100 MW SOLAR PROJECT IN BHADLA IN RAJASTHAN

Document Prepared by

Emergent Ventures India Pvt. Ltd.

Project Title	100 MW Solar project in Bhadla in Rajasthan
Version	1.2
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Monitoring Period	01-April-2020 to 30-September-2020
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity involves operation of 100 MW_{AC} solar power project in Bhadla in the state of Rajasthan, India and to supply electricity to the Indian grid system. The project activity was commissioned in two phases with the first phase of 50 MW on 16/09/2018 and the second phase of another 50 MW on 06/10/2018.

The details of the project are mentioned in the table:

Project Investors' Name	**Commissioning Date**	**Capacity in MW_{AC}**	**Location (Village/State)**
Clean Sustainable Energy Pvt. Ltd.	16/09/2018 (1st Phase) 06/10/2018 (2nd Phase)	(50 MW + 50 MW) = 100 MW	Village: Bhadla, District: Jodhpur

The solar power does not involve any fossil fuel consumption and hence the project does not lead to any greenhouse gas emissions. Thus, electricity is generated through sustainable means without causing any negative impact on the environment.

The current monitoring period is considered from **01/04/2020 to 30/09/2020**. The total GHG emission reductions or removals generated in this monitoring period are **114,035** tCO2e.

1.2 Sectoral Scope and Project Type

Sectoral Scope: 01 - Energy industries (renewable / non-renewable sources)

Project Type: I-Renewable Energy Projects

Methodology: ACM0002: Grid-connected electricity generation from renewable sources - Version 19[1]

The project is not a grouped project activity.

1.3 Project Proponent

Organization name	Clean Sustainable Energy Pvt. Ltd.
Contact person	Prashant Choubey
Title	Senior Vice President
Address	3rd Floor, PTI Building,4,Parliament Street, Delhi-110001
Telephone	+91-97113 02259

[1] https://cdm.unfccc.int/methodologies/DB/5725LCHYPYM4I1V8OD9SFYVAMFFWNP

Email	Prashant.choubey@avaada.com

1.4 Other Entities Involved in the Project

Organization name	WeAct Pty Ltd
Role in the Project	Authorized Representative
Contact person	Satish Duvvuru
Title	Director
Address	1/115 Chapal Street, Widnsor,Victoria-3181, Australia.
Telephone	Ph: +61-409 135 580
Email	satish@weact.com.au

WeAct Pty Ltd. is the “Authorized Representative” of PP and the “Sole Focal Point” for all the communications with the DOE, VCS Board and Registry.

Organization name	Emergent Ventures India Pvt. Ltd.
Role in the Project	Project Consultant
Contact person	Atul Sanghal
Title	Business Head
Address	Magnum Tower 1, 8th Floor, Sector 58, Gurgaon
Telephone	+91-97173 96309
Email	contact@emergent-ventures.com

