Monitoring report form for CDM project activity
(Version 07.0)

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

MONITORING REPORT		
Title of the project activity	24 MW Dummagudem Hydel project by SLS Power Corporation Limited	
UNFCCC reference number of the project activity	4818	
Version number of the PDD applicable to this monitoring report	5	
Version number of this monitoring report	1	
Completion date of this monitoring report	15/08/2020	
Monitoring period number	2	
Duration of this monitoring period	01/04/2015 to 31/12/2017	
Monitoring report number for this monitoring period	MR/02	
Project participants	M/s SLS Power Corporation Limited	
Host Party	India	
Applied methodologies and standardized baselines	ACM0002: Grid-connected electricity generation from renewable sources, Version 11	
Sectoral scopes	Scope 1: Energy Industries	
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
	0	116,772 tCO_2
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	246,035 tCO_2	

SECTION A. Description of project activity

A.1. General description of project activity

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Purpose of the project activity

The 24 MW Dummagudem hydro project of SLS Power Corporation Limited is a grid connected run-of-river hydro power project located in Telangana, (earlier was embedded and called as Andhra Pradesh), India. The proposed project is located in the Southern Power Region and has been conceived for harnessing the power potential of left flank of the branch anicut in the Godavari River in Khammam District. This project involves the installation of six Horizontal Pit type full Kaplan turbines & generating units of 4 MW each to generate 24MW of power utilizing a rated head of 4.8m and a design discharge of 601.02m^3/s .

The project activity is a Greenfield project planned on the Godavari River. Thus, the scenario existing prior to the implementation of this project activity would be to allow the potential energy in the flowing river to go untapped. In the absence of the project activity, any existing power demand in the region would be met by the continued operation of fossil fuel based power plants in the grid. Hydropower is a clean, renewable source of energy and does not contribute to air or water pollution or the emissions of greenhouse gases. The water after powering the turbines will be discharged back into the Godavari River through a tailrace canal, located within the river course close to the left bank open channel.

The objective of the proposed project is to generate power from harnessing the water to meet the ever increasing demand for electricity in the Southern region of India. The generated power will be exported to the Southern regional grid via the sub-station at Bhadrachalam. The project is expected to export 100,300 MWh of energy per year to the grid. Hydro power plants are considered to be zero emission power sources. The project activity will displace the fossil fuel fired power generation from the grid and hence contribute to a reduction in greenhouse gases.

Brief description of the installed technology and equipment

The project is a run-of-river hydro electric power plant with a design discharge of rated head of 4.8m and a design discharge of 601.02 cumecs. As mentioned in the PDD, the hydro power plant has an installed capacity of 24 MW (6 x 4 MW each) and is capable of producing 103,400 MWh of power per year in a 90% dependable year with 95% machine availability and operating at a plant load factor of 49.18%. The catchment area at the diversion site is 307 km^2.

The salient features of the project are:

Table 1: Technical Parameters of Project activity

Parameter	Value
Net head	4.8m
Type of power house	Surface
Design discharge	600 Cumecs
Type of switchgear	11/132kV air insulated switchgear
Speed of turbine	111 rpm
Generation voltage	11kV
Transmission voltage	132kV
GSU transformer	20MVA 3 phase, 11/132 kV

The main components of the project are:

- A 100m wide gated weir
- An intake located at the axis of branch anicut
- One de silting basin

- A head race channel is located on the existing navigational channel
- Six (9.5 m x 10.5 m each) intake gate opening is provided for flow of water to turbines
- A surface power house to house six horizontal pit type full Kaplan units of 4MW each
- A tail race channel with a reverse slope and then with gradient up to 550 m that will discharge into the river in the direction of the river flow
- A surface switchyard 70m x 30m which shall house the generator transformer bays and an outgoing line
- 11 / 132 kV SC line from the site to Bhadrachalam to Etapaka Sub-Station (20 Kms)for evacuation of power

The turbine characteristics have been selected such that the optimum efficiency falls close to the rated output of the unit at rated head. A pumping station will be provided to supply an adequate quantity of water from the tailrace only for cooling of the turbine generator bearings, generator air coolers and selected plant services. It will then flow back into the river.

Each synchronous generator would be horizontal shaft, salient pole type, 3 phase, 50Hz directly coupled to the turbine. It would be rated for a continuous output of 4000 kW at a power factor of 0.85 and a rated voltage of 11kV with the capability of 10% intermittent overloading.

The power from the proposed project activity has been planned to be pooled at the proposed 132kV Etapaka (Bhadrachalam) sub-station. The Bhadrachalam sub-station in turn is hooked to the grid. The line length is around 20kms. Thus, the project activity will supply renewable energy to the Southern grid of India, thereby partly replacing the energy generated by other, fossil fuel based plants connected to the grid.

