



WIND BASED RENEWABLE ENERGY PROJECT IN GUJARAT



Document Prepared by CLP India Private Limited

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CONTENTS

1	PROJECT DETAILS.....	3
1.1	Summary Description of the Implementation Status of the Project.....	3
1.2	Sectoral Scope and Project Type.....	3
1.3	Project Proponent.....	3
1.4	Other Entities Involved in the Project.....	4
1.5	Project Start Date.....	4
1.6	Project Crediting Period.....	4
1.7	Project Location	4
1.8	Title and Reference of Methodology	6
1.9	Participation under other GHG Programs.....	6
1.10	Other Forms of Credit.....	7
1.11	Sustainable Development.....	7
2	SAFEGUARDS.....	8
2.3	AFOLU-Specific Safeguards.....	8
3	IMPLEMENTATION STATUS.....	8
3.1	Implementation Status of the Project Activity	8
3.2	Deviations	9
3.3	Grouped Projects	9
4	DATA AND PARAMETERS.....	9
4.1	Data and Parameters Available at Validation	9
4.2	Data and Parameters Monitored.....	11
4.3	Monitoring Plan	12
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS.....	16
5.1	Baseline Emissions	16
5.2	Project Emissions.....	18
5.3	Leakage	18
5.4	Net GHG Emission Reductions and Removals	18

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity has been undertaken by Gujarat Paguthan Energy Corporation Private Limited (GPECL) in the dist. of Jamnagar, Kalavad and Jamjodhpur Taluk in Gujarat, India. Further on 03/02/2012, name of GPECL has been changed to CLP India Private Limited (CLPIPL). The project activity utilises wind energy to generate clean power with a view to bring in greenhouse gas emission reductions.

The project activity has been installed to utilize the kinetic energy present in wind to generate electrical power in the state of Gujarat. To do so, CLPIPL has installed 63 Wind Electric Generators (WEGs) of individual capacity 800 kW that have been supplied by Wind World India Ltd. (WWIL), totalling an installed capacity of 50.4 MW. The Project activity is a new facility (Greenfield) and utilizing wind energy to generate electricity and supply it to distribution licensees which is a part of the NEWNE (Northern, Eastern, Western and North-Eastern) grid of India. Out of the 63 WEGs implemented, one WEG is under a wheeling and banking agreement with Dakshin Gujarat Vij Company Limited (DGVCL) whereas the remaining 62 turbines sell power distribution company under a power purchase agreement.

The first machine under this project activity was commissioned on 12/04/2008 and last machine was commissioned on 12/03/2009. During this monitoring period of 01/01/2015 to 11/04/2018 (both days inclusive) the project activity has exported 308,429.40 MWh of energy to the Indian grid of India. The total emission reductions achieved during this monitoring period from 01/01/2015 to 11/04/2018 is 277,832 tCO₂.

1.2 Sectoral Scope and Project Type

Sectoral scope: 1 Energy Industries (renewable -/ non renewable sources)

Project Type: I, Renewable energy project

The project is not a grouped project.

1.3 Project Proponent

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1.4 Other Entities Involved in the Project

Organization name	NA
Role in the Project	NA
Contact person	NA
Title	NA
Address	NA
Telephone	NA
Email	NA

1.5 Project Start Date

The project start date is 12/04/2008 which is the date of commissioning of the first wind turbine installed under the project activity.

1.6 Project Crediting Period

The length of the crediting period of the project activity is 10 years (Renewable) starting from 12/04/2008 to 11/04/2018

1.7 Project Location

The project activity is located in the dist. of Jamnagar, Kalavad and Jamjodhpur taluk in Gujarat, India. GPS Coordinates of individual WEGs: The coordinates of individual WEGs are stated below:

WTG ID No.	Village	Location		Date of Commissioning
		Latitude	Longitude	
EIL/800/07-08/0934	Narmana	N22° 05' 16.1"	E70° 21' 35.5"	12-Apr-08
EIL/800/07-08/0945	Bodi	N22° 05' 20.0"	E70° 21' 26.4"	30-May-08
EIL/800/07-08/0946	Bodi	N22° 05' 18.0"	E70° 21' 17.1"	30-May-08
EIL/800/07-08/0947	Bodi	N22° 05' 06.7"	E70° 21' 12.4"	30-May-08
EIL/800/07-08/0948	Bodi	N22° 05' 30.0"	E70° 21' 11.6"	30-May-08
EIL/800/07-08/0949	Bodi	N22° 05' 37.7"	E70° 21' 06.1"	30-May-08
EIL/800/07-08/0950	Bodi	N22° 06' 19.1"	E70° 20' 23.5"	30-May-08
EIL/800/07-08/0935	Machharda	N22° 06' 20.3"	E70° 20' 13.4"	11-Jun-08
EIL/800/07-08/0936	Machharda	N22° 06' 37.0"	E70° 20' 16.5"	11-Jun-08
EIL/800/07-08/0937	Machharda	N22° 06' 26.4"	E70° 20' 30.1"	11-Jun-08
EIL/800/07-08/0938	Machharda	N22° 06' 34.2"	E70° 20' 42.0"	11-Jun-08

WTG ID No.	Village	Location		Date of Commissioning
		Latitude	Longitude	
EIL/800/07-08/0939	Machharda	N22° 06' 42.3"	E70° 20' 37.1"	11-Jun-08
EIL/800/07-08/0940	Machharda	N22° 06' 46.6"	E70° 20' 33.1"	11-Jun-08
EIL/800/07-08/0941	Machharda	N22° 06' 52.2"	E70° 20' 33.1"	11-Jun-08
EIL/800/07-08/0942	Machharda	N22° 06' 58.5"	E70° 20' 28.9"	11-Jun-08
EIL/800/07-08/0943	Makrani	N22° 07' 04.2"	E70° 20' 22.9"	9-Jul-08
EIL/800/07-08/0944	Sanosara	N22° 07' 11.4"	E70° 19' 59.4"	9-Jul-08
EIL/800/07-08/1211	Jam Ambardi	N22° 07' 06.1"	E70° 19' 46.5"	9-Jul-08
EIL/800/07-08/1212	Jam Ambardi	N22° 06' 37.0"	E70° 19' 25.9"	9-Jul-08
EIL/800/07-08/1213	Jam Ambardi	N22° 06' 37.0"	E70° 19' 10.2"	9-Jul-08
EIL/800/08-09/1195	Phagas	N22° 06' 30.7"	E70° 19' 09.8"	18-Aug-08
EIL/800/08-09/1197	Phagas	N22° 06' 24.5"	E70° 19' 05.9"	18-Aug-08
EIL/800/08-09/1198	Makrani	N22° 05' 38.8"	E70° 18' 47.9"	18-Aug-08
EIL/800/08-09/1199	Sanosara	N22° 05' 42.0"	E70° 18' 42.7"	18-Aug-08
EIL/800/08-09/1200	Narmana	N22° 05' 48.1"	E70° 18' 39.4"	18-Aug-08
EIL/800/08-09/1205	Sogthi	N22° 05' 56.6"	E70° 18' 38.9"	18-Aug-08
EIL/800/08-09/1206	Sogthi	N22° 08' 49.8"	E70° 14' 30.2"	18-Aug-08
EIL/800/08-09/1184	Phagas	N22° 08' 56.1"	E70° 14' 25.6"	8-Sep-08
EIL/800/08-09/1185	Phagas	N22° 09' 02.6"	E70° 14' 24.8"	8-Sep-08
EIL/800/08-09/1186	Phagas	N22° 09' 10.3"	E70° 14' 33.7"	8-Sep-08
EIL/800/08-09/1191	Phagas	N22° 09' 16.5"	E70° 14' 33.6"	23-Sep-08
EIL/800/08-09/1192	Phagas	N22° 09' 22.5"	E70° 14' 38.6"	24-Sep-08
EIL/800/08-09/1193	Phagas	N22° 04' 07.2"	E70° 08' 56.0"	25-Sep-08
EIL/800/08-09/1194	Phagas	N22° 02' 31.7"	E70° 10' 09.4"	26-Sep-08
EIL/800/08-09/1196	Phagas	N22° 02' 24.5"	E70° 10' 16.6"	27-Sep-08
EIL/800/08-09/1190	Phagas	N22° 02' 15.8"	E70° 10' 17.9"	24-Oct-08
EIL/800/08-09/1201	Narmana	N22° 02' 07.9"	E70° 09' 47.2"	24-Oct-08
EIL/800/08-09/1202	Narmana	N22° 02' 14.5"	E70° 09' 47.4"	24-Oct-08
EIL/800/08-09/1204	Sogthi	N22° 02' 20.7"	E70° 09' 46.6"	24-Oct-08
EIL/800/08-09/1345	Laloi	N22° 02' 26.3"	E70° 09' 47.7"	24-Nov-08
EIL/800/08-09/1346	Jam Ambardi	N22° 02' 41.2"	E70° 09' 43.9"	24-Nov-08
EIL/800/08-09/1347	Jam Ambardi	N22° 01' 56.9"	E70° 09' 13.1"	24-Nov-08
EIL/800/08-09/1188	Phagas	N22° 02' 03.7"	E70° 09' 14.0"	24-Nov-08
EIL/800/08-09/1349	Kalyanpur	N22° 02' 11.9"	E70° 09' 16.0"	29-Nov-08
EIL/800/08-09/1215	Kalyanpur	N22° 02' 18.1"	E70° 09' 16.0"	5-Dec-08
EIL/800/08-09/1216	Kalyanpur	N22° 02' 24.2"	E70° 09' 15.9"	5-Dec-08

