



**Monitoring report form for CDM project activity  
(Version 09.0)**

**MONITORING REPORT**

<b>Title of the project activity</b>	Dak Srong 3B Hydropower Project		
<b>UNFCCC reference number of the project activity</b>	5631		
<b>Version number of the PDD applicable to this monitoring report</b>	4.2		
<b>Version number of this monitoring report</b>	1.0		
<b>Completion date of this monitoring report</b>	10/12/2021		
<b>Monitoring period number</b>	1		
<b>Duration of this monitoring period</b>	06/04/2012 – 05/04/2019		
<b>Monitoring report number for this monitoring period</b>	1		
<b>Project participants</b>	Hoang Anh Tona Hydropower Joint Stock Company		
<b>Host Party</b>	Viet Nam		
<b>Applied methodologies and standardized baselines</b>	ACM0002 ver. 12		
<b>Sectoral scopes</b>	1 : Energy industries (renewable - / non-renewable sources)		
<b>Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period</b>	<b>Amount achieved before 1 January 2013</b>	<b>Amount achieved from 1 January 2013 until 31 December 2020</b>	<b>Amount achieved from 1 January 2021</b>
	27,054	196,553	0
<b>Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD</b>	293,001		

## SECTION A. Description of project activity

### A.1. General description of project activity

- a. The purpose of the project activity is to generate renewable electricity from a run-of-river hydropower plant. As a run-of-river type and thus is a particularly environmentally friendly solution to growing energy demand in Viet Nam. It offsets the combustion of fossil fuels and, in doing so, helps preserving non-renewable resources by promoting the exploitation and use of renewable resources and technologies.
- b. The project activity has a total installed capacity of 19.5 MW, made up of 3 units of 6.5 MW each.
- c. The commercial operation date of the project activity was on 09/05/2012

### A.2. Location of project activity

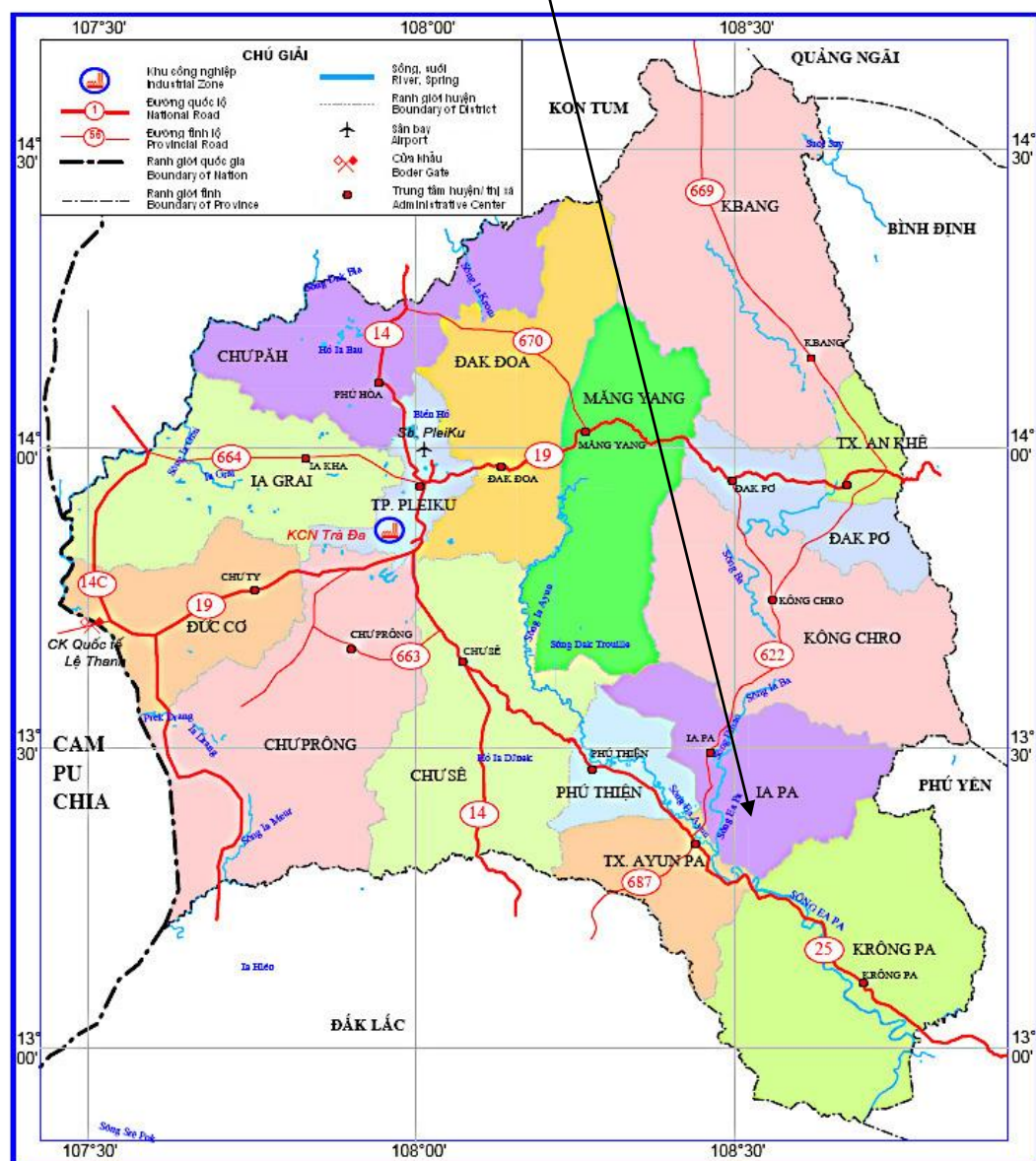
The project is situated on the Ba river, a large river in the Central Provinces of Viet Nam, which has a basin area of 14,000km<sup>2</sup>. The Ba River originates from the Ngoc Ro mountain of the Truong Son range, and runs to the East Sea. The nearest town and city to the project site is layun Pa town (~20 km ) and Pleiku City (~ 150 km Southern East). Figure A.1 shows the location of the project. The co-ordinates of the site are:

- Latitude from 13°19'20"N to 13°22'30"N
- Longitude from 108°31'00"E -108°34'56"E

**Figure 1: Project location on Viet Nam map**



**Figure 2: Project location on Provincial map**



### A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Socialist Republic of Viet Nam (host)	Private Entity: Hoang Anh Tona Hydropower Joint Stock Entity	No

#### A.4. References to applied methodologies and standardized baselines

Applied methodology: ACM0002, Consolidated Methodology for Grid Connected Electricity Generation from Renewable Sources, Version 12.2.0

Methodological tool: Tool for the demonstration and assessment of additionality (Version 6.0.0)

Methodological tool: Tool to calculate the emission factor of an electricity system (Version 1.1)

#### A.5. Crediting period type and duration

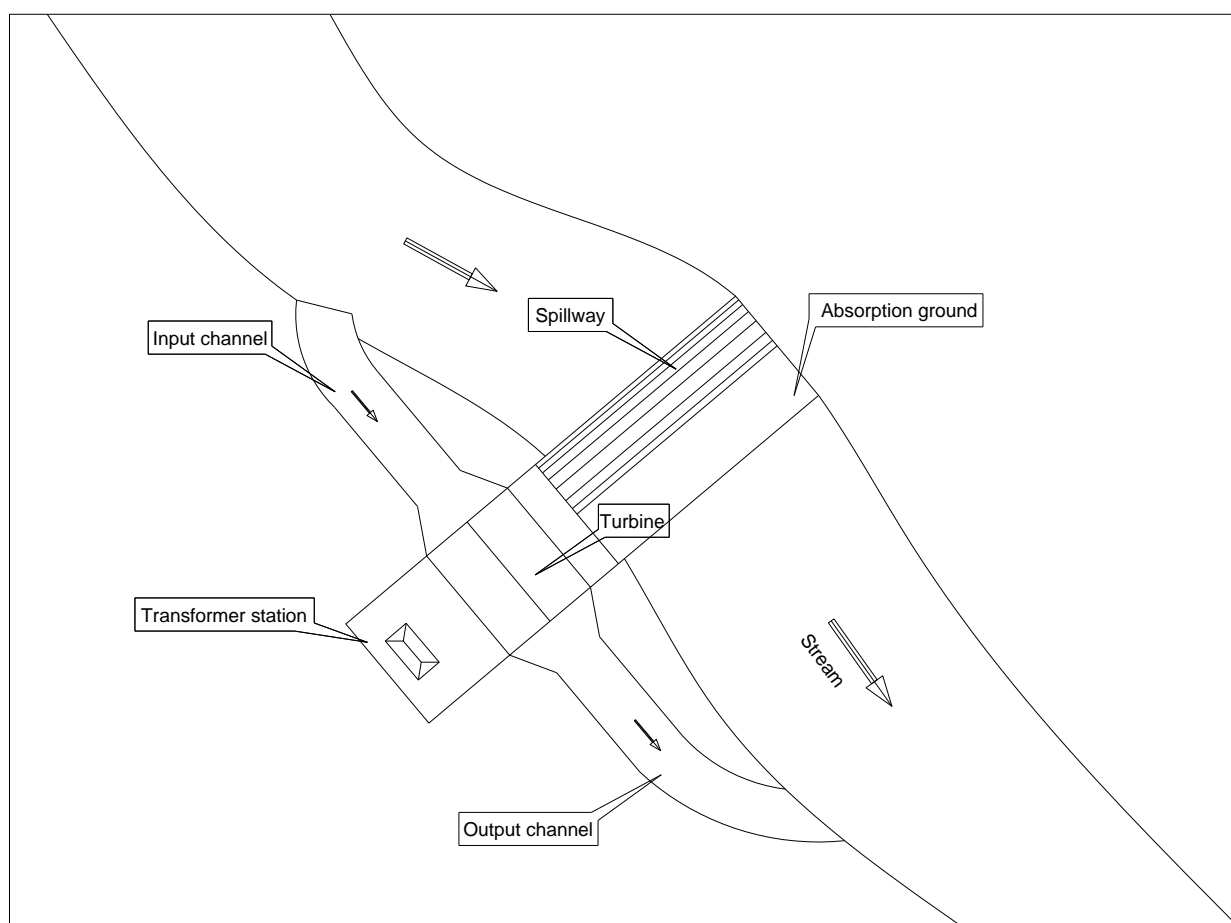
Renewable period: 06/04/2012 – 05/04/2019 (Expired)

