Monitoring report form for CDM project activity
(Version 09.0)

MONITORING REPORT			
Title of the project activity	1.65 MW Wind Power Project in Gujarat		
UNFCCC reference number of the project activity	5010[1]		
Version number of the PDD applicable to this monitoring report	05		
Version number of this monitoring report	01		
Completion date of this monitoring report	31/03/2022		
Monitoring period number	01		
Duration of this monitoring period	16/08/2011 to 15/08/2021 (First and last day included)		
Monitoring report number for this monitoring period	NA		
Project participants	M/s Gopal Glass Works Limited		
Host Party	India		
Applied methodologies and standardized baselines	Applied methodology: AMS-I.D. ver. 16[2] - Grid connected renewable electricity generation standardized baseline: N/A		
Sectoral scopes	1 : 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
	5,205 tCO_2e	15,304 tCO_2e	1,497 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	31,275 tCO_2e		

[1] https://cdm.unfccc.int/Projects/DB/RWTUV1310557296.94/view

[2] https://cdm.unfccc.int/methodologies/view?ref=AMS-I.D.

SECTION A. Description of project activity

A.1. General description of project activity

The project activity by Gopal Glass Works Ltd. (GGWL) envisages production of 1.65 MW wind power from single Wind Turbine Generator (WTGs) in Gujarat state in India. The WTG details are as follows

Location	No. x Capacity (MW)	WTG Supplier	WTG location Number as per micro siting	Date of Commissioning	Location
Lakhapar (Wandhiya)	1 x 1.65 MW	Vestas Wind Technology India Private Limited	W-9	26.03.2008	Survey No. – 147/1p1 Village – Lakhapar, Wandhiya Distt. - Kutch

The project activity is expected to evacuate approximately 3,450 MWh of renewable power annually to the power deficit Western Region of Integrated NEWNE (Now Indian grid) (i.e. Northern Eastern Western & North- Eastern) grid. The electricity generation from this project contributes to annual GHG reductions estimated at 3,125 tCO_2e (tonnes of carbon dioxide equivalent). Although the project life is envisaged as 20 years, the project activity needs to mitigate the risks involved in Renewable Energy Technology for the first 10 years. The net electricity wheeled during this verification period is 24,292.52 MWh, which results to a net emission reduction of 22,006 tCO_2e.

Purpose of the project activity:
The project activity is essentially conceived to generate GHG emission free electricity by making use of available wind energy at the site to meet captive energy demand. The project being a renewable energy project leads to sustainable development through efficient utilisation of available natural resources and generation of additional employment for the local stakeholders

A.2. Location of project activity

Host Party	State	City
India	Gujrat	Kutch

District	Survey No.	WTG location	Latitude & Longitude
Kutch	147/1p1	W-9	N 23° 12' 31.9'' E 70° 38' 07.4''

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)	M/s Gopal Glass Works Limited (Private entity)	No

A.4. References to applied methodologies and standardized baselines

Type : I – Renewable Energy Projects
Project Category : I.D. – Grid connected renewable electricity generation (Version 16[3]: EB54)

Reference: Latest Amended Version 12 (EB 41, Annex 20) of Appendix B of the simplified modalities and procedures for small-scale CDM project activities i.e. „Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories"

Following tools have also been referred to:-

- Tool to calculate the emission factor for an electricity system (Version 02, EB50)
- Additionality tool for small scale project activities (Attachment A to Appendix B, Version 06: 30 September 2005)
- Non-binding best practice examples to demonstrate additionality for SSC project activities (Annex 34, EB 35)

A.5. Crediting period type and duration

Crediting period type : Fixed
Crediting period duration : 16/08/2011 - 15/08/2021

SECTION B. Implementation of project activity

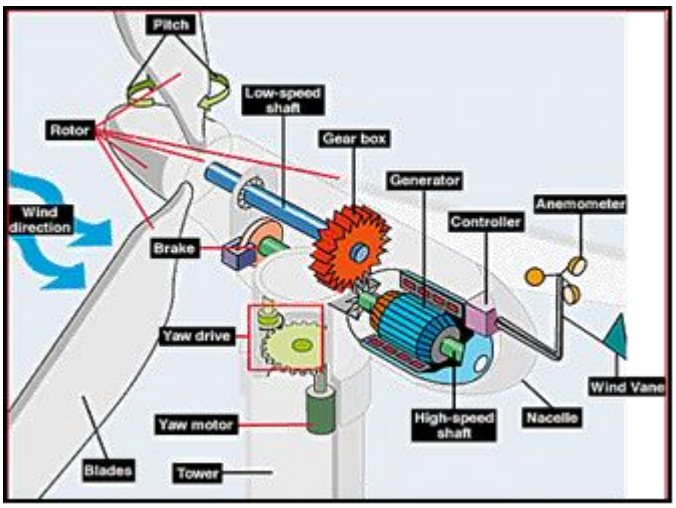
B.1. Description of implemented project activity

Technology Employed:

[3] https://cdm.unfccc.int/methodologies/view?ref=AMS-I.D.

