Gold Standard for the Global Goals

TEMPLATE

MONITORING REPORT

PUBLICATION DATE **14.10.2020**

VERSION **v. 1.1**

RELATED SUPPORT - **TEMPLATE GUIDE Monitoring Report v. 1.1**

This document contains the following Sections

KEY PROJECT INFORMATION

Key Project Information

GS ID (s) of Project (s)	GS5013
Title of the project (s) covered by monitoring report	Vaayu India Wind Power Project in Jaisalmer, Rajasthan
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	5.0
Version number of the monitoring report	1.2
Completion date of the monitoring report	28/05/2022
Date of project design certification	06/01/2017 (GS Registration Date)
Date of Last Annual Report	Not Applicable
Monitoring period number	4
Duration of this monitoring period	01/04/2020-30/09/2021 (including both days)
Project Representative	Vaayu (India) Power Corporation Private Limited ACT Financial Solutions B.V. Statkraft Markets GmbH First Climate Markets A.G.
Host Country	India
Activity Requirements applied	☐ Community Services Activities ☒ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	ACM0002 “Grid-connected electricity generation from renewable sources” Version 12.1.0
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units / Products
SDG 3	Good health and well being	3000	Numbers
SDG 7	Affordable and Clean Energy	142346.59 MWh	MWh
SDG 8	Decent Work and Economic Growth	5 Training 10 employees	Numbers
SDG 13	Climate Action	131,310	tCO2e

Table – Product Vintages

		Amount Achieved (tCO2e)		
Start Dates	End Dates	Baseline Emission	Project Emission	Leakage Emission
01/04/2020	31/12/2020	58,708	0	0
01/01/2021	30/09/2021	72,602	0	0

SECTION A. DESCRIPTION OF PROJECT

A. . General description of project

The project activity includes development, design, engineering, procurement, finance, construction, operation and maintenance of Vaayu 50.4 MW wind power project ("Project") in the Indian state of Rajasthan to provide reliable, renewable power to the Rajasthan state electricity grid which is part of the India electricity grid. The Project leads to reduce greenhouse gas emissions because it displaces electricity from grid connected fossil fuel-based electricity generation plants.

The Project involves 63 wind energy converters (WECs) of 800 kW E-53 with internal electrical lines connecting the Project with local evacuation facility.

The first WEC under the project activity was commissioned on 14/05/2011 and the last WEC under the project activity was commissioned on 14/07/2011. The expected operational lifetime of the project is for 20 years. The length of the Crediting period of the project activity as per registered PDD is 10 years (Fixed). The end date of crediting period is 30/09/2021. The total emission reductions achieved under current monitoring period (01/04/2020-30/09/2021; Inclusive of both dates) are 131,310 tCO2e.

The project activity has been registered in CDM on 20/09/2011. The previous monitoring period under Gold Standard which was 3rd monitoring period for the duration "01/01/2019-31/03/2020" which was a part of the CERs under the 8th issuance in CDM, accounted for 93,917 tCO2e. The current monitoring period under Gold Standard is considered for the duration "01/04/2020 to 30/09/2021", which is transitioned from GS CERs to GS VERs. The transition was approved on 23/03/2022.

A. . Location of project

(a) >> Host Party(ies);
India

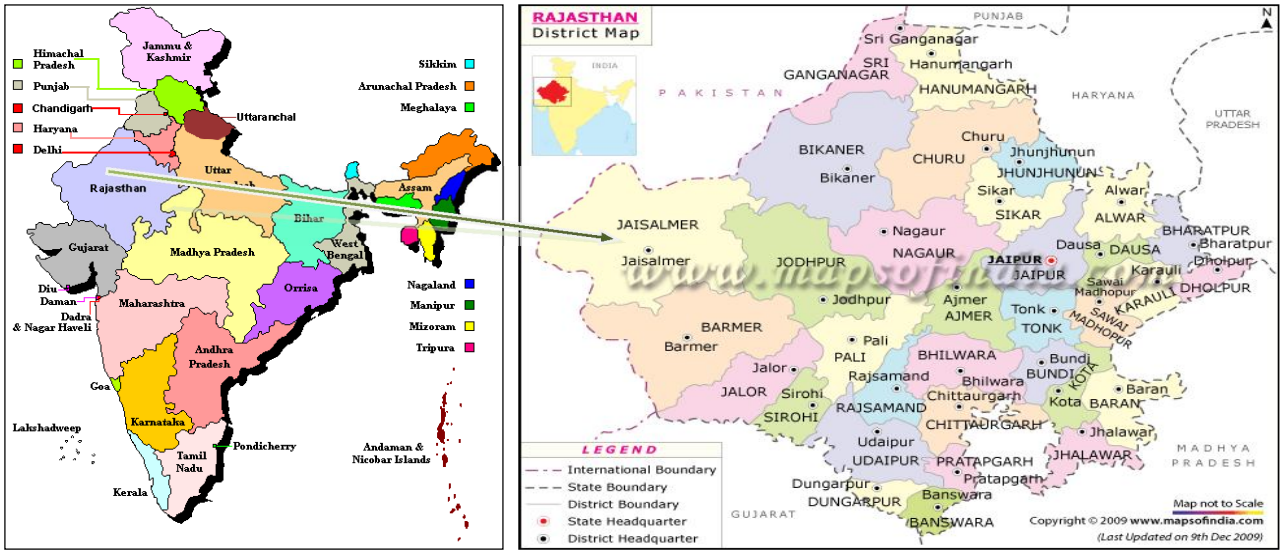
(b) Region/State/Province, etc.;
Northern Region/Rajasthan State

(c) City/Town/Community, etc.;
The Project is located at Jaisalmer district of Rajasthan state in India.