### SECTION B. Implementation of project activity

#### B.1. Description of implemented project activity

The project is a run-of-river hydropower plant with a small run-of-river reservoir and consists of a weir, a penstock, a powerhouse (containing turbines and generators) and a tailrace as shown in the figure below. The generation capacity of the project is 19.5 MW. The main items of equipment such as turbines, generators, governors etc are imported from China. The electricity generated by the project is delivered to the Viet Nam national grid via a new single-circle 110 kV transmission line.

**Figure 3: A schematic representation of the project activity**



The technology of the project is detailed in the table below.

	Items	Specification
<b>Turbines</b>	Quantity	3
	Capacity	6.8 MW
	Type	Kaplan
	Design head	14.7 m
	Rated speed	166.7 rpm
	Runaway speed	387.9 rpm
<b>Generators</b>	Quantity	3
	Capacity	6.5 MW
	Frequency	50Hz
	Cosφ	0.8
	Rated voltage	6.3 kV

## **B.2. Post-registration changes**

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

Throughout the monitoring period, a calibrated meter has been used to monitor and record the electricity generated by the project. However, there was a period of deviation between 05/2018 to 07/2018 while the project transitioned from a single main and backup meter to three sets of main and backup meters – one for each generation unit. During this period, only a main meter (properly calibrated) was utilized. As there were no issues with this meter, this did not have any impact on the accuracy of measurement or recording of parameters or on the calculation of emission reductions.

#### **B.2.2. Corrections**

None

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

None

#### **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**

None

#### **B.2.6. Changes to project design**

None

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

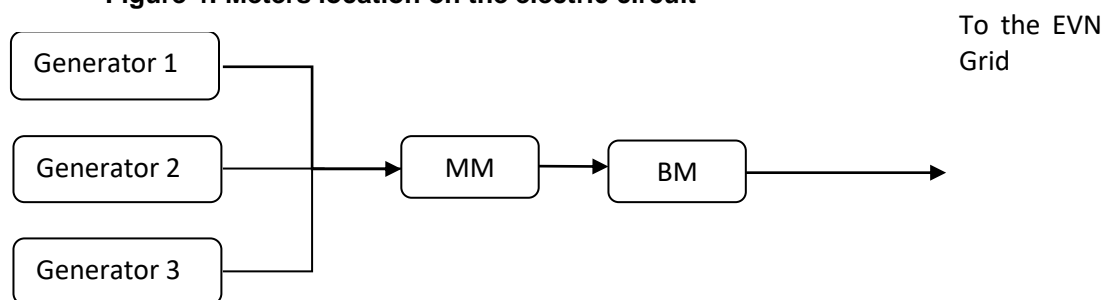
Not Applicable

**SECTION C. Description of monitoring system****C.1. Electricity metering system**

The system is composed of 2 energy meters: 1 main and 1 backup located at the connection point belonging to the grid operator EVN and used as the source of data for the calculation of emission reductions.

