



**Monitoring report form for CDM project activity
(Version 06.0)**

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

MONITORING REPORT

Title of the project activity	Bundled Charmadi Mini Hydel and Aniyur Hole Small Hydro Project at Karnataka, India	
UNFCCC reference number of the project activity	10100	
Version number of the PDD applicable to this monitoring report	02.1	
Version number of this monitoring report	1.0	
Completion date of this monitoring report	29.04.2018	
Monitoring period number	1 st Monitoring Period	
Duration of this monitoring period	Duration: 07/05/2015 – 30/06/2017 (First and last days included)	
Monitoring report number for this monitoring report	01	
Project participants	International Power Corporation Private Limited	
Host Party	India	
Sectoral scopes	Sectoral Scope 1	
Applied methodologies and standardized baselines	AMS ID – “Grid Connected Renewable Electricity Generation”.	
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
	NA	29,589
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	57,107	

SECTION A. Description of project activity

A.1. General description of project activity

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The bundled project activity is implementation of 10.5 MW hydro power project in the Karnataka state of India. The purpose of the bundled project is to generate Hydro-electric power utilising naturally available potential energy in the water fall of Aniyur river in Dakshin Kannad District & water flows of Charmadi stream (tributary to the Nethravathi River) Dakshin Kannada district in Karnataka State, India. The project supplies electricity to Karnataka Power Transmission Corporation Limited (KPTCL) which falls under the Southern grid system of India.

The bundled project includes Aniyur Hole Small Hydro Project (AHSHP) (6 MW) and Charmadi Mini Hydel Scheme (CMHS) (4.5 MW). Both the projects AHSHP & CMHS were being managed under the name of Prasanna Power Limited (PPL) and Thrinethra Energy Conversions Limited (TECL) respectively until the time these companies were amalgamated (merged) into IPCPL on 04th April 2014. Through this amalgamation order, all the debts, assets, business licenses, permits, authorizations, approvals etc are transferred over to IPCPL.

Both PPL and TECL were Special Purpose Vehicles (SPV) for the managing the proposed projects and were 100% subsidiary of IPCPL.

AHSHP contemplates utilization of natural fall of the Aniyur river. The Scheme utilizes seasonal monsoon discharges of the river mainly from southwest monsoon. The power generated will be stepped up to 11/33 KV level at the switchyard of the generating station for further evacuation of the same to the nearest switching station at Kakkinge.

The project generates electrical energy through sustainable means without causing any negative impact on environment. Use of renewable sources for power generation contributes to mitigation of greenhouse gases emissions.

How the proposed activity reduces GHG emissions

The project activity generates electricity using hydro potential and converts it into mechanical energy using hydro turbines, which drives the alternators to generate energy. The generated electricity is exported to the regional grid system. Hence, the generation by the proposed activity is non-GHG source and thus reduces the proportion of fossil fuel based generation in the grid leading to lesser carbon intensive grid.

A.2. Location of project activity

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Host Party:	India
State:	Karnataka
District:	Dakshin Kannada
Taluk:	Belthangadi
Village:	Aniyur (AHSHP) & Kakkanje (CMHS)

Aniyur SHP is located in Dakshin Kannad District contemplates utilization of natural fall of the Aniyur river. Aniyur SHP is located at a distance of 22 Km from Dharmasthala.

Charmadi Mini Hydel Scheme contemplates utilization of flows and head available in the Charmadi stream (tributary to the Nethravathi River) for power generation. It is located about 2km from Mangalore Kottigehar Road near Charmadi Village.

Project site is a distance of about 370 km from Bangalore. Nearest Rail head can be reachable at a distance of 50 Km at Puthur. **The physical location of plant site is depicted in the maps below:**