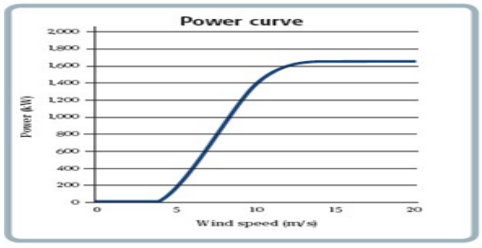
In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. Wind has considerable amount of kinetic energy when blowing at high speeds. This kinetic energy when passes through the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity.

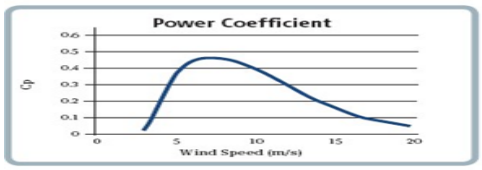
The technology is a clean technology since there are no GHG emissions associated with the electricity generation. The project envisages the utilization of a state-of-the-art wind power generation technology 1650 KW (V82) Wind Turbine Generators (WTG) to generate electricity.

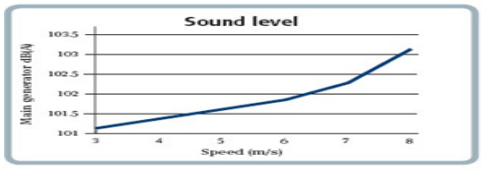


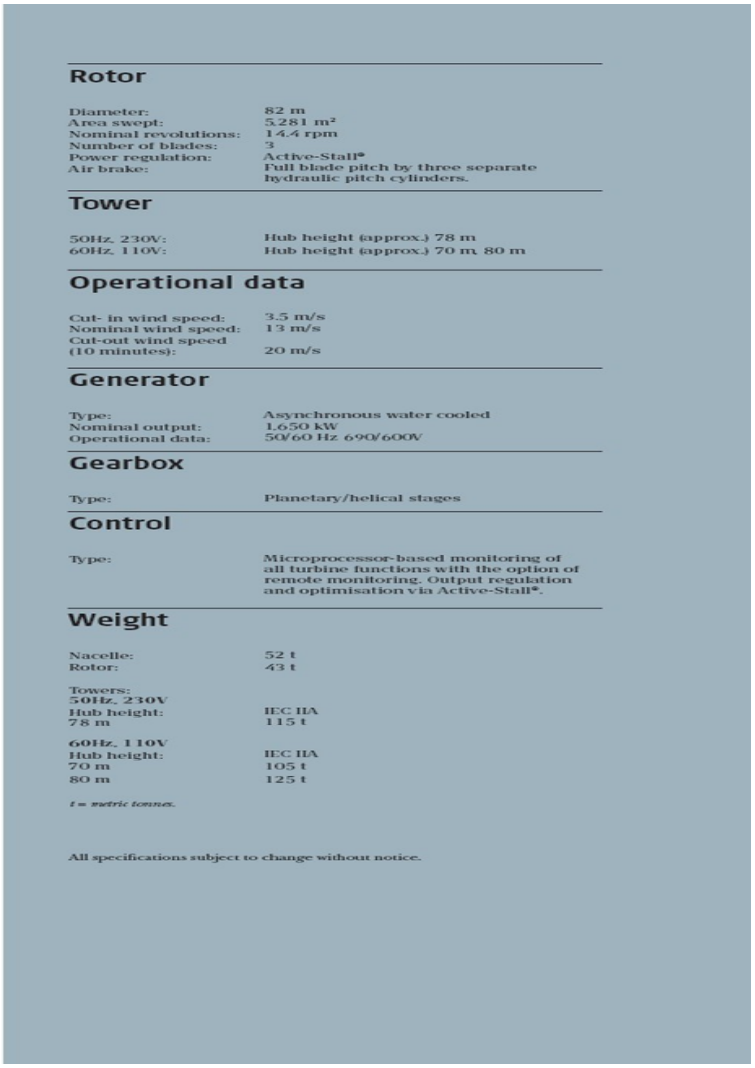
Major Mechanical Parts of Wind Turbine Generators

Technical specification of the Wind Turbine Generator (V82/1650) used in the project activity has been detailed as follows
Technical Specification of the Wind Turbine Generator (V82/1650)









Rotor

Diameter:	82 m
Area swept:	5,281 m²
Nominal revolutions:	14.4 rpm
Number of blades:	3
Power regulation:	Active-Stall®
Air brake:	Full blade pitch by three separate hydraulic pitch cylinders.