In the absence of the project activity the power in the grid would have been supplied by other grid connected power plants and addition of new power plants. The baseline scenario is the same as the scenario existing prior to the start of the implementation of the project activity.

(a) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.);

S.No.	Description	Start Date(As per DPR)	Actual Start Date	Finish(As per DPR)	Actual Finish Date
1	Civil	Aug'2008	March'2009	May'2010	May'2013
2	E&M	Aug'2008	Sep'2009	April'2010	Nov'2013
3	H&M	Aug'2008	Nov'2009	April'2010	March'2013
4	Transmission Line &S/Y	Oct'2009	Feb'2010	July'2010	May'2013
5	Commissioning	-	-	-	7 Dec 2013

The project has been operational since 7 Dec 2013. However due delay in commissioning, the project was detailed to EB to change the crediting period. And accordingly UNFCCC EB approved post registration change of crediting period, this monitoring period covers the period from 01/04/2015 to 31/12/2017.

(b) Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of First Monitoring Period	01/04/2015
Carbon credits claimed up to	31/12/2017
Total Emission Reductions	**116,772** tCO_2

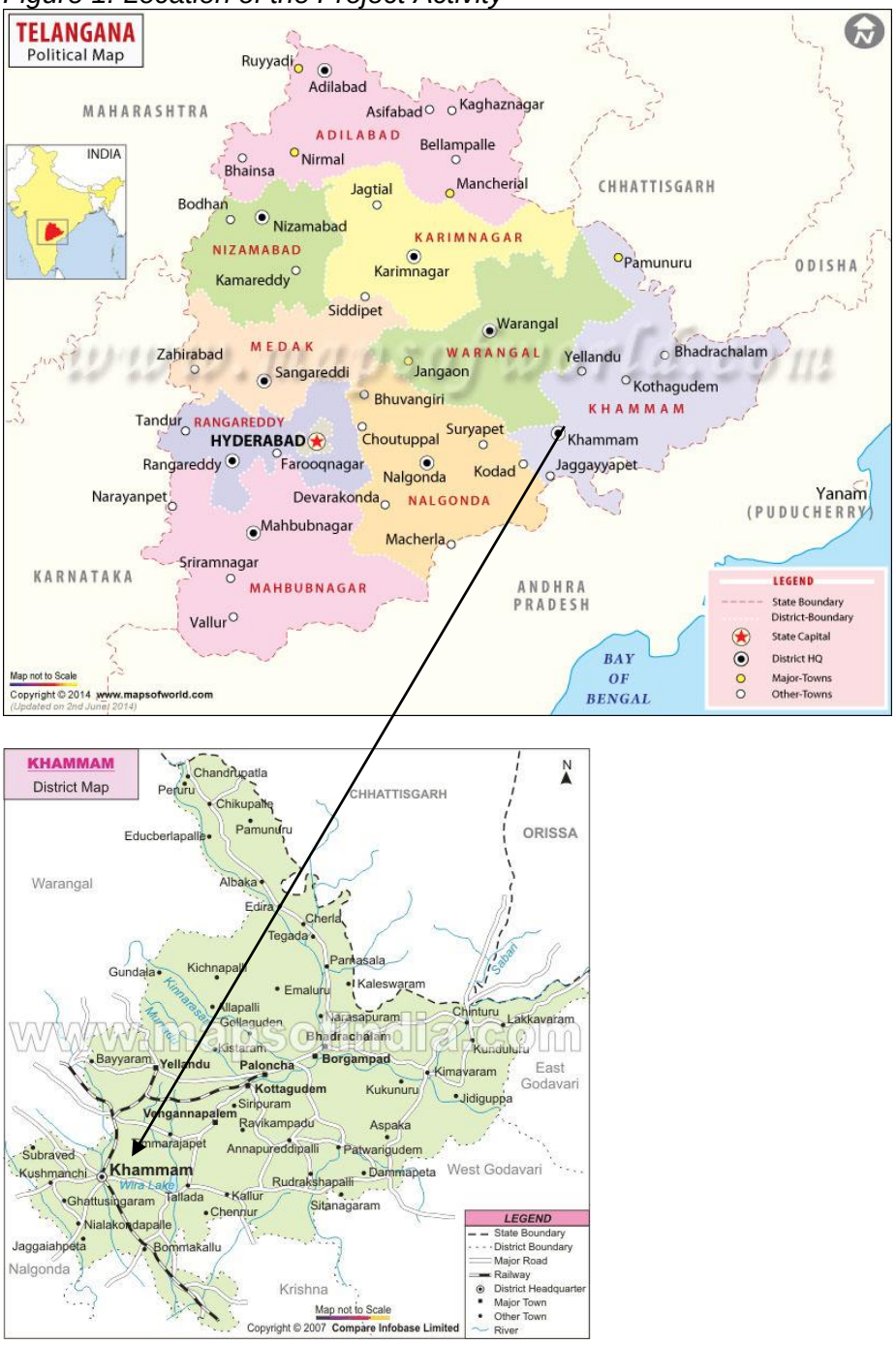
A.2. Location of project activity

Dummagudem village, Bhadrachalam Taluka ,Khammam District, Telangana, India
The geographical co-ordinates of the project site are:

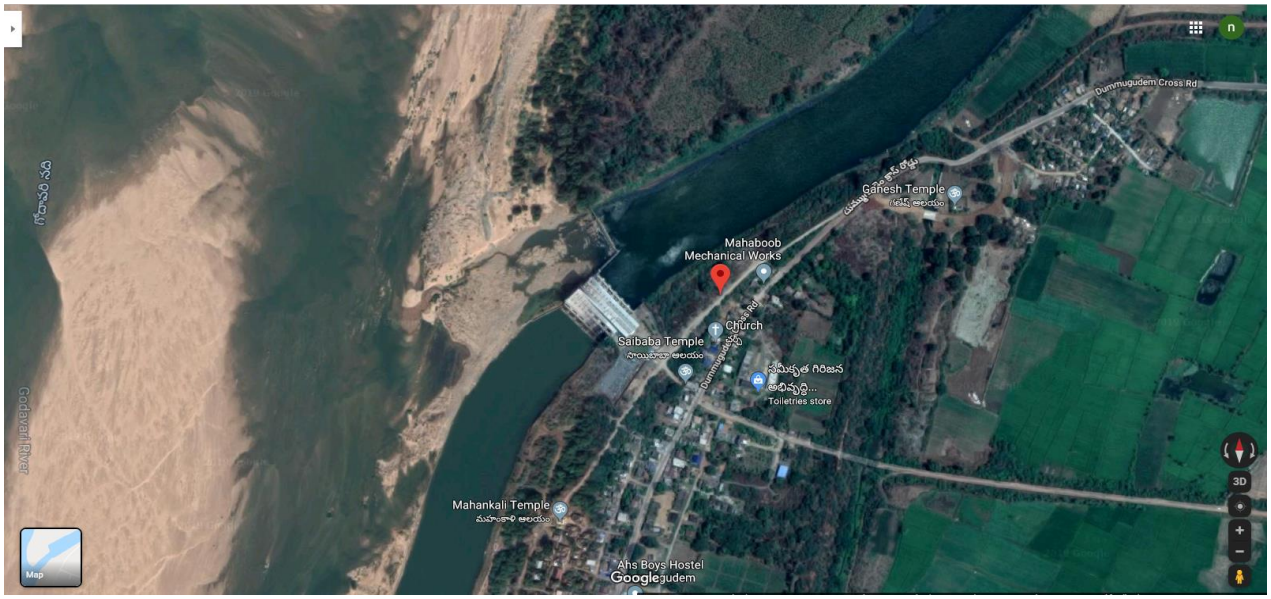
Longitude: 80^0 53' 12" E
Latitude: 17^0 51' 19" N

The maps below show the exact location of the project activity in the state of Andhra Pradesh in India.

Figure 1: Location of the Project Activity



The google maps below show the exact location of the project activity.



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 (host)	M/s. SLS Power Corporation Limited	No

A.4. References to applied methodologies and standardized baselines

(a) Applied Methodology: Sectoral Scope: 1 Energy industries (renewable - / non-renewable sources)
Version 11 – Approved consolidated baseline and monitoring methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", EB 52

(b) Methodological Tools:
Version 2 – Tool to calculate the emission factor for an electricity system, EB 50
Version 2 - Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, EB 41
Version 5.2 – Tool for the demonstration and assessment of additionality, EB 39, Annex 10

A.5. Crediting period type and duration

(a) Type:	Fixed Crediting Period
(b) State Date of the crediting period	10/10/2013
(c) Length of the crediting period corresponding to this monitoring period:	10 years, 0 months (10/10/2013 to 09/10/2023)
(d) Length of the current monitoring period	2 years, 9 months

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

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Description of the installed technologies, technical process and equipment

The project is a run-of-river hydro electric power plant with a design discharge of rated head of 4.8m and a design discharge of 601.02 cumecs. The hydro power plant has an installed capacity of 24 MW (6 x 4 MW each) and is capable of producing 103,400 MWh of power per year in a 90% dependable year with 95% machine availability and operating at a plant load factor of 49.18%. The catchment area at the diversion site is 307 km^2.

