



**Verified Carbon
Standard**

GRID CONNECTED WIND ENERGY PROJECT IN TAMIL NADU



Document Prepared By CLP Wind Farms (Theni – Project II) Private Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project has been implemented by CLP Wind Farms (Theni – Project II) Private Limited (“CLP”) in the state of Tamil Nadu. The Wind Energy Generators (“WEG”) have been supplied by Vestas Wind Technology India Private Limited (“Vestas”). As per the Supply and Services agreement signed between CLP and Vestas, later is responsible for technology and equipment supply, as well as the operation and maintenance of the WEGs. The Project uses wind energy to generate electricity using 1.65 MW Wind Turbine Generators (WEGs) in the Tamil Nadu state in India. Total 30 numbers 1.65 MW of Vestas make WEGs are installed as part of this Project by CLP. The power generated from this project activity is supplied to the state electricity grid which is a part of Southern regional grid of India *and now* same is now part of integrated Indian grid. The Project is fully commissioned and is supplying electricity to Southern Regional Grid.

The Project activity helps to reduce the demand- supply gap in the country and also helps in contributing to the sustainable development by using wind energy as the source of power generation and reduction of GHG emissions.

The first machine under this project activity was commissioned on 25-Jun-2010 and last machine was commissioned on 02-Jul-10.

During this monitoring period the project activity has exported 123.81 GWh of net energy to the Southern Grid of India (same is now part of integrated Indian grid). The total emission reductions achieved during the monitoring period from 10-Sept-2018 to 24-Jun-2020 (both days inclusive) is 111,058 tCO₂.

1.2 Sectoral Scope and Project Type

The project activity is considered under “grid-connected electricity generation from renewable sources” (Sectoral Scope) that generates electricity in excess of 15 MW (limit for small scale project). Therefore, as per the scope of the project activity enlisted in the “list of sectoral scopes and related approved baseline and monitoring methodologies”, the project activity is categorized in Scope Number 1. Details of the same are listed below:

Scope Number :	1
Sectoral Scope:	Energy industries (renewable/non-renewable sources)
Methodology :	ACM0002 - Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 13.0.0)

The Project is neither a grouped nor an AFOLU project.

1.3 Project Proponent

Organization name	CLP Wind Farms (Theni – Project II) Private Limited
Contact person	Sandip Saha
Title	Deputy Manager – Carbon & Sustainability
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1.4 Other Entities Involved in the Project

Organization name	Not Applicable
Role in the Project	Not Applicable
Contact person	Not Applicable
Title	Not Applicable
Address	Not Applicable
Telephone	Not Applicable
Email	Not Applicable

1.5 Project Start Date

25-June-2010, being the date of commissioning of first WEG installed under the project activity

1.6 Project Crediting Period

Crediting Period: 10 years 0 months (renewable twice)

Start Date of Crediting Period: 25-June-2010

End Date of Crediting Period: 24-June-2020

The project proponent is undertaking the same project activity under CDM¹ however VCU's shall be claimed only till the day before the start date of crediting period under CDM. The Project Proponent confirms that the Project is also registered under CDM on 04/10/2012 and they will always claim emissions reductions from the Project only in one mechanism for a particular monitoring period to avoid double counting.

¹ <http://cdm.unfccc.int/Projects/DB/RWTUV1348485861.38/view>

1.7 Project Location

Villages :G.Usulampatti, Mottanoothu, Kothapatti, Shanmuga Sundara Puram & Marikundu
District :Theni
State :Tamil Nadu
Host Party :India

The Project is spread across G.Usulampatti, Mottanoothu, Kothapatti, Shanmuga Sundara Puram & Marikundu of Theni district of Tamil Nadu state in India. The nearest airport and railway station are in Madurai city which is located at a distance of approximately 75 km from the project activity site. The coordinates of individual WEGs of this site are as below:

Sr. No.	Unique Identification No.	HTSC. No.	Latitude	Longitude	Date of Commissioning
1	35	WEG T 117	N77°33'53.78"	E9°57'02.06"	02-Jul-10
2	1131	WEG T 100	N77°34'20.08"	E9°56'30.83"	25-Jun-10
3	526	WEG T 95	N77°35'02.04"	E9°57'07.75"	25-Jun-10
4	63	WEG T 97	N77°35'26.08"	E9°56'46.16"	25-Jun-10
5	1050	WEG T 103	N77°34'14.52"	E9°57'20.06"	25-Jun-10
6	1422	WEG T 106	N77°33'04.40"	E9°59'00.59"	25-Jun-10
7	1202	WEG T 91	N77°34'05.23"	E9°55'46.90"	25-Jun-10
8	763	WEG T 120	N77°33'40.54"	E9°58'45.28"	02-Jul-10
9	1064	WEG T 102	N77°34'34.83"	E9°56'58.04"	25-Jun-10
10	177	WEG T 108	N77°33'20.37"	E9°57'39.66"	25-Jun-10
11	26	WEG T 122	N77°35'19.41"	E9°58'53.99"	02-Jul-10
12	781	WEG T 104	N77°34'06.37"	E9°58'33.47"	25-Jun-10
13	64	WEG T 118	N77°33'41.62"	E9°56'30.64"	02-Jul-10
14	185	WEG T 119	N77°33'00.32"	E9°57'56.24"	02-Jul-10
15	645	WEG T 101	N77°34'59.71"	E9°58'14.94"	25-Jun-10
16	1087	WEG T 116	N77°34'11.23"	E9°56'45.05"	02-Jul-10
17	1143	WEG T 99	N77°34'28.19"	E9°56'19.93"	25-Jun-10
18	488	WEG T 92	N77°34'40.75"	E9°56'43.03"	25-Jun-10
19	473	WEG T 93	N77°34'49.98"	E9°56'32.52"	25-Jun-10
20	293	WEG T 114	N77°35'06.63"	E9°56'50.57"	02-Jul-10
21	274	WEG T 115	N77°35'24.86"	E9°57'01.23"	02-Jul-10
22	542	WEG T 98	N77°34'53.27"	E9°57'24.12"	25-Jun-10
23	443	WEG T 94	N77°34'59.07"	E9°56'20.61"	25-Jun-10
24	694	WEG T 121	N77°34'53.77"	E9°58'36.03"	02-Jul-10

Sr. No.	Unique Identification No.	HTSC. No.	Latitude	Longitude	Date of Commissioning
25	1194	WEG T 113	N77°34'03.96"	E9°56'04.90"	02-Jul-10
26	197	WEG T 96	N77°35'29.19"	E9°57'27.12"	25-Jun-10
27	292	WEG T 109	N77°32'53.88"	E9°57'21.68"	25-Jun-10
28	1165	WEG T 90	N77°34'23.87"	E9°55'55.31"	25-Jun-10
29	1149	WEG T 105	N77°33'35.52"	E9°59'27.51"	25-Jun-10
30	195	WEG T 107	N77°32'41.36"	E9°57'57.56"	25-Jun-10

1.8 Title and Reference of Methodology

The approved consolidated baseline and monitoring methodology ACM0002 (Version 13.0.0, EB67), has been used to determine the baseline emissions and emission reduction due to the project activity. The details of the methodology are mentioned below:

Title of the baseline and monitoring methodology: "Consolidated Baseline Methodology for grid connected electricity generation from renewable sources"

Reference: ACM0002, Version 13.0.0 (EB 67, Annex 13),
Sectoral scope: 1

It has been referred from the list of approved methodologies for CDM project activities on the UNFCCC CDM website (<http://cdm.unfccc.int/methodologies/PAMethodologies/approved.html>).