Tower

50Hz, 230V:	Hub height (approx.) 78 m
60Hz, 110V:	Hub height (approx.) 70 m, 80 m

Operational data

Cut- in wind speed:	3.5 m/s
Nominal wind speed:	13 m/s
Cut-out wind speed (10 minutes):	20 m/s

Generator

Type:	Asynchronous water cooled
Nominal output:	1,650 kW
Operational data:	50/60 Hz 690/600V

Gearbox

Type:	Planetary/helical stages

Control

Type:	Microprocessor-based monitoring of all turbine functions with the option of remote monitoring. Output regulation and optimisation via Active-Stall®.

Weight

Nacelle:	52 t
Rotor:	43 t
Towers:	
50Hz, 230V	
Hub height:	IEC IIA
78 m	115 t
60Hz, 110V	
Hub height:	IEC IIA
70 m	105 t
80 m	125 t

t = metric tonnes.

All specifications subject to change without notice.

B.2. Post-registration changes

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

There are no temporary deviations from the registered monitoring plan, the applied methodologies, the applied standardized baselines or the other applied methodological regulatory documents during this monitoring period. Hence, Not Applicable

B.2.2. Corrections

There are no corrections to project information or parameters fixed at the registration or renewal of crediting period of the project activity. Hence, Not Applicable

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

There is no request for the change to the start date of the crediting period.

B.2.4. Inclusion of monitoring plan

There is no post-registration change to include a monitoring plan into the PDD.

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

There are no any permanent changes from registered monitoring plan or applied methodology.

B.2.6. Changes to project design

There are no changes to project design of registered project activity.

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

Not applicable as this project activity is not afforestation or reforestation project activity.

SECTION C. Description of monitoring system

The project activity essentially involves generation of electricity from wind, the employed WTG can only convert wind energy into electrical energy and cannot use any other input fuel for electricity generation.

- The project activity requires evacuation facilities for sale to grid and the evacuation facility is essentially maintained by the state power utility
- The electricity generation measurements are required by the utility and the investors to assess electricity sales revenue and / or wheeling charges

Apportionment approach – (Description of billing calculation from net meter to individual meters)

Each sub-station is connected to numbers of wind turbines. The generation reading is collectively displayed by the substation meter located at the injection point i.e. at the pooling sub-station. Substation meter, where Joint Meter Reading (JMR) is done remains in the custody of the SLDC. However, metering is also done also done individually for all WTGs connected to the sub-station at the injection point. This meter at is called Main meter and remains in the custody of State Electricity Utility.
The responsibilities of CDM project team is presented below-

Designation	Responsibilities
Project Head	▪ Overall performance monitoring ▪ Project execution
Project Executer andController	▪ Operation ▪ Verification of data ▪ Site visit to check authenticity of data and take corrective action, wherever necessary ▪ Storage of data
Site MainController	▪ Operation, monitoring and verification of data ▪ Data recording ▪ Storage of data
Operation and Maintenance Contractor	▪ Operation and maintenance ▪ Data recording ▪ Storage of data

Data Monitoring:

Actual Electricity generation from the project activity – i.e. the actual electricity supplied to the regional grid during the year y; the actual electricity supplied can be measured through the meters at the substation. The meters at the substation in custody of State Electricity Utility. SEB officials

and a PP representative (O & M personnel from Vestas) takes the readings in these meters and the same reading may be used to determine the net power wheeled to the user and determine the extent of mitigation of GHG over a period of time.

As a fail-safe measure the plant personnel takes the reading every month for the units generated from the meters installed at WTG and can be used to cross verify the electricity generation figures recorded by the SEB at the sub-station.

Completeness

- For Electricity generation data: There is tower wise meter (individual meter of the WTG) which is used to monitor tower wise power generation data. This meter is maintained by O&M team contracted by GGWL. A daily generation report is prepared which is sent to GGWL. Overall plant electricity generation is monitored using meter. The energy generated at the wind farm metered and measured by GETCO & GEDA on monthly basis at sending end substation of the wind farm.
- A daily log is maintained by O&M team about issues related to power generation (tower shutdown, grid failure etc). A monthly MIS is prepared based on this data and is reviewed by GGWL.

Calibration of Meters

- There are two metering points -- one at the WTG ends i.e. transformer yard meters and one at substation end i.e. main meter. All these meters shall be calibrated at-least once in three years as per Para 17(c) of Annex23, EB58 (General Guidelines to SSC CDM methodologies).

Frequency

- Electricity generation data is collected monthly by O&M team

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	**$EF_{grid,OMSimple,y}$**
Unit	tCO_2/MWh
Description	CO_2 Simple Operating Margin emission factor of the grid
Source of data	CEA Database (Baseline CO_2 Emission Database/ Version 4.0[4], September 2008), as published by Central Electricity Authority – Government of India
Value(s) applied	1.0086
Choice of data or measurement methods and procedures	Calculated as per ACM0002 with 3 years vintage (2005-06 to 2007-08) data obtained from CEA database on CO_2 baseline for Indian Power Sector. Computed once during PDD finalization (ex-ante) Recording frequency – Once at the time of PDD submission.
Purpose of data/parameter	To calculate baseline emission.
Additional comments	The total data is electronically archived.