(d) Physical/ Geographical location.
The detailed individual WECs location numbers and coordinates of project activity are provided below

			Latitude			Longitude		
Sr.No	Loc.No.	Village	Deg.	Minute	Second	Deg.	Minute	Second
1	2	Khuhri	26	40	25.4	70	44	21.9
2	3	Barna	26	40	33.2	70	44	18.6
3	4	Barna	26	40	33.8	70	44	11.2
4	5	Barna	26	40	27.2	70	43	58
5	6	Barna	26	40	39.7	70	43	57.1
6	7	Barna	26	40	35.8	70	43	47.2
7	8	Barna	26	40	35.5	70	43	39.6
8	9	Barna	26	40	58	70	44	3.5
9	10	Sipla	26	41	14.8	70	44	27.3
10	110	Senag	26	42	0.7	70	48	28.8
11	13	Barna	26	41	48.8	70	44	20.1
12	14	Barna	26	41	49.3	70	44	11.2
13	15	Barna	26	40	45.6	70	43	31.6
14	16	Barna	26	40	43.6	70	43	24.2
15	17	Barna	26	41	0.4	70	43	26.1
16	23	Barna	26	41	37	70	42	50.3
17	24	Barna	26	41	44.7	70	42	44.7
18	25	Barna	26	41	49.2	70	42	37.1
19	29	Barna	26	42	5.7	70	42	27.3
20	30	Barna	26	42	9.7	70	42	37.7
21	32	Barna	26	42	18.6	70	42	52.6
22	33	Barna	26	42	18.7	70	43	10.8
23	38	Sipla	26	42	24.6	70	43	28.8
24	39	Sipla	26	42	23.7	70	43	36.8
25	40	Sipla	26	42	22.9	70	43	44.9
26	72	Khuhri	26	41	53.3	70	45	50.8
27	79	Pithla	26	42	40.3	70	46	11.5
28	80	Pithla	26	42	44.6	70	46	3.2
29	87	Pithla	26	42	53.1	70	46	24.9
30	88	Kotri	26	42	43.1	70	46	31.3
31	93	Senag	26	42	18.4	70	46	55.6
32	99	Senag	26	42	0.9	70	47	39
33	101	Senag	26	42	27.4	70	47	39
34	102	Senag	26	42	33.1	70	47	30.8
35	103	Kotri	26	42	22.5	70	47	49.1
36	106	Kotri	26	42	25.4	70	48	15.2
37	107	Kotri	26	42	16.8	70	48	22
38	114	Senag	26	41	39	70	48	6.1
39	115	Kotri	26	41	42.2	70	48	16.2
40	117	Kotri	26	41	35.3	70	48	31
41	118	Senag	26	41	36.4	70	48	39.1
42	123	Pithla	26	42	19.5	70	49	11.2
43	124	Pithla	26	42	2	70	49	10.1

44	125	Pithla	26	41	54.2	70	49	15.6
45	144	Pithla	26	43	43.5	70	45	56.4
46	148	Pithla	26	44	3.9	70	46	3.1
47	150	Pithla	26	44	21	70	46	8.5
48	151	Pithla	26	44	20.9	70	45	59
49	152	Pithla	26	44	32.9	70	46	22.6
50	157	Pithla	26	44	48.7	70	46	4.5
51	158	Pithla	26	44	36	70	45	52
52	159	Pithla	26	44	40.9	70	45	46.8
53	503(S)	Pithla	26	41	11.5	70	48	38.9
54	504(S)	Pithla	26	41	19.3	70	48	35
55	505(S)	Kotri	26	41	19.3	70	48	27.4
56	507(S)	Kotri	26	42	20.7	70	46	34.8
57	508(S)	Kotri	26	42	22.8	70	46	27.1
58	512(S)	Kotri	26	42	40.8	70	47	1.9
59	513(S)	Kotri	26	42	35.2	70	47	9
60	514(S)	Kotri	26	42	32	70	47	21.9
61	520(S)	Senag	26	42	44.3	70	48	7.3
62	521(S)	Senag	26	42	38.2	70	48	19.2
63	525(S)	Senag	26	41	50.6	70	49	23.5



A. . Reference of applied methodology

>> Title: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”

Reference: Approved consolidated baseline methodology ACM0002 (Version 12.1.0)

ACM0002 draws upon the following tools which have been used in the PDD:

- Tool to calculate the emission factor for an electricity system – Version 02
- Tool for the demonstration and assessment of additionality – Version 05.2

A. . Crediting period of project

>>Type of crediting period	:	Fixed
Start date of crediting period	:	01/10/2011
Length of crediting period	:	30/09/2021 (fixed crediting period, to be ended at the end of CDM crediting period)

SECTION B. IMPLEMENTATION OF PROJECT

B. . Description of implemented project

>> The starting date of operation of the project activity is 14/05/2011. The commissioning date for all the WECs included in the project activity is given in the table below:

S. No.	WEG S.C. NO	No. & Capacity	Commissioning Date (dd/mm/yyyy)
1	2	1 X 800 kW	30/06/2011
2	3	1 X 800 kW	14/05/2011
3	4	1 X 800 kW	14/05/2011
4	5	1 X 800 kW	14/05/2011
5	6	1 X 800 kW	14/05/2011
6	7	1 X 800 kW	14/05/2011
7	8	1 X 800 kW	14/05/2011
8	9	1 X 800 kW	14/05/2011
9	10	1 X 800 kW	30/06/2011
10	13	1 X 800 kW	14/05/2011
11	14	1 X 800 kW	14/05/2011
12	15	1 X 800 kW	14/05/2011
13	16	1 X 800 kW	14/05/2011
14	17	1 X 800 kW	14/05/2011
15	23	1 X 800 kW	14/05/2011
16	24	1 X 800 kW	14/05/2011
17	25	1 X 800 kW	14/05/2011
18	29	1 X 800 kW	14/05/2011
19	30	1 X 800 kW	14/05/2011
20	32	1 X 800 kW	14/05/2011
21	33	1 X 800 kW	14/05/2011
22	38	1 X 800 kW	14/07/2011
23	39	1 X 800 kW	14/07/2011
24	40	1 X 800 kW	14/07/2011
25	72	1 X 800 kW	14/07/2011
26	79	1 X 800 kW	14/05/2011
27	80	1 X 800 kW	14/05/2011
28	87	1 X 800 kW	14/05/2011
29	88	1 X 800 kW	14/05/2011
30	93	1 X 800 kW	30/06/2011
31	99	1 X 800 kW	15/05/2011
32	101	1 X 800 kW	14/07/2011
33	102	1 X 800 kW	14/07/2011
34	103	1 X 800 kW	15/05/2011
35	106	1 X 800 kW	15/05/2011
36	107	1 X 800 kW	15/05/2011
37	110	1 X 800 kW	15/05/2011