The approved methodology also draws upon:

- Version 06.0.0 (EB 65, Annex 21, 25th November 2011) of the "Tool for the demonstration and assessment of additionality"; and
- Version 02.2.1 (EB 63, Annex 19, 29th September 2011) of the "Tool to calculate the emission factor for an electricity system"
- Guidance on assessment of investment analysis (05, EB 62)

1.9 Participation under other GHG Programs

The Project is a CDM registered Project activity and its CDM details are as follows,

Project Title: Grid Connected Wind Energy Project in Tamil Nadu

CDM Registration Number: 7416

Crediting Period Start Date: 10-Sep-2013

Emission Reduction Claimed Till Date: No claim made till date in CDM

Further, the net GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions.

1.10 Other Forms of Credit

- Emission Trading Programs and Other Binding Limits: The project has not participated in any Emissions Trading Programs. The emission reductions generated for this duration of periodic verification would not be claimed under any other GHG programs
- Other Forms of Environmental Credit: CLP hereby confirms that the project has not sought or received any other GHG related environmental credit 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 project proponent believes that the project activity has contributed to the sustainable development as discussed below according to the indicators stipulated by Ministry of Environment and Forests, Government of India for sustainable development:

1. Social well-being:

- The project activity provided job opportunities to some of the local people during erection and operation of the wind farms contributing up to some extent in poverty alleviation of the local community.
- The project activity contributed in infrastructure development by improving the availability of the electricity to the grid.

2. Economic well being:

- The project activity leads to investment to a developing region which otherwise would not have happened in the absence of project activity. The generated electricity is fed into the regional grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers & sub-urban habitants) which provides new opportunities for industries and economic activities to setup in the area thereby resulting in greater local employment, ultimately leading to overall development.
- The project activity requires temporary and permanent, skilled and semi-skilled manpower at the wind park; this created additional employment opportunities

3. Environmental well being:

- The project utilizes wind energy for generating electricity which otherwise would have been generated through the operation of power plants in the NEWNE grid & Southern grid, contributing to reduction in specific emissions (tons of emissions /MWh of energy generated) including GHG emissions.
- As wind power projects produce no end products in the form of waste (e.g. Particulate Matter, Fly ash, Water effluent etc.).
- Being a renewable resource, using wind energy to generate electricity contributes to natural scarce resource (e.g. Fossil fuel used for electricity generation) conservation.

- Thus, the project causes no negative impact on the surrounding environment contributing to environmental well being.

4. Technological well being:

- The project activity leads to the promotion of 1.65 MW of Vestas WTGs into the region, demonstrating the success of this type of wind turbines, which fed the generated power into substation in Tamil Nadu, thus strengthening the grid supply and improving quality of power under the service area of the substation. Hence the project leads to technological well being.

The project technology manufactured, operated & maintained indigenously and doesn't involve any technology transfer from foreign countries.

2 SAFEGUARDS

2.1 No Net Harm

In line with Ministry of Environment Forest and Climate Change, Govt. of India, Environmental Impact Assessment (EIA) is not mandatory for wind energy project. However, as per CLP's internal governance system, EIA is mandatory for all projects. Thus, EIA has been conducted before project installation and found that this 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

The local stakeholder meetings were carried out at site of the project activity and the details of the same can be referred from the registered VCS PD. As a part of continuous feedback from stakeholders, along with the 3rd party O&M contractor, CLP has also appointed independent Asset Managers at every site. These assets managers are responsible for site supervision and continuous day-to-day interaction with the local stakeholders e.g. local villagers, local govt. authorities and others. Based on the local requirements, CLP has initiated several CSR/sustainable development activities in the project catchment area. Further, CLP has also placed a grievance register onsite where-in, the stakeholders can put down their request/complaint/requirements. Same is continuously monitored and appropriate action are also being taken by management. Furthermore, CLP has also placed a notice board on site to communicate any necessary information/updates to local stakeholders. CLP has found this two-way communication with local stakeholders is very effective towards sustainability of the project in long run.

2.3 AFOLU-Specific Safeguards

This section is not applicable for this project activity

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

- **Implementation Status:**

All the WEGs of the Project are commissioned and the Project is fully implemented. The commissioning dates of the individual WEGs have been provided in section 1.7.

