Monitoring report form

(Version 05.1)

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form" at the end of this form.

MONITORING REPORT		
Title of the project activity	Dagachhu Hydropower Project, Bhutan	
UNFCCC reference number of the project activity	2746	
Version number of the monitoring report	02	
Completion date of the monitoring report	16/02/2017	
Monitoring period number and duration of this monitoring period	Second monitoring period Duration: 01/01/2016 to 31/12/2016 (first and last days are included)	
Project participant(s)	1. Bhutan: Dagachhu Hydro Power Corporation Limited 2. India: Tata Power Trading Company Ltd. 3. Sweden: Asian Development Bank as trustee of Future Carbon Fund 4. Sweden: Swedish Energy Agency	
Host Party	Bhutan and India	
Sectoral scope(s)	Sectoral Scope 01 - Energy industries (renewable/ non-renewable sources)	
Selected methodology(ies)	ACM0002 ver. 7 - Consolidated methodology for grid-connected electricity generation from renewable sources	
Selected standardized baseline(s)	Not Applicable	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	514,955 tCO_2e	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0	349,239 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>> The Dagachhu Hydropower Project with an installed capacity of 126 MW (2 units of 63 MW each) is a run-of-river hydropower project which is located on Dagachhu River in Dagana Dzongkhag (district) in Bhutan (the 'Project' or 'Dagachhu HPP'). The overall purpose of the Project is to generate electricity based on renewable energy sources. The electricity generated by the Project is being delivered to the regional grid consisting of Bhutan and the Indian grid[1]. The Project leads to reduce the greenhouse gas emissions while displacing the power which would otherwise be generated from the fossil fuel based electricity generation plants such as coal, diesel, gas, etc. Furthermore, the hydropower generated by the Project has contributed in increasing the share of renewable energy in the regional grid.

For Bhutan, the Project during the applied monitoring period has contributed with the great benefits to the national economy through the production and sale of hydropower. The Project has also contributed to the national environmental sustainability while reducing carbon dioxide (CO_2) emissions in the regional grid of Bhutan and grid of India. Furthermore, implementation of this Project in Bhutan was carried out within an overall CDM capacity building project, thereby providing the project developer (Dagachhu Hydro Power Corporation Limited – hereafter referred as DHPC) with necessary skills and know-how to utilize its CDM potential for other projects in the pipe line.

The development of the Project had improved access to public services, telephone services, roads, water supply and electricity. The construction of new access roads and the up-gradation of existing roads had improved the access to the Dagana Dzongkhag district. In general, the Project had provided significant social benefits to local community in terms of additional employment and business opportunities, better road access and electrification of the area and had improved the living standard.

For India, the Project contributes to the achievement of the national sustainability goals:

- Socio-Economic well-being: The Project supplies power to Indian grid and contributes in reducing chronic deficit.
- Environmental well-being: The Project displaces the power which would otherwise be generated from fossil fuel such as coal, diesel, gas etc.

The Civil Works of the Project was awarded to the Contractor on 20/07/2009 and Electro-Mechanical Works on 27/07/2009. The construction of the Project began from 01/10/ 2009. While the Unit 1 of the Project was commissioned on 21/02/ 2015, the Unit 2 was commissioned on 15/03/2015.

The total emission reductions achieved during the monitoring period (01/01/2016 to 31/12/2016) is 349,239 tCO_2e.

A.2. Location of project activity

Dagachhu Hydropower Project is located in Dagana Dzongkhag (District) in Bhutan on the Dagachhu River

A.2.1: Host Parties

[1] Eastern grid of India was integrated into the Northern, Eastern, Western, and North-Eastern regional grid (NEWNE grid) of India, and further the NEWNE grid is integrated with the Southern Grid (SR) of India also.

Bhutan and India

A.2.2 Region/State/Province etc

Dagana Dzongkhag (District)

A.2.3 City/Town/Community etc

Dagana Dzongkhag (District)

A.2.4 Physical/geographical location

>> The Dagana Dzongkhag is one of the remotest districts in Bhutan. Its total area is approximately 1400 km² and it lies between 26°50'N to 27°17'N and 89°41'E to 90°5'E. The Dzongkhag falls within the temperate zone in the north and sub-tropical zone in the south, with wet summers and cool and dry winters. About 79% of the total area is covered with forest. The Project uses the water of the Dagachhu, which is a tributary stream to the Punatsangchhu (Sunkosh) that drains into the Brahmaputra in India. The total size of the catchment area utilized by the Project is 676 km². The elevation within the catchment ranges from approximately 800 m to 4000 m.

