Monitoring report form for CDM project activity
(Version 09.0)

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT			
Title of the project activity	6MW Solar Power Project by Arhyama Solar Power		
UNFCCC reference number of the project activity	10122		
Version number of the PDD applicable to this monitoring report	05.0		
Version number of this monitoring report	09.0		
Completion date of this monitoring report	27/10/2021		
Monitoring period number	Second Monitoring Period		
Duration of this monitoring period	18/02/2017 – 31/12/2020		
Monitoring report number for this monitoring period	Not Applicable		
Project participants	Arhyama Solar Power Private Limited		
Host Party	INDIA		
Applied methodologies and standardized baselines	Methodology: AMS-I.D "Grid connected renewable electricity generation" (Version 17)		
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	35146	0
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	36420		

SECTION A. Description of project activity

A.1. General description of project activity

>>
The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source. Arhyama Solar Power Pvt. Ltd. is the promoter of the proposed project activity. The project activity involves installations of 6.00 MW solar photovoltaic technology based power plant at Nalgonda, Telangana. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 9535 tCO_2e per year, thereon displaces average 9899 MWh/year amount of electricity from the generation-mix of power plants connected to the Southern grid, which is mainly dominated by thermal/fossil fuel based power plant.

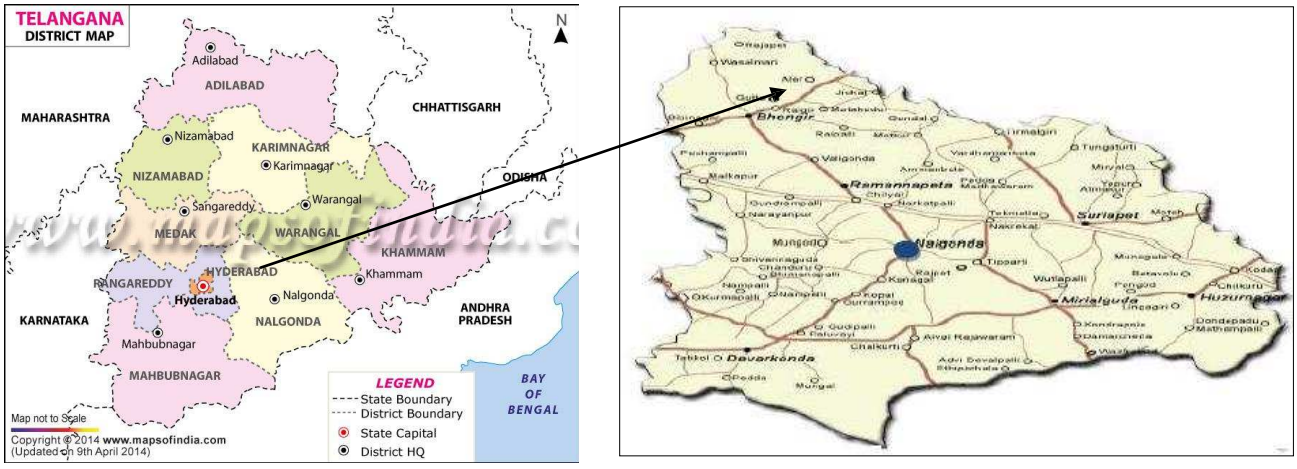
The details of project and the state of installation are mentioned in the table:

Project Promoters' Name	Capacity	Connection with Grid	State	Use of Electricity
Arhyama Solar Power Pvt. Ltd.	6 MW	Southern	Telangana	Sale to third party

A.2. Location of project activity

>>
The project is located at Kolanpaka Village, Aleir Mandal, Nalgond District, Telangana. The land is located about 1000 meters from the main road. The Project is located 17° 63" North and 79° 01" East.

Key Drivers	Distance
Nearest City	Hyderabad 105 km
Nearest Rail Station	Aleir 5 km from the site
Nearest Airport	Hyderabad 140 Km



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	Arhyama Solar Power Pvt. Ltd. (Private Entity)	No

A.4. References to applied methodologies and standardized baselines

>>
Title : Grid connected renewable electricity generation

Reference : The project activity meets the eligibility criteria to use the simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 I of decision 17/CP.7. Details of methodology for baseline calculations for CDM projects of capacity less than 15 MW are available in the "Appendix B of the simplified modalities and procedure for small scale CDM project activities".

Methodology : AMS I. D Grid Connected Renewable Electricity Generation (Version 17)
Type I : Renewable Energy Project (Small Scale)

Category : "D", Grid Connected Renewable Electricity Generation

Reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

Tool referred with above methodology is – Version 04, of "Tool to calculate the emission factor for an electricity system"

A.5. Crediting period type and duration

>>
Renewable crediting period of 7 years 00 Months have been opted for the project activity. This is the first crediting period of the project activity.
Duration of Crediting Period: 13/02/2015 – 12/02/2022

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

>>
The technology employed by the Proposed Project Activity includes the usage of poly crystalline based solar PV modules with an aggregate of 6.00 MW generation capacity to supply the generated electricity to the Grid. The Proposed Project Activity is estimated to supply on average approximately 9899 MWh of electricity annually. The generation and consumption of the Proposed Project Activity is monitored continuously through the energy meters at project site & substations. The data is used for the calculation of exports to the grid and imports from the grid.