- **Events that may impact the GHG emission reductions or removals and monitoring:**

No such events took place during this monitoring period that may impact the GHG emission reductions for the project activity. Regular O&M activities were conducted but barring them the project activity has been exporting electricity continuously since commissioning. There were neither major breakdowns nor other events for the project activity during the monitoring period that may impact the GHG emission reductions for the project activity.

3.2 Deviations

2.3.1 Methodology Deviations

There are no deviations related to methodology.

2.3.2 Project Description Deviations

Following deviation has been considered during 4th verification in this project activity:

In this project activity, project WTGs are generating electricity at 690 V and then stepped up to 33 kV through 3 phase transformers located near to the each WTG and dedicated bi-directional energy meters are also connected to these transformers to monitor the electricity export and import by the WTGs. In accordance with Standards on Installation and Operation of Meters (pg no 15 of 20) of the notification dated 17/03/2006 published by Central Electricity Board, Govt. of India (www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf), interface meter with 0.5s or better accuracy class needs to be installed if energy meter is connected above 650 volts and up to 33 kV. Thus, during project commissioning state utility has installed energy meters with 0.5s accuracy class as energy meters are connected to grid at 33 kV. However, TNEB (state utility) has decided to upgrade accuracy class of all energy meters from 0.5s to 0.2s. Thus, being a project developer under TNEB jurisdiction, CLP has to replace all interface energy meters at site and same is beyond the control of CLP. Presently, all main meters have been replaced with 0.2s. Thus, this project activity is now using energy meters with higher accuracy class to monitor export and import of electricity which is more conservative in nature.

Following deviation has been considered in current periodic verification:

During registration, calibration frequency has been considered once in a three year. However, in actual practice, state utility conducted the accuracy check of all interface meters once in five years. These meters also tested whenever the energy and other quantities recorded by the meter are abnormal or inconsistent with electrically adjacent meters. Details of the calibration is

mentioned in section 4 of the PPA which is in line with para 18.1.b of the notification dated 17/03/2006 published by Central Electricity Board, Govt. of India (www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf). Testing and calibration has been done by state utility which is beyond the control of Project Participant.

The above mentioned deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology i.e. ACM0002 version 12.3.0.

3.3 Grouped Projects

Not Applicable

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _{grid,OM,y}	
Data unit	tCO ₂ e/MWh	
Description	Operating Margin (OM) Emission Factor of Southern Grid	
Source of data	The CO ₂ Baseline Database for the Indian Power Sector - Ministry of Power: Central Electricity Authority (CEA) Version 7.	
Value applied	Year	Simple operating margin of Southern regional grid (tCO ₂ e/MWh)
	2008-09	0.9729
	2009-10	0.9415
	2010-11	0.9419
	Generation weighted average Operating Margin emission factor in the last three years	0.9513
Justification of choice of data or description of measurement methods and procedures applied	Data is taken as per the methodology, guidelines and tools mentioned in section 1.8 of this monitoring report.	
Purpose of Data	Baseline Emission calculation	
Comments	Operating margin emission factor is fixed ex-ante throughout the crediting period.	

Data / Parameter	EF _{grid,BM,y}
Data unit	tCO ₂ e/MWh
Description	Build Margin (BM) Emission Factor of Southern Grid
Source of data	The CO ₂ Baseline Database for the Indian Power Sector - Ministry of Power: Central Electricity Authority (CEA) Version 7.
Value applied	0.7339 tCO ₂ /MWh for the year 2010-11
Justification of choice of data or description of measurement methods and procedures applied	Data is taken as per the methodology, guidelines and tools mentioned in section 1.8 of this monitoring report.
Purpose of Data	Baseline Emission calculation
Comments	Build margin emission factor is fixed ex-ante throughout the crediting period.

