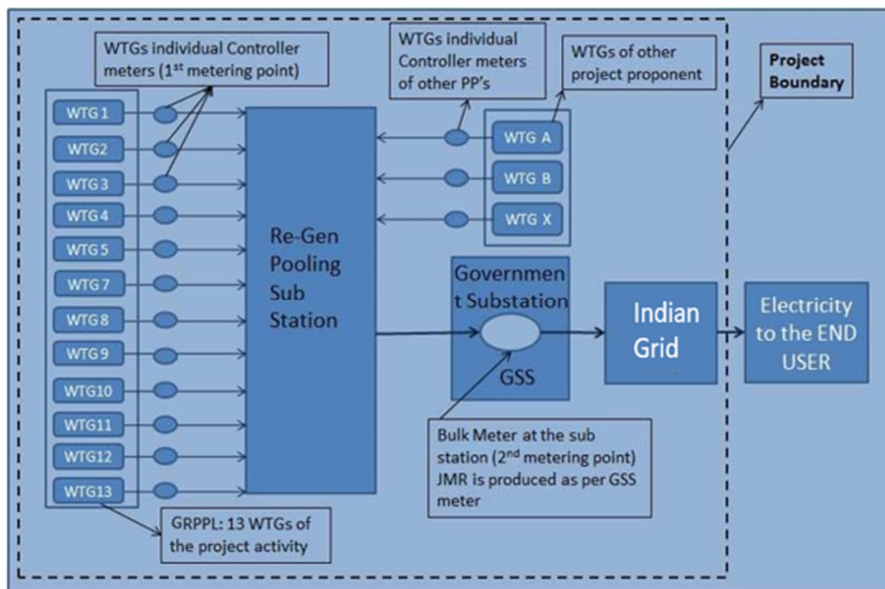
At the respective sub-station, the total export & import to this feeder is monitored using the main meter & the backup meter, which are electronic tri-vector meters. The total export at this meter is generally arrived at by multiplying the monthly meter reading to the multiplying factor of the meter 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:

GJWEPL: Metering System



GRPPL Metering System:



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. The main meter and check meter were operating in the acceptable limits of accuracy and there were no issues identified.

Mismatch in Monitoring Period and the 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 from:

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

Where,

D = Net electricity exported to the grid

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.

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**³⁶. 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.

³⁶ http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf

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.

Data Recording & Archiving:

O &M operator keeps all the data items monitored under the monitoring plan and 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 is archived both electronically and manually, and kept in safe storage by PP

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

Apportioning the net electricity exported to grid, as recorded in the consolidated JMR Report by the respective state DISCOM, based on the number of days in the monitoring period and the number of days for which JMR Report was prepared.

The calculated value after apportioning would be used for calculation of emission reductions during that period.

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

No commercially sensitive information has been excluded from the public version of the project description. Hence, appendix 1 is not applicable.

APPENDIX 2: CALIBRATION DETAILS

Calibration of all the meters are as follows and will be undertaken at least once in 5 years.

For Greenko Jaisalmer Wind Energy Private Limited (GJWEPL)

Meter Details	Main Meter	Backup Meter
Installed at	400KV GSS AKAL, RRVPNL	400KV GSS AKAL, RRVPNL
Meter Serial No	RJB90214	RJB90215
Meter Make	Secure	Secure
Model	PREMIER 300	PREMIER 300
Accuracy Class	0.2 s	0.2 s
Date of Calibration	23-January-2020	23-January-2020
	04-April-2024	04-April-2024
Due Date of Calibration	03-April-2029	03-April-2029

For Greenko Renewable Power Private Limited (GRPPL)

Meter Details	Main Meter	Check Meter
Installed at	GSS at 132kv GSS RVPNL, Dalot	GSS at 132kv GSS RVPNL, Dalot
Meter Serial No	RJB79226	APMB3516
Meter Make	Secure	Secure
Model	PREMIER 300	PREMIER 300
Accuracy Class	0.2 s	0.2 s
Date of Calibration	12-April-2020	12-April-2020
	07-May-2024	07-May-2024
Due Date of Calibration	06-May- 2029	06-May- 2029