



Monitoring report form
(Version 05.1)

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" 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 ¹	
Version number of the monitoring report	02	
Completion date of the monitoring report	21/08/2017	
Monitoring period number and duration of this monitoring period	Monitoring period number: 1 13/02/2015 to 17/02/2017 (Including both days)	
Project participant(s)	Arhyama Solar Power Private Limited	
Host Party	INDIA	
Sectoral scope(s)	Sectoral Scope: 1 - Energy industries (renewable / non renewable sources)	
Selected methodology(ies)	Methodology: AMS-I.D "Grid connected renewable electricity generation" (Version 17)	
Selected standardized baseline(s)	Not Applicable	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	19,454 tonnes of CO ₂ e	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0	17390 tonnes of CO ₂ e

¹ <https://cdm.unfccc.int/Projects/DB/CRA1423841654.9/view>

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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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 9,535 tCO₂e per year, thereon displaces average 9,899 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 the 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

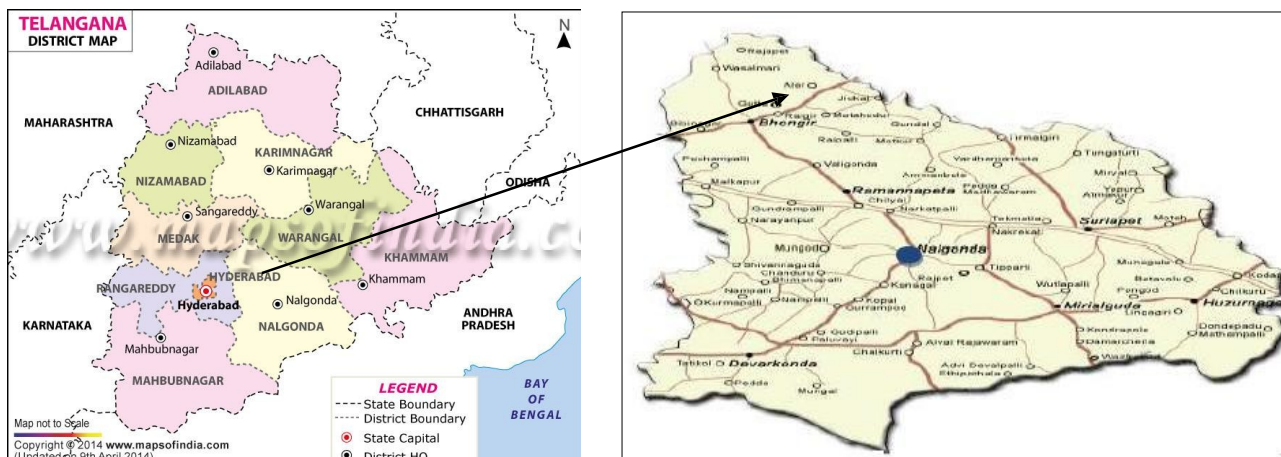
Total GHG emission reductions achieved in this monitoring period are 17390 tCO₂. The project activity Commissioned on 23/012/2013 and the project activity involves installations of 6 MW solar photovoltaic technology based power plant at Aler (Mandal), Telangana (State).

A.2. Location of project activity

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The project is located at Kolanpaka Village, Aleir Mandal, Nalgonda District, Telangana state in India. 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	Aler 5 km from the site
Nearest Airport	Hyderabad 140 Km

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
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India	Arhyama Solar Power Pvt. Ltd. (Private Entity)	No

A.4. Reference of applied methodology and standardized baseline

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Title: Grid Connected Renewable Electricity Generation

Reference: AMS I.D. (Version 17)

The approved methodology also refers to latest approved versions of

- Tool to calculate the emission factor for an electricity system, version 04
- Guidelines on demonstration and assessment of the Prior consideration of CDM (EB 62 Annex 13)
- Guidelines on the demonstration of additionality of small-scale project activities (version 9 EB68)
- Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (EB 41 Annex 11)

A.5. Crediting period of project activity

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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 and the period is 13/02/2015 to 12/02/2022 (Including both days).

A.6. Contact information of responsible persons/entities

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Mr. Ananth Nakirikanti
Arhyama Solar Power Pvt. Ltd.
8-3-224/4/a/11 & 12, II Floor, Door No. 215,
Yousufguda Main Road, Beside Ratandeep Supermarket
Hyderabad, Telangana
INDIA - 500 045

The person / entity is also a project participant in Appendix 1

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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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 registered monitoring plan, applied methodology or applied standardized baseline**

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There is no request for temporary deviation from registered monitoring plan, applied methodology or applied standardized baseline during this monitoring period.