1.5 Project Start Date

16-Sep-2018

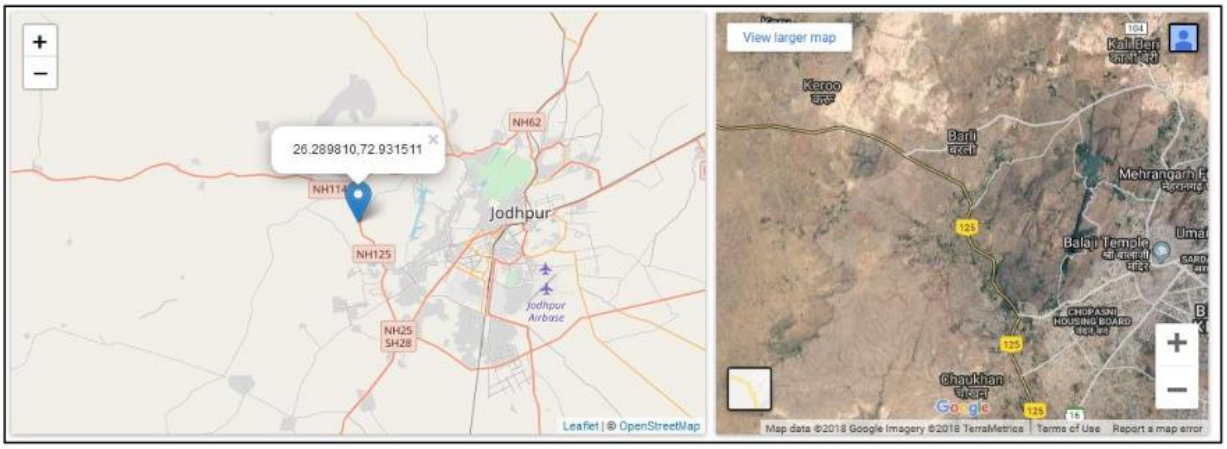
1.6 Project Crediting Period

Crediting Period Start date : 16-Sep-2018
Crediting Period End date : 15-Sep-2028

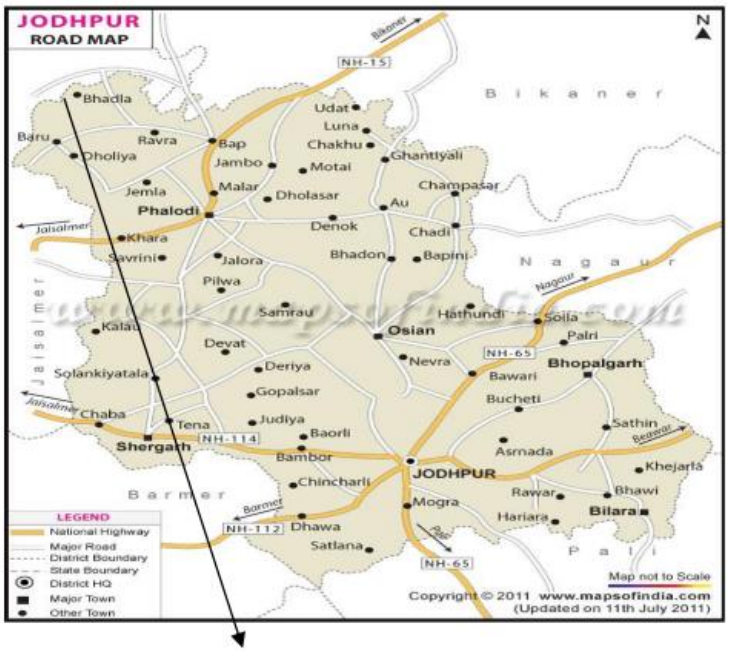
The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum twice.

1.7 Project Location

Name of SPV	Capacity	Village	District	State	Latitude (N)	Longitude (E)
Clean Sustainable Energy Pvt Ltd	100 MW_{AC}	Bhadla	Jodhpur	Rajasthan	26° 17’ 23.316”	72° 55’ 53.436”



Showing State of Rajasthan



Bhadla village, Jodhpur district

1.8 Title and Reference of Methodology

Title: ACM0002: Grid-connected electricity generation from renewable sources - Version 19[2]

Reference: The project activity meets the eligibility criteria of large scale project as it is more than 15 MW.

Type I: Energy industries (renewable / non-renewable sources)

Category: Approved Consolidated Methodology (ACM0002)

Tools referred with above methodology and applicable for project activity are:

- Tool to calculate the emission factor for an electricity system - Version 07.0 (EB 100, Annex 04)[3]
- Methodological Tool- Tool for the demonstration and assessment of additionality; Version 07.0.0 (EB 70, Annex 08)[4]

1.9 Participation under other GHG Programs

The project has neither been registered nor seeking registration under any other GHG programs. The project is registered only in VCS program. The Project is not rejected by other GHG programs.

1.10 Other Forms of Credit

Net GHG emission reductions or removals generated by the Project are not used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

The Project has no intent to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

However it can be crosschecked that PP is not claiming REC benefits, the same can be verified with the REC accreditation body of India.