Data / Parameter	EF _{grid,CM,y}
Data unit	tCO ₂ e/MWh
Description	Combined Margin (CM) Emission Factor of Southern Grid
Source of data	The CO ₂ Baseline Database for the Indian Power Sector - Ministry of Power: Central Electricity Authority (CEA) Version 7.
Value applied	Computed using the following formula $EF_{grid,y} = W_{OM} * EF_{grid,OM,y} + W_{BM} * EF_{grid,BM,y}$ $EF_{grid,y} = 0.75 * 0.9513 + 0.25 * 0.7339 = 0.8970$ Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the “Tool to calculate the emission factor for an electricity system”
Justification of choice of data or description of measurement methods and procedures applied	Data is taken as per the methodology, guidelines and tools mentioned in section 1.8 of this monitoring report.
Purpose of Data	Baseline Emission calculation
Comments	Combined margin emission factor is fixed ex-ante throughout the crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	EG _{PJ,y}
Data unit	MWh (Mega-watt hour)
Description	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity during the period y
Source of data	The electricity supplied to the grid taken from the Joint Meter Reading Report carried out at the TNEB meter located near each WEG.
Description of measurement methods and procedures to be applied	The net electricity generated and exported to the grid is measured by the main meters (or by check meter in case of error in main meter installed). These meters are installed by TNEB at the metering point near each WEG. The total net electricity supplied to TNEB grid by the project activity is the summation of net electricity supplied by individual WEGs of the project activity.
Frequency of monitoring/recording	The main meter and check meters, located near the foot of the turbine, continuously monitors export, import and net export of energy from each turbine. The readings at the Metering Point are undertaken every month jointly by the representatives of the state grid/ TNEB and CLP/Vestas representative. Based on these meter readings, TNEB issues generation record/ JMR that contains export, import and net export of each WEGs of the project activity. Thus, the recording frequency for this data is monthly.
Value monitored	123,812.21
Monitoring equipment	The project proponent has installed two identical 0.2s accuracy class trivector meters, referred as main and check meters. These meters are located at the foot of the turbine on 33 kv outgoing feeders. Reading of the main meter is taken for the billing purpose, while the same is getting cross checked using the check meter. The metering equipments (main and check) are duly approved, tested and sealed by TNEB in the presence of the parties involved (TNEB and Vestas).
QA/QC procedures to be applied	The quantity of net electricity supplied is cross-verified from the invoice raised to TNEB by the project proponent. The TNEB carries out the calibration, periodical testing, sealing and maintenance of meters in the presence of Vestas

	representative. The frequency of meter testing is once in 3 years. All meters are tested at the Metering Point.
Purpose of the data	To calculate emissions reductions from the Project
Calculation method	Measured quantity
Comments	The data will be archived for crediting period + 2 years.

4.3 Monitoring Plan

The approved large scale methodology ACM0002 (Version 13.0.0), stipulates the monitoring of the net electricity generation supplied by the project plant/unit to the grid.

Description of the Monitoring Plan

Each of the 30 WEGs considered in the Project has Main and Check meters installed on the 33 kV outgoing feeder for metering of electricity produced/ consumed by the WEGs Both of these Main and Check meters are identical in terms of technical specification.

The TNEB carries out the calibration, periodical testing, sealing and maintenance of meters in the presence of Vestas representative. The frequency of meter testing is once in 3 year. All meters are tested at the Metering Point.

Metering procedure

The generated electricity is measured through a two steps procedure wherein the first metering is carried out at the micro-processor based controller (Local Control System) specially designed to control the WEG. The primary function of the LCS is to ensure that all the components of the WEG remain fully operational under all conditions. In order to meet this requirement, it is necessary to monitor wind speed, wind direction, temperature, rotational speeds, electricity generated, voltage etc. The LCS display and keyboard enable control of all WEG functions. The electricity generation details are displayed in the LCS. 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 and well trained staff personnel of O&M contractor, Vestas, 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 TNEB meter located near each WEG. This is the metering point wherein the Joint Meter Reading (JMR) is carried out every month in presence of the representatives of the project proponent & the state electricity utility (TNEB). This JMR is used for calculation of the amount of electricity supplied to the grid against which the utility makes the payment to the project proponent. The JMR gives both the “export” and “import” of the electricity to/ from the Southern grid. There is a single meter which gives both the export and import values, this metered reading gave value net of line losses (negligible since metering/JMR point is very close to the WEG) and auxiliary consumption.