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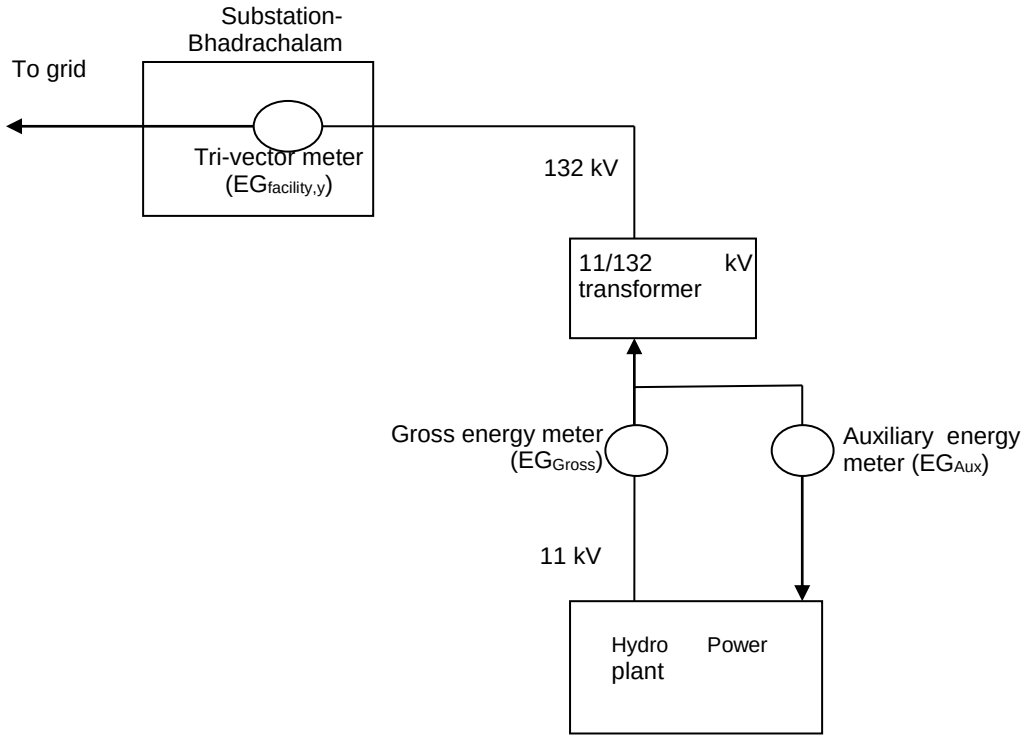
The details of the Generator and Turbine are as below:

TURBINE – GENERATOR SET SPECIFICATIONS

S.No	Name of the Equipment	Details of the Equipment.
I	**HYDRAULIC TURBINE**	

		Make : M/s ZHEJIANG JINLUN ELECTRO MECHANIC CO. LTD., Type : Horizontal pit type full Kaplan, Rated Head : 4.8 Mts Rated Discharge : 100.17 Cumecs Rated Power : 4297 KW, Date : 2010/01 Sl. Nos : 001, 002, 003, 004, 005, 006, Qty : 6 Nos.
II	**SPEED INCREASER**	
1		Make : M/s CITIC HEAVY INDUSTRIES CO. LTD, Specification : ZZDT 1400 Input Power : 4800 KW Input Speed : 111 RPM Ratio : 1: 4505 Mass : 21740 Kg Date of Manufacture : 2009 – 08 Sl.Nos: 09-368, 09-366, 09-369, 09-367, 09-364, 09-365, Qty : 6 Nos.
III	**HYDRO GENERATOR**	
1		Make : M/s Chaozhou Huineng Electrical Machinery Co. Ltd ., Type : SFW-4000-12/2150, Capacity : 4000 KW, Rated Voltage : 11000 V, Rated Current : 247 A, Freq : 50 HZ, Power Factor : 0.85, Rated Speed : 500 RPM Excitation Voltage : 65 V Excitation Current : 413.4 A, Insulation Class : F Standard No. : GB / T 7894 Sl. Nos : 9248, 9249, 9315, 9316, 10030, 10031. Qty : 6 Nos.
IV	**Power Transformer**	
		Make : M/s Areva T&D Ltd., Rating: 132kV/11kV Capacity: 20 MVA Qty: 2 Sl Nos: TBI/620900211/1, TBI/620900211/2

The diagram showing metering arrangement is mentioned below:



Information on the implementation and actual operation of the project activity
The project has been commissioned and synchronized to the grid from 7/12/2013. This monitoring period covers from the date 01/04/2015 to 31/12/2017. The project got delayed and the crediting period was changed and approved by EB for the post registration changes.