Data/Parameter	**$EF_{grid,BM,y}$**
Unit	tCO_2/MWh
Description	CO_2 Build Margin emission factor of the grid

[4] https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_4.zip

Source of data	CEA Database (Baseline CO_2 Emission Database/ Version 4.0[5], September 2008), as published by Central Electricity Authority – Government of India
Value(s) applied	0.5977
Choice of data or measurement methods and procedures	Calculated as per ACM0002 with 1 year vintage (2007-08) data obtained from CEA database on CO2 baseline for Indian Power Sector. Computed once during PDD finalization (ex-ante). Recording frequency – Once at the time of the PDD submission.
Purpose of data/parameter	To calculate baseline emission.
Additional comments	The total data is electronically archived.

Data/Parameter	**$EF_{CO2, grid, y}$**
Unit	tCO_2/MWh
Description	CO_2 Emission factor of the grid
Source of data	Calculated
Value(s) applied	0.9059
Choice of data or measurement methods and procedures	Estimated figure based on 75% of OM and 25% of BM values, CEA Database. Version 4.0, September 2008. Recording frequency – Once at the time of the submission of PDD.
Purpose of data/parameter	To calculate baseline emission.
Additional comments	The total data is electronically archived.

D.2. Data and parameters monitored

Data/Parameter	**EG_{BLy}**
Unit	MWh /Year
Description	Net Electricity Exported to grid by the ith WTG in the year y
Measured/calculated/ default	Calculated
Source of data	The monthly share of electricity certificates issued by GEDA/SLDC. The Sold Electricity cross checked with the Commercial Invoices raised
Value(s) of monitored parameter	24,292.52
Monitoring equipment	NA
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	As per the PPA between M/s Gopal Glass Works Ltd and Uttar Gujarat Vij Company Limited – As per Section 5.0 Metering of Energy - • The Metering of the energy generated at the Wind Farm metered and measured by GETCO & GEDA on monthly basis at sending end substation of wind farm. The qualifying energy to be wheeled computed on the basis the above measurement. As per Section 3.3 Wheeling of Energy • The energy wheeled (Net Wheeling / Transmission loss / Charge) set off against monthly consumption of the company's recipient unit located in the DISCOM.
QA/QC procedures	The Energy Generated at the Wind Farm metered and measured by GETCO & GEDA on monthly basis. The qualifying energy to be wheeled or sold computed on the basis of the energy measured. The meters have an accuracy class of 0.5s

[5] https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_4.zip

Purpose of data/parameter	To calculate baseline emission
Additional comments	The Data is being archived electronically for a period of two years beyond the crediting period

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 are given as:

$BE_y = EG_{BLy} \times EF_{CO2, grid, y}$

Where,

EG_{Bly} : Net quantity of electricity supplied to the manufacturing facility by the project during the year y in MWh
$EF_{CO2, grid, y}$: CO_2 baseline emission factor for the electricity displaced due to the project activity during the year y (tCO_2/MWh).
$EF_{grid,CM,y}$: 0.9059 tCO_2/MWh

BE_y = 24,292.52 * 0.9059
= 22,006 tCO_2e (round down value)

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

As per Para. 19 For most renewable energy project activities, $PE_y = 0$.

E.3. Calculation of leakage emissions

In-accordance with the Para 20, “If the energy generating equipment is transferred from another activity, leakage is to be considered”, no leakage is considered.

As per Para 21

$ER_y = BE_y – PE_y – LE_y$

Where:
ER_y = Emission reductions in year y (t CO_2/y)
BE_y = Baseline Emissions in year y (t CO_2/y)
PE_y = Project emissions in year y (t CO_2/y)
LE_y = Leakage emissions in year y

Since, the project emissions for this project (PE_y) is zero, and No Leakage

$ER_y = BE_y$
= 22,006 tCO_2e

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	22,006	0	0	5,205	15,304	1,497	22,006

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)
22,006	31,275

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

Considering the annual average emission reductions as per the registered PDD which is 3,125 tCO_2e per year, the number of days since commissioning covered during the current monitoring period comes out to be 3,653 days. The amount estimated is using unitary method i.e. 3,125/365*3,653= 31,275 tCO2e.

E.6. Remarks on increase in achieved emission reductions

The achieved emission reduction are 29.64 % lower than the estimated emission reductions.

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

The installed capacity of the project is still 1.65 MW which is less than 15 MW. The project activity remains as a Small scale project activity for the entire crediting period.

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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.

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