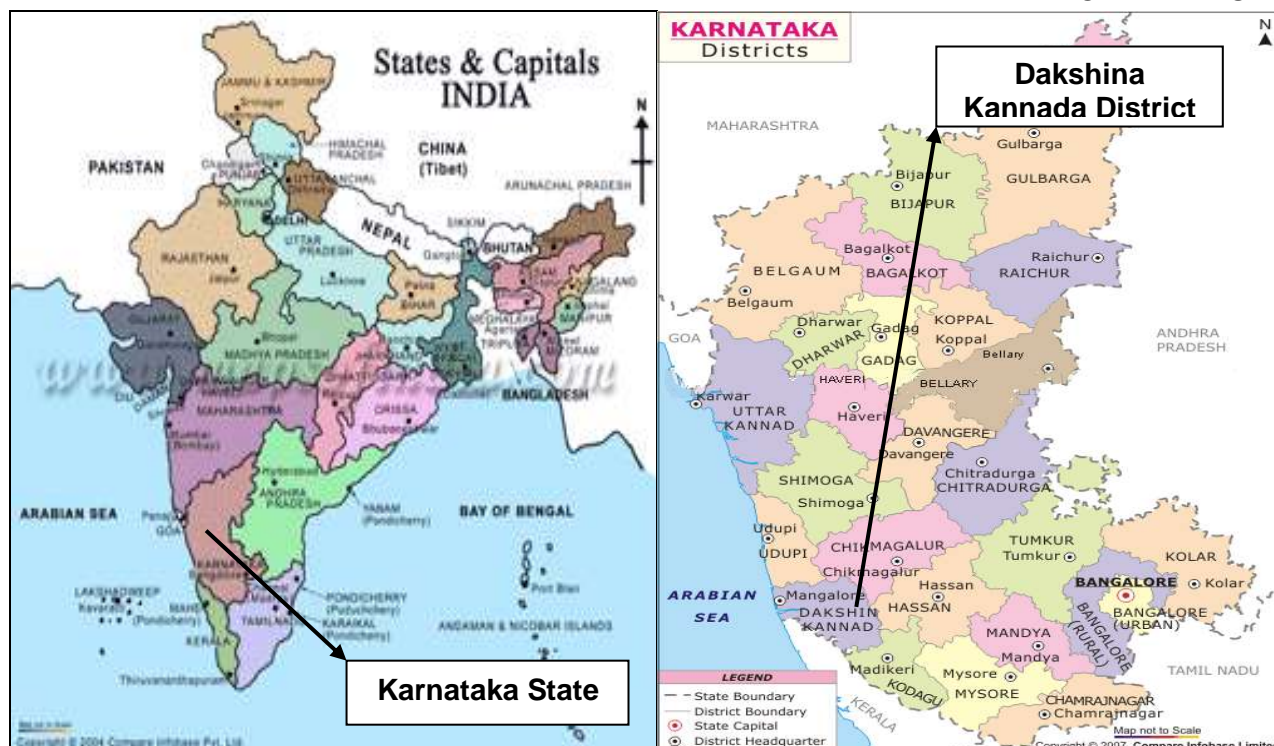


Fig: Location of Karnataka State in India Map **Fig:** Location of Dakshina Kannada District in Karnataka State Map

Geographical coordinates of Power House of AHSHP is Latitude- 13.07826 N and Longitude- 75.43911 E.

Geographical coordinates of power House of CMHS project activity is Latitude- 13.03581 N, and Longitude- 75.38811 E.

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)	International Power Corporation Limited (Private entity)	No

A.4. Reference to applied methodologies and standardized baselines

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Project Type: Type I – Renewable Energy Projects

Category I D: AMS I.D (grid connected renewable electricity generation), Version 18, EB 61

Reference: AMS I.D, Version 18, EB 61 (Valid from 28/11/2014)

AMS I-D draws into following tool to determine baseline for electricity system

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC CDM website

(<http://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK>)

Tools:

Tool to calculate the emission factor for an electricity system, (Version 4)

It has been referred from the UNFCCC CDM website

(http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf/history_view)

A.5. Crediting period type and duration

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Type: Renewable

Start Date of Current Crediting period: 07/05/2015

Crediting period: 07/05/2015 – 06/05/2022 (Renewable)

Current Monitoring period: 07/05/2015 – 30/06/2017

SECTION B. Implementation of project activity**B.1. Description of implemented project activity**

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Description of the installed technology, technical processes and equipment's;

The Project uses well established hydro power generation technology in electricity generation and transmission. The project is constructed around the catchment areas, weirs, desilting tank, headrace tunnels, fore bay, penstock, powerhouse, tailrace and the transmission system till the evacuation point. The electricity would be exported to the Karnataka Power Transmission Corporation Limited (KPTCL) grid.