The location of each instrument is indicated schematically in the monitoring diagram shown in Figure

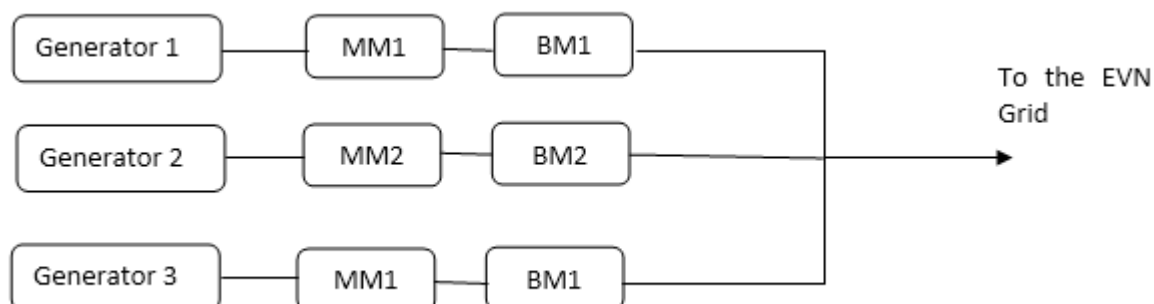
**Figure 4: Meters location on the electric circuit**



- MM is the main meter. It is used to measure the electricity generation at the hydropower site while taking into account both export and import to/from the national grid. The MM is the source of data for the EVN receipts.
- BM is the backup meter. It is used as record source in case the main meter fails (see section C3).

However, from August 2018, each of the three generators received individual main and backup meters. The new setup fulfils the monitoring requirements.

**Figure 5: New meter locations on the electric circuit**



**C.2. Data treatment and verification**

A verification of the data recorded is performed by the spot check of field instruments by staff and external consultants.

**C.3. Non-conformities and emergency procedures**

Non-conformities are internally defined as any incidents affecting the project's monitoring (e.g.: calibration delay, data loss, instrument malfunction, change in project implementation, etc.) They feature various severities and some of them may lead to data reconstruction (emergency procedure), request for temporary deviation or PDD revision, whereas some others may not require any particular corrective measures.

In the event that the metering system suffers any failure, damage and unexpected problems, or if any errors in the main metering systems are detected during calibration, the electricity exported will be identified as follows:

- Using the results of the backup system
- Should the backup system also suffer a breakdown, the electricity exported is proposed by reconstructing data by means of trend analysis (taking a conservative approach)

**C.4. Maintenance and calibration of monitoring instruments**

Calibration takes place at least every 2 years to ensure that the monitoring equipment is correctly installed and functioning properly.

**C.5. Monitoring team**

The CDM monitoring team is composed of the following staff:

Report to:	Position
Hoang Anh Tona Hydropower Joint Stock Company	Site manager
	Supervisors/Heads of Shift
	Operators
Kyoto Energy Pte Ltd	CDM Consultant/ CER buyer

**Table 1: CDM Monitoring Team Details**

#	Tasks description (and frequency)	Operator	Supervisor	Site manager / Project director	CDM consultant Project manager
<b>Monitoring activity</b>					
1	Recording of manual data	✓			
<b>Quality Assurance &amp; Quality Control</b>					

#	Tasks description (and frequency)	Operator	Supervisor	Site manager / Project director	CDM consultant Project manager
2	Verification of data monitored (consistency and completeness)		✓		
3	Ensuring adequate training of staff		✓		
4	Ensuring adequate maintenance		✓		
	Ensuring calibration of monitoring instruments		✓		
5	Data archiving: ensuring adequate storage of data monitored (integrity and backup): 2 years after the end of the crediting period			✓	
6	Identification of non-conformance and corrective/preventive actions and monitoring plan improvement		✓		
7	Emergency procedures		✓		
8	External audit				✓
<b>Calculation of GHG emission reductions and reporting</b>					
9	Processing of data and calculation of emission reductions			✓	
10	Monitoring report: management review of monitoring report (internal audit)			✓	

Table 2: Allocation of monitoring responsibilities

**C.6. Adequate training of staff**

The monitoring plan is made available to each member of staff involved in the project's monitoring.

A training session was organised on 15/06/2012 to introduce / give refresher training to the staff with respect to the monitoring plan requirements. Background information was also given about the impacts of the CDM project and the importance of monitoring.

