Monitoring report form for CDM Project activity

(Version 09.0)

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT			
Title of the project activity	Generation of electricity from 4.8 MW capacity wind mills by Sun-n-Sand Hotels Private Limited at Maharashtra		
UNFCCC reference number of the project activity	5334		
Version number of the PDD applicable to this monitoring report	05		
Version number of this monitoring report	01		
Completion date of this monitoring report	16/09/2022		
Monitoring period number	02		
Duration of this monitoring period	From 01/01/2016 to 31/12/2020 (both days are included)		
Monitoring report number for this monitoring period	N/A		
Project participants	Sun-n-Sand Hotels Private Limited		
Host Party	India		
Applied methodologies and standardized baselines	Approved baseline methodology AMS I.D: "Grid connected renewable electricity generation", Version 17		
Sectoral scopes	01 – Energy Industries (renewable / non-renewable sources)		
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013 until 31 December 2020	Amount achieved from 1 January 2021
	0	33615	-
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	38126		

SECTION A. Description of project activity

A.1. General description of project activity

>>

The Sun-n-Sand Hotel network in India is Owned and Managed by Sun-n-Sand Hotels Private Limited (SnS). They decided to invest in the renewable energy sector and installed windmills in Maharashtra. They commissioned five Enercon (India) Limited wind turbines in Satara and one in Ahmednagar districts of Maharashtra, India. The project has a total capacity of 4.8 MW. The project supplies energy to the grid under a power purchase agreement signed with Maharashtra State Electricity Distribution Company Limited (MSEDCL).

Wind energy projects are environmentally friendly, with no greenhouse gas emissions. If the project had not taken place, the same quantity of electricity would have been generated by power plants connected to the grid, the bulk of which are fossil-fuel-based. As a result, the project is replacing anthropogenic emissions from a fossil-fuel-based power plant that is connected to the national grid.
The details of the wind mills involved in the project activity are as follows:

Owner	Total Capacity of wind mills	No. of wind Turbines	Capacity of each turbine	Date of Commissioning
Sun-n -Sand Hotels Pvt. Ltd.(SNS)	4.0MW	5	0.8MW	10-12-2008
	0.8MW	1	0.8MW	30-03-2009
Total	**4.8 MW**	**6**		

Relevant dates for the project activity:

Date of Registration: 15 November, 2011

Commencement of crediting period: 01 February 2012

Monitoring Period	Time Period	Status
2	01-01-16 to 31-12-20	Current

Total amount of emission reduction achieved in this (Second) monitoring period is 33615 tCO_2e.

A.2. Location of project activity

>>

The windmills are located at:

1. Nivi-Village, Patan-Taluka, Satara-District
2. Karpewadi-Village, Patan-Taluka, Satara-District
3. Ambevangan-Village, Akole-Taluka, Ahmednagar-District, in Maharashtra, India.

The windmills' latitude and longitude are mentioned below:

Loc. No.	Latitude (N)	Longitude(E)
SNS-45	17^O 09'02.3"	73^O 54'52.8"
SNs-46	17^O 08'56.6"	73^O 54'53.2"
SNS-48	17^O 08'43.6"	73^O 55'15.4"
SNS-49	17^O 08'47.6"	73^O 55'14.0"
SNS-59	17^O 09'38.7"	73^O 55'07.6"
SNS-509	19^O 36'43.6"	73^O 47'19.9"

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host Party)	Private entity: Sun-n-Sand Hotels Pvt. Ltd.	No

A.4. References to applied methodologies and standardized baselines

>>

Approved baseline methodology AMS I. D: "Grid connected renewable electricity generation",(Version 17, EB 61), has been applied to this project.
Sectoral scope: 01 – Energy Industries (renewable-/ non-renewable sources).

EF calculation tool: Tool to calculate the emission factor for an electricity system, Version02.2.0, EB 61"

Reference:
https://cdm.unfccc.int/methodologies/SSCmethodologies/approved

A.5. Crediting period type and duration

>>

Choice of crediting period : Fixed crediting period with a length of 10 years is chosen

Crediting Period : 01/02/2012 to 31/01/2022

Current monitoring period : 01/01/2016 to 31/12/2020

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

>>

The project is currently operational. The monitoring plan is implemented in compliance with the registered PDD.

The project activity comprises of 6 wind turbines each of 0.8 MW capacity. These wind turbines are of Enercon make (E-48 gearless type) WTG.

Features of the wind turbine are as follows:

S No.	Parameter	Description
1	Turbine	Gearless, variable speed, variable pitch control
2	Rotor	Diameter = 48m, Designed to optimise energy generation at low and medium wind speed. Blade tips have been optimised to improve energy yield and handle the turbulences very effectively.
3	Speed Function	Variable, speed range of 16 to 32 RPM
4	Pitch Control	Three synchronised blade pitch system with battery backup.
5	Wear & Tear	Less Wear & Tear as no mechanical brakes are needed due to low speed generator which runs at maximum speed of 32.0 RPM and uses Air Brakes
6	Aero Brakes	Three independent Aero Brakes with emergency power back up supply.
7	Rated Wind Speed	3.0 m/s
		12 m/s
8	Protection	Lightning protection which includes blades.

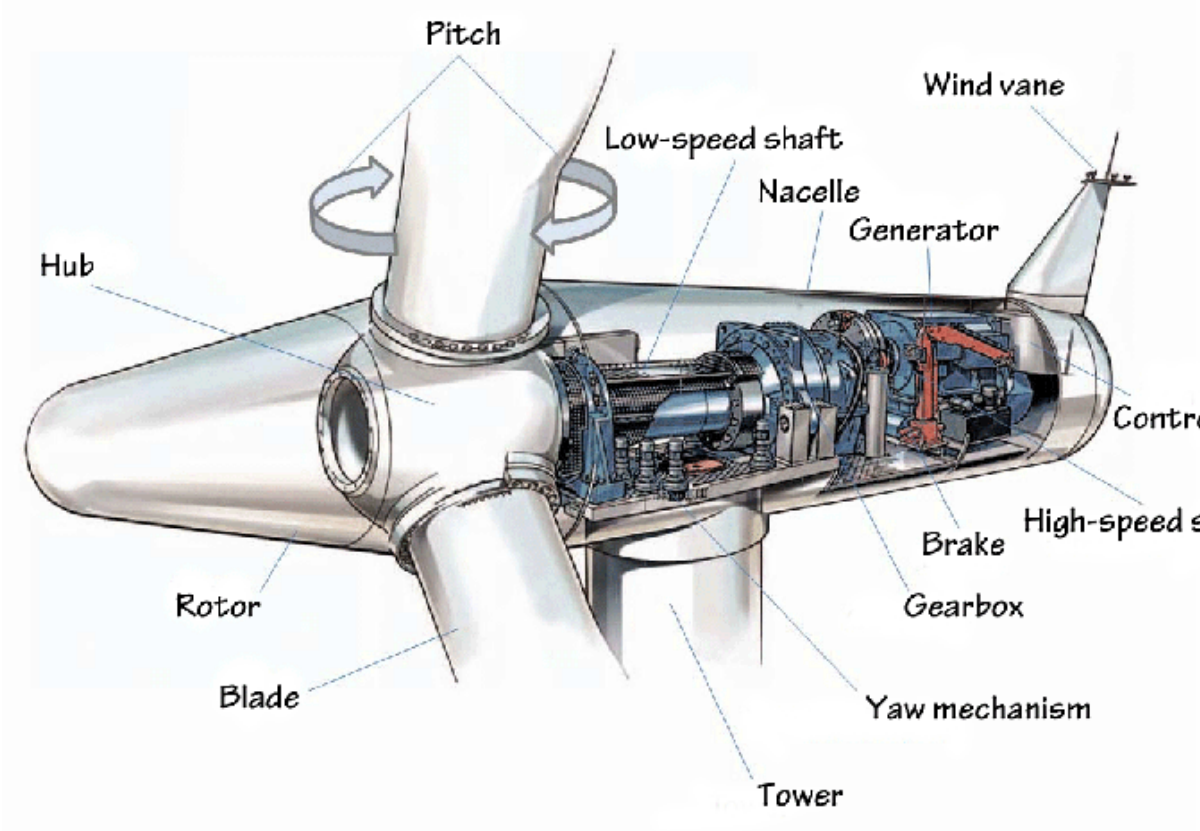


Figure 1: Major mechanical parts of a wind turbine

The wind energy generated from the wind farm is evacuated to the grid System through the Grid's EHV sub-station. There are HV transmission lines and equipment to transfer the generation from the individual wind turbine to facility's switchyard and from the switchyard up to the Grid EHV sub-station, for evacuation of wind energy.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

>>
Not applicable

B.2.2. Corrections

>>
Not applicable

B.2.3. Changes to the start date of the crediting period

>>
Not Applicable

B.2.4. Inclusion of monitoring plan

>>
There have not been any changes in the monitoring plan during the current monitoring period.

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

>>
Not Applicable.

