Monitoring report form for CDM project activity
(Version 09.0)

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MONITORING REPORT			
Title of the project activity	Solar Power Project by Fortum FinnSurya Energy Pvt. Ltd.		
UNFCCC reference number of the project activity	10404		
Version number of the PDD applicable to this monitoring report	05		
Version number of this monitoring report	01		
Completion date of this monitoring report	03/11/2021		
Monitoring period number	03		
Duration of this monitoring period	01/08/2020 to 31/12/2020 (inclusive of both days)		
Monitoring report number for this monitoring period	NA		
Project participants	Fortum FinnSurya Energy Pvt. Ltd.		
Host Party	India		
Applied methodologies and standardized baselines	ACM0002- Grid-connected electricity generation from renewable sources – Version 17.0		
Sectoral scopes	Sectoral Scope 1: Energy Industries (renewable/non-renewable sources)		
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013 until 31 December 2020	Amount achieved from 1 January 2021
	0	73,185	0
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	74,350 tCO2e		

SECTION A. Description of project activity

A.1. General description of project activity

>> The project activity is a 100 MW solar power project, promoted by Fortum FinnSurya Energy Pvt. Ltd. The purpose of this project activity is to generate clean form of electricity through renewable solar energy source. The project activity involves installation of 100 MW (AC) or (125MWp) solar power project at Thirumani village, Pavagada Tehsil, Tumkur district, Karnataka.

The project will replace anthropogenic emissions of greenhouse gases (GHGs) by displacing equivalent amount of electricity from the generation-mix of power plants connected to the Indian grid which is mainly dominated by thermal/fossil fuel-based power plant. The annual average of estimated electricity generation and estimated emission reduction over 7 years of crediting period will be 181,417 MWh/year and 177,371 tCO2e per year.

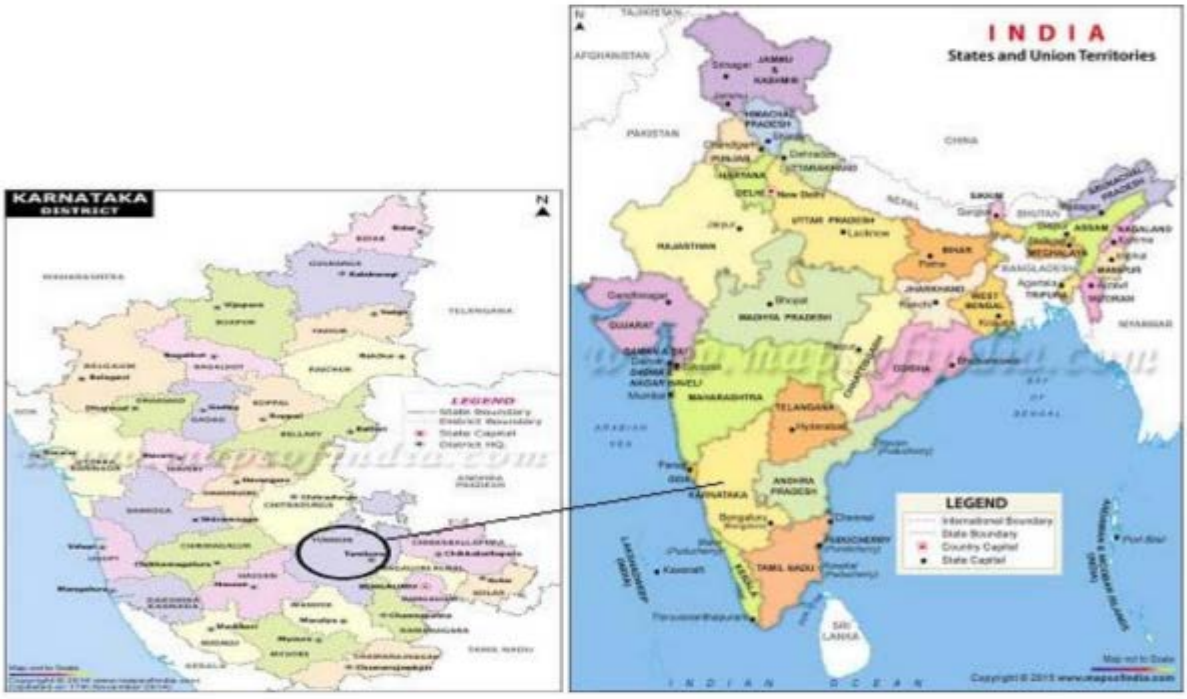
The details of the project and the state of installation are mentioned in the table below:

Project Proponent's Name	Capacity in MW	Connection with Grid	State
Fortum FinnSurya Energy Pvt. Ltd	100 MW (AC)	Indian Grid	Karnataka

A.2. Location of project activity

>> The project activity is in Village Thirumani, Tehsil Pavagada and district Tumkur in the state of Karnataka, India.