During the training, the staff signed a training attendance list. All training records are retained inclusive of training attendance, and training materials. Following this, periodic retraining has been conducted on a regular basis.

Records of training will be kept for at least 2 years after the crediting period.

**C.7. Data archiving**

The log files will be kept for a minimum of 2 years after the end of the last crediting period by using paper documents and electronic files.

The log files are stored on various media (CD-ROM and hard disks) at several locations (plant, headquarters and CDM consultant server).



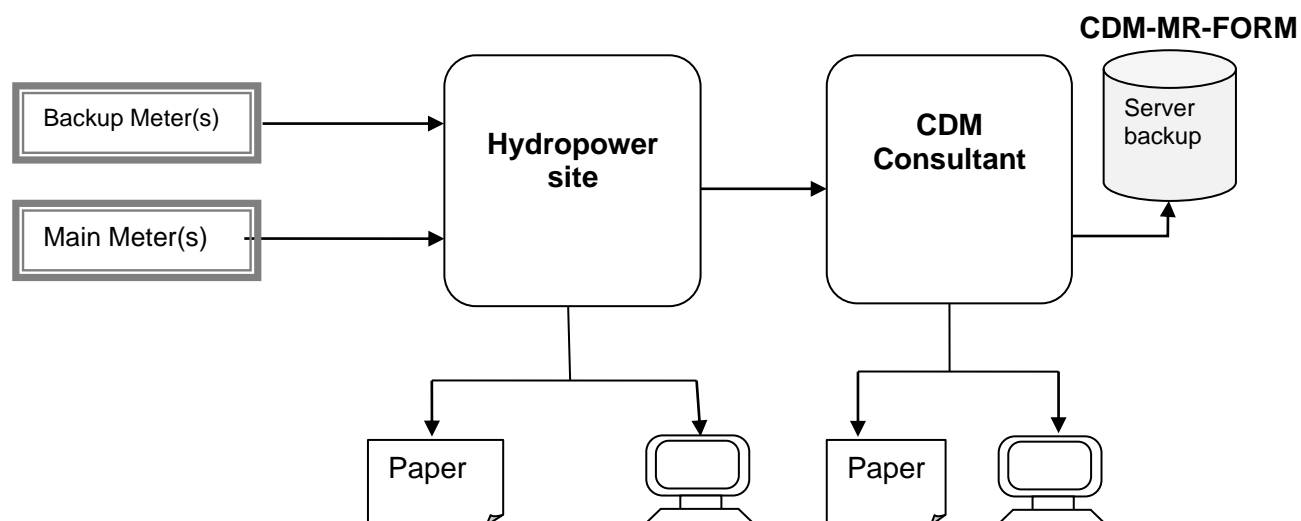


Figure 6: Monitoring data flow chart

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO <sub>2</sub> /MWh
Description	Combined margin CO2 emission factor for grid connected power generation as calculated in DNA issued "Study, Definition of Viet Nam Grid Emission Factor, 2009". Calculation was completed in 2009, published and made available in 2010.
Source of data	As per the "Tool to calculate the emission factor for an electricity system"
Value(s) applied	0.5764
Choice of data or measurement methods and procedures	As per methodology
Purpose of data/parameter	Baseline emissions
Additional comments	-

Data/Parameter	$EF_{Res}$
Unit	kgCO <sub>2e</sub> /MWh
Description	Default emission factor for emissions from reservoirs
Source of data	Decision by EB23
Value(s) applied	90
Choice of data or measurement methods and procedures	As per ACM0002
Purpose of data/parameter	Project emissions
Additional comments	-

Data/Parameter	$CAP_{BL}$
Unit	W

Description	Installed capacity of the hydropower plant before the implementation of the project activity.
Source of data	Project site
Value(s) applied	0
Choice of data or measurement methods and procedures	For new projects, value is 0.
Purpose of data/parameter	Project emissions
Additional comments	-

<b>Data/Parameter</b>	<b>A<sub>BL</sub></b>
Unit	m <sup>2</sup>
Description	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full.
Source of data	Project site
Value(s) applied	0
Choice of data or measurement methods and procedures	For new projects, value is 0.
Purpose of data/parameter	Project emissions
Additional comments	-