1.11 Sustainable Development

Contribution to sustainable development:

Ministry of Environment and Forests, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project contributes to sustainable development using the following ways.

Social well-being: The project generates employment opportunities during the construction and operation phases. The project activity leads to development in infrastructure in the region like development of roads and also promotes business with improved power generation.

[2] https://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD
[3] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf/history_view
[4] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

Economic well-being: The project is a clean technology investment in the region, which would not have taken place in the absence of the VCS benefits the project activity also helps to reduce the demand supply gap in the state.

Technological well-being: The successful operation of project activity leads to promotion of Solar based power generation.

Environmental well-being: Solar being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission, the Project activity also helps in avoiding significant amount of GHG emissions and specific pollutants like SOx, NOx, and SPM associated with the conventional thermal power generation facilities.

This reporting is consistent with previous verifications.

2 SAFEGUARDS

2.1 No Net Harm

Being renewable Solar PV power generation project there is no negative environmental and socio-economic impacts in fact project activity contributes positively by providing environment friendly power generation leading to sustainable development of the region. Also, the generation of employment directly supports upliftment of socio-economic status of region.

Thus there are no significant negative impacts due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

2.2 Local Stakeholder Consultation

PP has set up a mechanism at site to receive complaints from the local community. No complaints were received during the monitoring period.

2.3 AFOLU-Specific Safeguards

Not Applicable, as this project is a non-AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The details of the SPVs for the project and their location of installation are mentioned in the table below:-

Name of SPV	Capacity Commissioned	COD	Connection with Grid	State
Clean Sustainable Energy Pvt Ltd	50 MW	16/09/2018	Indian Grid	Rajasthan
	50 MW	06/10/2018	Indian Grid	Rajasthan

There are no events that took place in the current monitoring period that might impact GHG emissions reductions. The project remained operational through the period.

3.2 Deviations

3.2.1 Methodology Deviations

There is no methodology deviation.

3.2.2 Project Description Deviations

There is no project description deviation.

3.3 Grouped Projects

The project is not a grouped project activity.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO2e/MWh
Description	Combined margin emission factor for Indian grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system"
Source of data	CO2 baseline database (Version 14.0) published by CEA on December 2018
Value applied	0.93684
Justification of choice of data or description of measurement methods and procedures applied	This value is calculated using OM and BM values as per Version 7.0 of methodological tool to calculate the emission factor for an electricity system and using data base of CEA.
Purpose of Data	For the calculation of Emission Factor of the grid
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid, OM, y}$
Data unit	tCO2e/MWh
Description	Simple operating margin emission factor for Indian grid
Source of data	CO2 baseline database (Version 14.0) published by CEA on December 2018
Value applied	0.9610
Justification of choice of data or description of measurement methods and procedures applied	This value is calculated by taking weighted average of Simple Operating Margin of recent three years for Indian grid as per the "Tool to calculate the emission factor for an electricity system", version 07.0.0
Purpose of Data	For the calculation of Emission Factor of the grid
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid, BM, y}$
Data unit	tCO2e/MWh
Description	Simple build margin emission factor for Indian grid
Source of data	CO2 baseline database (Version 14.0) published by CEA

	December 2018
Value applied	0.8644
Justification of choice of data or description of measurement methods and procedures applied	This value is calculated by taking weighted average of Simple build Margin of recent three years for Indian grid as per the "Tool to calculate the emission factor for an electricity system", version 07.0.0
Purpose of Data	For the calculation of Emission Factor of the grid
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{PJ, y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Joint Meter Readings based Apportioning note issued by Rajasthan DISCOM
Description of measurement methods and procedures to be applied	Data Type: Measured Monitoring equipment: Energy Meters are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Calibration frequency: Once in 5 years. Electricity exported/imported to the grid is in kWh. However, for the calculation purpose electricity exported is converted in MWh. The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from joint meter reading and apportioning certificates/credit notes issued by Rajasthan Discom as per below equation: $EG_{PJ,y} = EG_{Export} - EG_{Import}$ - Transmission losses The calculation is done by DISCOM and the Project Developer has no control over the authority for the calculation. Based on the joint meter reading, apportioning certificates/credit notes, the project developer raises the invoice.