WTG ID No.	Village	Location		Date of Commissioning
		Latitude	Longitude	
EIL/800/08-09/1209	Kalyanpur	N22° 02' 30.1"	E70° 09' 18.6"	8-Dec-08
EIL/800/08-09/1187	Phagas	N22° 02' 36.7"	E70° 09' 20.5"	11-Dec-08
EIL/800/08-09/1348	Bhupat Ambardi	N22° 02' 43.4"	E70° 09' 24.4"	11-Dec-08
EIL/800/08-09/1189	Phagas	N22° 03' 07.0"	E70° 09' 20.7"	16-Jan-09
EIL/800/08-09/1207	Kalyanpur	N22° 03' 22.5"	E70° 08' 55.7"	21-Jan-09
EIL/800/08-09/1208	Kalyanpur	N22° 03' 59.7"	E70° 08' 58.1"	21-Jan-09
EIL/800/08-09/1210	Kalyanpur	N22° 03' 38.8"	E70° 08' 44.9"	21-Jan-09
EIL/800/08-09/1214	Kalyanpur	N22° 03' 30.5"	E70° 08' 37.3"	21-Jan-09
EIL/800/08-09/1356	Kalyanpur	N22° 03' 25.2"	E70° 08' 40.8"	29-Jan-09
EIL/800/08-09/1350	Kalyanpur	N22° 03' 18.4"	E70° 08' 39.5"	10-Feb-09
EIL/800/08-09/1351	Kalyanpur	N22° 04' 06.1"	E70° 05' 24.9"	10-Feb-09
EIL/800/08-09/1352	Kalyanpur	N22° 04' 11.9"	E70° 05' 21.1"	10-Feb-09
EIL/800/08-09/1353	Kalyanpur	N22° 04' 20.5"	E70° 05' 20.9"	10-Feb-09
EIL/800/08-09/1354	Kalyanpur	N22° 04' 26.9"	E70° 05' 18.6"	10-Feb-09
EIL/800/08-09/1203	Narmana	N22° 04' 50.1"	E70° 05' 50.6"	12-Mar-09
EIL/800/08-09/1355	Kalyanpur	N22° 04' 33.8"	E70° 05' 17.8"	12-Mar-09
EIL/800/08-09/1357	Kalyanpur	N22° 01' 45.9"	E70° 05' 42.6"	12-Mar-09

1.8 Title and Reference of Methodology

Sectoral Scope: 1, Energy industries (renewable/ non-renewable sources)

Project Category: Consolidated Baseline Methodology for grid-connected electricity generation from renewable sources" (ACM0002 Version 08)" (<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>).

1.9 Participation under other GHG Programs

Project is also registered as a separate CDM Project activity. Details of these CDM projects are as follows:

Project Title: Wind based renewable energy project in Gujarat¹

UNFCCC Registration Number: 2925

CLP has issued 155,510 CERs for the duration of 13/02/2010 to 31/12/2010 and 01/01/2011 to 31/12/2011. Post this period, CLP has not undertaken any CDM verification for this project activity. Emission reductions from 01/01/2012 to 31/12/2014 are being claimed under VCS only, hence any chances for double counting of credits is ruled out.

¹ <https://cdm.unfccc.int/Projects/DB/RWTUV1250689673.15/view>

1.10 Other Forms of Credit

- Emission Trading Programs and Other Binding Limits: The project has not participated in any Emissions Trading Programs other than VCS scheme. The related emission reductions have not and will not be claimed under any other GHG programs.
- Other Forms of Environmental Credit: CLP has issued 155,510 CERs for the duration of 13/02/2010 to 31/12/2010 and 01/01/2011 to 31/12/2011. Further, in this periodic verification, CLP has considered duration from 01/01/2015 to 11/04/2018 (both days inclusive) and submitted a declaration to DoE that CLP wouldn't claim any form of environmental credit except VCU for the said duration.