B.2.6. Changes to project design

>>
Not Applicable

B.2.7. Changes specific to afforestation or reforestation project activity

>>
Not Applicable

SECTION C. Description of monitoring system

>>
The monitoring system for the project activity is described in the following sections.

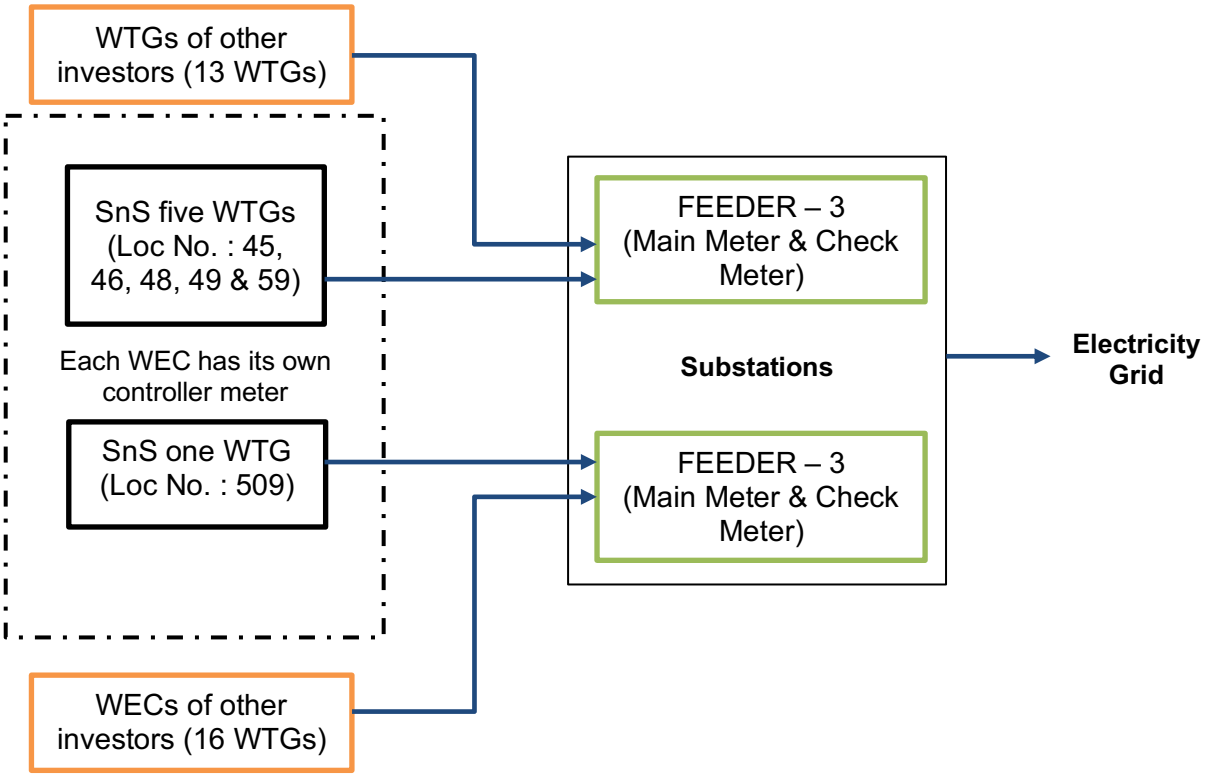
Data Collection Procedure:

Net Electricity supplied to the grid (EG_y) from the project activity will be calculated from thefollowing parameters:

$EG_{GEN\text{-}4.8MW}$: $\left(\sum_0^n EG_{n,y}\right)$	Total gross electricity generated by 6 **WTG** (feeder 3- Bhambarwadi & feeder 3- Panchpatta) of the project activity connected to the Bhambarwadi & Panchpatta Substation in, Maharashtra, recorded in the individual **WTG panels**
$EG_{GEN\text{-}all}$: $\left(\sum_0^n EG_{n,y} + \sum_0^m EG_{m,y}\right)$	Total gross electricity generated by all **WTGs** including the project activity WTGs connected to the Bhambarwadi & Panchpatta Substation at in Maharashtra and recorded in the individual **WTG panels**
$EG_{4.8MW(Export)}$:	Electricity exported to the grid from SNS 4.8 MW wind farm connected to the Bhambarwadi & Panchpatta Substation.
$EG_{GEN\text{-}Others}$: $\left(\sum_0^m EG_{m,y}\right)$	Total gross electricity generated by **WTG** (feeder 3- Bhambarwadi & feeder 3- Panchpatta) other than project activity connected to the Bhambarwadi & Panchpatta Substation in Maharashtra, recorded in the individual **WTG panels.**
$EG_{4.8MW(Import)}$	Auxiliary consumption for 6 **WTGs** of SNS.
$EG_{all\ (Export)}$:	Total electricity exported from the wind farm (includes all **WTGs**, project activity and others) to the grid. Recorded at the MSEDCL meter at Bhambarwadi & Panchpatta Substation.
$EG_{all\ (Import)}$:	Total electricity Imported by the wind farm (includes all **WTGs**, project activity and others) from the grid. Recorded at the MSEDCL meter at Bhambarwadi & Panchpatta Substation.

Detailed discussion on emission reduction calculation based on the data collection described above is provided in Section E.

The technology and machines were supplied by Enercon (India) Limited and they have also taken the contract for operating and maintaining the machines. In order to implement a precise and representative monitoring plan, SNS has established a continual registration of each monitoring parameter as part of its Quality management system. The figure presented below shows the relevant monitoring points.



The QA/QC measures for the data to be monitored for the Project Activity are as follows:

ID Number	Data monitored	Uncertainty level of data (High/ Medium / Low)	Are QA/QC procedures planned for these data?	Outline explanation why QA/QC procedures are or are not being planned
1. $EG_{GEN\text{-}4.8MW}$ $\left(\sum_0^n EG_{n,y}\right)$	Total Gross Electricity Generated by 6 WTGs of project activity (metered individual WTG panel)	Low	Yes	This data will be used for the calculation of net electricity supplied by project activity to the grid (EG_y). This will be recorded by panels installed in the WTGs. These controller meters are microprocessor based intelligent meters with online system, Which does not require calibration. Please refer Note 1.
2. $EG_{GEN\text{-}Others}$ $\left(\sum_0^m EG_{m,y}\right)$	Total Gross Electricity Generated by WTGs other than project activity (metered individual WTG panel)	Low	Yes	This data will be used for the calculation of net electricity supplied by project activity to the grid (EG_y). This will be recorded by panels installed in the WTGs. These controller meters are microprocessor based intelligent meters with online system, which does not require calibration. Please refer Note 1.

3. $EG_{GEN\text{-}all}$ $\left(\sum_{0}^{n} EG_{n,y} + \sum_{0}^{m} EG_{m,y}\right)$	Total Gross Electricity Generated by all WTGs connected to common MSEDCL meter at Substations including project activity WTGs (metered in individual WTG panel)	Low	Yes	This data will be used for the calculation of the net electricity supplied by project activity to the grid (EG_y). This will be recorded by panels installed in the WTGs. These controller meters are microprocessor based intelligent meters with online system, which does not require calibration.
4. $EG_{all\ (Export)}$	Total electricity exported from all WTGs (Including project WTGs) connected to MSEDCL meter(s) at substations.	Low	Yes	Recorded by the MSEDCL meter. The metering equipment consisting of the Main Meter (0.2 accuracy class) and the Check Meter (0.2 accuracy class) are operated and maintained by MSEDCL. These meters comply with the requirements of the Electricity Rules. The meter readings at the Metering Point are undertaken jointly by the representatives of the Grid/MSEDCL and Enercon (India) representative in the first week of every month. The meter readings are jointly certified by representatives of the Grid/MSEDCL and Enercon (India). The Joint Meter Reading (JMR) gives both the "export" and "import" of the electricity to/from the grid. Please refer Notes below for further details.
5. $EG_{all\ (Import)}$	Total electricity imported by all WTGs (including project WTGs) connected to the MSEDCL meter(s) at substations.	Low	Yes	Recorded by the MSEDCL meter. The metering equipment consisting of the Main Meter (0.2 accuracy class) and the Check Meter (0.2 accuracy class) are operated and maintained by MSEDCL. These meters comply with the requirements of the Electricity Rules. The meter readings at the Metering Point are undertaken jointly by the representatives of the Grid/MSEDCL and Enercon (India) representative in the first week of every month. The meter readings are jointly certified by representatives of the Grid/MSEDCL and Enercon (India). The Joint Meter Reading (JMR) gives both the "export" and "import" of the electricity to/from the grid. Please refer Notes below for further details.