38	114	1 X 800 kW	15/05/2011
39	115	1 X 800 kW	15/05/2011
40	117	1 X 800 kW	15/05/2011
41	118	1 X 800 kW	15/05/2011
42	123	1 X 800 kW	15/05/2011
43	124	1 X 800 kW	15/05/2011
44	125	1 X 800 kW	15/05/2011
45	144	1 X 800 kW	14/05/2011
46	148	1 X 800 kW	14/05/2011
47	150	1 X 800 kW	14/05/2011
48	151	1 X 800 kW	30/06/2011
49	152	1 X 800 kW	14/05/2011
50	157	1 X 800 kW	14/07/2011
51	158	1 X 800 kW	30/06/2011
52	159	1 X 800 kW	30/06/2011
53	503	1 X 800 kW	15/05/2011
54	504	1 X 800 kW	15/05/2011
55	505	1 X 800 kW	15/05/2011
56	507	1 X 800 kW	14/05/2011
57	508	1 X 800 kW	14/05/2011
58	512	1 X 800 kW	30/06/2011
59	513	1 X 800 kW	30/06/2011
60	514	1 X 800 kW	14/07/2011
61	520	1 X 800 kW	15/05/2011
62	521	1 X 800 kW	15/05/2011
63	525	1 X 800 kW	15/05/2011

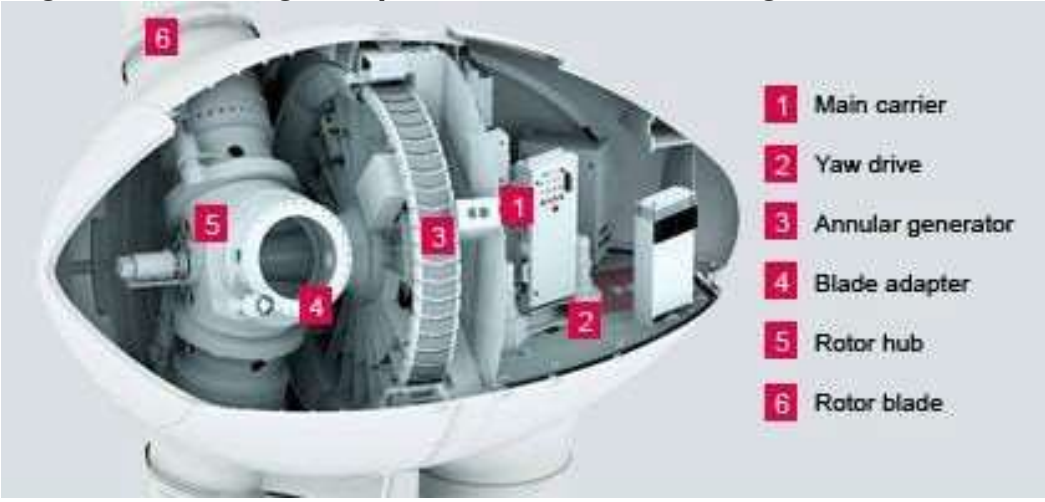
Wind World operation and maintenance activities are ISO 9001:2008 certified and all the events are recorded at the project site. Referring to the data available, it can be inferred that there has not been any major event for any machines that are included in the project activity. As a part of regular maintenance, the machines are stopped for mechanical and electrical maintenance.
During the current monitoring period, there has not been any event that may impact the applicability of the methodology.

The project activity involves 63-wind energy convertors (WEC's) of Wind World make (800 kW, E- 53) with internal electrical lines connecting the project activity with local evacuation facility. The WECs generates 3-phase power at 400V, which is stepped up to 33 KV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%. The average life time of the WEC is around 20 years as per the industry standards. The other salient features of the state-of-art-technology are:

Turbine model	E – 53
Rated Power	800 kW
Rated diameter	53 m

Hub height	75 m
Turbine type	Gearless horizontal axis wind turbine with variable rotor speed
Power regulation	Independent electromechanical pitch system for each blade
Cut in wind speed	2.5 m/s
Rated wind speed	12 m/s
Cut out wind speed	28 - 34 m/s
Extreme wind speed	59.5 m/s
Rated rotational speed	32 rpm
Operating range rot. Speed	12 - 29 rpm
Orientation	Upwind
No. of blades	3
Blade material	Fibre glass Epoxy reinforced with integral lightning protection
Gear box type	Gearless
Generator type	Synchronous generator
Braking	Aerodynamic
Output voltage	400 V
Yaw system	Active yawing with 4 electric yaw drives with brake motor and friction bearing
Tower	74 m Concrete

Figure: E-53 Diagram (Cross sectional drawing of nacelle E-53 / 800 kW)



B.1.1 Forward Action Requests

>> Not Applicable

B. . Post-Design Certification changes

B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

>> Not Applicable

B.2.2. Corrections

>> Not Applicable

B.2.3. Changes to start date of crediting period

>> Not Applicable

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

>> Revision in monitoring plan has been approved by UNFCCC on 06/11/2013 and the description of revised monitoring plan has been provided in section C of the monitoring report & in revised approved PDD version 5, dated 04/10/2013.
(Weblink: https://cdm.unfccc.int/PRCContainer/DB/prcp812692939/view)

B.2.5. Changes to project design of approved project

>> Not Applicable

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

>> Approved monitoring methodology ACM0002 Version 12.1.0, EB 58 Sectoral Scope: 1, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", by CDM - Meth Panel is proposed to be used to monitor the emission reductions. Wind World (India) Limited is EPC contractor for the project activity. Wind World (India) Limited is responsible for the maintaining all the monitoring data on behalf of VIPCPL in respect of the project activity. Wind World (India) Limited has implemented the management structure for managing the monitored data.

This approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating Margin emission factor and build margin emission factor of the grid, where ex ante determination of grid emission factor has been chosen.

Since the EF is determined ex ante, hence the monitoring of operating margin emission factor and build margin emission factor is not required. Further, wind based electricity generation is not associated with any kind of leakages. Hence, the sole parameter for monitoring is the electricity generated by the project and supplied to the grid. The project is operated by Wind World (EPC contractor for the project activity) and managed by the PP. The operational and maintenance contract for the project is with Wind World. Wind World is an ISO certified company. Wind World follows 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 break-up sheet reflecting net electricity supplied by the project activity to the grid is prepared by EPC contractor based on the allocation procedure explained below. Based on this break-up sheet, tariff Invoice is raised by PP to DISCOM.

$E_{JMR,Export}$ = Electricity exported, as recorded by the main meter at the substation

$E_{JMR,Import}$ = Electricity imported, as recorded by the main meter at the substation

$E_{Controller,\ Export}$ = Summation of electricity generated by the project activity WECs recorded at respective LCS meters

$\sum E_{Controller,\ Export}$ = Electricity exported by all the WECs (project activity & non project activity) connected to the main meter at the substation, measured at the controller of each WEC

$\sum E_{WEC,Export}$ Project = Summation of electricity exported to the grid by all the WECs (63 machines) included in the project activity.

$\sum E_{WEC,Import}$ Project = Summation of electricity imported from the grid by all the WECs (63 machines) included in the project activity.

Electricity exported by each WECs of project activity (63 machines) is apportioned on the basis of electricity exported recorded at the controller LCS Meter of each project activity WECs and the electricity exported at the main meter and mentioned in the JMR. The export multiplication factor is calculated as follows:

$$\text{Export Multiplication Factor} = \frac{E_{JMR,Export}}{\Sigma E_{Controller,\ Export}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (1)$$

Thus the total energy exported by a WECs of the project activity (63 machines) to the grid is given by the equation-

$$\sum_{Project} E_{WEC,Export} = \text{Export Multiplication factor X } E_{Controller,\ Export} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (2)$$

As the LCS meter doesn't record import, the apportioning of energy imported by WECs of project activity (63 machines) is also done on the basis of electricity exported recorded at the LCS Meter of project activity WECs and the electricity imported at the main meter and mentioned in the JMR. The import multiplication factor is calculated as follows-

$$\text{Import Multiplication Factor} = \frac{E_{JMR,Import}}{\Sigma E_{Controller,\ Export}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (3)$$

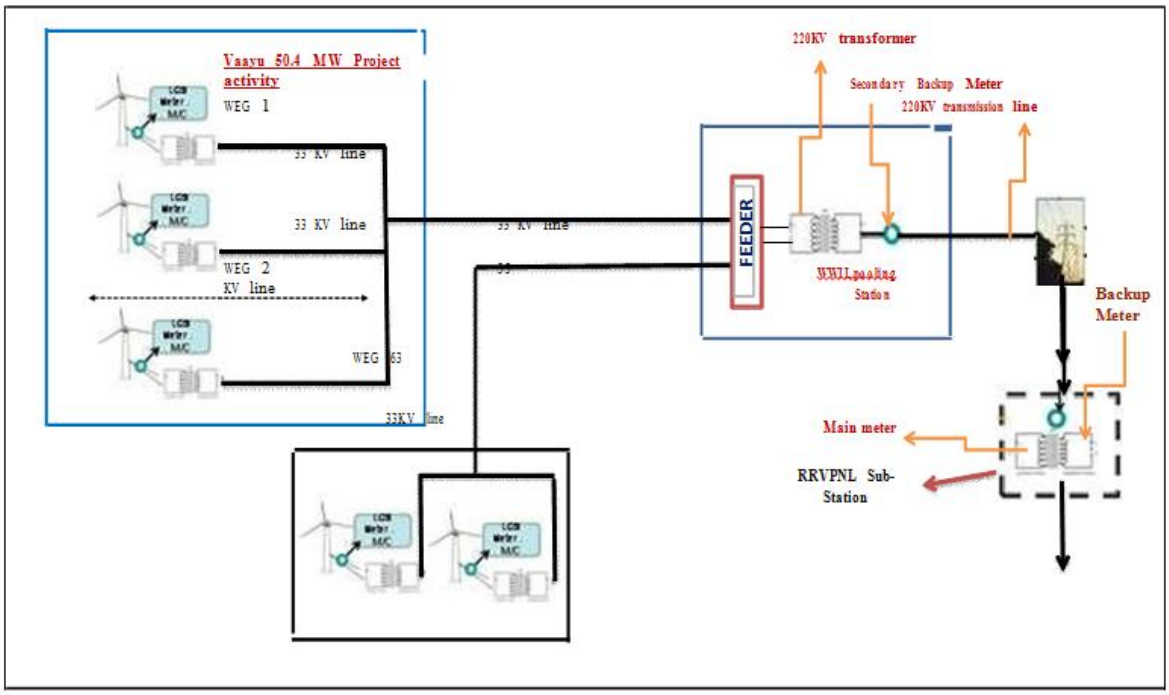
Thus the total energy imported by WECs of the project activity (63 machines) to the grid is given by the equation-

$$\sum_{Project} E_{WEC,Import} = \text{Import Multiplication factor X } E_{Controller,\ Export} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (4)$$

The net electricity exported by the WECs of the project is given by the equation-

$$EG_y = \sum_{Project} E_{WEC,Export} - \sum_{Project} E_{WEC,Import} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ (5)$$

Schematic diagram for the wind farm showing location of main, backup and LCS meters in the wind farm



Metering

- There is a main & back meter at DISCOM substation with an accuracy class of 0.2s, to which the project & non project activity WECs are connected.