1.11 Sustainable Development

The National CDM Authority (NCDNA) which is the Designated National Authority (DNA) for the Government of India (GoI) in the Ministry of Environment and Forests (MoEF) has stipulated four indicators for sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India². The contribution of this project activity towards in terms of these four indicators is provided below:

1. Social Well Being:

- The project activity has led to the development of supporting infrastructure such as road network etc., in the wind park location, which also provides access to the local population.
- The project activity leads to alleviation of poverty by establishing direct and indirect benefits through employment generation and improved economic activities by strengthening of local grid of the state electricity utility.
- Use of a renewable source of energy reduces the dependence on imported fossil fuels and associated price variation thereby leading increased energy security.

2. Environmental Well Being:

- The project activity involves use of renewable energy source for electricity generation instead of fossil fuel based electricity generation which would have emitted gaseous, liquid and/or solid effluents/wastes.
- Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

3. Economic Well Being:

- The project activity requires temporary and permanent, skilled and semi-skilled manpower at the wind park; thus, project activity has created additional employment opportunities.
- The generated electricity is being fed into the Western regional grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers

² http://cdmindia.nic.in/host_approval_criteria.htm

(villagers & sub-urban habitants) which has provided new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development.

4. **Technological Well Being:**

Increased interest in wind energy projects will further push R&D efforts by technology providers to develop more efficient and better machinery in future.

2 SAFEGUARDS

2.1 No Net Harm

Project does not have any negative environmental and socio-economic impacts. Thus, this is not applicable for this project activity.

2.2 Local Stakeholder Consultation

Since this is the second periodic verification of the project activity, hence, local stakeholders' consultation details are not applicable in this project activity.

2.3 AFOLU-Specific Safeguards

This section is not required.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The first machine under the project activity was commissioned on 12/04/2008 and last machine was commissioned on 12/03/2009. The commissioning dates for all the machines installed in the project activity are given in section 1.7.

The Project activity is operated by O&M contractors at sites and managed by the CLP. The operational and maintenance contracts for the project activity are with WWIL, which are an ISO 9001 certified company. O&M contractors follow the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

No major breakdown occurred during this monitoring period. The WTGs were operating normally. As per the requirement of O & M activities, WTGs were shut down for some time.

3.2 Deviations

2.3.1 Methodology Deviations

There has not been any methodology deviation during the aforesaid monitoring period (01/01/2015 to 11/04/2018)

2.3.2 Project Description Deviations

Following deviations have been considered in previous periodic verification:

- The project activity has been undertaken by Gujarat Paguthan Energy Corporation Private Limited (GPECL) in the dist. of Jamnagar, Kalavad and Jamjodhpur Taluk in Gujarat, India. Further on 03/02/2012, name of GPECL has been changed to CLP India Private Limited (CLPIPL).
- The meters installed at the project metering point are under the custody of state DISCOM. State DISCOM is altering the metering position time to time as per latest requirement and all project developers connected to the same substation have to follow the same system. From commissioning of this project, WTGs under Sadodar substation previously connected to 5 feeders where 5 main meters were installed respectively. However, on 11/11/2015, DISCOM changed the electrical connectively and installed two new main meters as billing meters and subsequently previous meters are now considered as check meters.

Thus, same change in has been accounted as Project Description deviations in line with section 3.6.1 of VCS standard version 3. However, this project deviation doesn't have an adverse impact in the applicability of the methodology, additionally or the appropriateness of the baseline scenario.

3.3 Grouped Projects

The project activity is not a grouped project.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _y
Data unit	tCO ₂ e/MWh
Description	Combined Margin CO ₂ emission factor for western regional grid
Source of data	Referred from CO ₂ Baseline Database for the Indian Power Sector prepared by Central Electricity Authority, Version 3.0.
Value applied	0.9008

Justification of choice of data or description of measurement methods and procedures applied	It is calculated it as per Tool to calculate the emission factor for an electricity system (Version 01.1) with 3years vintage data and option of ex ante calculation based on 75% of OM and 25% of BM values approach. This has been computed once during PDD finalization and same is fixed for the entire crediting period of the project. .
Purpose of Data	Baseline Emission calculation
Comments	This database is an official publication of Government of India for the purpose of baseline emission calculation. It is based on most recent data available to the Central Electricity Authority and hence considered authentic. As the calculation of baseline emission has been done ex ante its value will be remain fixed for the entire crediting period.