Organizational structure, responsibilities and competencies

The representatives of Operations and Maintenance contractor (Vestas) record the readings and prepare daily generation reports of all the WEGs. The primary recording of the electricity fed to the electricity grid is being carried out jointly at the TNEB meter located near each WEG. The operations and maintenance structure for the project activity is as follows:



Generating, Recording, Storing, Aggregating, Collating and Reporting of Data:

The meter readings at the Metering Point (main meter and check meter) are undertaken every month jointly by the representatives of the TNEB and Vestas representative for the previous month and it is certified by representatives of TNEB. The reporting structure has been presented in the preceding section. The monthly data is recorded and stored by the project proponent.

Procedures for handling data uncertainty (internal auditing and non-conformities):

- In case main meter is faulty- check meter is used to calculate the electricity exported to the grid. Main meter is immediately replaced by a new meter and meter reading from the replaced meter is used thereafter.
- In case the check meter is faulty- The check meter is immediately replaced. The emission reduction calculation would not be affected as reading from main meter is used to calculate the net electricity exported to the grid.
- In case error is identified during annual accuracy testing- If during the annual tests, the meter is found to be beyond the permissible limits of error, the meter shall be immediately calibrated and replaced, if necessary. The error that is identified in the annual accuracy testing would be applied to all the readings of electricity exported as indicated in the credit note from the state utility from the date of last accuracy testing. Billing for the period thereafter shall be as per the calibrated meter.

The Project Management team of CLP receives the data from both the sources and keeps track of project activity which reduces the carbon emission reductions.

Apportioning of data:

In case the start date of Monitoring period falls in between the monthly Monitoring date, i.e. JMR date, in such case the generation data for the number of days for the monitoring period would be calculated based on the generation ratio as per the controller data. The following generation

apportioning procedure will be followed, if the crediting period date of the project activity falls in – between the billing cycles:

Partial days generation of the project activity WTG's at controller of a Month: **X**

Total generation of the project activity WTG's at controller for the same month: **Y**

% Generation for partial days of generation (%): **Z= (X/Y) *100**

Electricity supplied to grid by the WTGs of the project activity as per share certificate for the same month: **G²**

Electricity supplied to grid by the WTGs of the project activity for the partial days: **(G*Z/100)**.

Further, the data would also be required to be apportioned for calculation of yearly Emission reductions in case the JMR is not as per the starting of the month. In such cases apportioning based on the number of days shall be applied.

Calibration Details of Meters for Current Monitoring Period:

HTSC Number	Main Meter				Check meter			
	Sr. No.	Calibration Date	Validity	Class	Sr. No.	Calibration Date	Validity	Class
T-90	HPL624813	23-Feb-17	22-Feb-22	0.2s	HPL624819	22-Feb-17	21-Feb-22	0.2s
T-91	HPL624812	25-Feb-17	24-Feb-22	0.2s	HPL624817	25-Feb-17	24-Feb-22	0.2s
T-92	HPL624814	24-Feb-17	23-Feb-22	0.2s	HPL624978	24-Feb-17	23-Feb-22	0.2s
T-93	HPL624972	24-Feb-17	23-Feb-22	0.2s	HPL624976	24-Feb-17	23-Feb-22	0.2s
T-94	HPL624971	24-Feb-17	23-Feb-22	0.2s	HPL624975	24-Feb-17	23-Feb-22	0.2s
T-95	HPL624973	25-Feb-17	24-Feb-22	0.2s	HPL624977	25-Feb-17	24-Feb-22	0.2s
T-96	HPL624979	22-Feb-17	21-Feb-22	0.2s	HPL624980	22-Feb-17	21-Feb-22	0.2s
T-97	HPL624820	22-Feb-17	21-Feb-22	0.2s	HPL624974	22-Feb-17	21-Feb-22	0.2s
T-98	HPL625141	23-Mar-17	22-Mar-22	0.2s	HPL625146	23-Mar-17	22-Mar-22	0.2s
T-99	HPL625144	24-Mar-17	23-Mar-22	0.2s	HPL625150	23-Mar-17	22-Mar-22	0.2s
T-100	GENUS 4322544	29-May-17	28-May-22	0.2s	HPL 3033738	08-Dec-17	07-Dec-22	0.2s
T-101	GENUS 4321972	30-May-17	29-May-22	0.2s	HPL 3033737	08-Dec-17	07-Dec-22	0.2s
T-102	HPL625145	24-Mar-17	23-Mar-22	0.2s	HPL625149	24-Mar-17	23-Mar-22	0.2s
T-103	HT2160431	01-Mar-16	28-Feb-21	0.2s	HT2160432	01-Mar-16	28-Feb-21	0.2s
T-104	GENUS 4321968	30-May-17	29-May-22	0.2s	HPL 3033733	08-Dec-17	07-Dec-22	0.2s