Project Investor	Location	Latitude (N)	Longitude (E)	Date of Commissioning
Fortum FinnSurya Energy Pvt. Ltd.	Plot B-30	14° 14' 24.83"	77° 27' 54.45"	05/12/2017
	Plot B-31			02/12/2017



The location of the project activity as visible in Google Maps is shown below:

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	Fortum FinnSurya Energy Pvt. Ltd.	Yes

A.4. References to applied methodologies and standardized baselines

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Title : Grid-connected electricity generation from renewable source.[1]
Reference : The project activity meets the eligibility criteria of large-scale project as it is more than15MW.
Methodology : ACM0002: Grid-connected electricity generation from renewable sources- Version 17.0[2]
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 emission factor for an electricity system[3] - Version 05.0 (EB 87, Annex 09)
- Tool for the demonstration and assessment of additionality[4] - Version 07.0.0 (EB 70, Annex 08)

[1] https://cdm.unfccc.int/methodologies/PAmethodologies/approved

[2] https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN

[3] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf

[4] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

A.5. Crediting period type and duration

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Type of crediting period	Renewable
Crediting period from	06 Nov 17- 05 Nov 24 (Renewable)
Length of the crediting period	7 years
Monitoring period from	01/08/2020-31/12/2021 (both days included)
Length of the monitoring period	153 days

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

>> The project activity aims to harness solar energy through installation of PV with total installed capacity of 100 MW (AC).

Technical detail[5] of the equipment	**Pavagada 1 (plot 30)**	**Pavagada 2 (Plot 31)**
No of Modules	543510	112.5Wp:- 88000, 115Wp:-370260, 117.5Wp:- 85360
Make	First Solar	First Solar
Capacity	115 Wp	112.5Wp, 115Wp,117.5Wp
No of inverters	50	50
Make	TMEIC	TMEIC
Capacity	1000KVA	1000KVA
No. of transformers	13 (IDT) +2 (PT)	13 (IDT) +2 (PT)
Life	25 years	25 years

B.2. Post-registration changes

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

>> There is no request for deviation applied during this monitoring period.

B.2.2. Corrections

>> The corrections are already approved by the UNFCCC on 12/06/2020 (ref No: PRC-10404-001).

[5] It is to be noted that in future there is possibility of change in module configuration, however project capacity will remain same as 100 MW (AC).

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

>> There is no change in the start date of the crediting period, considering the monitoring plan has been implemented.

B.2.4. Inclusion of monitoring plan

>> Not applicable

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

>>
The project is undergoing post registration change and the summary of post registration change is as follows:

Change:
Procedure of generating monthly energy statements has been upgraded by SRPC (Southern Regional Power Committee). The REA (Regional Energy Account) statement is the document which provides net actual & scheduled power delivered to the grid. The Monthly “REA statement” is the source document to consider the actual net energy delivered to the grid which will form the basis for the calculation of Emission reduction from the project activity.

Reason :
To improve the metering efficiency and to avoid any discrepancy in electricity generated & delivered. The change does not have any material impact on the applicability of the applied methodologies; the methodology applied was ACM0002: Grid-connected electricity generation from renewable sources- Version 17.0 (EB 89) there is no change in it. Neither the additionality is affected. There is no impact on other applied methodological regulatory documents, or the accuracy and completeness of the monitoring.