Technical details of Aniyur Hole Small Hydro Project (AHSHP) (6 MW)

The technology employed for power generation in a hydroelectric plant is, converting the potential energy available in the water into mechanical energy using hydro turbines and then into electrical energy using alternators. The components involved in the Aniyur Hole SHEP are Pick up wear, intake structure, Trash racks, Intake gates, Surge Tank, Penstock, Power House and Tail race. The generated power will be transformed to match the nearest 33 kV substation near Kakkinge.

S. No	Parameters	Specifications
Generator		
1	Make	WEG
2	No of Generating Units	02
3	Capacity of Each Generating Units	3000kW
4	Total Capacity of this project activity	6000 kW
5	Type of generator	3 phase, Synchronous Generator
6	Excitation System	Brushless
7	Power Factor	0.85
8	Rated Frequency	50HZ
9	Rated Speed	600RPM
10	Generation Voltage	11kV
11	Efficiency of Generator at 100% rated output	96.7%
Penstock		
12	No of Penstock	1
13	Length of Penstock	850 m
14	Internal Dia	2.40m
15	Shell thickness	14 mm
16	Type	Steel Penstock
Turbine		
17	Make	Kirloskar Brothers Ltd
18	Type of Turbine	Horizontal Francies
19	No of Turbines	2
20	Turbine Speed	600 RPM
21	Continuous Over Load Capacity or Rated Output	3142 kW

22	Efficiency at rated output	92.7%
23	Continuous Over Load Capacity	110%
24	Rated Net Head in (m)	48.0 m
25	Rated discharge at rated head in (cumecs)	7.21 cumecs
Forebay		
26	FSL	EL 195.60 m
27	MDDL	EL 199.20 m
28	Forebay Floor Level	EL 195.60 m
29	Top of Side Walls	EL 199.20 m
30	Size	40.0m (L) * 2.5 m (B)
Power House		
31	Type	Surface/Pit type
32	Size	40.80* 21.40 m
33	Installed Capacity	6.0 MW
34	No of Bays	2unit bays and one service bay
35	Generator Floor Level	143.50m
36	Switch Gear room floor level	150.50m
37	Control Room Floor Level	150.50m
38	Gross Head	54.60 m
39	Net Head	48.00 m
Transmission Lines 110kV		
40	Length	12.1 KM to Kakkinje Pooling Station point of Energy Recording.
41	Terminal Point	Kakkinje pooling station, KPTCL 33 kV substation
42	Type	33 kV Single Circuit
Water Conductor System		
43	Type	Circular Steel Pipe
44	Nos	1
45	Size	4.91Sq Mtrs
46	Length	725 m
47	Wall Thickness	14 m
Tail Race Channel		
48	Type	Open Channel
49	Size	11.0m Wide x 25m long
Monitoring Equipment		
50	Monitoring Equipment (Electricity meter) type	Trivector Energy Meter
51	Electricity meter accuracy class	0.2s.
52	Location of Electricity meter	At the pooling station which is 12.1 km from the plant site

Technical Specification of Charmadi Mini Hydel Scheme (CMHS) (4.5 MW)

The components involved in the Charmadi Mini Hydel Scheme are pick up weir, open channel/Penstock, Surge Tank, Power House and Tail race channel. Electricity will be generated at a lower voltage, which will be stepped up to higher voltage level within the project boundary to facilitate export of power to KPTCL.

S. No	Parameters	Specifications
Generator		

1	Make	WEG
2	No of Generating Units	02
3	Capacity of Each Generating Units	2250 kW
4	Total Capacity of this project activity	4500 kW
5	Type of generator	3 phase, Synchronous Generator
6	Excitation System	Brushless
7	Power Factor	0.85
8	Rated Frequency	50HZ
9	Rated Speed	500 RPM
10	Generation Voltage	11kV
11	Efficiency of Generator at 100% rated output	95.0%
Penstock		
12	No of Penstock	1
13	Length of Penstock	800 m
14	Internal Dia	2.10 m
15	Shell thickness	14 mm
16	Type	Steel Penstock
Turbine		
17	Make	HPP Energy (India) Pvt Ltd
18	Type of Turbine	Horizontal Francies
19	No of Turbines	2
20	Turbine Speed	500 RPM
21	Efficiency at rated output	85%
22	Continuous Over Load Capacity or Rated Output	2250 kW + 10% Overload
23	Rated Net Head in (m)	39 m
24	Rated discharge at rated head in (c umecs)	7.75 cumecs
Forebay		
25	FSL	EL 186.0 m
26	MDDL	EL 188.00 m
27	Forebay Floor Level	EL 190.0 m
28	Top of Side Walls	EL 190.0 m
29	Size	35.00 m (L) * 2.50 m (B)
Power House		
30	Type	Surface/Pit type
31	Size	36.0 * 18.00 m
32	Installed Capacity	4.5 MW
33	No of Bays	2 unit bays and one service bay
34	Generator Floor Level	140.0m
35	Switch Gear room floor level	150.0m
36	Control Room Floor Level	150.0m
37	Gross Head	42.0 m
38	Net Head	39.0 m
Transmission Lines 110kV		
39	Length	7.00 KM to Kakkinje Pooling Station point of Energy Recording.
40	Terminal Point	Kakkanje Pooling Station, KPTCL 33 kV substation
41	Type	110 kV Single Circuit
Water Conductor System		
42	Type	Circular Steel Pipe