- There is a secondary back up meter installed at Wind World Pooling substation, although the secondary back up meter reading is not used by DISCOM for calculating the generation.

- The electricity supplied to the grid is metered at DISCOM substation. Representatives of DISCOM and Wind World jointly take the main/back up meter readings and sign the meter reading on monthly basis.

- The allocation of the net electricity supplied to the grid by the project activity is done based on the joint meter readings taken at the DISCOM substation & LCS meter readings of individual WECs. Apportioning procedure is applied by the EPC contractor, the details of which have been explained in Section C

- Based on this apportioning procedure, break up sheet indicating the net electricity supplied to the grid by the project activity is prepared by EPC contractor, based on which the PP raises invoice for payments. The copy of the invoice raised by PP to DISCOM would be used for cross checking the net electricity supplied by project activity as indicated in the breakup sheet.

- The meters will be jointly inspected/ tested once in a year as per the provisions of PPA. The main and the backup metering systems will be sealed in presence of representatives of Wind World and RRVPN/Jodhpur DISCOM. Joint inspection and testing will also be carried out as and when difference in monthly meter readings exceeds the sum of maximum error as per accuracy class of main and back up meters.

Metering Equipment and Metering Arrangement Information

- The meters are two-way meter and measure the electricity import and export and give the net electricity.

- As per the Power Purchase Agreement entered into with the electricity distribution utility, there will be two meters, one main meter and one backup meter. Both meters would be two-way export import meters that measure both export and import of electricity and provide net electricity exported to the grid.

- In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated. Whenever a main meter goes defective, the consumption recorded by the backup meter will be referred.

- If main as well as back up metering system becomes defective, the details of the malfunctioning along with date and time and snaps shot parameters along with load survey will be retrieved from the main meter. The exact nature of the malfunctioning will be determined after analyzing the data so retrieved and the consumption recorded by the main meter will be adjusted accordingly.

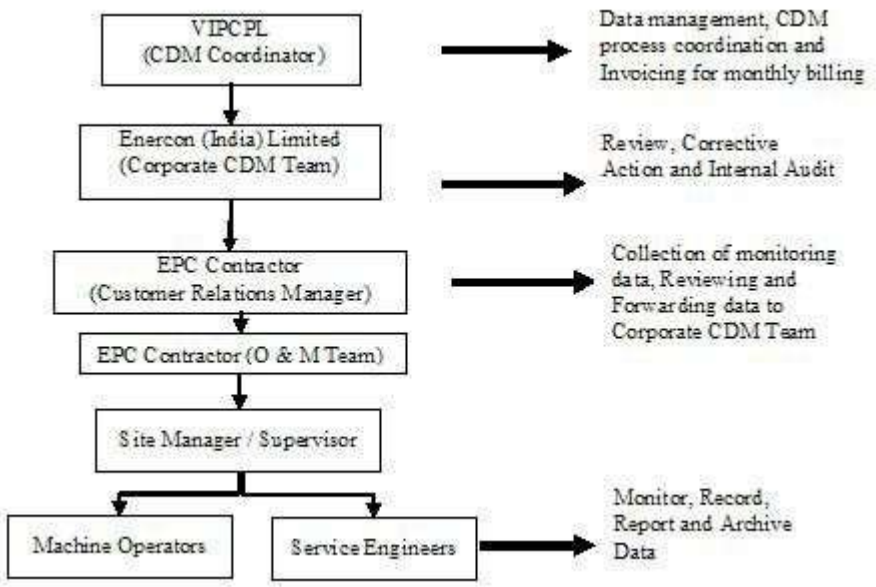
- The main meter readings are apportioned based upon the LCS meter readings from the individual WECs to compute net electricity supplied from individual WECs. The LCS meter readings of project activity WECs are archived electronically on continuous basis. Joint meter reading at the DISCOM substation is noted each month. Therefore, cumulative LCS meter reading for each month is used for purpose of allocation of net electricity supplied to the grid from the project activity.

- Both main and back up meters will be calibrated annually (Annex 1).

- The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WECs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. The operations and maintenance staff will attend to the problem immediately in order to identify the error and correction factor will be determined.

The empirical formula applied for computing net electricity supplied to the grid is detailed above. PP will be monitoring the data sent by the O&M contractor and the data for electricity generated by the project activity will be kept as records for the period of 10+2 years i.e. 2 years beyond the term of crediting period. Wind World is O&M contractor and will be responsible for data recording.

The main and check meters are calibrated once each year and LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WECs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. Furthermore, the net electricity supplied to the grid that is used for calculation of emission reductions can be cross checked from the invoices raised by the PP on the state utility. Therefore, there is no data uncertainty. The operational and management structure implemented for data monitoring is as follows:



Training and maintenance requirements:

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the Wind Energy Converters (WECs), it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that Wind World's service staff is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. The Wind World Training Academy provides need-based training to meet the training requirements of Wind World projects. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving.

SECTION D. DATA AND PARAMETERS

D. . Data and parameters fixed ex ante or at renewal of crediting period

Relevant SDG Indicator	**13.2.1 Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)**
Data/Parameter	$EF_{grid\ OM,\ y}$
Unit	tCO2e/MWh
Description	Operating Margin Emission Factor of NEWNE Electricity Grid
Source of data	"CO2 Baseline Database for Indian Power Sector", version 5.0, published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at https://cea.nic.in/cdm-co2-baseline-database/?lang=en
Value(s) applied	1.00498
Choice of data or measurement methods and procedures	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with ACM0002.
Purpose of data/parameter	The data is used to calculate baseline emission reductions.
Additional comments	This value is calculated on ex-ante basis and will remain fixed for the entire crediting period.

Relevant SDG Indicator	**13.2.1 Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)**
Data/Parameter	$EF_{grid\ BM,\ y}$
Unit	tCO2e/MWh
Description	Build Margin Emission Factor of NEWNE Electricity Grid
Source of data	"CO2 Baseline Database for Indian Power Sector", version 5.0, published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at https://cea.nic.in/cdm-co2-baseline-database/?lang=en

Value(s) applied	0.6752
Choice of data or measurement methods and procedures	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002.
Purpose of data/parameter	The data is used to calculate baseline emission reductions.
Additional comments	This value is calculated on ex-ante basis and will remain fixed for the entire crediting period.