B.2. Post-registration changes

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

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There are no temporary deviations from the registered monitoring plan or applied methodology.

B.2.2. Corrections

>>
There are no corrections to project information or parameters fixed at validation.

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

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The project had been delayed and the project proponent had requested for a change in start date of the crediting period from 11/10/2011 to 10/10/2013. This change of the crediting period was accepted by EB on 20 Aug 2014 (PRC Ref No. 4818-001).

B.2.4. Inclusion of monitoring plan

>>
There is no inclusion of a monitoring plan to the registered PDD that was not included at registration

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 from the registered monitoring plan and applied methodology.

B.2.6. Changes to project design

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There are no changes to project design of registered project activity.

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

>>
Not Applicable

SECTION C. Description of monitoring system

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Monitoring consists of metering the net electricity supplied to the grid ($EG_{facility,y}$), turbine gross generation (EG_{gross})and any auxiliary consumption (EG_{aux}) of electricity due to the internal loads present in the project activity. An internal audit is also carried out every year at the power plant to ensure that these parameters are being monitored in accordance with the project PDD.

The certified emission reductions (CERs) will be determined annually based on the monthly JMRs undertaken by representatives of M/s. SLS Power Corporation Ltd & the Tata Power/grid. The JMR will record both export and Import readings. The same figure will be reported to CDM Team/Consultant in order to estimate the monthly emission reductions. The energy delivered to the TATA Power which is traded in the IEX power exchange. The energy imported from the grid is invoiced by the DISCOM, as this is considered an import component by the grid operator DISCOM.

In order to cross check the accuracy of this figure, the PP will also monitor Total/gross electricity generation from the turbine/s and any auxiliary consumption due to the internal loads. There will be three 8 hour shifts and the readings from energy meter/s will be taken on an hourly basis by the shift supervisor and recorded in logbooks. This hourly data will be signed off at the end of every shift by the engineer in charge of the shift and again at the end of each day by the power plant manager. The power plant manager will analyze the data every month and report to the head office. The data will be archived electronically every month.

In line with the monitoring requirements of the methodology and the tools referred to in the methodology, the PP will also monitor the following parameters in order to estimate project emissions:

- The quantity of fossil fuel/diesel (FC_y) used in the backup DG present at the site, which will be determined using ruler gauges in the diesel tank available for the DG set
- The Net Calorific Value (NCV_y) of the fossil fuel/diesel used in the project activity, which will be determined using either supplier's receipts or IPCC default data
- The CO_2 emission factor of the fossil fuel/diesel used in the project activity ($E_{FCO2,y}$), which will be determined using either supplier's receipts or IPCC default data

The suppliers of the equipments will train the staff in- charge during erection, to operate and maintain the equipments efficiently. Apart from this, the equipment supplier will provide complete manuals and documentation providing details for the maintenance schedule and the required activities associated with the project. All the meters used in the project activity will be calibrated on an annual basis.

The monitored data will be reported by the PP to CDM Team/the CDM consultant on a monthly basis for the calculation and estimation of emission reductions. This data will be checked against initial estimates and a summary report will be provided quarterly. If the project is not performing as expected or if there are any negative impacts on the volume of emission reductions obtained, on the basis of the monthly data being monitored.

Data storage and Archiving

In accordance with the methodology all the data collected during the crediting period will be archived electronically and kept for at least two years after the end of crediting period. 100% of the data is monitored and the meters owned by grid/project owners is calibrated at regular intervals to ensure low uncertainty in the monitored data.

Training of Operators- Since there are no major changes in the production technology, no extensive initial training is required. The operator's team is trained on CDM concepts. Operators are also trained on monitoring of data and record keeping.

Emergency Preparedness Plan: The PP has prepared an emergency preparedness plan and also a plan on unforeseen predictions as per the discussion in the Environmental Assessment.

Monitoring of Sustainable Development (SD) indicator: The SD indicators of the project is monitored as per the requirements of the Andhra Pradesh Pollution Control Board (PCB), and as described in the Environmental Monitoring Plan. The PCB has also given the consent to operate. This is also renewed at regular intervals by the PCB.

The details of the energy meter installed are given below

S.No	Trivector Meter	Specifications – New Meter
1	MAIN METER	Make: M/s Secure Apex 100, Type: R3E, Year: 2014, Class: 0.2S, Sl. No: APZ00001. Connected voltage: 132 kV
2	CHECK METER	Make: M/s Secure Apex 100, Type: R3E, Year: 2014, Class: 0.2S, Sl. No: APZ00002. Connected voltage: 132 kV
3	STANDBY METER	Make: M/s Secure Apex 100, Type: R3E, Year: 2014, Class: 0.2S, Sl. No: APZ00003. Connected voltage: 132 kV

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

(Copy this table for each data or parameter.)