## D.2. Data and parameters monitored

<b>Data/Parameter</b>	<b>EG<sub>facility</sub> (EG<sub>y</sub>)</b>
Unit	MWh
Description	Quantity of electricity generation supplied by the project plant/unit to the grid in crediting period
Measured/calculated/default	Measured
Source of data	Project site – main meter
Value(s) of monitored parameter	348,545
Monitoring equipment	
Measuring/reading/recording frequency	Continuous measurement and at least monthly recording
Calculation method (if applicable)	N/A
QA/QC procedures	Cross check measurement results with records for sold electricity Calibration of meters to be done as per manufacturer specifications or at least once every two years
Purpose of data/parameter	To calculate emission reductions
Additional comments	

<b>Data/Parameter</b>	<b>Cap<sub>PJ</sub></b>
Unit	MW

Description	Installed capacity of the hydro power plant after the implementation of the project activity
Measured/calculated/default	Not Applicable
Source of data	Project site, equipment name plates
Value(s) of monitored parameter	16.5
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Yearly (any changes documented)
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Calculation of Project Emissions
Additional comments	-

Data/Parameter	APJ
Unit	m <sup>2</sup>
Description	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Measured/calculated/default	Measured from topographical surveys, maps, satellite pictures, etc
Source of data	Project site
Value(s) of monitored parameter	770,000
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Yearly (any changes documented)
Calculation method (if applicable)	N/A
QA/QC procedures	N/A
Purpose of data/parameter	Calculation of Project Emissions
Additional comments	-

### D.3. Implementation of sampling plan

Not applicable as no sampling is proposed

## SECTION E. Calculation of emission reductions or net anthropogenic removals

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

The Baseline emissions are calculated as follows:

$BE_y = EG_y * EF_{grid,CM,y}$			
Where:	Description	Units	Value
$BE_y$	Baseline Emissions	tCO <sub>2</sub>	223,607
$EG_y$	Net quantity of electricity generated and delivered to the grid by the hydropower project in period y	MWh	348,545

$EF_{grid,CM,y}$	CO <sub>2</sub> emission factor in period y	tCO <sub>2</sub> /MWh	0.5764
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## E.2. Calculation of project emissions or actual net removals

Since the power density of the project is 25.32 W/m<sup>2</sup> (greater than 10 W/m<sup>2</sup>), hence as per the methodology, there are no project emissions for this project activity.

## E.3. Calculation of leakage emissions

As per the applied methodology and the registered PDD, the project does not need consider leakage.

Therefore:

$$LE_y = 0$$

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

	Baseline GHG emissions or baseline net GHG removals (t CO <sub>2</sub> e)	Project GHG emissions or actual net GHG removals (t CO <sub>2</sub> e)	Leakage GHG emissions (t CO <sub>2</sub> e)	GHG emission reductions or net anthropogenic GHG removals (t CO <sub>2</sub> e)			
				Before 01/01/2013	From 01/01/2013 until 31/12/2020	From 01/01/2021	Total amount
<b>Total</b>	223,607	0	0	27,054	196,553		224,272

## 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 <sub>2</sub> e)	Amount estimated ex ante for this monitoring period in the PDD (t CO <sub>2</sub> e)
223,607	293,001

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

As per the registered PDD, the project was expected to generate 42,405 tCO<sub>2</sub>e of emission reductions per annum. The project started commercial operations on 9 May 2012 and the monitoring period ended on 05 April 2019. This is a period of 6 years and 332 days (i.e. 33 days short of 7 years). This implies an ex-ante amount of 293,001 tCO<sub>2</sub>e of emission reductions over this monitoring period.

## E.6. Remarks on increase in achieved emission reductions

There is no increase in emission reductions.

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

Not applicable.

## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	8 October 2021	Revision to: <ul style="list-style-type: none"> <li>Ensure consistency with version 03.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN).</li> </ul>
08.0	6 April 2021	Revision to: <ul style="list-style-type: none"> <li>Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).</li> </ul>
07.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period;</li> <li>Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes;</li> <li>Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods;</li> <li>Make editorial improvements.</li> </ul>
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>Make editorial improvements.</li> </ul>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> <li>Include provisions related to delayed submission of a monitoring plan;</li> <li>Provisions related to the Host Party;</li> <li>Remove reference to programme of activities;</li> <li>Overall editorial improvement.</li> </ul>
04.0	25 June 2014	Revisions to: <ul style="list-style-type: none"> <li>Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));</li> <li>Include provisions related to standardized baselines;</li> <li>Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;</li> <li>Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>;</li> <li>Editorial improvement.</li> </ul>
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.

<i>Version</i>	<i>Date</i>	<i>Description</i>
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.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		