43	Nos	1
44	Size	3.46Sq mtrs
45	Length	800 m
46	Wall Thickness	0.014 m
Tail Race Channel		
47	Type	Open Channel
48	Size	18m Wide x 25m long
Monitoring Equipment		
49	Monitoring Equipment (Electricity meter) type	Trivector Energy Meter
50	Electricity meter accuracy class	0.2s.
51	Location of Electricity meter	At the pooling station which is 7.0 km from the plant site

Information on the implementation of project activity

AHSHP was commissioned on 13/08/2009 and CMHS on 05/072008.

Monitoring Period Number	Monitoring Period Duration	Status of Verification
1 st Monitoring Period	07/05/2015 – 30/06/2017	Current monitoring period

Information on the actual operation of the project activity

During the monitoring period (07/05/2015 – 30/06/2017) the project activity was operated and monitored in accordance with the applicable baseline and monitoring methodology AMS ID and registered PDD.

Both the projects were in operation and no abnormal circumstance occurred during this monitoring period. All the events are recorded in the log book available at the project site. As a part of regular maintenance the machines are stopped for mechanical and electrical maintenance.

B.2. Post-registration changes

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

>>NA

B.2.2. Corrections

>>NA

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

>>NA

B.2.4. Inclusion of monitoring plan

>>NA

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

>>NA

B.2.6. Changes to project design

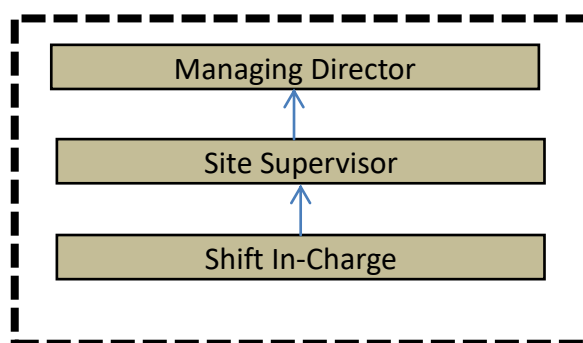
>>NA

SECTION C. Description of monitoring system

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Project Management Plan:

For the purpose of internal audit, PP has formulated Project Management plan. A CDM project team is constituted with participation from relevant departments. People are trained on CDM concept and monitoring plan. This team will be responsible for data collection and archiving. This team will meet periodically to review CDM project activity check data collected, emissions reduced etc. On a weekly basis, the monitoring reports are checked and discussed by the seniors CDM team members/managers. In case of any irregularity observed by any of the CDM team member, it is informed to the concerned person for necessary actions. Once in six months the report of Internal Auditor is forwarded to the management level.



Managing Director: MD has the responsibility to comply with the CDM monitoring plan.

Site Supervisor: Responsibility for completeness of data, reliability of data (calibration of meters), and monthly report generation.

Shift In-charge: Responsibility of daily report generation.

Parameters requiring monitoring:

The parameter required for the estimation of emission reductions is the net electricity exported to the KPTCL grid, which is calculated as electricity exported to the grid by the project minus the electricity imported from the grid by the project activity.

Completeness: For Electricity generation data: The project activity has installed the latest state of art monitoring and control equipment that measure, record, report, monitor and control various key parameters. Real time data collection happens using these control systems. An hourly log of data is also prepared by the shift in-charge. A daily report of aggregation of these data is also prepared. Parameters monitored are power exported to the grid and power imported from the grid.

Reliability: For Electricity generation data automatic control meters regarding power generation and exports are regularly maintained. The regular plant operating & maintenance procedures also include process of regular meter testing, calibration & maintenance.