Data/Parameter	**$EF_{grid,CM,y}$**
Unit	t CO_2/MWh
Description	CO_2 emission factor for the regional grid system
Source of data	CEA published grid emission factors data
Value(s) applied	0.890
Choice of data or measurement methods and procedures	Calculated based on Central Electricity Authority CO2 Baseline Database version 5

Purpose of data/parameter	This data is used to calculate baseline emissions
Additional comments	The value applied is the arithmetic mean of the Operating Margin (OM, adjusted for imports) and the Build Margin (BM)

D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

<table>
<tr><td>Data/Parameter</td><td>EG _{facility, y}</td></tr>
<tr><td>Unit</td><td>MWh</td></tr>
<tr><td>Description</td><td>Quantity of net electricity supplied by the project plant/unit to the grid in year y</td></tr>
<tr><td>Measured/calculated/ default</td><td>Measured</td></tr>
<tr><td>Source of data</td><td>From the Plant records and Joint Meter Reading (JMR)</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>131,207</td></tr>
<tr><td>Monitoring equipment</td><td>
<table>
<tr><th>S.No</th><th>Trivector Meter</th><th>Specifications – New Meter</th></tr>
<tr><td>1</td><td>MAIN METER</td><td>Make: M/s Secure Apex 100,
Type: R3E,
Year: 2014,
Class: 0.2S,
Sl. No: APZ00001.
Connected voltage: 132 kV
Meter fixed on: 30/08/2014 (calibration valid until 29/08/2015)

1st calibration date: 13/09/2014 (calibration valid until 12/09/2015)
2nd calibration date: 14/06/2017 (calibration valid until 13/06/2018)</td></tr>
<tr><td>2</td><td>CHECK METER</td><td>Make: M/s Secure Apex 100,
Type: R3E,
Year: 2014,
Class: 0.2S,
Sl. No: APZ00002.
Connected voltage: 132 kV
Meter fixed on: 30/08/2014 (calibration valid until 29/08/2015)

1st calibration date: 13/09/2014 (calibration valid until 12/09/2015)
2nd calibration date: 14/06/2017 (calibration valid until 13/06/2018)</td></tr>
<tr><td>3</td><td>STANDBY METER</td><td>Make: M/s Secure Apex 100,
Type: R3E,
Year: 2014,
Class: 0.2S,
Sl. No: APZ00003.
Connected voltage: 132 kV
Meter fixed on: 29/09/2014 (calibration valid until 28/09/2015)
2nd calibration date: 14/06/2017 (calibration valid until 13/06/2018)</td></tr>
</table>
Calibration Frequency: Annually
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Measuring Frequency: Hourly Continuous
Frequency of Recording: Monthly</td></tr>
<tr><td>Calculation method (if applicable)</td><td>Not Applicable</td></tr>
</table>

QA/QC procedures	The data is accurately measured by high quality and high accuracy meters installed. Every month these readings are recorded by plant personnel and Tata Power/Grid Transmission Company, which are archived for cross-checking. These meter readings are used to determine the electricity supplied to the grid by the project activity. The meters are calibrated at least once a year.
Purpose of data/parameter	Calculation baseline emissions
Additional comments	The $EG_{facility, y}$ is sourced from the JMR which records the monthly reading of energy meter installed at sub-station. This can be cross-checked from the gross electricity generation (at the turbines) and auxiliary consumption measured at the plant.

Data/Parameter	**EG_{Gross}**
Unit	MWh
Description	Quantity of electricity produced by the project plant/unit from the grid in year y i
Measured/calculated/ default	Measured
Source of data	From the Plant Record of Joint Meter Reading
Value(s) of monitored parameter	131,462
Monitoring equipment	Main Meter: Number of Meters: 6 Make: M/s Wasion Group Ltd., China. Type: Model: DSSD331, 3Ph 3wire Electronic multifunction meter Year: 2009, Class: 0.5, Sl. Nos: 09100180300002, 09100180340001, 09100180340007, 09100180340003, 09100180340008, 09100180300001
Measuring/reading/recording frequency	Measuring Frequency: Continuous Frequency of Recording: Monthly
Calculation method (if applicable)	Not Applicable
QA/QC procedures	The data is accurately measured by high quality and high accuracy meters installed. Every month these readings are recorded by plant personnel and Tata Power/Grid Transmission Company, which are archived for cross-checking. These meter readings are used to determine the electricity supplied to the grid by the project activity. The meters are calibrated at least once a year.
Purpose of data/parameter	It is not used for emission reduction calculation, but used for crosschecking the $EG_{facility, y}$ data.
Additional comments	