B.2.6. Changes to project design

>> Not applicable

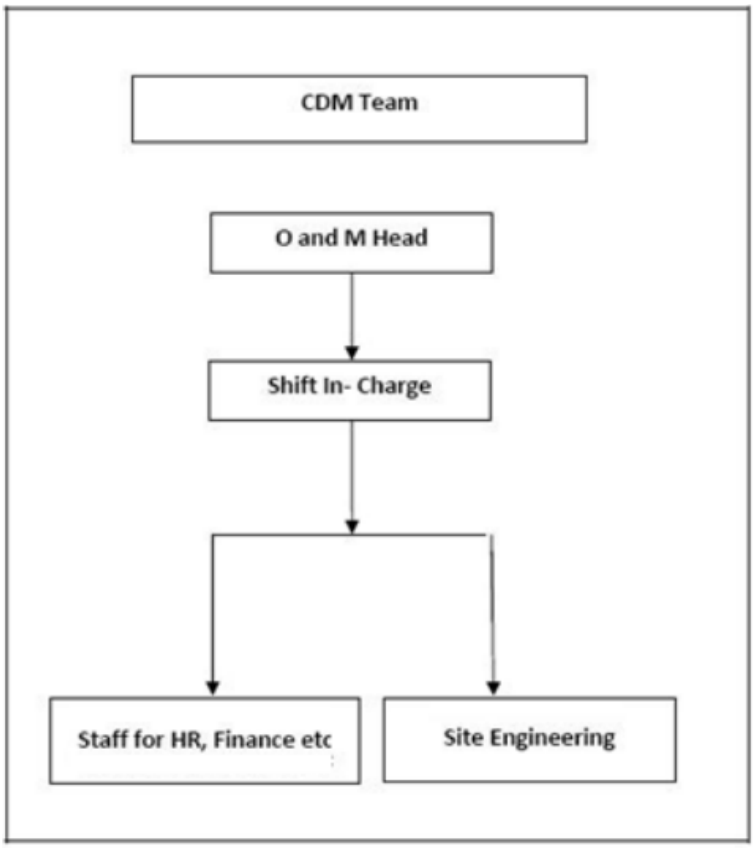
B.2.7. Changes specific to afforestation or reforestation project activity

>> Not applicable

SECTION C. Description of monitoring system

>>
The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is for grid-connected solar power project in Karnataka, India. The monitoring plan implemented by the project participant describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participant. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipment for this project activity.



Responsibility
• Reviewing the monthly and annual generation statistics. • Evaluating the GHG performance of the project activity. • Identifying the opportunities for future improvement • Addressing grievance related to project activity.
• Implementation of corrective appropriate measures in case any discrepancies are identified in the reported parameters. • Review of monthly report. • Ensuring calibration of monitoring equipment as and when required.
• Monitoring and reporting the GHG performance related parameters following the guidance provided in the project design document • Preparation of monthly and annual generation statistics. • Reporting of any discrepancies identified in the reporting parameters. • Ensuring calibration of the monitoring equipments as and when required.

Data Measurement

At the Plant switchyard net energy meter is installed showing net energy data that are uploaded at the SRPC website every week. Readings of meters are uploaded on weekly basis by authorized officer of SEB in the presence of PP or representative of PP. The REA statement issued by SRPC (Southern Regional Power Committee) contains the information of the Scheduled Power, Actual Power and the net Deviation (i.e. difference between actual & scheduled power). The invoice is raised on monthly scheduled power, as per the procedure followed by SRPC a weekly settlement is carried out for the deviation (i.e. difference between actual energy & scheduled energy).
The monitoring practise, metering arrangement, calibration frequency interval is under control of state electricity board and PP do not have any control on it.

Data collection and archiving

The SRPC(Southern Regional Power Committee) is a credible government body, and the REA statement is publicly available at the website of SRPC(Southern Regional Power Committee), which can be referred from http://www.srpc.kar.nic.in.

The SRPC(Southern Regional Power Committee) also provide soft copy files and description relating to computed files of SRPC, which are in zip format, giving data, basic and computed, 15 minutes-time block-wise which can be referred from http://www.srpc.kar.nic.in/html/xml-search/commercial.html#gsc.tab=0. So, the Actual Power obtained from REA statement for a particular month can be crosschecked with the commercial_dev report available in the zip documents (i.e. by combining the 15 minute time interval data of the actual power for a particular month).

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.

Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff (CDM team) will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

The schematic diagram of the project is illustrated below:

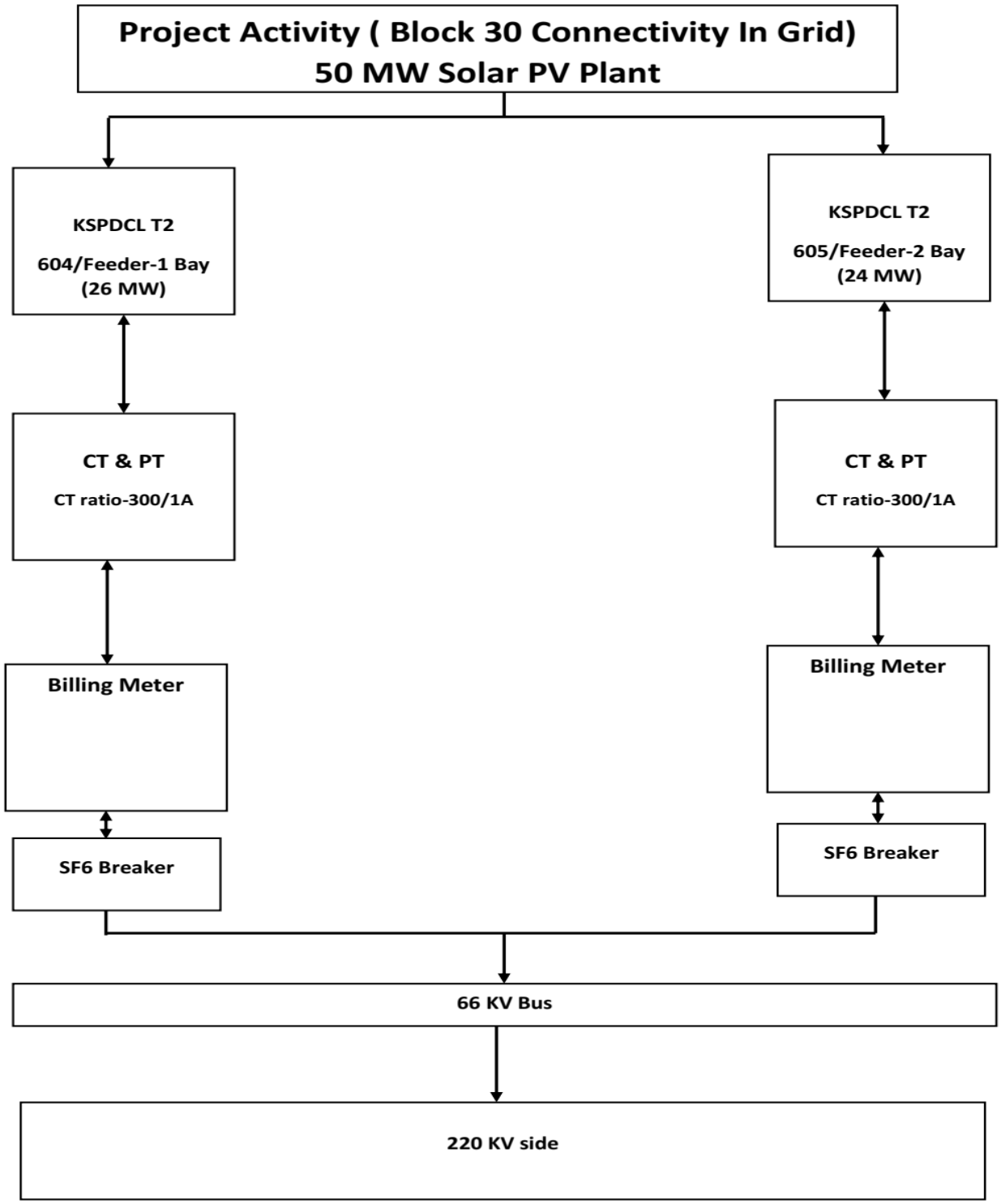


Figure 1. B-30 Connectivity in Grid

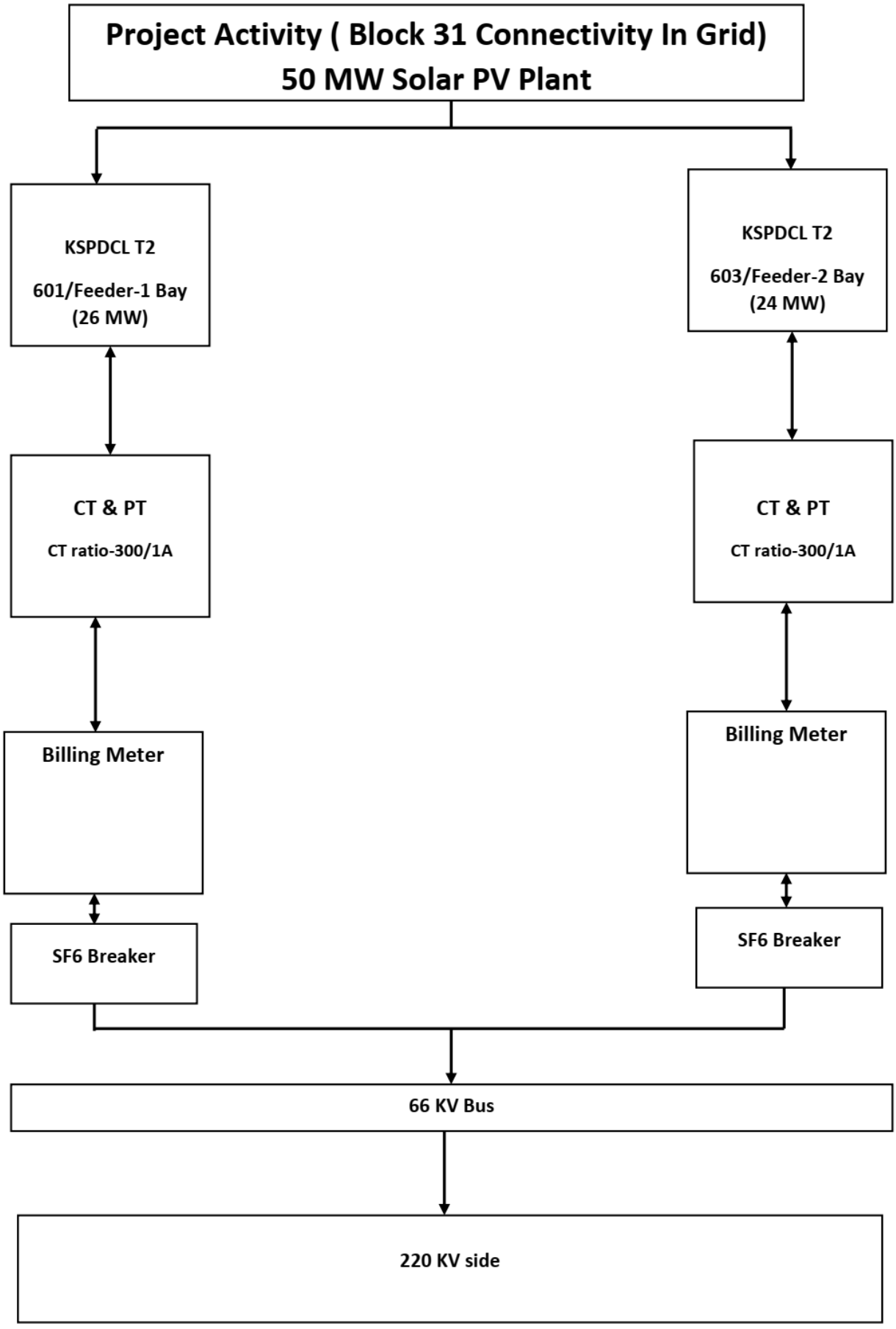


Figure 2. B-31 Connectivity in Grid

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,OM,y}$
Unit	tCO_2/MWh
Description	Operating Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016[6]
Value(s) applied	0.9941
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05" as 3-year generation weighted average using data for the years 2012-13, 2013-14, & 2014-15. The data are obtained from "CO_2 Baseline Database for Indian Power Sector" version 11, published by the Central Electricity Authority, Ministry of Power, Government of India
Purpose of data/parameter	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period

Data/Parameter	$EF_{grid,BM,y}$
Unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 11, April 2016[7]
Value(s) applied	0.9285
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 05" as 3-year generation weighted average using data for the years 2012-13, 2013-14, & 2014-15. The data are obtained from "CO_2 Baseline Database for Indian Power Sector" version 11, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data/parameter	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor in y
Source of data	Calculated from CEA database, Version 11, April 2016
Value(s) applied	0.9777
Choice of data or measurement methods and procedures	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$ Where: $EF_{grid,BM,y}$= Build margin CO_2 emission factor in year *y* (tCO_2/MWh) $EF_{grid,OM,y}$= Operating margin CO_2 emission factor in year *y* (tCO_2/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM}= Weighting of build margin emissions factor (%) = 25%
Purpose of data/parameter	For the calculation of the Baseline Emission
Additional comments	This parameter is fixed ex-ante for the entire crediting period.