A Joint Monitoring Report (JMR) is prepared on the basis of the joint meter reading taken by the plant personnel and KPTCL. Actual power generation data is also metered using power output meter maintained by KPTCL. Every year KPTCL calibrates these meters.

The receipt of sales shall be used to validate the data accuracy.

Frequency- Net energy supplied is measured continuously and recorded monthly A monthly Joint Monitoring Report (JMR) is prepared.

The Main meter and Check Meter in the switchyard are sealed by KPTCL and are generally calibrated once in a year by KPTCL with a pre-calibrated meter. The installed meters are two-way meter and are used for both export and import.

Accuracy: The meters have high accuracy level of 0.2%.

Calibration of meters: Calibration of main meters and check meters is done on yearly by KPTCL people.

Dealing with uncertainty: Check meters are provided in line with main meters to take care of any uncertainty related to electricity measurement.

Data storage and Archiving

All the data items monitored under the monitoring plan will be kept for 2 years after the end of crediting period or till the last issuance of CERs for this project activity whichever occurs later. The monitored data will be presented to an independent verification agency or DOE to whom verification of emission reductions will be assigned.

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 (part of usual plant performance data monitoring).

Emergency Preparedness Plan: Plant has a documented Emergency Preparedness plan. This plan covers operating procedures, Do's and Don't' during emergency.

Monitoring of sustainable development indicator: The project activity contributes to sustainable development of the region. GHG reduction, power generation and employment generation are the main benefits arising from the project implementation. GHG reduction and power generation are monitored regularly as explained in the above monitoring plan. The project activity also keeps a record of number of people employed directly in the project activity.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	NCV _{diesel,y}
Unit	TJ/Gg
Description	Net calorific value of diesel
Source of data	IPCC Default value ("2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy, Tables 1.4 and 2.2 ") IPCC default values at the lower 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
Value(s) applied	41.4
Choice of data or measurement methods and procedures	IPCC value has been used for the fuel type since no country specific oxidation factor is available. In case of any revision in the IPCC guidelines, the revised value shall be taken into account.
Purpose of data/parameter	Calculation of project emissions
Additional comments	-

Data/Parameter	EF _{co2 diesel, y}
Unit	t CO2/TJ
Description	Weighted average CO2 emission factor of the diesel consumed in the project activity in year y.
Source of data	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.
Value(s) applied	74.8
Choice of data or measurement methods and procedures	IPCC values have been used for emission factor of diesel because no country specific data is available. In case of any revision in the IPCC guidelines, the revised value shall be taken into account.
Purpose of data/parameter	Calculation of project emissions
Additional comments	-

Data/Parameter	EF _y
Unit	t CO2/GWh
Description	CO2 emission factor for the regional grid system.
Source of data	CEA published grid emission factors
Value(s) applied	900.1
Choice of data or measurement methods and procedures	Average of 3 year OM (2009 to 2012) and latest year of BM (2011-12). With a view to obtaining uniformity of approach in the country towards a common objective, Central Electricity Authority (CEA) values have been used, which are authentic and are made available publicly by Govt of India.
Purpose of data/parameter	The data is used to calculate emission reductions.
Additional comments	The Combined Margin Emission Factor has been calculated as a weighted sum of Operating Margin emission factor and Build Margin emission factor taking the weight age value as 0.50 and 0.50 respectively.

D.2. Data and parameters monitored

AHSHP is facility 1 and CMHS is Facility 2

Data / Parameter:	EG _{facility1, export, y}
Unit:	MWh/yr
Description:	Quantity of electricity supplied by the project plant/unit to the grid in year y
Measured/ Calculated / Default:	Measured
Source of data:	From the Joint Meter Reading (JMR)
Value(s) of monitored parameter:	21654

Monitoring equipment:	<p>Meter type: Trivector Accuracy Class: 0.2s Meter Serial No: Main Meters: 14194465 Check Meters: 14194471</p> <p>Calibration Frequency: Annually Meters (main & check) calibration dates covering current monitoring period: 04/07/2014, 20/06/2015, 16/10/15, 12/07/2016 Date of last Calibration: 12/07/2016 Validity of last Calibration Report: 11/07/2017</p>
Measuring/ Reading/ Recording frequency:	<p>Measuring Frequency: Continuous Frequency of Recording: Monthly</p>
Calculation method (if applicable):	Not Applicable
QA/QC procedures:	<p>The metering equipment is maintained in accordance with electricity standards and is of accuracy class 0.2.</p> <p>Every month these readings are recorded in the presence of plant personnel and KPTCL, 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 in the custody of KPTCL and are calibrated every year. Records of meter reading are maintained at Project site.</p>
Purpose of data:	Calculation baseline emissions
Additional comment:	