² The value of G is for the month where billing cycle date does not match with the monitoring period dates (start and/or end date). Both the parameter EGPJy and G are the net electricity supplied to the grid by the WTGs of the project activity. EGPJy is the net electricity supplied to the grid for the year/monitoring period. The apportioning procedure will only be used when the billing cycle and monitoring period dates does not match.

HTSC Number	Main Meter			Class	Check meter			Class
	Sr. No.	Calibration Date	Validity		Sr. No.	Calibration Date	Validity	
T-105	HPL624853	22-Mar-17	21-Mar-22	0.2s	HPL624860	22-Mar-17	21-Mar-22	0.2s
T-106	HPL624856	22-Mar-17	21-Mar-22	0.2s	HPL624859	27-Feb-17	26-Feb-22	0.2s
T-107	HPL625142	22-Mar-17	21-Mar-22	0.2s	HPL625148	23-Mar-17	22-Mar-22	0.2s
T-108	HPL625143	23-Mar-17	22-Mar-22	0.2s	HPL625147	23-Mar-17	22-Mar-22	0.2s
T-109	HPL624854	27-Feb-17	26-Feb-22	0.2s	HPL624855	27-Feb-17	26-Feb-22	0.2s
T-113	HPL624811	21-Feb-17	20-Feb-22	0.2s	HPL624816	21-Feb-17	20-Feb-22	0.2s
T-114	HPL624815	22-Feb-17	21-Feb-22	0.2s	HPL624818	21-Feb-17	20-Feb-22	0.2s
T-115	HPL625081	23-Feb-17	22-Feb-22	0.2s	HPL625089	23-Feb-17	22-Feb-22	0.2s
T-116	GENUS 4321967	29-May-17	28-May-22	0.2s	HPL 3033735	08-Dec-17	07-Dec-22	0.2s
T-117	HPL624741	25-Feb-17	24-Feb-22	0.2s	HPL624747	25-Feb-17	24-Feb-22	0.2s
T-118	HPL624857	27-Feb-17	26-Feb-22	0.2s	HPL624858	27-Feb-17	26-Feb-22	0.2s
T-119	HPL624743	25-Feb-17	24-Feb-22	0.2s	HPL624745	25-Feb-17	24-Feb-22	0.2s
T-120	HPL624748	27-Feb-17	26-Feb-22	0.2s	HPL624750	25-Feb-17	24-Feb-22	0.2s
T-121	GENUS 4322548	29-May-17	28-May-22	0.2s	GENUS 4322548	27-Feb-17	26-Feb-22	0.2s
T-122	GENUS 4321971	30-May-17	29-May-22	0.2s	HPL 3033748	08-Dec-17	07-Dec-22	0.2s

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The baseline emissions for the monitoring period are calculated as follows:

Duration			Break-up of Energy		Net Electricity Export (MWh)
			Electricity Export (kWh)	Electricity Import (kWh)	
10-Sep-2018	To	09-Oct-2018	44,91,840	1,37,430	4,354.41
09-Oct-2018	To	09-Nov-2018	9,59,220	1,72,110	787.11
09-Nov-2018	To	09-Dec-2018	7,10,520	1,80,540	529.98