6. $EG_{4.8\ MW(Export)}$	$EG_{4.8MW(Export)}$ is the apportioned electricity exported to the grid from SNS 4.8 MW wind project	Low	Yes	Calculated. The value is presented as export reading for 6 WTGs of SNS in the JMR taken at Bhambarwadi & Panchpatta substation. The apportioned electricity value calculated as per the apportioning procedure described in section D.2 may be cross checked with value reported as the export readings in the JMR.
7. $EG_{4.8MW(Import)}$	$EG_{4.8MW(Import)}$ is the apportioned Auxiliary consumption of the SNS 4.8MW wind project	Low	No	Calculated. The value is presented as import reading for 6 WTGs of SNS in JMR taken at Bhambarwadi & Panchpatta Substation. The apportioned electricity value of auxiliary consumption calculated as per the apportioning procedure described in section D.2 may be cross checked with value reported as the import reading in the JMR.
8. EG_y	Net Electricity supplied to grid (MSEDCL) by SNS 4.8 MW wind farm.	Low	No	Calculated. The value is calculated based on the preceding parameters. In case of any discrepancy between JMR and apportioned values, the lower value of the two, being more conservative, will be used for calculation of emission reductions.

Notes:

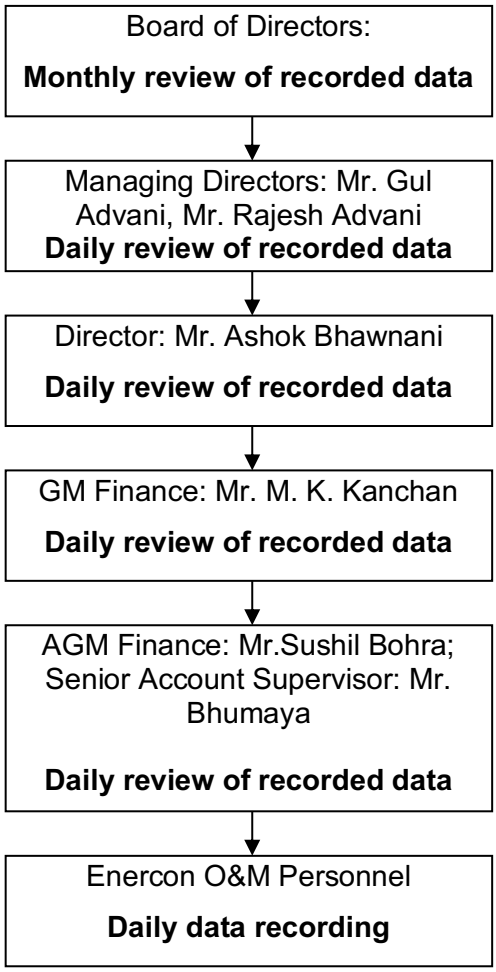
1. The individual windmill has a control panel which displays the energy generated by the windmill. This is an online system and does not require calibration. The controller meter recording the electricity generated from wind turbine are micro-processor based intelligent controller which has been specially designed for control of wind turbines, where control functions, data collection and storage, real time grid monitoring and storage function are integrated. The detail of QA/QC for the windmill controller as being followed by Enercon (O&M contractor) on site can be verified at site..
2. The meters located at the grid sub-station are sealed, maintained and calibrated by the State electricity utility (MSEDCL). The meters are tested and maintained as per the Metering Code[1] for Maharashtra.
3. The MSEDCL carries out the calibration, periodical testing, sealing and maintenance of meters in the presence of Enercon (India) Limited (EIL) representative. The frequency of meter testing is annual. All meters are tested only at metering point.
4. The generated electricity is measured through a two-step procedure wherein the first metering is carried out at the controller of the machine with on board meter. The monitoring of all these wind turbines is done from a common monitoring station as a part of central monitoring system. The system consists of a state-of-the-art controlling and monitoring station as a part of central monitoring system. The system consists of a state-of-the-art controlling and monitoring and well trained staff personnel of O&M contractor, Enercon (India) Limited, are always present on site to monitor various parameters of power generation and deal with any problems related to generation, transmission or maintenance. The second metering is carried out at grid interconnection point (sub-station) wherein the Joint Meter Reading (JMR) is carried out on first week of every month in presence of the representatives of the project proponent and the state electricity utility (MSEDCL). The JMR gives both the "export" ($EG_{all\ (Export)}$) and "import" ($EG_{all\ (Import)}$) of the electricity to/from the grid. Further, as there is a common

[1] https://www.mahatransco.in/uploads/docs/Metering_Code_InSTS_final.pdf

MSEDCL joint meter for multiple project proponents, the joint meter reading (JMR) is taken every month by MSEDCL personnel reflects the cumulative monthly generation for all wind turbines connected to this MSEDCL meter. The apportioning of electricity generated from the various wind turbines is done by the EPC contractor, Enercon (India) Limited, based on the power generation from the individual wind turbines connected to this MSEDCL meter. Enercon (India) Limited O&M personnel prepare a monthly report on generation and consumption. This report contains details of power exported/imported to/from the grid by each of the wind turbines connected. This apportioned value is then used by the project proponent to raise invoice from MSEDCL.

Operational and management structure:

The organization structure, along with respective roles and responsibilities, is described in the following figure:



QC/QA procedures being undertaken for data monitored:

The Quality Control and Quality Assurance (QC & QA) procedures are equivalent to applicable National and International Standards as well as standards given by the technology supplier. The QA& QC procedures are set and implemented in order to:

- Secure a good consistency through planning to implement the project activity,
- Assign the responsibility as per the requirements and,
- Avoid any misunderstanding between people and organization involved.

The following table provides the calibration and maintenance of measurement instruments:

Location	Type	MSEDCL Meter Serial No.	Accuracy Class	Make	Calibration Frequency	Calibration done on	Calibration due on

Feeder No. 3, Panchpatta	Main	14831529	0.2s	Elster	Annually	28-09-15 14-12-16 23-05-18 28-03-19 08-05-20	27-09-16 13-12-17 22-05-19 27-03-20 07-05-21
	Check	14831530	0.2s	Elster	Annually	07-03-15 14-12-16 20-03-18 28-03-19 08-05-20	06-03-16 13-12-17 19-03-19 27-03-20 07-05-21
Feeder No. 3, Bhambarwadi	Main	04832747 02843247	0.2s	Elster	Annually	29-12-14 20-04-16 20-09-16 13-03-18 06-09-18 26-06-20	28-12-15 19-04-17 19-09-17 12-03-19 05-09-19 25-06-21
	Check	04865571 02843250	0.2s	Elster	Annually	29-12-14 20-04-16 20-09-16 08-02-18 06-09-18 26-06-20	28-12-15 19-04-17 19-09-17 07-02-19 05-09-19 25-06-21

Emergency Procedure:

In case of an emergency when data from both main and check meters are not available, emission reduction for that period will not be calculated.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**EF_y**
Unit	tCO_2e/MWh
Description	CO_2 Emission Factor for the electricity displaced due to the project activity
Measured/calculated/ default	Estimated
Source of data	"CO_2 Baseline Database for the Indian Power Sector" version 4.0 dated 1 September 2008 published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) applied	0.9062
Choice of data or measurement methods and procedures	Calculated based on the build margin emission factor and operating margin emission factor; according to the "Tool to calculate the emission factor for an electricity system" the weight of the build margin emission factor and operating margin emission factor have been taken as 0.25 and 0.75 respectively for the wind power project. = (0.75* $EF_{OM,y}$) + (0.25* $EF_{BM,y}$)
Purpose of data/parameter	This factor will help in calculating CO_2 emission reductions in tCO_2e
Additional comments	As per the PDD this value is ex-ante, therefore, will remain the same during the crediting period.

D.2. Data and parameters monitored

Data/Parameter	$EG_{GEN-4.8MW} = \sum_0^n EG_{n,y}$
Unit	MWh

Description	Total gross electricity generated by 6 WTGs of project activity (values are monitored via individual WTG controller readings.)
Measured/calculated/ default	Measured, Calculated
Source of data	Controller Panel meter installed at the WTGs
Value(s) of monitored parameter	**01-Jan-16 – 31-Dec-16** = 7187 MWh **01-Jan-17 – 31-Dec-17** = 7853 MWh **01-Jan-18 – 31-Dec-18** = 8432 MWh **01-Jan-19 – 31-Dec-19** = 7588 MWh **01-Jan-20 – 31-Dec-20** = 6912 MWh **Total** = 37971 MWh
Monitoring equipment	Individual WTG has integrated control panel which is a micro-processor based intelligent controller. This is an online system and does not require calibration.
Measuring/reading/recording frequency	Continuously measured and Monthly calculated
Calculation method (if applicable)	The gross generation, is obtained as a summation of values taken from individual panel meters of the 6 WTGs.
QA/QC procedures	Refer Section C of this MR
Purpose of data/parameter	To calculate baseline emissions.
Additional comments	-