Data/Parameter	**EG_{aux}**
Unit	MWh
Description	Total auxiliary electricity used for internal loads in year y
Measured/calculated/ default	Measured

Source of data	From the Plant Record of Log Book
Value(s) of monitored parameter	254
Monitoring equipment	Auxiliary Meter Details: Number of meters: 2 Make: Wasion group limited Model: DSSD331, 3Ph 3wire Electronic multifunction meter Year: 2009 Class:0.5 SI.NO : 1) 09100180340005 2) 09100180340006
Measuring/reading/recording frequency	Measuring Frequency: Continuous Frequency of Recording: Hourly and cumulated to monthly
Calculation method (if applicable)	Not Applicable
QA/QC procedures	The data is accurately measured by high quality and high accuracy meters installed. The electricity supplied to internal loads is monitored shift wise on hourly basis and recorded in the plant log book.
Purpose of data/parameter	-
Additional comments	-

Data/Parameter	**$EF_{CO2,y}$**
Unit	tCO_2/GJ
Description	CO_2 emission factor for diesel
Measured/calculated/ default	Default
Source of data	(http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)
Value(s) of monitored parameter	74.8 t CO_2/TJ
Monitoring equipment	IPCC Default Value
Measuring/reading/recording frequency	-
Calculation method (if applicable)	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
QA/QC procedures	-
Purpose of data/parameter	Calculation of Project Emissions
Additional comments	-

Data/Parameter	**NCV_J**
Unit	GJ/Gg
Description	Average net calorific value of diesel in year y
Measured/calculated/ default	Default
Source of data	http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)

Value(s) of monitored parameter	43.3 *TJ/Gg*
Monitoring equipment	IPCC Default Value
Measuring/reading/recording frequency	
Calculation method (if applicable)	IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories. (http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)
QA/QC procedures	This parameter is a fixed value for a hydro power plant and has to be checked every year to be consistent
Purpose of data/parameter	--
Additional comments	--

Data/Parameter	**$FC_{diesel, y}$**
Unit	Volume unit per year (Kilo Litres)
Description	Quantity of diesel combusted in the project activity during year y
Measured/calculated/ default	Measured
Source of data	Plant Log Book
Value(s) of monitored parameter	0.455
Monitoring equipment	Metering system consists of measurement of diesel used with the mass volume approach by ruler guage. Before pouring the diesel into the DG set, Shift in Charge shall measure the amount of diesel with ruler guage and enter into the log book. The difference between the reading before and after use of DG set provides information about the usage of diesel. Usage of diesel is further verified from the total number of operating hours of DG set. Both operating hours and diesel measurements are recorded in the log book and maintained at the DG Set room. Monitoring Frequency: Continuously Measurement Frequency: Daily Recording Frequency: Monthly, Summarized Annually Calibration Frequency: Not required. Done only if damaged. Archiving Policy: Paper & / Electronic Accuracy of the Measurement Method: To confirm the accuracy on measurement of quantity of diesel consumed in the project activity can be cross checked against the fuel purchase receipts. Responsibility: Log book sheet would be maintained by the shift in charge and same would be crossed checked by the Plant Manager of the project activity.
Measuring/reading/recording frequency	Measuring Frequency: Continuous Frequency of Recording: Monthly
Calculation method (if applicable)	Not Applicable
QA/QC procedures	The data recorded can be cross checked against the fuel purchase receipts/invoices
Purpose of data/parameter	Calculation of project emissions
Additional comments	--

D.3. Implementation of sampling plan

>>
No sampling process is involved, hence not applicable.

SECTION E. Calculation of emission reductions or net anthropogenic removals

As per the methodology, Emission reductions are calculated as the difference between the baseline emission from displaced electricity and the sum of the project emissions (PE_y) and leakage (LE_y).

$ER_y = BE_y - (PE_y + LE_y)$

In which:

Symbol	Description	Unit
ER_y	Emission reductions by the project activity during a given year *y*	tCO_2e/year
BE_y	Baseline emissions of the project activity during the year *y*	tCO_2e/year
PE_y	Project emissions of the project activity during the year y	tCO_2e/year
LE_y	Leakage emissions in the year *y*	tCO_2e/year

However, LE_y has been neglected as per the guidelines of the methodology. A separate spreadsheet is provided for the details of emission reductions calculations.

Hence $ER_y = BE_y - PE_y$

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

>>
The Baseline emission calculation is based on ex-ante option chosen and as per the registered PDD the value i.e. EF_y = 0.89 tons CO2/MWh.

The baseline is the MWh produced by the project activity multiplied by an emission coefficient (measured in tonnes CO_2/MWh) calculated in a transparent and conservative manner as the weighted average emissions (in tonnes CO_2/MWh) as described in the registered PDD.