Data / Parameter:	EG_{facility1, import, y}
Unit:	MWh/yr
Description:	Quantity of electricity imported by the project plant/unit from the grid in year y
Measured/ Calculated / Default:	Measured
Source of data:	From the Joint Meter Reading
Value(s) of monitored parameter:	142
Monitoring equipment:	<p>Meter type: Trivector Accuracy Class: 0.2s Meter Serial No: Main Meters: 14194465 Check Meters: 14194471</p> <p>Calibration Frequency: Annually Meters (main & check) calibration dates covering current monitoring period: 04/07/2014, 20/06/2015, 16/10/15, 12/07/2016 Date of last Calibration: 12/07/2016 Validity of last Calibration Report: 11/07/2017</p>
Measuring/ Reading/ Recording frequency:	<p>Measuring Frequency: Continuous Frequency of Recording: Monthly</p>
Calculation method (if applicable):	Not Applicable

QA/QC procedures:	<p>The metering equipment is maintained in accordance with electricity standards and is of accuracy class 0.2.</p> <p>Every month these readings are recorded in the presence of plant personnel and KPTCL, which are archived for cross-checking.</p> <p>These meter readings are used to determine the electricity supplied to the grid by the project activity.</p> <p>The meters are in the custody of KPTCL and are calibrated every year. Records of meter reading are maintained at Project site.</p>
Purpose of data:	Calculation baseline emissions
Additional comment:	

Data / Parameter:	EG_{facility1,y}
Unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Measured/ Calculated / Default:	Calculated
Source of data:	From the Joint Meter Reading/Invoice
Value(s) of monitored parameter:	21512
Monitoring equipment:	<p>The net electricity supplied to the grid is the difference of power exported to the grid (EG_{facility1, export y}) and power imported from the grid (EG_{facility1, import y}). This is a calculated value:</p> $\mathbf{EG_{facility1,y} = \{ (EG_{facility1, export y}) - (EG_{facility1, import y}) \}}$ <p>A monthly Joint Meter Reading (JMR) is prepared and the summation of the same has been considered for the purpose of raising of Invoice and the same has been taken for emission reduction calculation</p>
Measuring/ Reading/ Recording frequency:	<p>Measuring Frequency: Continuous</p> <p>Frequency of Recording: Monthly from Energy Meter, Summarized Annually</p>
Calculation method (if applicable):	$\mathbf{EG_{facility1,y} = EG_{Facility1, Export, y} - EG_{Facility1, Import, y}}$
QA/QC procedures:	<p>The metering equipment is maintained in accordance with electricity standards and is of accuracy class 0.2.</p> <p>Every month these readings are recorded in the presence of plant personnel and KPTCL, which are archived for cross-checking.</p> <p>These meter readings are used to determine the electricity supplied to the grid by the project activity.</p> <p>The meters are in the custody of KPTCL and are calibrated every year. Records of meter reading are maintained at Project site.</p>
Purpose of data:	Calculation baseline emissions
Additional comment:	--

Data / Parameter:	EG_{facility2, export, y}
Unit:	MWh/yr
Description:	Quantity of electricity supplied by the project plant/unit to the grid in year y
Measured/ Calculated / Default:	Measured
Source of data:	From the Joint Meter Reading (JMR)

Value(s) of monitored parameter:	11526
Monitoring equipment:	<p>Meter type: Trivector Accuracy Class: 0.2s Meter Serial No Main Meters: 14194495 Check Meters: 14194493</p> <p>Calibration Frequency: Annually Meters (main & check) calibration dates covering current monitoring period: 04/07/2014, 20/06/2015, 16/10/15, 12/07/2016 Date of last Calibration: 12/07/2016 Validity of last Calibration Report: 11/07/2017</p>
Measuring/ Reading/ Recording frequency:	<p>Measuring Frequency: Continuous Frequency of Recording: Monthly</p>
Calculation method (if applicable):	Not Applicable
QA/QC procedures:	<p>The metering equipment is maintained in accordance with electricity standards and is of accuracy class 0.2.</p> <p>Every month these readings are recorded in the presence of plant personnel and KPTCL, 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 in the custody of KPTCL and are calibrated every year. Records of meter reading are maintained at Project site.</p>
Purpose of data:	Calculation baseline emissions
Additional comment:	