Data/Parameter	$EG_{GEN-Others} = \sum_{0}^{m} EG_{m,y}$
Unit	MWh
Description	Total gross electricity generated by WTGs other than project activity (values are monitored via individual WTG controller readings.)
Measured/calculated/ default	Measured, Calculated
Source of data	Controller Panel meter installed at the WTGs
Value(s) of monitored parameter	**01-Jan-16 – 31-Dec-16** = 30216 MWh **01-Jan-17 – 31-Dec-17** = 26306 MWh **01-Jan-18 – 31-Dec-18** = 22911 MWh **01-Jan-19 – 31-Dec-19** = 29024 MWh **01-Jan-20 – 31-Dec-20** = 28787 MWh **Total** = 137244 MWh
Monitoring equipment	Individual WTG has integrated control panel which is a micro-processor based intelligent controller. This is an online system and does not require calibration.
Measuring/reading/recording frequency	Continuously measured and Monthly calculated
Calculation method (if applicable)	The gross generation, is obtained as a summation of values taken from individual panel meters of the WTGs other than project activity.
QA/QC procedures	Refer Section C of this MR
Purpose of data/parameter	To calculate baseline emissions.
Additional comments	-

Data/Parameter	$EG_{GEN-all} = \sum_{0}^{n} EG_{n,y} + \sum_{0}^{m} EG_{m,y}$
Unit	MWh

Description	Total gross electricity generated by all WTGs (including project activity) connected to common MSEDCL meter at Substations (values are monitored via individual WTG controller readings.)
Measured/calculated/ default	Measured, Calculated
Source of data	Controller Panel meter installed at the WTGs
Value(s) of monitored parameter	**01-Jan-16 – 31-Dec-16** = 37403 MWh **01-Jan-17 – 31-Dec-17** = 34159 MWh **01-Jan-18 – 31-Dec-18** = 31342 MWh **01-Jan-19 – 31-Dec-19** = 36612 MWh **01-Jan-20 – 31-Dec-20** = 35699 MWh **Total** = 175215 MWh
Monitoring equipment	Individual WTG has integrated control panel which is a micro-processor based intelligent controller. This is an online system and does not require calibration.
Measuring/reading/recording frequency	Continuously measured and Monthly calculated
Calculation method (if applicable)	The gross generation, is obtained as a summation of values taken from individual panel meters of all the WTGs. The data is available with O&M contractor (Enercon).
QA/QC procedures	Refer Section C of this MR
Purpose of data/parameter	To calculate baseline emissions.
Additional comments	-
Data/Parameter	**$EG_{all\ (Export)}$**
Unit	MWh
Description	Total electricity exported by all WTGs (including project activity) connected to common MSEDCL meter at Bhambharwadi & Panchpatta Substation.
Measured/calculated/ default	Measured
Source of data	Reading taken from “export” of MSEDCL meter(s) to which all turbines are connected. This value is presented as export reading under the head of “energy delivered at common delivery point” at Bhambarwadi & Panchpatta Substation. This reading can be found in prepared JMR also.
Value(s) of monitored parameter	**01-Jan-16 – 31-Dec-16** = 36418 MWh **01-Jan-17 – 31-Dec-17** = 33353 MWh **01-Jan-18 – 31-Dec-18** = 30609 MWh **01-Jan-19 – 31-Dec-19** = 35640 MWh **01-Jan-20 – 31-Dec-20** = 34548 MWh **Total** = 170568 MWh
Monitoring equipment	The metering equipment consisting of Main and check meter (both of 0.2 accuracy class) are owned, operated and maintained by MSEDCL. These meters comply with the requirements of the electricity rules.
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	-
QA/QC procedures	Refer Section C of this MR
Purpose of data/parameter	To calculate baseline emissions.
Additional comments	-

Data/Parameter	**$EG_{all\ (import)}$**
Unit	MWh

Description	Total electricity imported by all (including project activity) WTGs at the project site connected to common MSEDCL meter at Bhambarwadi & Panchpatta Substation
Measured/calculated/ default	Measured
Source of data	Reading taken from "import" of MSEDCL meter(s) to which all turbines are connected. This value is presented as import reading under the head of "energy delivered at common delivery point" at Bhambarwadi & Panchpatta Substation. This reading can be found in prepared JMR also.
Value(s) of monitored parameter	**01-Jan-16 – 31-Dec-16** = 33 MWh **01-Jan-17 – 31-Dec-17** = 48 MWh **01-Jan-18 – 31-Dec-18** = 50 MWh **01-Jan-19 – 31-Dec-19** = 37 MWh **01-Jan-20 – 31-Dec-20** = 47 MWh **Total** = 215 MWh
Monitoring equipment	The metering equipment consisting of Main and check meter (both of 0.2 accuracy class) are owned, operated and maintained by MSEDCL. These meters comply with the requirements of the electricity rules.
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	-
QA/QC procedures	Refer Section C of this MR
Purpose of data/parameter	To calculate baseline emissions.
Additional comments	-

Data/Parameter	**$EG_{4.8\ MW\ (Export)}$**
Unit	MWh
Description	Electricity exported to the grid by SnS 4.8 MW wind project
Measured/calculated/ default	Calculated
Source of data	This value is presented as export reading for 6 WTGs of SnS in JMR taken at Bhambarwadi & Panchpatta Substation, this value is also calculated by apportioning the export import data sheet provided by O&M contractor (Enercon)
Value(s) of monitored parameter	**01-Jan-16 – 31-Dec-16** = 6995 MWh **01-Jan-17 – 31-Dec-17** = 7697 MWh **01-Jan-18 – 31-Dec-18** = 8265 MWh **01-Jan-19 – 31-Dec-19** = 7421 MWh **01-Jan-20 – 31-Dec-20** = 6752 MWh **Total** = 37130 MWh
Monitoring equipment	-
Measuring/reading/recording frequency	Monthly

Calculation method (if applicable)	Calculated as per the procedure being followed by MSEDCL and the O & M contractor (Enercon) as the break-up of energy recorded at the main meter of MSEDCL and presented in the Joint Meter Reading (JMR) issued by MSEDCL. The joint meter reading is taken every month by MSEDCL personnel and Enercon official at the common meter owned by MSEDCL located at the Bhambarwadi & Panchpatta Substation in Maharashtra. O&M (Enercon) personnel prepare a monthly report on generation for each WTG based on the Panel controller meter readings located at the project activity site. The export and import readings from the JMR issued by MSEDCL are apportioned by Enercon officials based on the generation recorded for the project activity, and the generation recorded for all WTGs connected at the Bhambarwadi & Panchpatta substation. The apportioning of electricity for the electricity exported by SnS 4.8 MW project is carried out as follows. $$EG_{4.8MW(Export)} = EG_{all\ (Export)} * \frac{EG_{GEN\ 4.8MW}}{EG_{GEN-all}}$$ OR $$EG_{4.8MW(Export)} = EG_{all\ (Export)} * \frac{\sum_0^n EG_{n,y}}{\left(\sum_0^n EG_{n,y} + \sum_0^m EG_{m,y}\right)}$$ Parameter $EG_{4.8MW\ (Export)}$ is also presented in monthly JMR taken at Bhambarwadi & Panchpatta Substation.
QA/QC procedures	Refer Section C of this MR
Purpose of data/parameter	To calculate baseline emissions.
Additional comments	-

Data/Parameter	**$EG_{4.8\ MW\ (Import)}$**
Unit	MWh
Description	Apportioned auxiliary consumption of the SNS 4.8 MW wind project
Measured/calculated/ default	Calculated
Source of data	This value is presented as import reading for 6 WTGs of SnS in the JMR taken at Bhambarwadi & Panchpatta Substation, this value is also calculated by apportioning via export import data sheet prepared by O&M contractor (Enercon)
Value(s) of monitored parameter	**01-Jan-16 – 31-Dec-16** = 5 MWh **01-Jan-17 – 31-Dec-17** = 7 MWh **01-Jan-18 – 31-Dec-18** = 9 MWh **01-Jan-19 – 31-Dec-19** = 6 MWh **01-Jan-20 – 31-Dec-20** = 8 MWh **Total** = 35 MWh
Monitoring equipment	Main and check meter (both of 0.2 accuracy class) owned and maintained by MSEDCL. These meters comply with the requirements of the electricity rules.
Measuring/reading/recording frequency	Monthly

Calculation method (if applicable)	Calculated as per the procedure being followed by MSEDCL and the O&M contractor (Enercon) as the auxiliary consumption recorded at the main meter of MSEDCL and presented in the Joint Meter Reading (JMR) issued by MSEDCL. The Joint Meter Reading (JMR) is taken every month by MSEDCL personnel and Enercon officials at the common meter owned by MSEDCL located at the Bhambarwadi & Panchpatta Substation in Maharashtra. O&M personnel (Enercon) prepare a monthly report on generation for each WTG based on the Panel controller meter readings located at the project activity site. The export and import readings from the JMR issued by MSEDCL are apportioned by Enercon officials based on the generation recorded for the project activity, and the generation recorded for all WTGs connected at the Bhambarwadi & Panchpatta substation. The apportioning of electricity for the electricity imported by SnS 4.8 MW project is carried out as follows. $$EG_{4.8MW(Import)} = EG_{all\ (Import)} * \frac{EG_{GEN\ 4.8MW}}{EG_{GEN-all}}$$ OR $$EG_{4.8MW(Import)} = EG_{all\ (Import)} * \frac{\sum_0^n EG_{n,y}}{\left(\sum_0^n EG_{n,y} + \sum_0^m EG_{m,y}\right)}$$ Parameter $EG_{4.8MW(Import)}$ is also presented in monthly JMR taken at Bhambarwadi & Panchpatta Substation.
QA/QC procedures	Refer Section C of this MR
Purpose of data/parameter	To calculate baseline emissions.
Additional comments	-