The above mentioned investors employed the Solar PV Modules of poly crystalline technology for the proposed 6.00 MW project. The Solar power system has been designed with number of sub main plants, solar PV arrays and inverters of suitable capacity.

The electricity exported by the proposed project activity would displace an equivalent amount of electricity generated by the power plants already operational and proposed to be added in the Southern Grid which relies predominantly on fossil fuels.

No events or situations happened during the reported monitoring period which can alter the applicability of the applied methodology.

B.2. Post-registration changes

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

>>
There are no temporary deviations from the registered monitoring plan, the applied methodologies, the applied standardized baselines or the other applied methodological regulatory documents during this monitoring period.

B.2.2. Corrections

>>
There are no corrections to project information or parameters fixed at the registration or renewal of crediting period of the project activity.

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

>>
There is no change to the start date of the crediting period fixed at the registration of the project activity.

B.2.4. Inclusion of monitoring plan

>>
There is no post-registration change to include a monitoring plan into the PDD, for which the delayed submission of the monitoring plan was chosen by the project participants at the time of the registration of the project activity.

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

>>
There are no permanent changes to the registered monitoring plan, or permanent deviation of monitoring from applied methodologies, applied standardized baseline, or other methodological regulatory documents.

B.2.6. Changes to project design

>>
There are no changes to the project design of the project activity.

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

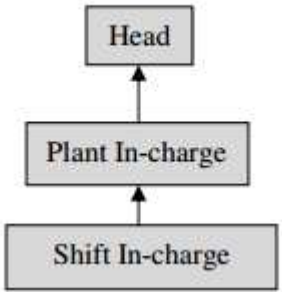
>>
Not Applicable as it is a solar power project

SECTION C. Description of monitoring system

>>
The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected solar power project being implemented in Telangana, India. The monitoring plan, which will be 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. The team comprises of the following members:

Organisational Structure for Monitoring



Responsibilities of Head: Overall functioning and maintenance of the project activity.
Responsibilities of Plant In-charge: Responsibility for Maintains the data records, ensures completeness of data, and reliability of data (calibration of equipment).
Responsibilities of Shift In-charge: Responsibility for day to day data collection and maintains day to day log book for monitored data.

Data Measurement
The export and import energy will be measured continuously using above mentioned Main, Check and Standby meters located at the substation. Readings of meters shall be taken on monthly basis by authorized officer of TSTRANSCO in the presence of PP or representative of PP. The meter reading will be taken jointly and signed by the representatives of the TSTRANSCO and PP or representative of PP. TSTRANSCO then issues the Energy Settlement Report to Arhyama Solar which then issues invoice based on this Energy Settlement Report.

Data collection and archiving
Readings from meters will be collected in the presence of the plant in-charge. Export and Import data would be recorded and stored in logs as well as in electronic form on a daily basis. The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of CERs for the project activity whichever occurs later.

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.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

(Copy this table for each data or parameter.)

Data/Parameter	$EF_{,OM,y}$
Unit	tCO_2/MWh

Description	Operating Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 09, January 2014[1]
Value(s) applied	**0.9675**
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 04.0.0" as 3-year generation weighted average using data for the years 2010-2011, 2011-2012, & 2012-2013. The data are obtained from "CO_2 Baseline Database for Indian Power Sector" version 9.0, 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	$EF_{,BM,y}$
Unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 09, January 2014
Value(s) applied	**0.9509**
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 04.0.0" for the year 2012-2013. The data is obtained from "CO_2 Baseline Database for Indian Power Sector" version 9.0, 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_y
Unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor in year y
Source of data	Calculated from CEA database, Version 09, January 2014
Value(s) applied	**0.9633**
Choice of data or measurement methods and procedures	Calculated as per "Tool to calculate the emission factor for an electricity system, version 04.0.0". The data is obtained from "CO2 Baseline Database for Indian Power Sector" version 9.0, 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.