Relevant SDG Indicator	**13.2.1 Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)**
Data/Parameter	$EF_{grid\ CM,\ y}$
Unit	tCO_2e/MWh
Description	Combined Margin Emission Factor of NEWNE Electricity Grid
Source of data	Combined Margin Emission Factor ($EF_{grid,CM,y}$) is calculated as the weighted average of Operating Margin Emission Factor (EFgrid,OM,y) and Build Margin Emission Factor (EFgrid,BM, y). The "CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at https://cea.nic.in/cdm-co2-baseline-database/?lang=en
Value(s) applied	0.92252
Choice of data or measurement methods and procedures	Combined Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with CDM methodologies: ACM0002, and Tool to Calculate the emission Factor for an Electricity System.
Purpose of data/parameter	The data is used to calculate baseline emission reductions.
Additional comments	This value is calculated on ex-ante basis and will remain fixed for the entire crediting period.

D. Data and parameters monitored

Relevant SDG Indicator	**7.2.1Renewable energy share in the total final energy consumption**
Data/Parameter	EG_y
Unit	MWh

Description	Net electricity generation supplied to the grid by the Project activity.
Measured/calculated/ default	Calculated (based on the measured values of electricity exported and imported)
Source of data	The break-up sheet based on Joint Meter Reading (JMR).
Value(s) of monitored parameter	142346.59 MWh
Monitoring equipment	Since it is calculated value, hence not applicable.
Measuring/reading/recording frequency	Frequency of measurement/recording data: Continuously monitoring and Monthly recording Refer section 'Description of monitoring system' for an illustration of the provisions for measurement methods. Monthly values of parameter are provided in the ER calculation sheet.
Calculation method (if applicable)	The procedures for calculation of net electricity supplied to grid has been followed as per the provisions of the power purchase agreement and details of calculation method has been explained in monitoring plan under section C of monitoring report.
QA/QC procedures	Value of EGy can be cross checked with the tariff invoices raised on the DISCOM . All the billing Main & Backup meters are calibrated by DISCOM annually and the records are available with the EPC Contractor (WWIL)
Purpose of data/parameter	Calculation of baseline emission
Additional comments	The data will be archived both in electronic and hard paper format for crediting period + 2 years.

Relevant SDG Indicator	**7.2.1Renewable energy share in the total final energy consumption**
Data/Parameter	$E_{Controller,Export}$
Unit	MWh (Mega-watt hour)
Description	Summation of electricity generated by the project activity WECs recorded at respective LCS meters.
Measured/calculated/ default	Measured
Source of data	Monthly operating logs recorded in electronic format by EPC contractor.
Value(s) of monitored parameter	149009.671 MWh

Monitoring equipment	Controller meter (LCS).
Measuring/reading/recording frequency	Frequency of measuring/recording data: Continuous measurement and Monthly recording The value is recorded continuously by the online monitoring station. This reading can also be seen in the electronic panel installed inside the WEG tower. The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the Panel meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. The operations and maintenance staff will attend to the problem immediately in order to identify and correct the error. Monthly values of parameter are provided in the ER calculation sheet.
Calculation method (if applicable)	Not Applicable
QA/QC procedures	This data parameter will be logged electronically on a monthly basis by EPC contractor on its online portal. The value of this parameter shall be compared with the value of EGy and the conservative approach would be taken by the PP for estimating the net electricity supplied value for the calculation of emission reduction.
Purpose of data/parameter	Calculation of Baseline Emissions
Additional comments	The data will be archived both in electronic and hard paper format for crediting period + 2 years

Relevant SDG Indicator	**7.2.1Renewable energy share in the total final energy consumption**
Data/Parameter	$\Sigma E_{WEC,Export}$ Project
Unit	MWh (Mega-watt hour)
Description	Summation of electricity exported to the grid by all the WECs (63 machines) included in the project activity.
Measured/calculated/ default	Calculated
Source of data	The break-up sheet based on Joint Meter Reading (JMR) prepared by EPC Contractor.
Value(s) of monitored parameter	142423.80 MWh

Monitoring equipment	Since it is calculated value, hence not applicable.
Measuring/reading/recording frequency	Frequency of recording data: Monthly. Further all the meters have the capability of continuous measurement of data. Refer section 'C' for an illustration of the provisions for measurement methods. Monthly values of parameter are provided in the ER calculation sheet.
Calculation method (if applicable)	Based on the monthly JMR reading recorded at main meters installed at DISCOM sub-stations and the LCS controller meters (panel meters) readings.
QA/QC procedures	Value of EG_y can be cross checked with the tariff invoices raised on the DISCOM. All the billing & Backup meters are calibrated by DISCOM annually and the records are available with the EPC Contractor (WWIL).
Purpose of data/parameter	Calculation of Baseline Emissions
Additional comments	The data will be archived both in electronic and hard paper format for crediting period + 2 years.

Relevant SDG Indicator	**7.2.1Renewable energy share in the total final energy consumption**
Data/Parameter	Σ EWEC,Import Project
Unit	MWh (Mega-watt hour)
Description	Summation of electricity imported from the grid by all the WECs (63 machines) included in the project activity.
Measured/calculated/ default	Calculated
Source of data	The break-up sheet based on Joint Meter Reading (JMR) prepared by EPC Contractor.
Value(s) of monitored parameter	77.21 MWh
Monitoring equipment	Since it is calculated value, hence not applicable.
Measuring/reading/recording frequency	Frequency of recording data: Monthly Further all the meters have the capability of continuous measurement of data. Refer section 'C' for an illustration of the provisions for measurement methods. Monthly values of parameter are provided in the ER calculation sheet.
Calculation method (if applicable)	Based on the monthly JMR reading recorded at main meters installed at DISCOM sub-stations and the LCS controller meter (panel meters) readings.