Data/Parameter	**EG_y**
Unit	MWh
Description	Net electricity supplied to the grid (MSEDCL) by SNS 4.8 MW wind farm
Measured/calculated/ default	Calculated
Source of data	Reported in the Credit note from MSEDCL
Value(s) of monitored parameter	**01-Jan-16 – 31-Dec-16** = 6990 MWh **01-Jan-17 – 31-Dec-17** = 7690 MWh **01-Jan-18 – 31-Dec-18** = 8256 MWh **01-Jan-19 – 31-Dec-19** = 7415 MWh **01-Jan-20 – 31-Dec-20** = 6744 MWh **Total** = 37095 MWh
Monitoring equipment	-
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	$EG_y = EG_{4.8MW\ (Export)} - EG_{4.8MW\ (Import)}$ In case of any discrepancy between JMR and apportioned values, the lower value of the two, being more conservative, will be used for calculation of emission reductions
QA/QC procedures	Refer Section C of this MR
Purpose of data/parameter	To calculate baseline emissions.
Additional comments	-

D.3. Implementation of sampling plan

>>
Not Applicable

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

>>
Baseline Emissions BE_y are given as follows:

$BE_y = EG_y \times EF_y$

Where:

BE_y = Baseline emissions (tCO_2/year)

EF_y = CO_2 emission factor for the electricity displaced due to the project activity.
= 0.9062 tCO_2/MWh

EG_y = Net Electricity supplied to the grid (EG_y) from the project activity and is calculated as described below:

Net electricity supplied to the grid (EG_y) of the project activity is calculated by using following parameters:

$EG_{GEN\ 4.8MW}$:	Total gross electricity generated by 6 **WTG** of the project activity connected to the MSEDCL Substation at Bhambarwadi & Panchpatta Substation, recorded in the individual **WTG panels**
$EG_{GEN\text{-}Others}$:	Total gross electricity generated by WTGs other than project activity (values are monitored via individual WTG controller readings.)
$EG_{GEN\text{-}all}$:	Total gross electricity generated by all **WTGs** including the project activityWTGs connected to the MSEDCL Substation at Bhambarwadi & Panchpatta and recorded in the individual **WTG panels**
$EG_{4.8MW\ (Export)}$:	Electricity exported to the grid from SNS 4.8 MW wind farm connected to the Bhambarwadi & Panchpatta Substation.
$EG_{4.8MW\ (Import)}$	Auxiliary consumption for 6 **WTGs** of SNS.
$EG_{all\ (Export)}$:	Total electricity exported from the wind farm (includes all **WTGs**, project activity and others) to the grid. Recorded at the MSEDCL meter at Bhambarwadi & Panchpatta Substation.
$EG_{all\ (Import)}$:	Total electricity Imported by the wind farm (includes all **WTGs**, project activity and others) from the grid. Recorded at the MSEDCL meter at Bhambarwadi & Panchpatta Substation.

The formula for calculation of EGy is as follows:

$EG_y = EG_{4.8MW\ (Export)} - EG_{4.8MW\ (Import)}$

Where:
$EG_{4.8MW\ (Export)}$ is the value of electricity exported to the grid from SNS 4.8 MW wind farm. It is obtained using the joint meter reading taken at the MSEDCL meter at the Bhambarwadi & Panchpatta Substation as follows:

$$EG_{4.8MW\ (Export)} = EG_{all\ (Export)} * \frac{EG_{GEN-4.8MW}}{EG_{GEN-all}}$$

OR

$$EG_{4.8MW\ (Export)} = EG_{all\ (Export)} * \frac{\sum_0^n EG_{n,y}}{\left(\sum_0^n EG_{n,y} + \sum_0^m EG_{m,y}\right)}$$

Where,

$EG_{GEN-4.8MW}$ is the gross electricity generated by 6 **WTGs** of the project activity, recorded in the individual **WTG panels**

$EG_{GEN-all}$ is the gross electricity generated by all **WTGs** connected to the Bhambarwadi & Panchpatta Substation and recorded in the individual **WTG panels.**

$EG_{all\ (Export)}$ Total electricity exported by all **WTGs** (including project WTGs) connected to the MSEDCL meter at Bhambarwadi & Panchpatta Substation This value is presented as export reading under the head of "**energy delivered at common delivery point**" at Bhambarwadi & Panchpatta Substation.

$EG_{4.8MW\ (Export)}$ electricity exported to the grid from SNS 4.8 MW wind farm. This value is presented as export reading for 6 WTGs of SNS in the JMR taken at Bhambarwadi & Panchpatta Substation.

And

$EG_{4.8\ MW\ (import)}$ is Auxiliary consumption and is calculated as:

$$EG_{4.8MW\ (Import)} = EG_{all\ (Import)} * \frac{EG_{GEN-4.8MW}}{EG_{GEN-all}}$$

OR

$$EG_{4.8MW\ (Import)} = EG_{all\ (Import)} * \frac{\sum_0^n EG_{n,y}}{\left(\sum_0^n EG_{n,y} + \sum_0^m EG_{m,y}\right)}$$

This value is presented as import reading for 6 WTGs of SNS in the JMR taken at Bhambarwadi & Panchpatta Substation.

Where:

$EG_{all(Import)}$ is the reading taken from "import" of MSEDCL meter at Bhambarwadi & Panchpatta to which all WTGs turbines of 0.8 MW each are connected. This value is presented as import reading under the head of "**energy delivered at common delivery point**" at Bhambarwadi & Panchpatta Substation.

EG_y and BE_y Calculations:

Parameter	Value[2]	Unit
$EG_{GEN-4.8MW}$	37971	MWh
$EG_{GEN-Others}$	137244	MWh
$EG_{GEN-all}$	175215	MWh
$EG_{all\ (Export)}$	170568	MWh
$EG_{all\ (Import)}$	215	MWh
$EG_{4.8MW\ (Export)}$	37130	MWh
$EG_{4.8MW\ (Import)}$	35	MWh
EG_y	37095	MWh
EF_y	0.9062	tCO_2/MWh

CO_2 emission reduction	= **EG_y * EF_y** (Net Electricity supplied to grid X Baseline emission factor)
CO_2 emission reduction	= 37095 MWh X 0.9062 tCO_2/MWh
	= 33615 tCO_2e

E.2. Calculation of project emissions or actual net removals

>>

$PE_y = 0$

[2] Reference: Appendix 2 of this document

E.3. Calculation of leakage emissions

>>

$LE_y = 0$

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)			
				Before 01/01/ 2013	From 01/01/ 2013 until 31/12/ 2020	From 01/01/ 2021	Total amount
Total	33615	0	0	0	33615	0	33615

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
33615	7621 X (1826/365) = 38126 (7621 tCO_2e for 365 days)

E.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the PDD"

>>

Start date of the monitoring period	01/01/2016
End date of monitoring period	31/12/2020
Number of days in monitoring period	1826
Annual estimated reductions as per the PDD	7621 tCO_2e per 365 days
Estimated emissions reductions for this monitoring period	38126 tCO_2e (Round up value)
Actual emission reductions for this monitoring period	33615 tCO_2e
Percentage deviation of actual reductions as compared to estimated reductions for this monitoring period	11.83%

E.6. Remarks on increase in achieved emission reductions

>>

The total emission reductions achieved during this monitoring period 33615 tCO_2e which is 11.83% lower than the estimates in the registered PDD.

The electricity generation from wind power projects is seasonal and not equally distributed throughout the year. A wind power project generates power from wind resource, and thus variation in wind resource basically determines the variation in wind power generation which is beyond the control of PP. Further, wind generation is a cyclic process with peaks and lows. Hence, this deviation is justified

E.7. Remarks on scale of small-scale project activity

>>

The total capacity of the project activity is 4.8 MW which is less than 15MW. Hence the project is a small-scale project activity.