$BE_y = EG_{facility,y} \times EF_y$

Where,
BE_y is baseline emissions in year y, tCO2e
$EG_{facility,y}$ is the net electricity supplied to the grid in year y and is applied directly from JMR certified by state utility. This value can also be cross checked from the invoice.
EF_y is the CO2 emission factor of the grid (0.89 tCO2e/MWh fixed ex-ante).

Baseline Emission for the period (01/04/2015 to 31/12/2017)

= 131,207 (MWh) * 0.89 (tCO2/MWh)
= 116,774 tCO_2/MWh (rounded down)

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

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This section shall include all formulae used and description to calculate the project emissions applying actual values. A table may be used and included in this monitoring report or include references to spread sheet

Step 3: Project Emissions:
As per PDD,

$PE_y = PE_{FF,y}$

Where
PE_y = Project emissions in year y (tCO2e/yr)
$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (tCO2/yr)

As the project is equipped with diesel generator of suitable capacity to meet the emergency requirements of power house etc., emissions out of usage of fossil fuel (diesel) are accounted for as project emissions. Diesel generator is utilized to supply the emergency requirement for the project activity, diesel consumption shall be monitored in plant log records. Emissions resulting from usage of diesel in the backup diesel generator is accounted as project emissions based on the following equation as provided in the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" version 2.

The project emissions for the proposed project activity can be calculated as follows:

$PE_{FC,y} = \sum FC_y \text{ X } COEF_y$

PEFC,y = CO_2 emissions from diesel combustion in process, during the year y (tCO_2/yr)
FC_y = Quantity of diesel combusted in the process, in year y (mass/yr)
$COEF_y$ = CO2 emission coefficient of diesel, in year y (tCO_2/mass)

Option B of the tool is chosen to calculate the CO_2 emission coefficient $COEF_y$ based on net calorific value and CO_2 emission factor of the fuel type, as follows:

$COEF_y = NCV_y * EF_{CO2,y}$
Where
NCV_y = Weighted Average net calorific value of diesel in year y (GJ/mass or volume unit)
$EF_{CO2,y}$ = Weighted Average CO_2 emission factor of diesel (tCO_2/GJ)

Since only diesel is used in the project activity the project emission from fossil fuel consumption is:

$PE_{diesel,y} = FC_{diesel,j,y} \text{ x } NCV_{diesel,y} \text{ x } EF_{CO2,diesel,y}$

Where,
$FC_{diesel,y}$ = quantity of diesel used during the year
$NCV_{diesel,y}$ = weighted average net calorific value of diesel in year y (43.3 *TJ/Gg)*
$EFco_{2,diesel,y}$ = weighted average CO_2 emission factor of fuel type diesel in year y

In case the parameter for quantity of diesel used during year y "$FC_{diesel,j,y}$" has been measured in volume, it will be converted to mass of diesel:

$FC_{diesel,j,y} = F_{d,y} * \text{Density}$

Where:

$F_{d,y}$ is the quantity of diesel used during the year (Kilo Litres)

Density of diesel (0.82 kg/Ltr. as per Society of Indian Automobile Mfgs.http://www.siamindia.com/scripts/Diesel.aspx)

$NCV_{diesel, y}$ = 43.3 *TJ/Gg*
IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
(http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)

$EFco_{2, diesel, y}$ =74.8 t CO_2/TJ
IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
(http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf)

Project Emission for the period

= (455/10^6) x 0.82 x 43.3 x 74.8 = 1.21
= 2 tCO_2 (rounded up).

E.3. Calculation of leakage emissions

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As per ACM0002 the main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction, fuel handling (extraction, processing, and transport), and land inundation (for hydroelectric projects – see applicability conditions above). Project participants do not need to consider these emission sources as leakage in applying this methodology.

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	Total amount
Total	116,774	2	0	0	116,772	116,772

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)
116,772	246,035

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

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Details	Value
Monitoring Period Start Date (A)	1-Apr-15

Monitoring Period End Date (B)	31-Dec-17
Days in this Monitoring Period C = (B-A+1)	1006
Annual Emission Reduction Estimated in the PDD (D)	89,267 tCO_2
Estimated emission reduction for the monitoring period (D*C/365)	246,035 tCO_2

E.6. Remarks on increase in achieved emission reductions

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The Emission Reduction (ER) value in the monitoring period is very much lower as compared to the value estimated in the registered PDD. Due to removal of cofferdam, heavy silt has accumulated in the canal and it has caused for less generation. This is the reason for lesser emission reduction during this monitoring period.

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

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Not applicable

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Document information

Version	*Date*	*Description*
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.

Version	*Date*	*Description*
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.
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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