D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/Parameter	$EG_{facility,y}$
Unit	MWh
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year *y* (MWh)
Measured/calculated/ default	Measured
Source of data	Energy Settlement Report

1

Value(s) of monitored parameter	<table><tr><th>Year</th><th>Value Monitored (MWh)</th></tr><tr><td>2017</td><td>8556.757</td></tr><tr><td>2018</td><td>9574.527</td></tr><tr><td>2019</td><td>9246.973</td></tr><tr><td>2020</td><td>9133.488</td></tr></table> **Total quantity during this Monitoring Period - 36511.745 MWh**
Monitoring equipment	Bi-directional Energy Meters are used for monitoring <table><tr><th>Sl. No.</th><th>Energy Meter Description</th><th>Make</th><th>Serial Number</th><th>1st Calibration Date</th><th>2nd Calibration Date</th></tr><tr><td>1</td><td>Main Meter</td><td>Elster</td><td>15688052</td><td>16/08/2013</td><td>25/05/2017</td></tr><tr><td>2</td><td>Check Meter</td><td>Elster</td><td>15688084</td><td>16/08/2013</td><td>25/05/2017</td></tr><tr><td>3</td><td>Standby Meter</td><td>Elster</td><td>15688085</td><td>16/08/2013</td><td>25/05/2017</td></tr></table>
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	Electricity exported/imported to the grid is in kWh. However, for the calculation purpose electricity exported is converted into MWh. The net electricity supplied can be checked from the Generator Settlement Abstract of the Energy Settlement Report which is issued by TSTRANSCO (Transmission Corporation of Telangana Limited). The value can be calculated as below: $EG_{facility,y} = EG_{generated,y} – (Wheeling\ Loss^* EG_{generated,y})$
QA/QC procedures	Calibration of all the meters will be undertaken once in 5 years and faulty meters will be duly replaced immediately. All the meters will be of accuracy class 0.2.
Purpose of data/parameter	The Data/Parameter is required to calculate the baseline emission
Additional comments	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

Data/Parameter	Wheeling Loss
Unit	%
Description	Charges levied for wheeling of electricity
Measured/calculated/ default	Default
Source of data	as per Telangana State Electricity Regulatory Commission
Value(s) of monitored parameter	3.99 %
Monitoring equipment	-NA-
Measuring/reading/recording frequency	Monthly
Calculation method (if applicable)	TSERC Tariff Order determines the wheeling loss to be paid at different voltage levels. For the project activity, 3.99% wheeling loss is applied as the electricity is being supplied and drawn at 33kV. The current TSERC tariff order has currently fixed the wheeling losses at 3.99% but might change in the future.
QA/QC procedures	This value is directly provided by TSERC Tariff Order. Hence QA/QC for this parameter is not applicable
Purpose of data/parameter	The Data/Parameter is required for the calculation of emission reduction
Additional comments	None

D.3. Implementation of sampling plan

>>
Not Applicable

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

>>
The product of Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y in MWh and CO_2 Emission Factor of the grid in year y in tCO_2/MWh will give the estimated value of Baseline Emissions (BEy) in tCO_2.

Baseline Emissions (BE_Y) = $EG_{facility,y}$ * $EF_{grid,CM,y}$

Where,

$EG_{facility,y}$ is the Quantity of net electricity supplied by project activity to the grid in year y
$EF_{grid,CM,y}$ is the CO_2 emissions factor of the Southern Grid in year y & is calculated from CDM database provided by CEA.

Crediting Period	$EG_{BL,y}$ (MWh/yr)	$EF_{CO2,grid,y}$ (tonnes of CO_2/MWh)	BE_Y (tonnes of CO_2)
18/02/2017 to 31/12/2017	8556.757	0.9633	8236
01/01/2018 to 31/12/2018	9574.527	0.9633	9216
01/01/2019 to 31/12/2019	9246.973	0.9633	8902
01/01/2020 to 31/12/2020	9133.488	0.9633	8792
TOTAL	**36551.745**		**35146**

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

>>
Being a Solar power project, the project activity does not lead to any form of emissions; hence project emissions have not been considered in this case.

Hence, PE_Y= 0

E.3. Calculation of leakage emissions

>>
The leakage emissions have considered as 0 tCO_2e as no such equipment shall be transferred from another project activity,

Hence, LE_Y = 0

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	35146	0	0	NA	35146	NA	35146

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)
35146	36420

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

>>
Considering the annual average emission reductions as per the registered PDD which is 9535 tCO_2e per year, the amount estimated ex ante emission reductions attributed to this monitoring period comes out to be 36420 tCO_2e. The detailed calculation can be referred from the emission reduction sheet.

E.6. Remarks on increase in achieved emission reductions

>>
Actual GHG Emission Reductions achieved are not greater than the amount based on the ex-ante estimation in the registered PDD.

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

>>
Proposed project activity belongs to Type I - small-scale project & the total capacity of this project activity remained under the limit of that type every year during the crediting period.

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Document information

Version	*Date*	*Description*
09.0	8 October 2021	Revision to: • Ensure consistency with version 03.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN).
08.0	6 April 2021	Revision to: • Reflect the "Clarification: Regulatory requirements under temporary measures for post-2020 cases" (CDM-EB109-A01-CLAR).
07.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.

Version	*Date*	*Description*
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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