	The electricity exported to the grid by the project activity connected to the sub-station is measured by energy meters of accuracy class 0.2S. The electricity exported is measured continuously using Main & Check meters. Export readings of Main, Check meters are taken on monthly basis by authorized officer of Rajasthan DISCOM in the presence of Project Developer or representative. Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid.
Frequency of monitoring/recording	Monthly
Value monitored	**121,723.70**
Monitoring equipment	The two parameters, import and export to the grid, are measured at the same location near the connection to the grid, through standard electricity metering instrument. The metering instruments are installed at the grid-connected point to measure the amount of electricity going from and to the grid. The readings of electricity is continuously measured by metering instrument itself and monthly recorded.
QA/QC procedures to be applied	This data is directly used for calculation of emission reductions. Measurement results of electricity supplied to the grid and that delivered from the grid to the project is crosschecked with records for sold electricity.
Purpose of the data	The Data/Parameter is required to calculate the baseline emission.
Calculation method	N/A
Comments	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

4.3 Monitoring Plan

The monitoring methodology specified in the methodology requires that the project-monitoring plan to consist of monitoring of quantity of net electricity supplied to the grid in the year y. In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to grid by the project activity multiplied by emission factor for regional grid, would form the baseline for the project activity.

Since the baseline emission factor is based on an ex-ante determination, monitoring of this parameter is not required. The sole parameter for monitoring is the net electricity exported to the grid.

The project boundary includes the solar project, sub-stations, grid and all power plants connected to grid. The project activity evacuates power to the Indian grid. Therefore, the entire Indian grid and all connected power plants have been considered in the project boundary for the project activity.

The electricity generation from project activity is metered at 220/33kV Adani Renewable Energy Park Pooling substation. All the plants (including the project activity solar plant and other solar project developer's solar plants) are connected to their dedicated individual feeder at this substation. Feeder wise metering arrangements are available to each of the developers to quantify the electricity delivered to the 220/400kV RVPNL GSS substation by individual project developer.

A common metering point at 400/220 kV RVPNL substation for both the Line 1 & Line 2 coming from 33/220kV Adani substation is available. The metering point at both substations consists of both main & check meters (ABT Meters). The meters located at 400/220 kV substation are considered for evaluating transmission losses.

The transmission losses between 220/33 kV Pooling substation and 400/220 kV RVPNL substation will be apportioned to each solar project developers in proportion to their generation. The difference of final apportioned value of export and import of the project activity is used for calculation of net electricity supplied to the grid by the project activity and same value will be considered for ER calculations. The final value of export and import and net electricity for individual solar project developer is provided by state Utility board in the form of JMR sheets. The process of apportioning, metering/feeder arrangement, meter calibration interval is under state Utility and PP does not have any control over it.