APPENDIX 1

Sun-n-Sand Hotels Private Limited							
Net Electricity Supplied to grid (Feeder 3-Bhambarwadi + Feeder-3 Panchpatta) and Emission Reduction Calculation							
Monitoring Period: 01 January 2016 to 31 December 2020							
Month	Net Electricity Supply to grid		Net electricity supplied from project	Emission factor	Emission Reductions		Total
	SNS (Feeder - I)	SNS (Feeder - II)			SNS (Feeder - I)	SNS (Feeder - II)	
	EG_{y1}	EG_{y2}	$(EG_{y1} + EG_{y2}) = EG_y$		ER_{y1}	ER_{y2}	ER_y
UNIT	(MWh)	(MWh)	(MWh)	(tCO_2/MWh)	(tCO_2)	(tCO_2)	(tCO_2)
Jan-16	29	137	166	0.9062	27	124	151
Feb-16	25	209	233	0.9062	22	189	211
Mar-16	59	298	357	0.9062	53	270	323
Apr-16	85	380	465	0.9062	77	345	422
May-16	152	586	738	0.9062	138	531	669
Jun-16	128	1,093	1,221	0.9062	116	990	1,107
Jul-16	181	511	692	0.9062	164	464	627
Aug-16	54	1,313	1,367	0.9062	49	1,190	1,239
Sep-16	91	696	787	0.9062	83	631	714
Oct-16	32	269	301	0.9062	29	244	272
Nov-16	53	208	261	0.9062	48	189	237
Dec-16	60	341	401	0.9062	54	309	364
Jan-17	3	168	171	0.9062	3	152	155
Feb-17	36	226	262	0.9062	32	205	238
Mar-17	62	270	332	0.9062	56	244	301
Apr-17	100	464	564	0.9062	91	420	511
May-17	129	595	724	0.9062	117	539	656
Jun-17	90	1,112	1,202	0.9062	81	1,007	1,089
Jul-17	127	1,759	1,886	0.9062	115	1,594	1,709
Aug-17	116	1,061	1,177	0.9062	105	962	1,067
Sep-17	39	459	498	0.9062	35	416	452
Oct-17	25	262	287	0.9062	23	237	260
Nov-17	36	108	144	0.9062	32	98	130
Dec-17	61	382	443	0.9062	55	347	402
Jan-18	20	134	154	0.9062	18	121	140
Feb-18	31	132	163	0.9062	28	119	148
Mar-18	43	261	304	0.9062	39	236	275
Apr-18	56	369	425	0.9062	50	335	385
May-18	0	481	481	0.9062	0	436	436
Jun-18	131	1,151	1,282	0.9062	119	1,043	1,162
Jul-18	155	1,894	2,049	0.9062	141	1,716	1,857
Aug-18	152	1,947	2,099	0.9062	138	1,764	1,902
Sep-18	77	508	585	0.9062	70	460	530
Oct-18	10	200	210	0.9062	9	181	190

Nov-18	0	223	223	0.9062	0	202	202
Dec-18	44	239	283	0.9062	40	216	256
Jan-19	45	154	199	0.9062	41	140	181
Feb-19	56	169	225	0.9062	50	153	203
Mar-19	65	313	378	0.9062	59	284	343
Apr-19	109	386	495	0.9062	99	350	449
May-19	114	563	677	0.9062	104	510	614
Jun-19	134	863	997	0.9062	122	782	903
Jul-19	205	1,203	1,408	0.9062	186	1,090	1,276
Aug-19	159	874	1,033	0.9062	144	792	937
Sep-19	112	973	1,085	0.9062	101	882	983
Oct-19	69	275	344	0.9062	63	249	312
Nov-19	36	227	264	0.9062	33	206	239
Dec-19	41	268	309	0.9062	37	243	280
Jan-20	42	176	218	0.9062	38	160	197
Feb-20	48	205	254	0.9062	44	186	230
Mar-20	54	317	370	0.9062	49	287	335
Apr-20	80	330	411	0.9062	73	299	372
May-20	168	495	664	0.9062	153	449	601
Jun-20	55	613	668	0.9062	50	555	605
Jul-20	94	965	1,058	0.9062	85	874	959
Aug-20	171	1,455	1,626	0.9062	155	1,318	1,474
Sep-20	32	365	397	0.9062	29	331	359
Oct-20	35	200	235	0.9062	31	181	213
Nov-20	61	407	468	0.9062	55	369	424
Dec-20	44	332	376	0.9062	40	301	341
Total	**4552**	**32573**	**37095**		**4097**	**29518**	**33615**

APPENDIX 2

Sun-n-Sand Hotels Private Limited
Electricity Generation Data (Feeder 3- Panchpatta) and Emission Reduction Calculation
Monitoring Period: 01 January 2016 to 31 December 2020

Month	WEC Meter Readings			MSEDCL Meter Readings for Total Wind farm as per JMR Report			MSEDCL Meter Readings for SNS as per JMR Report			Meter Readings for SNS based on the Apportioning			Net Electricity supplied to grid (Minimum of JMR value and apportioned value)	Emission Factor	Emission Reduction
	Generation recorded from project WECs	Generation recorded from other WEC in the wind farm	Generation recorded from Total wind farm	Export to Grid from all WECs in Wind farm	Import from Grid from all WECs in Wind farm	Net Export to the grid	Export	Import	Net Electricity supplied to grid	Export	Import	Net Electricity supplied to grid			
	$\sum_0^n EG_{n,y}$	$\sum_0^m EG_{m,y}$	$\sum_0^n EG_{n,y} + \sum_0^m EG_{m,y}$	EG_{all} (Export)	EG_{all} (Import)	$= EG_{all}$ (Export) - EG_{all} (Import)	$EG_{0.8MW}$ (Export)	$EG_{0.8MW}$ (Import)	$= EG_{0.8MW}$ (Export) - $EG_{0.8MW}$ (Import)	$EG_{0.8MW}$ (Export)	$EG_{0.8MW}$ (Import)	$= EG_{0.8MW(Export)} - EG_{0.8MW(Import)}$	EG_y	EF_y	ER_y
UNIT	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(MWh)	(tCO_2/MWh)	tCO_2
Jan-16	30356	854324	884680	860082	3582	856500	29512	123	29389	29512	123	29389	29	0.9062	27
Feb-16	25291	783203	808494	786012	2202	783810	24588	69	24519	24588	69	24519	25	0.9062	22
Mar-16	60251	1217830	1278081	1242543	594	1241949	58576	28	58548	58576	28	58548	59	0.9062	53
Apr-16	87594	1309554	1397148	1357773	1215	1356558	85125	76	85049	85125	76	85049	85	0.9062	77
May-16	156588	1973752	2130340	2071308	975	2070333	152249	72	152177	152249	72	152177	152	0.9062	138
Jun-16	131760	2317759	2449519	2387445	759	2386686	128421	41	128380	128421	41	128380	128	0.9062	116
Jul-16	185213	2468564	2653777	2589051	390	2588661	180696	27	180668	180696	27	180668	181	0.9062	164
Aug-16	55718	1397830	1453548	1413957	2715	1411242	54200	105	54095	54200	104	54096	54	0.9062	49
Sep-16	93692	1536304	1629996	1585596	795	1584801	91140	46	91094	91140	46	91094	91	0.9062	83
Oct-16	32697	678753	711450	691668	4059	687609	31788	187	31601	31788	187	31601	32	0.9062	29

Nov-16	54477	991298	1045775	1016796	1251	1015545	52967	65	52902	52967	65	52902	53	0.9062	48
Dec-16	61842	1226428	1288270	1252572	2025	1250547	60128	97	60031	60128	97	60031	60	0.9062	54
Total (MWh)	**975**	**16756**	**17731**	**17255**	**21**	**17234**	**949**	**1**	**948**	**949**	**1**	**948**	**948**		**859**
Jan-17	3444	82396	85840	83523	10182	73341	3351	408	2943	3351	409	2943	3	0.9062	3
Feb-17	37238	568900	606138	589284	6372	582912	36203	391	35811	36203	391	35811	36	0.9062	32
Mar-17	63870	946090	1009960	981879	1260	980619	62094	80	62014	62094	80	62014	62	0.9062	56
Apr-17	102974	1135311	1238285	1202841	576	1202265	100027	48	99979	100027	48	99979	100	0.9062	91
May-17	132651	1655150	1787801	1735605	366	1735239	128778	27	128751	128778	27	128751	129	0.9062	117
Jun-17	91750	1459501	1551251	1519407	882	1518525	89867	52	89814	89867	52	89814	90	0.9062	81
Jul-17	130731	2376351	2507082	2429559	150	2429409	126689	8	126681	126689	8	126681	127	0.9062	115
Aug-17	121302	1842591	1963893	1879323	42	1879281	116078	3	116076	116078	3	116076	116	0.9062	105
Sep-17	41270	534204	575474	548898	4200	544698	39364	301	39063	39364	301	39063	39	0.9062	35
Oct-17	26592	389172	415764	395721	2682	393039	25310	172	25139	25310	172	25139	25	0.9062	23
Nov-17	37101	522721	559822	539778	2721	537057	35773	180	35592	35773	180	35592	36	0.9062	32
Dec-17	63971	446789	510760	487656	1314	486342	61077	165	60913	61077	165	60913	61	0.9062	55
Total (MWh)	**853**	**11959**	**12812**	**12393**	**31**	**12363**	**825**	**2**	**823**	**825**	**2**	**823**	**823**		**746**
Jan-18	21317	215259	236576	227493	2103	225390	20499	189	20309	20499	189	20309	20	0.9062	18
Feb-18	32714	453340	486054	466275	2463	463812	31383	166	31217	31383	166	31217	31	0.9062	28
Mar-18	44475	664134	708609	682044	2403	679641	42808	151	42657	42808	151	42657	43	0.9062	39
Apr-18	57621	970234	1027855	992427	1557	990870	55635	87	55548	55635	87	55548	56	0.9062	50
May-18	0	969321	969321	954951	1926	953025	0	0	0	0	0	0	0	0.9062	0
Jun-18	140370	1215177	1355547	1265811	867	1264944	131078	90	130988	131078	90	130988	131	0.9062	119
Jul-18	159983	1226348	1386331	1346670	66	1346604	155406	8	155399	155406	8	155398	155	0.9062	141
Aug-18	159657	768647	928304	885318	150	885168	152264	26	152238	152264	26	152238	152	0.9062	138
Sep-18	85434	343945	429379	389952	4086	385866	77589	813	76776	77589	813	76776	77	0.9062	70
Oct-18	10660	50292	60952	60387	1458	58929	10562	255	10307	10561	255	10306	10	0.9062	9
Nov-18	0	2305	2305	2127	9000	-6873	0	0	0	0	0	0	0	0.9062	0
Dec-18	48012	183468	231480	216492	3186	213306	44903	661	44242	44903	661	44242	44	0.9062	40