Data / Parameter:	EG_{facility2, import, y}
Unit:	MWh/yr
Description:	Quantity of electricity imported by the project plant/unit from the grid in year y
Measured/ Calculated / Default:	Measured
Source of data:	From the Joint Meter Reading
Value(s) of monitored parameter:	164
Monitoring equipment:	<p>Meter type: Trivector Accuracy Class: 0.2s Meter Serial No Main Meters: 14194495 Check Meters: 14194493</p> <p>Calibration Frequency: Annually Meters (main & check) calibration dates covering current monitoring period: 04/07/2014, 20/06/2015, 16/10/15, 12/07/2016 Date of last Calibration: 12/07/2016 Validity of last Calibration Report: 11/07/2017</p>
Measuring/ Reading/ Recording frequency:	<p>Measuring Frequency: Continuous Frequency of Recording: Monthly</p>

Calculation method (if applicable):	Not Applicable
QA/QC procedures:	<p>The metering equipment is maintained in accordance with electricity standards and is of accuracy class 0.2.</p> <p>Every month these readings are recorded in the presence of plant personnel and KPTCL, which are archived for cross-checking.</p> <p>These meter readings are used to determine the electricity supplied to the grid by the project activity.</p> <p>The meters are in the custody of KPTCL and are calibrated every year. Records of meter reading are maintained at Project site.</p>
Purpose of data:	Calculation baseline emissions
Additional comment:	

Data / Parameter:	EG_{facility2,y}
Unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Measured/ Calculated / Default:	Calculated
Source of data:	From the Joint Meter Reading/Invoice
Value(s) of monitored parameter:	11362
Monitoring equipment:	<p>The net electricity supplied to the grid is the difference of power exported to the grid (EG_{facility2, export y}) and power imported from the grid (EG_{facility2, import, y}). This is a calculated value:</p> $\mathbf{EG_{facility2,y} = \{(EG_{facility2, export y}) - (EG_{facility2, import, y})\}}$ <p>A monthly Joint Meter Reading (JMR) is prepared and the summation of the same has been considered for the purpose of raising of Invoice and the same has been taken for emission reduction calculation</p>
Measuring/ Reading/ Recording frequency:	<p>Measuring Frequency: Continuous</p> <p>Frequency of Recording: Monthly from Energy Meter, Summarized Annually</p>
Calculation method (if applicable):	$\mathbf{EG_{facility2,y} = EG_{Facility2, Export, y} - EG_{Facility2, Import, y}}$
QA/QC procedures:	<p>The metering equipment is maintained in accordance with electricity standards and is of accuracy class 0.2.</p> <p>Every month these readings are recorded in the presence of plant personnel and KPTCL, which are archived for cross-checking.</p> <p>These meter readings are used to determine the electricity supplied to the grid by the project activity.</p> <p>The meters are in the custody of KPTCL and are calibrated every year. Records of meter reading are maintained at Project site.</p>
Purpose of data:	Calculation baseline emissions
Additional comment:	--

Data / Parameter:	EG_{BL,y} ((EG_{facility1,y} + EG_{facility2,y}))
Unit:	MWh/yr
Description:	<p>Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y.</p> <p>(EG_{BL,y} is calculated by addition on of EG_{facility1, y} + EG_{facility2,y}.)</p> <p>Quantity of net electricity generation supplied by the AHSHP and CMHS project plant/unit to the grid in year y</p>