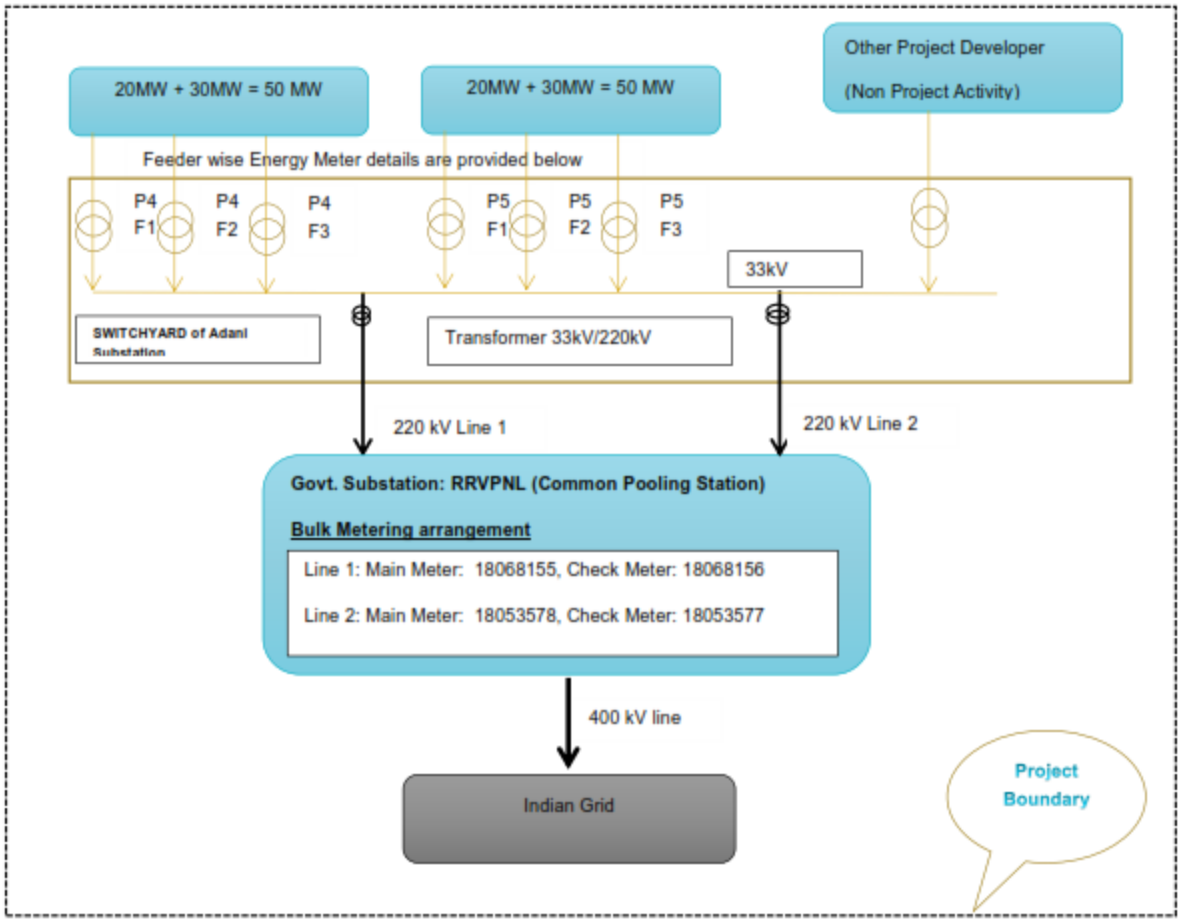
The meters are approved, tested & sealed by the State Utility. The meters are solely in the custody of State Utility. The frequency of calibration is once in 5 years or as per the clause mentioned in the PPA. All the meters are of 0.2s accuracy class.

The aggregated net monthly electricity supplied/exported by the project activity (100MW Capacity) is monitored, measured & metered continuously at the metering point shown in the below diagram. JMR report can be cross checked with the monthly invoices of sale.

In the absence or delay in the meter calibration appropriate guidelines will be applied appropriately to confirm the conservativeness of metering & monitored values.

The metering arrangement, accuracy class of meters, calibration frequency and apportioning approach is under control of state electricity board and project developer do not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered the monitoring parameter.

The monitoring layout and monitoring points under the project boundary:



Energy Meter details has been provided under Appendix-1

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project proponent. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipment's for this project activity. The team shall comprise of the following members:

Responsibilities of O & M Head: Overall functioning and maintenance of the project activity and overall responsibility of compliance with the Monitoring Plan.

Responsibilities of Plant In-charge: Responsibility for maintaining the data records, ensures completeness of data, and reliability of data. Regularly verifying the monthly energy generation date with energy sales receipt or installed meters reading for identification of any discrepancies in data collection and taking suitable action to rectify them.