Total (MWh)	**760**	**7062**	**7823**	**7490**	**29**	**7461**	**722**	**2**	**720**	**722**	**2**	**720**	**720**		**652**
Jan-19	47690	489107	536797	513336	3852	509484	45584	342	45242	45584	342	45242	45	0.9062	41
Feb-19	57887	575452	633339	611283	2340	608943	55871	214	55657	55871	214	55657	56	0.9062	50
Mar-19	67799	794781	862580	833097	1611	831486	65481	127	65355	65481	127	65355	65	0.9062	59
Apr-19	112378	1082387	1194765	1157283	1032	1156251	108900	97	108803	108900	97	108803	109	0.9062	99
May-19	117775	1525892	1643667	1595160	144	1595016	114373	10	114363	114373	10	114363	114	0.9062	104
Jun-19	139595	2280742	2420337	2327550	588	2326962	134300	34	134266	134300	34	134266	134	0.9062	122
Jul-19	213340	2917279	3130619	3013266	1662	3011604	205203	113	205090	205203	113	205090	205	0.9062	186
Aug-19	165140	1794723	1959863	1891866	333	1891533	159484	28	159456	159484	28	159456	159	0.9062	144
Sep-19	115360	1818309	1933669	1872975	864	1872111	111817	52	111765	111817	52	111765	112	0.9062	101
Oct-19	71673	1312950	1384623	1342674	2652	1340022	69551	137	69413	69551	137	69413	69	0.9062	63
Nov-19	37839	829834	867673	839103	2949	836154	36585	129	36456	36585	129	36456	36	0.9062	33
Dec-19	41940	940863	982803	951999	3003	948996	40650	128	40522	40650	128	40522	41	0.9062	37
Total (MWh)	**1188**	**16362**	**17551**	**16950**	**21**	**16929**	**1148**	**1**	**1146**	**1148**	**1**	**1146**	**1146**		**1039**
Jan-20	43537	859712	903249	871452	3399	868053	42004	164	41840	42004	164	41841	42	0.9062	38
Feb-20	49963	998469	1048432	1016292	2502	1013790	48477	119	48358	48477	119	48358	48	0.9062	44
Mar-20	55585	1113635	1169220	1130091	2622	1127469	53679	125	53555	53679	125	53555	54	0.9062	49
Apr-20	82539	1338881	1421420	1382331	972	1381359	80313	56	80257	80313	56	80257	80	0.9062	73
May-20	173692	2219185	2392877	2320080	585	2319495	168438	42	168395	168438	42	168395	168	0.9062	153
Jun-20	57618	894735	952353	919356	4029	915327	55621	244	55377	55621	244	55377	55	0.9062	50
Jul-20	96599	1677209	1773808	1718205	1599	1716606	93642	87	93555	93642	87	93555	94	0.9062	85
Aug-20	187572	3066337	3253909	2975835	648	2975187	171408	37	171371	171408	37	171371	171	0.9062	155
Sep-20	35688	737876	773564	686205	2403	683802	31703	111	31592	31703	111	31592	32	0.9062	29
Oct-20	36189	699492	735681	705309	3546	701763	34701	174	34527	34701	174	34527	35	0.9062	31
Nov-20	63363	1294597	1357960	1311549	2775	1308774	61249	130	61120	61249	129	61120	61	0.9062	55
Dec-20	45947	1135466	1181413	1142688	3639	1139049	44451	142	44309	44451	142	44309	44	0.9062	40
Total (MWh)	**928**	**16036**	**16964**	**16179**	**29**	**16151**	**886**	**1**	**884**	**886**	**1**	**884**	**884**		**801**
															4097

Sun-n-Sand Hotels Private Limited
Electricity Generation Data (Feeder 3- Bhambarwadi) and Emission Reduction Calculation
Monitoring Period: 01 January 2016 to 31 December 2020

Month	WEC Meter Readings			MSEDCL Meter Readings for Total Wind farm as per JMR Report			MSEDCL Meter Readings for SNS as per JMR Report			Meter Readings for SNS based on the Apportioning			Net Electricity supplied to grid (Minimum of JMR value and apportioned value)	Emission Factor	Emission Reduction
	Generation recorded from project WECs	Generation recorded from other WEC in the wind farm	Generation recorded from Total wind farm	Export to Grid from all WECs in Wind farm	Import from Grid from all WECs in Wind farm	Net Export to the grid	Export	Import	Net Electricity supplied to grid	Export	Import	Net Electricity supplied to grid			
	$\sum_0^n EG_{n,y}$	$\sum_0^m EG_{m,y}$	$\sum_0^n EG_{n,y} + \sum_0^m EG_{m,y}$	EG_{all} (Export)	EG_{all} (Import)	$= EG_{all}$ (Export) - EG_{all} (Import)	$EG_{4.0MW}$ (Export)	$EG_{4.0MW}$ (Import)	$= EG_{4.0MW}$ (Export) - $EG_{4.0MW}$ (Import)	$EG_{4.0MW}$ (Export)	$EG_{4.0MW}$ (Import)	$= EG_{4.0MW(Export)} - EG_{4.0MW(Import)}$	EG_y	EF_y	ER_y
UNIT	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(kWh)	(MWh)	(tCO_2/MWh)	tCO_2
Jan-16	143100	329346	472446	454800	2600	452200	137755	787	136968	137755	788	136968	137	0.9062	124
Feb-16	214595	555538	770133	750200	1000	749200	209041	279	208762	209041	279	208762	209	0.9062	189
Mar-16	303163	729499	1032662	1017400	1000	1016400	298682	294	298388	298682	294	298389	298	0.9062	270
Apr-16	386224	1037821	1424045	1403000	800	1402200	380516	217	380299	380516	217	380299	380	0.9062	345
May-16	597480	1778884	2376364	2330800	800	2330000	586024	201	585823	586024	201	585823	586	0.9062	531
Jun-16	1105643	2326912	3432555	3392600	200	3392400	1092773	64	1092709	1092773	64	1092709	1093	0.9062	990
Jul-16	539381	1315535	1854916	1759200	200	1759000	511548	58	511490	511548	58	511490	511	0.9062	464
Aug-16	1375498	2172478	3547976	3386200	200	3386000	1312780	77	1312703	1312780	78	1312702	1313	0.9062	1190
Sep-16	698582	1497323	2195905	2188800	0	2188800	696322	0	696322	696322	0	696322	696	0.9062	631
Oct-16	277489	584973	862462	838400	2400	836000	269747	772	268975	269747	772	268975	269	0.9062	244