The powerhouse is located about 11.5 km upstream of the junction of the Dagachhu and the Punatsangchhu. The intake is about 8.8 km upstream of the powerhouse.
The geographical coordinates of the Project are as follow;

Powerhouse: Latitude 26°57'56.1", Longitude 89°57'0 9.2"
Dam site: Latitude 27°01'50.2", Longitude: 89°55'27 .7"

Figure 1: Project Location

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
Bhutan (host)	Dagachhu Hydro Power Corporation Limited	Yes
India (host)	Tata Power Trading Company Ltd.	No
Sweden	Asian Development Bank as Trustee of the Future Carbon Fund	Yes
Sweden	Swedish Energy Agency	Yes

A.4. Reference of applied methodology and standardized baseline

>> The approved methodology applied is ACM0002 (Version 7) - Consolidated methodology for grid connected electricity generation from renewable sources.

For more information regarding the methodologies please refer to:
https://cdm.unfccc.int/methodologies/PAmethodologies/approved

A.5. Crediting period of project activity

>> Crediting period: 01/04/2014 – 31/03/2021 (Renewable)
Start date of crediting period: 01/04/2014
Length of crediting period: 7 years (Renewable)

A.6. Contact information of responsible persons/entities

>> Thinley Dorji
Chief Executive Officer
Dagachhu Hydro Power Corporation Limited
Dagana, Bhutan
Mobile No.: +975-17114660
Email: thinley06@gmail.com

Please refer to Appendix 1 for further details.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

>> The Project consists of a diversion weir, desilting chamber, head race tunnel, surge & pressure shaft, powerhouse and switchyard. The diversion weir diverts the water into the head race tunnel through channel and desilter. The water after reaching the bottom of surge shaft drops 271m to the powerhouse driving the turbine and generator to produce electricity. The electricity generated at 11kV by the generator is step up to 220kV in the switchyard and is fed into the Bhutan grid. The transmission line within Bhutan is used for transmission of electricity until India-Bhutan border and then is fed into the grid of India.

The details of the specification of the Generator and Turbine is as shown in the table below;

Generator

Manufacturer	Alstom
Type	SAV 435/175/22
Power factor	0.9 lagging
Rated Speed	272.1/min
Rated Frequency	50Hz
Power Output	63MW
Stator Voltage/Current	11kV/3674A
Rotor Voltage/Current	182V/973A
Insulation Class	F

Turbine

Manufacturer	Andritz
Rated Speed	272.7 rpm
Net Head	282 m
Rated Output	63MW
Rated Discharge	$25m^3/s$
Number of Nozzle	6
Rotation	Clockwise
Year of manufacturing	2012
Year of Commissioning	2014