Responsibilities of Shift In-charge:

- Responsibility for day to day data collection and maintains day to day log book for monitored data.
- Responsibility for monthly and annual report generation and quality assurance of the data/reports and preliminary check of data for any discrepancies

QA/QC procedures: The energy meters at the feeders are maintained and owned by Rajasthan DISCOM. Neither the project proponent nor the site personnel have any control over it. The records will be cross-checked with the records of sold electricity to the Rajasthan DISCOM. The meters are calibrated by DISCOM at-least once in five years.

Data Archiving: Monthly data shall be archived electronically and in paper form and stored for the entire crediting period and two years thereafter.

Emergency preparedness: The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized.

In the event that the main meter, which is used to record the net electricity exported by the project, is found to be faulty it will be repaired or replaced and the data from the check meter will be used in its place. In the unlikely event that the check meter fails it will also be repaired or replaced and stand by meter reading will be used.

In case of failure of all the meters simultaneously, a decision will be taken by RVPNL & project developers jointly as per the clause mentioned in the PPA and a generation statement will be issued by RVPNL based on their specific procedure. The RVPNL statement will form the basis for considering the amount of electricity delivered to the grid in that particular situation.

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 solar plants, 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 team 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. Each and every site personnel is provided with proper training to meet the requirements of the Operations and maintenance. This ultimately leads to creativity in problem solving.

Personnel training: In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the project staff will be trained as per project requirements.

Apportioning: In case of mismatch of date between the start date of the billing cycle and the start date of monitoring period the data will be apportioned in line to the daily generation values for the said mismatch period.

Apportioning Procedure for deduction of Aux & transmission losses in evacuation and providing net electricity delivered to grid for the individual project developers:

S.No.	Name of Transmission line at RVPNL GSS	Export (KWh)	Import (KWh)
1	220kV D/C Transmission Line 1	Export 1	Import 1
2	220kV D/C Transmission Line 2	Export 2	Import 2
	Total Electricity Received at RVPNL GSS	**A**=Export1+Export 2	**E**=Import 1+Import 2

Meter Reading of Individual SPD at 33kV Level (220/33kV) Adani Renewable Park pooling station			
S.No.	**Export/Import by all the Solar Power Developer (SPD) at 33kV feeder**	**Export (KWh)**	**Import (KWh)**
1	M/s CSEPL Plot 4 (P4)	a = P4F1+P4F2+P4F3	d = P4F1+P4F2+P4F3
2	M/s CSEPL Plot 5 (P5)	b = P5F1+P5F2+P5F3	e = P5F1+P5F2+P5F3
N	M/s XYZ…	c = P1F1+P1F2+….P1Fn	f = P1F1+P1F2+….P1Fn
	Total Export at 33kV level Exp_{33kV}	**B** = a +b + c	**F** = d + e + f
I. **Auxiliary & Transmission losses in Evacuation**		**C=B-A**	**D=E-F**
1)			
II. Total Generation/Export & Total Import of individual SPD after deduction of Aux & Transmission losses in Evacuation		CSEPL (P4) Export = SPD 1 = a – {(a/A) X C}	CSEPL (P4) Import = d + {(d/E) X D}
2)		CSEPL (P4) Export = SPD2 = b – {(b/A) X C}	CSEPL (P4) Import = e + {(e/E) X D}
3)		SPD n = c – {(c/A) X C}	SPD n = c + {(c/A) X C}
III. Total Export/Import by 33kv substation =		= SPD1+SPD2+….SPDn	= SPD1+SPD2+….SPDn

Net Generation (kWh) to be billed by individual SPD				
S.no.	**Name of SPD**	**Export/Generation unit**	**Import/consumption unit**	**(KWh)Net export**
1	**2**	**3**	**4**	**5=3-4**
SPD 1	M/s CSEPL (P4)	SPD1-Total Exp	SPD1-Total Imp	Net Gen = Total Exp – Total Imp
SPD 2	M/s CSEPL (P4)	SPD2-Total Exp	SPD2-Total Imp	Net Gen = Total Exp – Total Imp
SPD 3	M/s XYZ…	SPDn-Total Exp	SPDn-Total Imp	Net Gen = Total Exp – Total Imp

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

As per procedure established in the registered PD:

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

$EF_{grid,CM,y}$: Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO2/MWh) (i.e. 0.93684 tCO2/MWh).