Nov-16	210782	384123	594905	589400	1800	587600	208832	638	208194	208832	638	208194	208	0.9062	189
Dec-16	359820	748199	1108019	1052200	1400	1050800	341693	455	341238	341693	455	341239	341	0.9062	309
Total (MWh)	**6212**	**13461**	**19672**	**19163**	**12**	**19151**	**6046**	**4**	**6042**	**6046**	**4**	**6042**	**6042**		**5475**
Jan-17	173483	390356	563839	548600	2400	546200	168794	738	168056	168794	738	168056	168	0.9062	152
Feb-17	231327	571573	802900	786600	1000	785600	226619	288	226331	226619	288	226331	226	0.9062	205
Mar-17	276047	659208	935255	914600	1000	913600	269990	295	269695	269990	295	269695	270	0.9062	244
Apr-17	470789	1100267	1571056	1548000	600	1547400	463936	180	463756	463936	180	463756	464	0.9062	420
May-17	598544	1335968	1934512	1923800	1000	1922800	595224	309	594914	595224	309	594914	595	0.9062	539
Jun-17	1130875	2135386	3266261	3210800	600	3210200	1111900	208	1111692	1111900	208	1111692	1112	0.9062	1007
Jul-17	1792208	3334244	5126452	5032600	0	5032600	1759397	0	1759397	1759397	0	1759397	1759	0.9062	1594
Aug-17	1106988	2270612	3377600	3238400	0	3238400	1061224	0	1061224	1061224	0	1061224	1061	0.9062	962
Sep-17	461624	904128	1365752	1362000	3200	1358800	460356	1082	459274	460356	1082	459274	459	0.9062	416
Oct-17	263507	547228	810735	809400	3400	806000	263136	1105	262031	263136	1105	262031	262	0.9062	237
Nov-17	110728	254711	365439	359600	2000	357600	108959	606	108353	108959	606	108353	108	0.9062	98
Dec-17	383540	843395	1226935	1225400	2000	1223400	383060	625	382435	383060	625	382435	382	0.9062	347
Total (MWh)	**7000**	**14347**	**21347**	**20960**	**17**	**20943**	**6873**	**5**	**6867**	**6873**	**5**	**6867**	**6867**		**6223**
Jan-18	140392	322948	463340	444400	2200	442200	134653	667	133987	134653	667	133987	134	0.9062	121
Feb-18	136244	309435	445679	433000	2200	430800	132368	673	131696	132368	673	131696	132	0.9062	119
Mar-18	268006	626241	894247	872400	1800	870600	261458	539	260919	261458	539	260919	261	0.9062	236
Apr-18	379211	960284	1339495	1306000	1800	1304200	369729	510	369219	369729	510	369219	369	0.9062	335
May-18	488844	1323031	1811875	1783314	1362	1781952	481138	367	480771	481138	367	480771	481	0.9062	436
Jun-18	1151136	2274864	3426000	3425997	939	3425058	1151135	316	1150819	1151135	316	1150819	1151	0.9062	1043
Jul-18	1928690	3723977	5652667	5549973	249	5549724	1893651	85	1893566	1893651	85	1893566	1894	0.9062	1716
Aug-18	1979706	3536331	5516037	5424117	117	5424000	1946716	42	1946674	1946716	42	1946674	1947	0.9062	1764
Sep-18	523133	1196003	1719136	1670616	1743	1668873	508368	530	507838	508368	530	507838	508	0.9062	460
Oct-18	202638	491802	694440	687135	2241	684894	200506	654	199852	200506	654	199852	200	0.9062	181
Nov-18	227902	529619	757521	742164	2676	739488	223317	805	222512	223317	805	222512	223	0.9062	202
Dec-18	245356	553590	798946	779937	3066	776871	239519	942	238577	239519	942	238577	239	0.9062	216

Total (MWh)	**7671**	**15848**	**23519**	**23119**	**20**	**23099**	**7543**	**6**	**7536**	**7543**	**6**	**7536**	**7536**		**6830**
Jan-19	159798	353746	513544	496914	2019	494895	154640	628	154011	154640	628	154011	154	0.9062	140
Feb-19	174111	419517	593628	578304	2508	575796	169617	736	168881	169617	736	168881	169	0.9062	153
Mar-19	319676	817828	1137504	1114650	783	1113867	313328	220	313108	313328	220	313108	313	0.9062	284
Apr-19	394589	925548	1320137	1292955	822	1292133	386464	246	386219	386464	246	386219	386	0.9062	350
May-19	573906	1411132	1985038	1947729	486	1947243	563088	141	562948	563088	141	562948	563	0.9062	510
Jun-19	877177	2049486	2926663	2878911	753	2878158	862810	226	862584	862810	226	862584	863	0.9062	782
Jul-19	1226313	2669864	3896177	3823788	2253	3821535	1203346	709	1202637	1203346	709	1202637	1203	0.9062	1090
Aug-19	898451	815652	1714103	1667532	213	1667319	874120	112	874009	874120	112	874009	874	0.9062	792
Sep-19	987808	1500161	2487969	2451612	531	2451081	973535	211	973324	973535	211	973324	973	0.9062	882
Oct-19	281535	603060	884595	864879	1713	863166	275291	545	274746	275291	545	274746	275	0.9062	249
Nov-19	233780	522965	756745	737841	2217	735624	227993	685	227308	227993	685	227308	227	0.9062	206
Dec-19	272084	572615	844699	835311	1956	833355	269054	630	268424	269054	630	268424	268	0.9062	243
Total (MWh)	**6399**	**12662**	**19061**	**18690**	**16**	**18674**	**6273**	**5**	**6268**	**6273**	**5**	**6268**	**6268**		**5680**
Jan-20	187143	379784	566927	536043	2682	533361	176948	885	176062	176948	885	176062	176	0.9062	160
Feb-20	211829	460449	672278	653595	2496	651099	205948	786	205161	205948	786	205161	205	0.9062	186
Mar-20	323847	744626	1068473	1045722	1206	1044516	316958	366	316593	316958	366	316593	317	0.9062	287
Apr-20	338140	813954	1152094	1127085	1377	1125708	330799	404	330395	330799	404	330395	330	0.9062	299
May-20	505413	1246265	1751678	1717509	954	1716555	495501	275	495226	495501	275	495226	495	0.9062	449
Jun-20	623603	1534959	2158562	2122290	990	2121300	612917	286	612631	612917	286	612631	613	0.9062	555
Jul-20	981663	2206793	3188456	3134502	666	3133836	964800	205	964595	964800	205	964595	965	0.9062	874
Aug-20	1480204	3285644	4765848	4684203	267	4683936	1454913	83	1454831	1454913	83	1454831	1455	0.9062	1318
Sep-20	372170	706335	1078505	1059705	1842	1057863	365598	635	364963	365598	636	364963	365	0.9062	331
Oct-20	206481	328305	534786	520701	2742	517959	201043	1059	199984	201043	1059	199984	200	0.9062	181
Nov-20	414043	582065	996108	980643	1197	979446	407653	498	407156	407653	498	407156	407	0.9062	369
Dec-20	338917	462184	801101	786435	1935	784500	332741	819	331922	332741	819	331922	332	0.9062	301
Total (MWh)	**5983**	**12751**	**18735**	**18368**	**18**	**18350**	**5866**	**6**	**5860**	**5866**	**6**	**5860**	**5860**		**5310**
															29518

Appendix 3

TECHNICAL DATA

E-48

Last updated: 08/2019. Technical information subject to change.

GENERAL

Nominal power	800 kW
Wind class (IEC)	IEC IIA
Wind zone (DIBt)	WZ III
Turbine concept	gearless, variable speed, full power converter
Design service life	20 years
Cut in wind speed	2.5 m/s
Cut out wind speed	34 m/s
Extreme wind speed at hub height (3-second gust)	59.5 m/s
Rotational speed	11.0 - 29.8 rpm
Ambient temperature for normal operation	-10 °C to +40 °C
Extreme temperature range	-20 °C to +50 °C
Grid feed / control system	ENERCON inverter
Grid frequency	50 Hz / 60 Hz
Sound power level	89.0 - 102.5 dB(A)* Yield and noise-optimised operation. Further modes on request.

ROTOR

Rotor diameter	48 m
Swept area	1,810 m²
Type	upwind rotor with active pitch control

TOWER

Hub height	**IEC IA**	**IEC IIA**	**IEC IIIA**
		50 m	
		56 m	
		60 m	

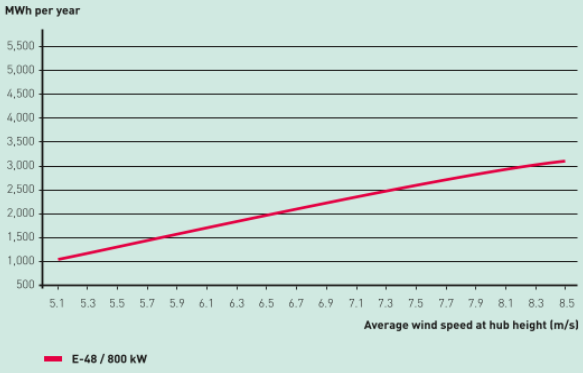
GENERATOR

Type	directly driven, separately excited annular generator
Cooling system	air cooling system

FEATURES

	STANDARD	**OPTIONAL**
FACTS and transmission	X	
ENERCON SCADA	X	
ENERCON storm control	X	
Ice detection system Power curve method	X	
Low radar reflectivity rotor blades		X
Additional ice detection system		X
Blade heating system		X
Hot-Climate		X
Shadow shutdown		X
ENERCON SCADA bat protection		X
STATCOM		X
Inertia Emulation		X
Sector management for wind farms		X
Beacon management for wind farms		X

ANNUAL ENERGY YIELD



* dependent on hub height

- - - - -

Document information

Version	*Date*	*Description*
09.0	8 October 2021	Revision to: • Ensure consistency with version 03.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN).
08.0	6 April 2021	Revision to: • Reflect the "Clarification: Regulatory requirements under temporary measures for post-2020 cases" (CDM-EB109-A01-CLAR).
07.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.

Version	*Date*	*Description*
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: monitoring report