Measured/ Calculated / Default:	Calculated
Source of data:	From the Joint Meter Reading/Invoice
Value(s) of monitored parameter:	32874
Monitoring equipment:	The net electricity supplied to the grid by AHSHP and CMHS Projects. A monthly Joint Meter Reading (JMR) is prepared for AHSHP Project and CMHS Project and the summation of the same has been considered for the purpose of emission reduction calculation. $EG_{BL,y} = EG_{facility1,y} + EG_{facility2,y}$
Measuring/ Reading/ Recording frequency:	Measuring Frequency: Continuous Frequency of Recording: Monthly from Energy Meter, Summarized Annually Net energy supplied is measured & calculated continuously and recorded monthly. A monthly Joint Meter Reading (JMR) is prepared for AHSHP Project and CMHS Project and the summation of the same has been considered for the purpose of emission reduction calculation.
Calculation method (if applicable):	$EG_{facility2,y} = EG_{Facility2, Export, y} - EG_{Facility2, Import, y}$
QA/QC procedures:	The metering equipment is maintained in accordance with electricity standards and is of accuracy class 0.2. Every month these readings are recorded in the presence of plant personnel and KPTCL, which are archived for cross-checking. These meter readings are used in the calculations to determine the electricity supplied to the grid by the project activity. The meters are in the custody of KPTCL and are calibrated every year. Records of meter reading are maintained at Project site.
Purpose of data:	Calculation baseline emissions
Additional comment:	--

Data / Parameter:	FC_{diesel, y}
Unit:	Mass or volume unit per year
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
Monitoring equipment:	<u>Measurement Procedure:</u> The total number of operating hours of DG set and the quantity of diesel consumed in the project activity will be recorded in the log book maintained at the DG set room. Before pouring the diesel into the DG set, Shift in Charge shall measure the amount of diesel and entered into the log book. Dip stick/level gauge is used for measurement of diesel. <u>Accuracy of the Measurement Method:</u> To confirm the accuracy on measurement of quantity of diesel consumed in the project activity can be cross checked against the fuel purchase receipts. <u>Responsibility:</u> Log book sheet would be maintained by the shift in charge and same would be crossed checked by the General Manager of the project activity.
Measuring/ Reading/ Recording frequency:	<u>Monitoring Frequency:</u> Continuously <u>Recording Frequency:</u> Monthly, Summarized Annually <u>Calibration Frequency:</u> Once in a year <u>Archiving Policy:</u> Paper & / Electronic
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:	Calculation of project emissions
Additional comment:	--

D.3. Implementation of sampling plan

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No sampling plan is followed by PP

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

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The Baseline emission calculation is based on ex-ante option chosen and as per the registered PDD the value i.e. $EF_y = 0.9001$ tons CO_2 /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 approved PDD.

$$BE_y = EG_y \times EF_y$$

Where,

BE_y is baseline emissions in year y, tCO₂e

EG_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 (0.9001 tCO₂e/MWh fixed ex-ante).

Baseline Emission for the period (07/05/2015 to 30/06/2017)

$$= 32,874 \text{ (MWh)} \times 0.9001 \text{ (tCO}_2\text{/MWh)}$$

$$= 29,589 \text{ tCO}_2 \text{ (rounded down)}$$

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 the ACM0002 there are no project related emissions.

However, 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 CO₂ emissions from fossil fuel combustion" version 2.

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

$$PE_{\text{diesel}, y} = FC_{\text{diesel}, j, y} \times NCV_{\text{diesel}, y} \times EF_{CO_2, \text{diesel}, y}$$

Where,

$FC_{\text{diesel}, y}$ = quantity of diesel used during the year

$NCV_{\text{diesel}, y}$ = weighted average net calorific value of diesel in year y (41.4 TJ/Gg)

$EF_{CO_2, \text{diesel}, y}$ = weighted average CO₂ emission factor of fuel type diesel in year y

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

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

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>)

$NCV_{\text{diesel}, y} = 41.4 \text{ TJ/Gg}$

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)

$EF_{CO_2, \text{diesel}, y} = 74.8 \text{ t CO}_2/\text{TJ}$

IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 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)

Project Emission for the period (07/05/2015 to 30/06/2017)

$$= (0/10^3) \times 0.82 \times 41.4 \times 74.8 = 0.00$$

= 0.00 tCO₂ (rounded up)

E.3. Calculation of leakage emissions

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As per AMS ID 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 ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	29,589	0	0	0	29,589	29,589

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 ₂ e)	Amount estimated ex ante (t CO ₂ e)
29,589	57,107

E.6. Remarks on increase in achieved emission reductions

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The Emission Reduction (ER) value in the monitoring period is 48.19% lower as compared to the value estimated in the registered PDD. Such variation has been due to the poor rainfall and unfavourable monsoon season. The water flow in the streams had been not as desirable during the operational period in the monitoring period and hence significant impact can be seen on the generation.

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
06.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • 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: <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 (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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