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

BE_y : Baseline emissions in year y (tCO2e/yr)

Here,

Monitoring Period	Total Net Power Generated (MWh)	Baseline Emission Factor (tCO2/MWh)	Total Emission Reduction (tCO2/ year)
01/04/2020 to 30/09/2020 (both days included)	121,723.70	0.93684	114,035

* rounded down value has been considered.

5.2 Project Emissions

Nil

5.3 Leakage

Nil

5.4 Net GHG Emission Reductions and Removals

As per the applied methodology, emission reductions are calculated as follows:

ERy = BEy - PEy - LEy

Where,

ERy = Emission Reduction in tCO2/year

BEy = Baseline emission in tCO2/year

PEy = Project emissions in tCO2/year

LEy = Leakage Emissions in tCO2/year

Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)
2020 (01/04/2020 to 30/09/2020)	**114,035**	**0**	**0**	**114,035**

The net emission reductions achieved during the current monitoring period is around 29% higher than the ex-ante estimated ERs for the equivalent period (calculation shown in the ER sheet).The difference between actual and ex-ante estimated ERs is high because monitoring period mainly covers the peak months of April-July.

APPENDIX 1:<ENERGY METER DETAILS>

Monitoring Equipment Details: Energy Meters
Calibration Frequency: Once in 5 years

Energy Meter Details(P4 F1)	Main Meter	Check Meter	Standby Meter
Serial No	X0682811	X0682810	X0682809
Make	Secure	Secure	Secure
Accuracy Class	0.2S	0.2S	0.2S
Calibration Date/Installation Date	09/08/2019	09/08/2019	08/08/2019

Energy Meter Details(P4 F2)	Main Meter	Check Meter	Standby Meter
Serial No	X0682814	X0682813	X0682812
Make	Secure	Secure	Secure
Accuracy Class	0.2S	0.2S	0.2S
Calibration Date/Installation Date	08/08/2019	08/08/2019	08/08/2019

Energy Meter Details(P4 F3)	Main Meter	Check Meter	Standby Meter
Serial No	X0682817	X0682816	X0682815
Make	Secure	Secure	Secure
Accuracy Class	0.2S	0.2S	0.2S
Calibration Date/Installation Date	08/08/2019	08/08/2019	08/08/2019

Energy Meter Details(P5 F1)	Main Meter	Check Meter	Standby Meter
Serial No	X0682820	X0682819	X0682818
Make	Secure	Secure	Secure
Accuracy Class	0.2S	0.2S	0.2S
Calibration Date/Installation Date	09/08/2019	09/08/2019	09/08/2019

Energy Meter Details(P5 F2)	Main Meter	Check Meter	Standby Meter
Serial No	X0682823	X0682822	X0682821
Make	Secure	Secure	Secure
Accuracy Class	0.2S	0.2S	0.2S
Calibration Date/Installation Date	09/08/2019	09/08/2019	09/08/2019

Energy Meter Details(P5 F3)	Main Meter	Check Meter	Standby Meter

Serial No	X0682826	X0682825	X0682824
Make	Secure	Secure	Secure
Accuracy Class	0.2S	0.2S	0.2S
Calibration Date/Installation Date	08/08/2019	08/08/2019	08/08/2019

Dedicated Feeder & Metering arrangement (at Substation)

Line 1	Main Meter	Check Meter
Serial No	18068155	18068156
Make	LNT	LN
Accuracy Class	0.2S	0.2S
Calibration Date/Installation Date	01/09/2020	01/09/2020

Line 2	Main Meter	Check Meter
Serial No	18053578	18053577
Make	LNT	LN
Accuracy Class	0.2S	0.2S
Calibration Date/Installation Date	01/09/2020	01/09/2020