Data / Parameter	$EF_{BM,y}$
Data unit	tCO ₂ e/MWh
Description	Build Margin emission factor for western regional grid
Source of data	Referred from CO ₂ Baseline Database for the Indian Power Sector prepared by Central Electricity Authority, Version 3.0.
Value applied	0.5938
Justification of choice of data or description of measurement methods and procedures applied	It is calculated in accordance with the Tool to calculate the emission factor for an electricity system (Version 01.1) with data for the year 2006-07 provided by CEA. The build margin is calculated as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation and option of ex ante calculation. This has been computed once during PDD finalization and same is fixed for the entire crediting period of the project.
Purpose of Data	Baseline Emission calculation
Comments	This database is an official publication of Government of India for the purpose of baseline emission calculation. It is based on most recent data available to the Central Electricity Authority and hence considered authentic. As the calculation of baseline emission has been done ex ante its value will be remain fixed for the entire crediting period.

Data / Parameter	$EF_{OM,y}$
Data unit	tCO ₂ e/MWh
Description	Operating Margin emission factor for western regional grid

Source of data	Referred from CO2 Baseline Database for the Indian Power Sector prepared by Central Electricity Authority, Version 3.0.
Value applied	1.0032
Justification of choice of data or description of measurement methods and procedures applied	It is calculated in accordance with the Tool to calculate the emission factor for an electricity system (Version 01.1) with 3 years vintage data (2004-05, 2005-06 and 2006-07) on Net Generation provided by CEA with an option of ex ante calculation. These data are obtained from "CO2 Baseline Database for Indian Power Sector" version 3.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of Data	Baseline Emission calculation
Comments	This database is an official publication of Government of India for the purpose of baseline emission calculation. It is based on most recent data available to the Central Electricity Authority and hence considered authentic. As the calculation of baseline emission has been done ex ante its value will be remain fixed for the entire crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	EG _y
Data unit	MWh/yr
Description	Net Electricity supplied to Western Grid
Source of data	Share certificate issued by GEDA
Description of measurement methods and procedures to be applied	The WEGs in a particular location are connected to a Vacuum Circuit Breaker metering yard (VCB) which in turn connects to a feeder that ultimately leads to the bulk main GETCO meter of accuracy class 0.2s, at the substation maintained by Enercon India Limited. Net electricity generated by the project wind farm has been monitored and reported by GEDA in its share certificate on the basis of the metering done at the bulk main meter connected to the incoming feeder of GETCO and the meters installed at the VCB metering yard. Data monitoring for electricity exported and electricity imported takes place at the VCB metering yard and GETCO meter at the substation. The electricity metered at the GETCO meter is proportionally divided among the customers connected to the meter on the basis of the pro-rata readings taken at the VCB end.

	There are seven meters now at the GETCO sub-station each of accuracy class 0.2s. The emission reduction calculations are done on the basis of the net electricity supplied as mentioned in the share certificate issued by GEDA on monthly basis.
Frequency of monitoring/recording	Continuous monitoring, hourly measurement and monthly recording
Value monitored	308,429.40
Monitoring equipment	Energy meters of accuracy class 0.2s
QA/QC procedures to be applied	Calibration of all the meters have been undertaken once in three years of intervals
Purpose of the data	Baseline emission reduction
Calculation method	O&M contractor apportioned the electricity export and import data based on individual WTGs controller reading, summation of all controller reading of WTGs connected under the common feeder and joint meter reading (based on billing meter) and provide month wise "Share Credit subdivision of Energy "which contains net electricity export by the project under. Detailed calculation procedure is mentioned in section 4.3.
Comments	The data will be archived electronically for two years after the end of the crediting period.

4.3 Monitoring Plan

WWIL is the O&M contactors for Samana-I site. O&M contractor is responsible for the maintaining all the monitoring data on behalf of state utility in respect of the project activity. O&M contractor has implemented the management structure for managing the monitored data.

This approved monitoring methodology requires monitoring of the following:

Net electricity supplied from the project activity

While Emission factor of the project activity is fixed ex ante, hence no further monitoring of this parameter is required. As per ACM0002 leakage need not be considered hence leakage has not been considered for the project activity. Hence, the sole parameter for monitoring is the net electricity supplied by the project activity to the grid.