QA/QC procedures	The Values can be cross checked with the tariff invoices raised on the DISCOM. All the billing & Backup meters are calibrated by DISCOM annually and the records are available with the EPC Contractor (WWIL).
Purpose of data/parameter	Calculation of Baseline Emissions
Additional comments	The data will be archived both in electronic and hard paper format for crediting period + 2 years

Sustainability Monitoring Plan:

Relevant SDG Indicator	**8.5.2 Unemployment rate, by sex, age and persons with disabilities**
Data/parameter:	Quality of Employment
Unit	Number of Health and safety trainings for qualitatively better work opportunities during Operation and Maintenance.
Description	Training records, categories of jobs created, occupational health management, safeguards put in place. Project developer has comprehensive internal systems in place wherein all essential norms pertaining to safety, occupational health and working conditions are being followed.
Measured/calculated/default	Measured
Source of data	Documentation pertaining to training programmes, awareness generation activities, photographs, interviews etc.

Value(s) of monitored parameter	Following training programs have been conducted in order to enhance the safety awareness, operational skill levels and occupational health management for the local staff. Total 5 trainings were organised in current monitoring period. 2020 - On 27/07/2020, total 11 employees benefitted through SHE training programs related to Electrical Safety & 5 Safety Rule. The records of training have been submitted to the DOE. - On 09/11/2020, total 19 employees benefitted through SHE training programs related to Electrical Safety & LOTO Awareness. The records of training have been submitted to the DOE. 2021 - On 21/01/2021, total 9 employees benefitted through SHE training programs related to Electrical Safety & LOTO Training. The records of training have been submitted to the DOE. - On 29/06/2021, total 9 employees benefitted through SHE training programs related to Incident Management, HIRA & PPE Training. The records of training have been submitted to the DOE. - On 24/08/2021, total 9 employees benefitted through SHE training programs related to First Aid, Fire & Electrical Safety. The records of training have been submitted to the DOE.
Monitoring equipment	Manually by PP representative
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	Manually by PP representative
QA/QC procedures:	The training programmes help in making the workforce efficient and skilled at their job. This not only helps the company but adds to growth of individual employees. Thus, the project has a positive impact on the parameter.
Purpose of data:	Assessment of SDGs as per safeguarding principles
Additional comments:	None

Relevant SDG Indicator	**8.5.2 Unemployment rate, by sex, age and persons with disabilities**
Data/parameter:	Quantitative employment and income generation
Unit	Number of Employees
Description	Number of jobs generated during the operation of the wind farm.
Measured/calculated/default	Measured
Source of data	Attendance Sheet and employment records maintained by Project Developer

Value(s) of monitored parameter	The project activity is connected to Jajiya substation. Total operational connected capacity with Jajiya substation is 230.4 MW. Local staff is hired by the project proponent for multiple projects which are connected to BHU sub-station. In order to justifiably arrive at employment generation which can be attributed to the project activity under consideration, number of local people hired have been apportioned w.r.t the total operational capacity connected to BHU substation. In addition to this, local villagers were engaged for short time jobs because of the infrastructure development (e.g. road construction, road repairs, cleaning of sub-station etc.) which leading to income generation. Further, for local transportation, PP is using local vehicles which have also created a revenue stream for the local people. Since this is an indirect benefit of the project activity in terms of income generation, it is not possible to exactly quantify the same. However, it can be conservatively stated that around 10 people have received additional livelihood/income generation opportunities because of the project activity. Same can be established through interviews with various local stakeholders by the DOE. Specifically, 10 local people have been employed for the project activity during the monitoring period under consideration. Corresponding attendance sheets and other relevant records on annual monitoring have been submitted to the DOE.
Monitoring equipment	Attendance Sheet and employment records maintained by Project Developer
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	-
QA/QC procedures:	Additional job opportunities created for the local population. Income generation to be enhanced by creating relatively high value job opportunities through training and capacity building.
Purpose of data:	To monitor the contribution to SDG 8
Additional comments:	None

In addition to above mentioned monitoring parameters as per approved transition annex of the project activity, PP has taken additional initiatives to improve basic education, health & hygiene and clean drinking water facility in nearby areas. The details of these programs organized during current monitoring period is provided below:

Relevant SDG Indicator	**3.8.1 Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, new born and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)**
Data/parameter:	Human and Institutional capacity
Unit	Total number of initiatives, events and programmes, primarily Health and Education Camps
Description	Health and Education related activities conducted for well-being of locals/villagers
Measured/calculated/default	Measured
Source of data	Records of organized events, photographs, proof of payments etc.
Value(s) of monitored parameter	Since access to basic education, health, basic amenities and infrastructural facilities are basic factors to facilitate human and institutional capacity development; various initiatives have been undertaken by the project developer to contribute to these thematic areas. The contribution made during monitoring period is mentioned below: - PP have also launched Safe Drinking Water facility programs in 10 govt. schools across Jaisalmer district. Under this program RO water facilities have been installed at schools giving access to clean and safe water for students. - During the time of COVID-19 crisis dry ration kits were distributed to the needy people across 6 villages.
Monitoring equipment	Manually
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	-
QA/QC procedures:	-
Purpose of data:	Assessment of SDGs as per safeguarding principles
Additional comments:	None

D. . Comparison of monitored parameters with last monitoring period

Data/Parameter	Value obtained in this monitoring period	Value obtained last monitoring period
SDG 7: Affordable and Clean Energy	142,346.59 MWh	101,804.889 MWh
SDG 8: Decent Work and Economic Growth	5 Training 10 Employees	2 Training 28 Employees
SDG 13: Climate Action	131,310 tCO2e	93,917 tCO2e

D. . Implementation of sampling plan

>> No sampling plan is followed by PP.

SECTION E. CALCULATION OF SDG IMPACTS

E. . Calculation of baseline value or estimation of baseline situation of each SDG Impact

In the baseline, there were no Social Development activities taking place; whereas baseline Emissions for electricity supplied by project activity, BE_y is calculated as:

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

Where,

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

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

$EF_{grid,CM,y}$ = Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO2/MWh).