Duration	Break-up of Energy		Net Electricity Export (MWh)
	Electricity Export (kWh)	Electricity Import (kWh)	
09-Dec-2018 To 31-Dec-2018	5,62,162	1,43,439	418.72
01-Jan-2019 To 31-Jan-2019	7,57,696	1,93,330	564.37
01-Feb-2019 To 28-Feb-2019	16,66,611	1,38,314	1,528.30
01-Mar-2019 To 31-Mar-2019	16,93,901	1,54,638	1,539.26
01-Apr-2019 To 30-Apr-2019	20,96,965	1,57,263	1,939.70
01-May-2019 To 31-May-2019	93,15,530	79,498	9,236.03
01-Jun-2019 To 30-Jun-2019	1,97,88,562	19,975	19,768.59
01-Jul-2019 To 31-Jul-2019	2,03,82,593	19,002	20,363.59
01-Aug-2019 To 31-Aug-2019	1,99,43,951	24,654	19,919.30
01-Sep-2019 To 30-Sep-2019	1,02,21,296	73,173	10,148.12
01-Oct-2019 To 31-Oct-2019	13,49,964	1,57,239	1,192.73
01-Nov-2019 To 30-Nov-2019	13,84,789	1,55,566	1,229.22
01-Dec-2019 To 31-Dec-2019	18,96,807	1,47,456	1,749.35
01-Jan-2020 To 31-Jan-2020	8,30,814	1,68,595	662.22
01-Feb-2020 To 29-Feb-2020	18,29,216	1,44,799	1,684.42
01-Mar-2020 To 31-Mar-2020	17,72,425	1,53,333	1,619.09
01-Apr-2020 To 30-Apr-2020	15,62,296	1,59,713	1,402.58
01-May-2020 To 31-May-2020	74,16,715	1,07,770	7,308.95
01-Jun-2020 To 24-Jun-2020 ³	1,58,79,710	13,533	15,866.18
Total	126,513,582.58	2,701,367.90	123,812.21

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y} \text{ -----Equation 6 of ACM0002}$$

Thus,

$$\begin{aligned}
 BE_y &= 123,812.21 * 0.8970 \text{ tCO}_2\text{e} \\
 &= 111,058.00 \text{ tCO}_2\text{e}
 \end{aligned}$$

5.2 Project Emissions

The project activity involves harnessing of wind energy and its conversion to electricity. Hence according to ACM0002 Version 13.0.0, there will be no project emissions in the project activity $PE_y = 0$

³ Due to end of current crediting period, monitoring period has been restricted upto 24-Jun-20 and electricity export and import (from 01-June-2020 to 30-June-2020) have been apportioned (e.g. electricity export*24/30)

5.3 Leakage

As per ACM0002 Version 13.0.0, no leakage has been considered for the calculation of emission factor.

5.4 Net GHG Emission Reductions and Removals

According to the approved methodology ACM0002 (Version 13.0.0) Emission Reductions are calculated as

$$ER_y = BE_y - PE_y \text{ -----Equation 6 of ACM0002}$$

Where:

ER_y Emission reductions in year y (tCO₂/yr)

BE_y Baseline Emissions in year y (tCO₂/yr)

PE_y Project Emissions in year y (tCO₂/yr)

Thus,

$$ER_y = 111,058.00 - 0 \text{ tCO}_2$$

$$= 111,058.00 \text{ tCO}_2$$

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 (10-Sept-18 to 31-Dec-18)	5,462.00	0.00	0.00	5,462.00
2019 (01-Jan-19 to 31-Dec-19)	79,993.00	0.00	0.00	79,993.00
2020 (01-Jan-20 to 24-Jun-20)	25,603.00	0.00	0.00	25,603.00
Total	111,058.00	0.00	0.00	111,058.00

The actual emission reductions achieved during this monitoring period is 42.73 % 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.