The Project activity is operated by O&M contractor for the project activity and managed by the CLP. The operational and maintenance contract for the project activity is with WWIL, which is an ISO 9001 certified company. O&M contractor follow the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

Monitoring Procedure:

WTGs installed under this project activity are connected to common feeders at site. A particular feeder comprises of WTGs belonging to owners other than CLP but belonging to the same O&M service provider. At the respective DISCOM's sub-station, the total export & import to this feeder is monitored using the main meter & the backup meter, which are electronic tri-vector meters. The total export at this meter is generally arrived at by multiplying the monthly meter reading to the multiplying factor of the meter concerned. The monthly meter reading is arrived at as the difference between the current meter reading and the previous meter reading. The period between these two readings is usually a period of 30 days. In a similar fashion, total import at this meter is also calculated. Details of the feeders are mentioned in Appendix-1. Additionally, O&M contractor is monitoring electricity generation by each WTG at the WTG controller by their Central Monitoring System. With the help of WTG controller readings and JMR reading, respective O&M contractor calculates the electricity export by each WTG (by apportioning procedure) and generate the "Share Certificate". Based on the same, all the project investors raise the invoice for the electricity export to the grid. The allocation of electricity or apportion procedure is executed as per the following procedure:

Calculation of the net export³ of electricity from project activity:

Time duration for calculation = 30 days

X = Electricity generation at controller of the WTG for 30 days in MWh

Y = Electricity generation by all WTG attached to the common feeder in MWh

R = % allocation for each of the WTG on the common feeder = $X \times 100\% / Y$

E = Electricity supplied by the common feeder to the grid monitored at main meter in MWh

I = Electricity imported by the common feeder from the grid monitored at main meter in MWh

Thus,

Apportioned electricity exported by the each WTG = $R\% \times E$ in MWh

Apportioned electricity imported by the each WTG = $R\% \times I$ in MWh

Net electricity generation = $E_{G_{BL,y}} = (R\% \times E) - (R\% \times I)$ in MWh

Baseline emission = $E_{G_{BL,y}} \times EF_{CM,y}$ tCO₂

³ Same calculation procedure is adopted in both the sites

Based on the above procedure, O&M contractor apportioned the electricity export and import and CLP received the “Share Certificate” (consists of net electricity exported by CLP). This document is the main source of information for the emission reduction calculation.

As the controller reading of WTGs belongs to other project developers are confidential information, hence, O&M contractor is not disclosing the same. Thus controller readings of other project developer connected to the same feeder are not available to CLP.

Upon receipt of these reports, CLP generates invoices on sale of electricity and sends to respective DISCOMs. Thereafter respective DISCOM makes payments against the invoices.

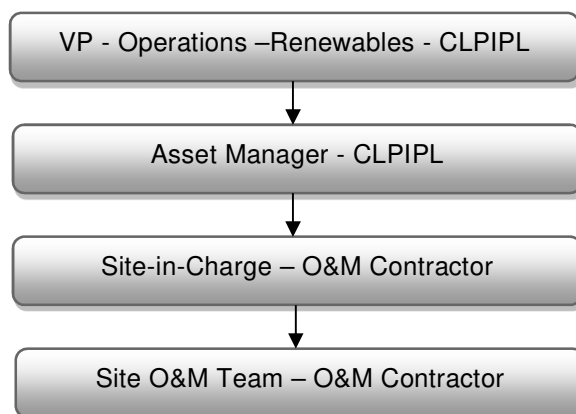
Training and maintenance requirements:

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 turbine, it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that O&M contractor’s service staffs 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 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.

Monitoring roles and responsibilities

The operational and management structure implemented for data monitoring is as follows:

The Project activity is operated by O&M contractor for the project activity and managed by the CLP. O&M contractor follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project. The data for the project is compiled by the O&M Contractor and subsequently stored by CLP. The roles and responsibilities for the project are described as below;



Data Recording

The state utility and representative of CLP shall jointly read the metering system every month at the delivery point.

Meter readings taken jointly has been signed by the representatives of state utility and of concerned power producer/developer. If Power Producer/ Developer's representative is not present for joint meter reading then the meter reading taken by state utility shall be considered as final; provided a signed copy of the meter reading is sent to the Power Purchase / Developer within twenty four (24) hours of such reading of the main metering system or back up metering system as the case may be.