D.2. Data and parameters monitored

Data/Parameter	$EG_{PJ, y}$
Unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Measured/calculated/ default	Measured
Source of data	Monthly joint meter reading reports (100MW)
Value(s) of monitored parameter	74,855
Monitoring equipment	Please refer Appendix I for Energy meter details
Measuring/reading/recording frequency	**Data Type:** Measured **Monitoring equipment:** Energy Meters are used for monitoring **Recording Frequency:** Continuous monitoring and Monthly recording **Energy Meters Archiving Policy:** Paper & Electronic **Calibration frequency:** At least once in 5 years The REA(Regional Energy Account) statement issued by SRPC (Southern Regional Power Committee) contains the information of the Scheduled Power, Actual Power and the net Deviation (i.e. difference between actual & scheduled power). The invoice is raised on monthly scheduled power, as per the procedure followed by SRPC a weekly settlement is carried out for the deviation (i.e. difference between actual energy & scheduled energy). Therefore, for ER calculations, the values of Actual power have been considered as per the REA statement.
Calculation method (if applicable)	NA
QA/QC procedures	The Invoices are raised as per the scheduled generation. The SRPC(Southern Regional Power Committee) is a credible government body, and the REA statement is publicly available at the website of SRPC(Southern Regional Power Committee), which can be referred from http://www.srpc.kar.nic.in The SRPC(Southern Regional Power Committee) also provide soft copy files and description relating to computed files of SRPC, which are in zip format, giving data, basic and computed, 15 minutes-time block-wise which can be referred from http://www.srpc.kar.nic.in/html/xml-search/commercial.html#gsc.tab=0. So, the Actual Power obtained from REA statement for a particular month can be crosschecked with the commercial_dev report available in the zip documents (i.e., by combining the 15 minute time interval data of the actual power for a particular month). The energy meters are special energy meters, which are installed and sealed by the Power Grid Corporation of India Limited, in the presence of the representatives of the power producer.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later.

D.3. Implementation of sampling plan

>> No sampling is required

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

>>

Formula used to calculate the net emission reduction for the project activity is $ER_y = BE_y – PE_y$

Where,

ER_y = Emission Reduction in tCO_2/year

BE_y = Baseline emission in tCO_2/year

PE_y = Project emissions in tCO_2/year

Baseline Emission (BE_y):

The baseline emissions are the product of electrical energy baseline $EG_{PJ,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

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

Where,

$EG_{PJ,y}$ = Total quantity of net electricity delivered to the INDIAN grid (now NEWNE Grid) $EF_{grid,CM,y}$ = Baseline emission factor = 0.9777 tCO_2/MWh

BE_y = 74,855 *0.9777 = 73,185 tCO2/year

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

Since the project activity does not involve combustion of fossil fuel, operation of geothermal power plants to release non-condensable gases and water reservoirs, emissions from the project activity are taken as nil.

Hence PEy = 0.

E.3. Calculation of leakage emissions

>> No leakage has been considered for the project activity.

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

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)			
				Before 01/01/ 2013	From 01/01/ 2013 until 31/12/ 2020	From 01/01/ 2021	Total amount
Total	73,185	0	0	0	73,185	0	73,185

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

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
73,185	74,350

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

>> As per CDM registered PDD, 177,371 tCO_{2e} is the amount of CERs generated annually. Therefore, following unitary method, the amount of estimated ex ante for this monitoring period is identified. The total number of days in this monitoring period is 153. = (177,371/365) * 153= 74,350 tCO_{2e}

E.6. Remarks on increase in achieved emission reductions

>> Actual Emission reduction is 1.57 %lower than the expected emission reduction for the equivalent period as explained in above section E.5. The difference is due variation in the Solar radiation's availability during the current monitoring period.

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

>> This project activity is large scale project activity.

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Document information

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

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

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