B.2.2. Corrections

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Not Applicable

B.2.3. Changes to start date of crediting period

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Not Applicable

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

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Not Applicable

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

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Not Applicable

B.2.6. Changes to project design of registered project activity

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Not Applicable

B.2.7. Types of changes specific to afforestation or reforestation project activity

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Not Applicable

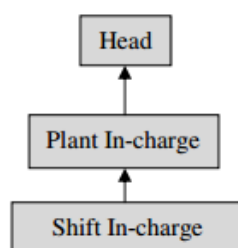
SECTION C. Description of monitoring system

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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 Maintaining 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 Head and discussed thoroughly with the plant in-charge. 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 or at renewal of crediting period

(Copy this table for each piece of data and 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 ⁵
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	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	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 "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	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 piece of data and 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																													
Value(s) of monitored parameter	18054 MW																													
Monitoring equipment	<div>Bi-directional Energy Meters are used for monitoring</div> <table><tr><th>Sl. No.</th><th>Energy Meter Description</th><th>Make</th><th>Serial Number</th><th>Calibration Date</th><th>Calibration Due date</th></tr><tr><td>1</td><td>Main Meter</td><td>Elster</td><td>15688052</td><td>16/08/2013</td><td>16/08/2018</td></tr><tr><td>2</td><td>Check Meter</td><td>Elster</td><td>15688084</td><td>16/08/2013</td><td>16/08/2018</td></tr><tr><td>3</td><td>Stand By</td><td>Elster</td><td>15688085</td><td>16/08/2013</td><td>16/08/2018</td></tr></table>						Sl. No.	Energy Meter Description	Make	Serial Number	Calibration Date	Calibration Due date	1	Main Meter	Elster	15688052	16/08/2013	16/08/2018	2	Check Meter	Elster	15688084	16/08/2013	16/08/2018	3	Stand By	Elster	15688085	16/08/2013	16/08/2018
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Measuring/reading/recording frequency:	Monthly																													
Calculation method (if applicable):	<p>Electricity exported/imported to the grid is in kWh. However for the calculation purpose electricity exported is converted into MWh.</p> <p>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:</p> $EG_{\text{facility},y} = EG_{\text{generated},y} - \text{Wheeling Loss} * EG_{\text{generated},y}$																													

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:	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 ²
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:	The Data/Parameter is required for the calculation of emission reduction
Additional comments:	None

D.3. Implementation of sampling plan

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Not Applicable

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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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 CO₂ Emission Factor of the grid in year y in tCO₂/MWh will give the estimated value of Baseline Emissions (BE_y) in tCO₂.

$$\text{Baseline emissions (BE}_y\text{)} = \text{EG}_{\text{facility},y} * \text{EF}_{\text{grid,CM},y}$$

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 CO₂ emissions factor of the Southern Grid in year y & is calculated from CDM database provided by CEA.

²http://www.tserc.gov.in/file_upload/uploads/Tariff%20Orders/Current%20Year%20Orders/Distribution%20Tariff%20Order%20for%202015-16.pdf

Monitoring Period	EG _{BL,y} (MWh/yr)	EF _{CO₂,grid,y} (tonnes of CO ₂ /MWh)	BE _y (tonnes of CO ₂)
17/02/2015 to 17/02/2016	8995.66	0.9633	8664
17/02/2016 to 17/02/2017	9059.04	0.9633	8726
TOTAL			17390

E.2. Calculation of project emissions or actual net GHG removals by sinks

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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

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The leakage emissions has considered as 0 tCO₂ as no such equipment shall be transferred from another project activity,

Hence, LE_y = 0

E.4. Summary of calculation of emission reductions or net GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	17390	0	0	NA	17390	17390

E.5. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	19454	17390

E.6. Remarks on difference from estimated value in registered PDD

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From E.5 above, we can observe that the actual emission reduction for the monitoring period is lesser than estimated emission reductions by 10.6%, this is due to the fact that lower PLF has been observed during current monitoring period.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input checked="" type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	Arhyama Solar Power Private Limited
Street/P.O. Box	8-3-224/4/a/11 & 12, II Floor, Door No. 215,
Building	Yousufguda Main Road, Beside Ratandee Supermarket,
City	Hyderabad
State/region	Telangana
Postcode	500045
Country	INDIA
Telephone	-
Fax	-
E-mail	-
Website	http://www.arhyama.com/
Contact person	Mr. Ananth Nakirikanti
Title	Director
Salutation	Mr.
Last name	Nakirikanti
Middle name	-
First name	Ananth
Department	-
Mobile	+91-91774-39452
Direct fax	-
Direct tel.	-
Personal e-mail	ananth@arhyamasolar.com

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • 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.
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 (EB70, 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	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		