Calibration Frequency

The main and backup meters shall be calibrated once in three years in line with notification issued by Central Electricity Authority, Govt of India dated the 17th March, 2006. The meters installed at both the sites were tested by any accredited laboratory in the presence of the parties (State Electricity Board, Project investor and the O&M Contractor) involved. Both parties shall seal main and backup meters. Defective meters shall be replaced immediately. As per the schedule, calibration of all energy meter, instruments and equipment will be carried out once in five year and recorded in calibration reports.

Calibration Details of Meters for Current Monitoring Period:

Samana Site:

Meter Identification No	Meter Make	Accuracy Class	Calibration Date	Calibration Expiry Date
GJU 01475 (Old Meter)	Secure	0.2s	06/09/2013	05/09/2016
GJU 04176 (Old Meter)	Secure	0.2s	06/09/2013	05/09/2016
GJU 01470 (Old Meter)	Secure	0.2s	06/09/2013	05/09/2016
KAB 11082 (Old Meter)	Secure	0.2s	06/09/2013	05/09/2016
GJ-2458-A* (New Meter)	L&T	0.2s	11/11/2015	10/11/2018
GJ-2459-A (New Meter)	L&T	0.2s	11/11/2015	10/11/2018

* From commissioning of the Sadodar substation, all WTGs under this substation were connected to four feeders and each feeder had individual TOD metering system (viz. GJU 01475 was connected to Feeder-1, GJU 04176 was connected to Feeder-2, GJU 01470 was connected to Feeder-3, KAB 11082 was connected to Feeder-4. However, in 11/11/2015 GETCO had installed two ABT meters into upstream of four TOD meter to enhance accuracy of metering system. Post installation, old TOD meters (which were previously used as main meters) are now considered check meters.

Description of calibration of WTG Controller

The controller used for the WTGs which is an LCS Controller is a micro-processor based intelligent controller which has been specially designed for control of wind turbines. In case there is any mismatch in the energy values recorded by the controller panel meter and the energy values calculated by the inverting system; the WTG machine will stop working and generate the error report automatically. Then the O&M team at the project site will replace the controller panel meter immediately. Hence calibration of the controller panel meter is not required.

Emergency Preparedness

In case of any abrupt breakdown, the fault will be immediately identified by the O&M personnel. All minor faults shall be taken care of by the O& M personnel, In case of any major faults, the grid personnel will be informed and replacement of the equipment shall be made within 24 hours

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

As per the equation 6 of the methodology ACM0002,

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

Where:

BE_y : Baseline emissions in year y (tCO₂e/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” (tCO₂e/MWh)

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

Duration			WEGs connected under 0.8 MW - PPA	WEGs connected under 29.76 MW - PPA	WEGs connected under 19.84 MW - PPA	Total Electricity Export (MWh)
Start		End	Net Electricity Export (MWh)	Net Electricity Export (MWh)	Net Electricity Export (MWh)	
01-Jan-2015	To	31-Jan-2015	124.866	5,176.814	3,451.209	8,752.89