Thus, the estimated baseline situation of each SDG outcomes are summarised as follows;

Item	Baseline value
SDG 7: Affordable and Clean Energy	**No Activities in the baseline**
SDG 8: Decent Work and Economic Growth	**No Activities in the baseline**
SDG 13: Climate Action	**Emission of 87,159 tCO2**

E. . Calculation of project value or estimation of project situation of each SDG Impact

Based on the surveys, PP identifies and works on several scope(s) of developmental activities such as health camps, distribution of furniture & sports kits in schools, during the time of COVID-19 crisis dry ration kits were distributed to the needy people across 6villages., drinking water requirements etc. Apart from these activities, some or all of the following SDGs will be conducted in any given year:

SDG Goal	Monitoring Plan
SDG 3: Ensure healthy lives and promote well-being for all at all ages	Since access to basic education, health, basic amenities and infrastructural facilities are basic factors to facilitate human and institutional capacity development; various initiatives have been undertaken by the project developer to contribute to these thematic areas. The contribution made during monitoring period is mentioned below: - PP have also launched Safe Drinking Water facility programs in 10 govt. schools across Jaisalmer district. Under this program RO water facilities have been installed at schools giving access to clean and safe water for students. - During the time of COVID-19 crisis dry ration kits were distributed to the needy people across 4 villages.
SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all	Method: Monitored through energy meter. The net electricity supplied to the grid by the wind farm has been calculated by Rajasthan state grid on the basis of main meter reading and the meter readings taken at substation meters after adjusting transmission loss. The net electricity generated by the project activity has been taken directly from the JMR issued by the state grid on monthly basis. Frequency: Monthly QA/QC procedures: Net electricity supplied to the grid by the project activity will be cross checked with invoices submitted to EB. The meter(s) shall be calibrated on a regular basis.
SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Method: Training records, Attendance Sheet, Employment records data maintained by Project Developer. Project developer has comprehensive internal systems in place wherein all essential norms pertaining to safety, occupational health and working conditions are being followed. Frequency: Annual QA/QC procedures: Continuation of regular trainings/workshops for employees & O&M staffs Purpose: To identify and record the no. of trainings provided to the employees as well as employment generated due to project activity.

SDG 13: Take urgent action to combat climate change and its impacts	Method: Monitored through energy meter. Net electrical energy has been calculated to the best accuracy at the substation of State Electricity Board. Further using processes and equations provided under "Tool to calculate the emission factor for an electricity system", and referencing data from CEA database. Frequency: Every crediting period (whereas Emission Factor calculated based on combined margin approach is fixed ex-ante for the entire crediting period) QA/QC procedures: Transparent data collection, analysis, calculation and reporting as CEA database is publicly available. Purpose: To calculate emissions avoided due to the project activity

E. . Calculation of leakage

No leakage is considered from the project activity as per approved methodology ACM0002.

E. . Calculation of net benefits or direct calculation for each SDG Impact

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
SDG 3	Good health and well-being	0	3000	3000
SDG 7	Affordable and Clean Energy	0	94,482 MWh	142,346.59 MWh
SDG 8	Decent Work and Economic Growth	0	1 training 10 employees	5 training 10 employees
SDG 13	Climate Action	87,159 tCO_2	0	131,310 tCO_2

E. . Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values[1] achieved during this monitoring period
SDG 3 : Good health and well-being	NA	3000 Numbers
SDG 7 : Affordable and Clean Energy	94,482 MWh	142,346.591 MWh
SDG 8 Decent Work and Economic Growth	1 training 10 employees	5 training 10 employees
SDG 13 Climate Action	87,159 tCO2	131,310 tCO_2

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

It is to be noted here that as per the estimated emission reduction to be achieved from the project activity for the current monitoring period is 131,310 tCO2e. The actual emission reduction achieved is 0.35% higher than the estimated figure as per registered PDD.

E. . Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

The actual emission reduction achieved is 0.35% high than the estimated figure as per registered PDD. This is due to higher electricity generation compared to estimated generation in registered PDD (for the equivalent period) during the monitoring period. Further, as the actual generation is less than the estimated generation mentioned in registered PDD, thus, further justification is not necessary.

SECTION F. SAFEGUARDS REPORTING

Not applicable.

[1] Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

Safeguard principles were assessed in detail and reported under the registered GS-Passport and Transition document.

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G. . List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

No grievances received during the monitoring period together with their respective answers/actions.

G. . Report on any stakeholder mitigations that were agreed to be monitored.

No grievances received in the previous monitoring period, thus no follow up required.

G. . Provide details of any legal contest that has arisen with the project during the monitoring period

No legal contest or dispute that has arisen with the project during the monitoring period.

ANNEX 1 – METERING SYSTEM DETAILS

The details of meters installed at the 400kV Akal substation in Jaisalmer for measuring export and import by project activity are provided below:

No. & Capacity	Make	Serial No.		Accuracy Class	Calibration Frequency	Calibration date		
		Main Meter	Back Up Meter			2020	2021	Validity
63 X 800 kW	L & T	13194980	13194981	0.2%	Annual	22-01-2020	19-02-2021	19-02-2022

As indicated in the above tables and confirmed through the calibration reports, there is delay in calibration identified during the current monitoring period, calibration results confirms that all meters were working satisfactorily and the error identified was within the prescribed error limit, which is maximum of 0.2%. Hence, a correction factor (maximum 0.2% error factor of the meters) has been applied to the monitoring parameters for the delayed period (please refer ER calculation sheet) in line with the guidelines as mentioned under paragraph 366(a) of VVS PAs v03.0.

Revision History

Version	Date	Remarks
1.1	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Section for POA monitoring Forward action request section Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on safeguard reporting Clarity on design changes Leakage section added for VER/CER projects Addition of Comparison of monitored parameters with last monitoring period Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.0	10 July 2017	Initial adoption