Duration			WEGs connected under 0.8 MW - PPA	WEGs connected under 29.76 MW - PPA	WEGs connected under 19.84 MW - PPA	Total Electricity Export (MWh)
Start		End	Net Electricity Export (MWh)	Net Electricity Export (MWh)	Net Electricity Export (MWh)	
01-Feb-2015	To	28-Feb-2015	114.476	4,009.339	2,672.893	6,796.71
01-Mar-2015	To	31-Mar-2015	138.571	4,384.347	2,922.898	7,445.82
01-Apr-2015	To	30-Apr-2015	126.481	4,815.793	3,210.529	8,152.80
01-May-2015	To	31-May-2015	172.283	6,156.134	4,104.089	10,432.51
01-Jun-2015	To	30-Jun-2015	151.086	5,794.404	3,862.936	9,808.43
01-Jul-2015	To	31-Jul-2015	286.878	9,962.687	6,641.791	16,891.36
01-Aug-2015	To	31-Aug-2015	157.641	5,217.327	3,478.218	8,853.19
01-Sep-2015	To	30-Sep-2015	61.953	2,516.533	1,677.689	4,256.18
01-Oct-2015	To	31-Oct-2015	75.146	2,714.152	1,809.435	4,598.73
01-Nov-2015	To	30-Nov-2015	93.090	4,086.708	2,724.472	6,904.27
01-Dec-2015	To	31-Dec-2015	121.432	5,101.485	3,400.990	8,623.91
01-Jan-2016	To	31-Jan-2016	80.563	3,007.954	2,005.303	5,093.82
01-Feb-2016	To	28-Feb-2016	104.595	3,749.763	2,499.842	6,354.20
01-Mar-2016	To	31-Mar-2016	116.755	4,032.428	2,688.285	6,837.47
01-Apr-2016	To	30-Apr-2016	119.542	4,091.973	2,727.982	6,939.50
01-May-2016	To	31-May-2016	181.724	7,165.645	4,777.096	12,124.47
01-Jun-2016	To	30-Jun-2016	203.675	7,588.726	5,059.151	12,851.55
01-Jul-2016	To	31-Jul-2016	185.660	6,610.042	4,406.695	11,202.40
01-Aug-2016	To	31-Aug-2016	162.938	5,665.939	3,777.293	9,606.17
01-Sep-2016	To	30-Sep-2016	92.130	3,507.226	2,338.151	5,937.51
01-Oct-2016	To	31-Oct-2016	57.393	1,967.012	1,311.341	3,335.75
01-Nov-2016	To	30-Nov-2016	59.306	2,529.974	1,686.650	4,275.93
01-Dec-2016	To	31-Dec-2016	85.636	3,657.108	2,438.072	6,180.82
01-Jan-2017	To	31-Jan-2017	115.437	4,706.464	3,137.643	7,959.54
01-Feb-2017	To	28-Feb-2017	115.298	4,306.831	2,871.220	7,293.35
01-Mar-2017	To	31-Mar-2017	150.612	4,800.323	3,200.215	8,151.15
01-Apr-2017	To	30-Apr-2017	164.931	5,686.649	3,791.099	9,642.68
01-May-2017	To	31-May-2017	178.424	6,313.459	4,208.973	10,700.86
01-Jun-2017	To	30-Jun-2017	140.727	5,584.067	3,722.712	9,447.51
01-Jul-2017	To	31-Jul-2017	214.531	7,864.163	5,242.775	13,321.47
01-Aug-2017	To	31-Aug-2017	121.728	5,042.953	3,361.968	8,526.65
01-Sep-2017	To	30-Sep-2017	-	1,777.303	1,184.869	2,962.17

Duration			WEGs connected under 0.8 MW - PPA	WEGs connected under 29.76 MW - PPA	WEGs connected under 19.84 MW - PPA	Total Electricity Export (MWh)
Start		End	Net Electricity Export (MWh)	Net Electricity Export (MWh)	Net Electricity Export (MWh)	
01-Oct-2017	To	31-Oct-2017	47.461	2,498.215	1,665.477	4,211.15
01-Nov-2017	To	30-Nov-2017	46.502	3,194.696	2,129.797	5,371.00
01-Dec-2017	To	31-Dec-2017	117.267	4,977.568	3,318.379	8,413.21
01-Jan-2018	To	31-Jan-2018	75.920	3,172.701	2,115.134	5,363.76
01-Feb-2018	To	28-Feb-2018	91.002	3,103.526	2,069.017	5,263.55
01-Mar-2018	To	31-Mar-2018	136.192	4,340.474	2,893.649	7,370.32
01-Apr-2018	To	11-Apr-2018	37.210	1,282.499	854.999	2,174.71
Total			4,827.06	182,161.40	121,440.94	308,429.40

Thus, $BE_y = 308,429.40 \text{ MWh} * 0.9008 \text{ tCO}_2\text{e/MWh}$
 $= 277,832.00 \text{ tCO}_2 \text{ (after rounding down)}$

5.2 Project Emissions

Since the project activity is a renewable energy project which generates electricity using wind power and hence does not result in project emissions as per the applicable methodology ACM0002.

5.3 Leakage

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

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2015 (01-Jan-15 to 31-Dec-15)	91,446.00	0.00	0.00	91,446.00
2016 (01-Jan-16 to 31-Dec-16)	81,738.00	0.00	0.00	81,738.00
2017 (01-Jan-17 to 31-Dec-17)	86,477.00	0.00	0.00	86,477.00

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2018 (01-Jan-18 to 11-Apr-18)	18,171.00	0.00	0.00	18,171.00
Total	277,832.00	0.00	0.00	277,832.00

The actual emission reductions achieved during this monitoring period is 20.95% lower than the estimated value as per registered PD which is due to lower wind availability at site. Wind availability is a natural phenomenon which is beyond the control of CLP.