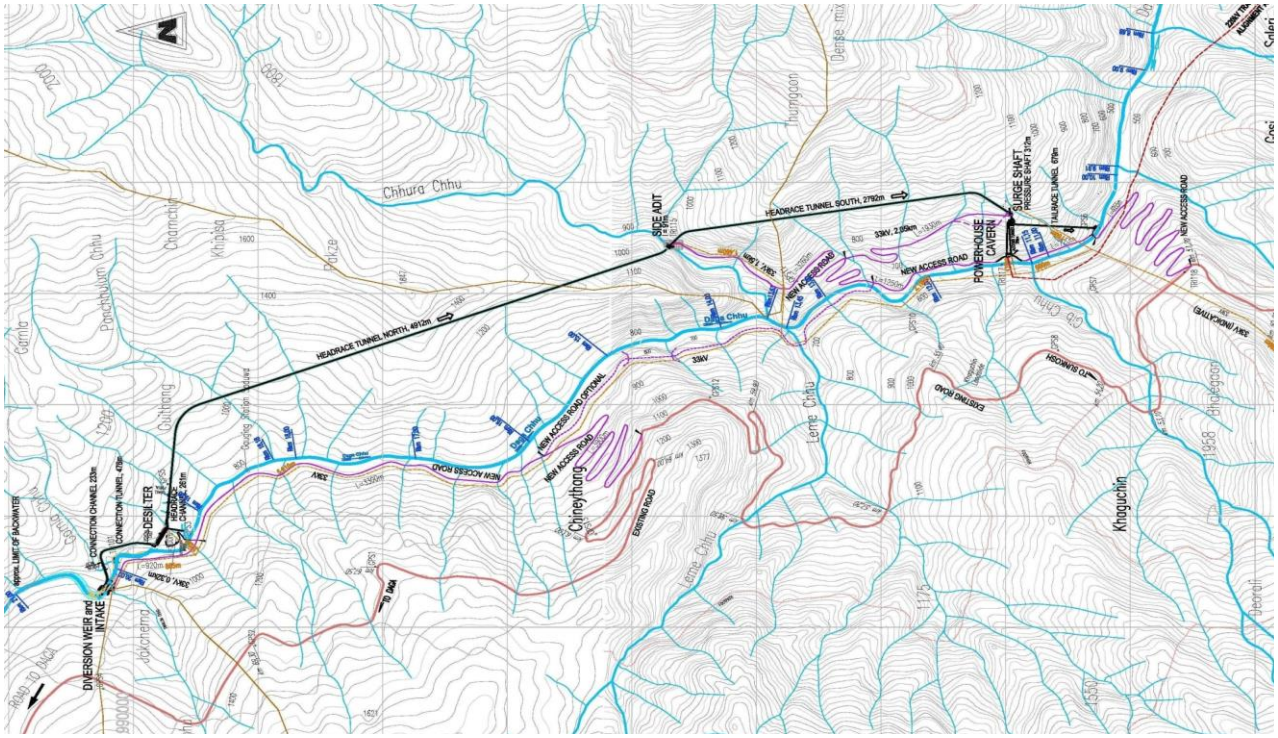

Figure 2: Overall layout of the Dagachhu Hydropower Project

All the components of the Project were constructed and implemented as per the description in the revised registered PDD. The two turbine-generator units (Unit 1 and Unit 2) were put into operation on 21/02/2015 and 15/03/2015 respectively. The Project is being operated and monitored as per the monitoring plan of the registered PDD.

The details of the power plant shutdown during the Monitoring period are as indicated in the table below;

Month	Outages & shutdown taken in Hours		Reason
Jan-16		744	The plant was under shut down due to rectification of Tail Race Tunnel
Feb-16		696	
Mar-16		513	511 hr of shut down due to rectification work which continued till March 22, 2016. 2 hr of outages is due to failure of the Grid
Apr-16		3	System failure
May-16		2	System failure
Jun-16		3.5	
Jul-16		6	
Aug-16		0	
Sep-16		290	The Outages is mainly due to failure of 220kV Transformer
Oct-16		10	System failure
Nov-16			
Dec-16		3	System Failure

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

>> No deviation in monitoring plan, applied methodology and standardised baseline.

B.2.2. Corrections

>> Not Applicable

B.2.3. Changes to start date of crediting period

>> The crediting period of the Project was revised to 01/04/2014 – 31/03/2021 (Renewable). Due to delay in the actual commissioning of the generating Unit 1 and Unit 2, the project developer has requested UNFCCC to change the crediting period from 01/01/2012 – 31/12/2018 to 01/04/2014 – 31/03/2021. The request was approved by UNFCCC on 06 November 2013 (with effective approval date of 04 November 2013).

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

>> Not applicable

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

>> There is no change in the monitoring plan. While the registered PDD had envisaged Eastern grid of India as the baseline for calculation of emission factor, the Eastern grid of India had been integrated into Northern, Eastern, Western, and North-Eastern regional grid (NEWNE grid) of India. The NEWNE grid has been further synchronized with the Southern Grid too, thereby forming an integrated Single Indian Grid. This integration of the grids was beyond under the control of the project developer. Since the project activity displaces the grid electricity of Indian grid, the emission factor of the Indian grid as published by Central Electricity Authority of India has been used for calculation of emission reductions from the project activity.

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

>> No change in the project design from registered project activity.

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

>> Not Applicable

SECTION C. Description of monitoring system

>> Dagachhu Hydro Power Corporation Limited (DHPC) has established the precise and well-defined monitoring procedure for the Project and ensured the accurate calculation of emission reductions. The Project employs latest state-of-the-art monitoring and control equipment, which also measure net electricity generated (i.e. power supplied to the grid). The monitoring procedures used in this project to enable the correct calculation of generated emission reductions are as shown below:

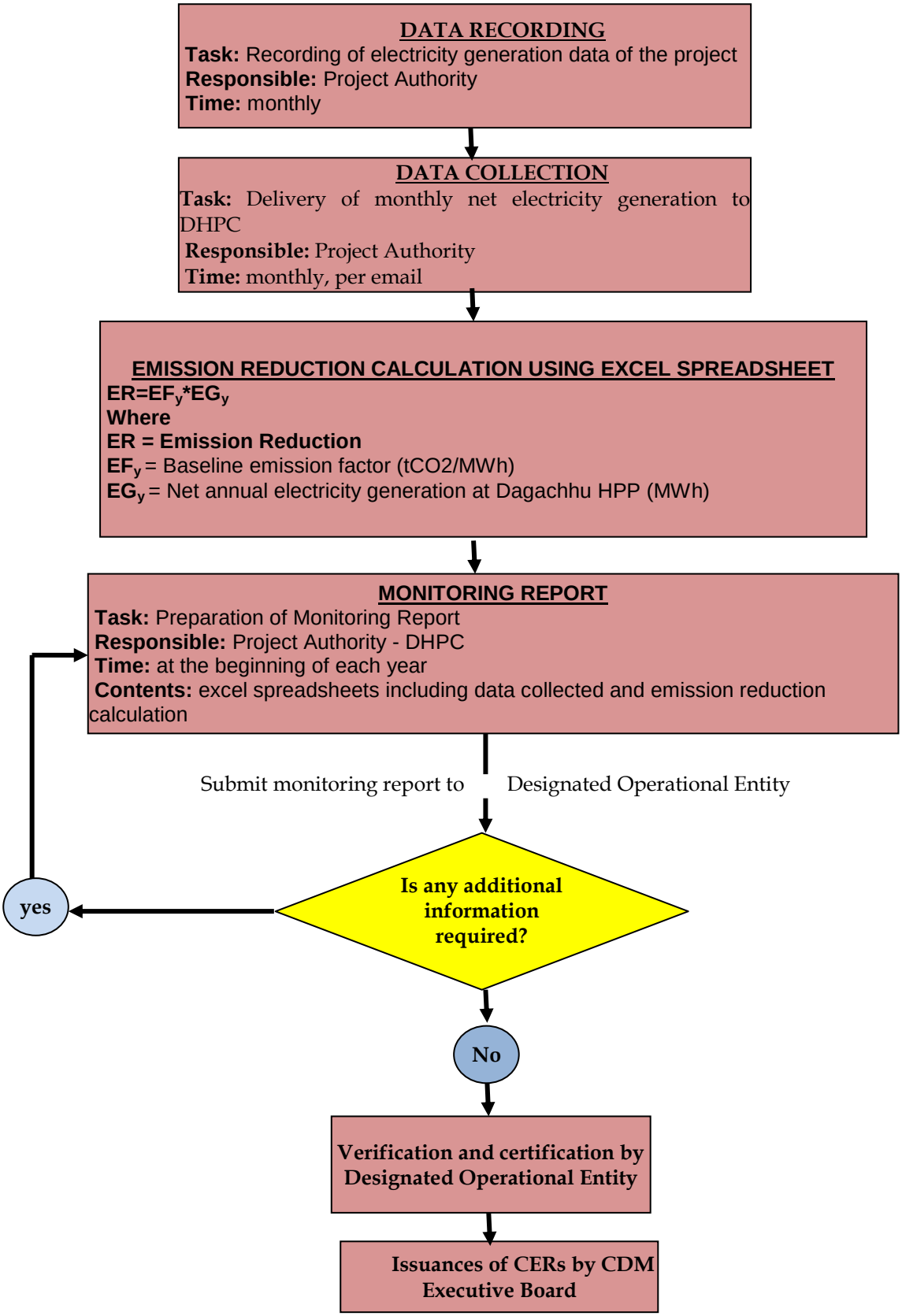

Figure 3: Monitoring Procedure

Description of monitoring system

The approved monitoring methodology ACM0002 (Version 07) is used for developing the monitoring plan. Monitoring tasks have been implemented according to the monitoring plan in order

to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reductions for the proposed project is monitored and reported.

Monitoring data and parameters

The main monitoring parameters include net annual electricity generated by the Project and supplied to the grid (EG_y); installed capacity of the Project (Cap_{PJ}); surface area of the reservoir at full water level (A_{PJ}); CO_2 combined emission factor of the regional power grid ($EF_{grid,CM,y}$); CO_2 operating margin emission factor of the grid ($EF_{grid,OMy}$); CO_2 build margin emission factor of the grid ($EF_{grid,BMy}$); and CO_2 emission coefficient of each fuel type ($COEF_i$). As stated in the registered PDD, the ex-post option has been used for the calculation of baseline emission factor (EF_y).

Monitoring Organization

The monitoring of the emission reductions achieved by the Project during the monitoring period has been carried out as per the organizational structure presented below in Figure 4. The Chief Executive Officer of the plant is responsible for the overall monitoring process, but as indicated in the organization chart shown below, the process is delegated to the Monitoring Officer.

The Electricity generated and supplied to the grid on daily basis are recorded by the team of O&M Division. Later the recorded data are submitted to the Monitoring Officer. The Monitoring Officer is responsible for verification of the measurement, recording, collection of sales receipts and the calculation of the emission reductions for verification purpose. The Monitoring Officer prepares the monitoring report which is then reviewed by the Chief Executive Officer.

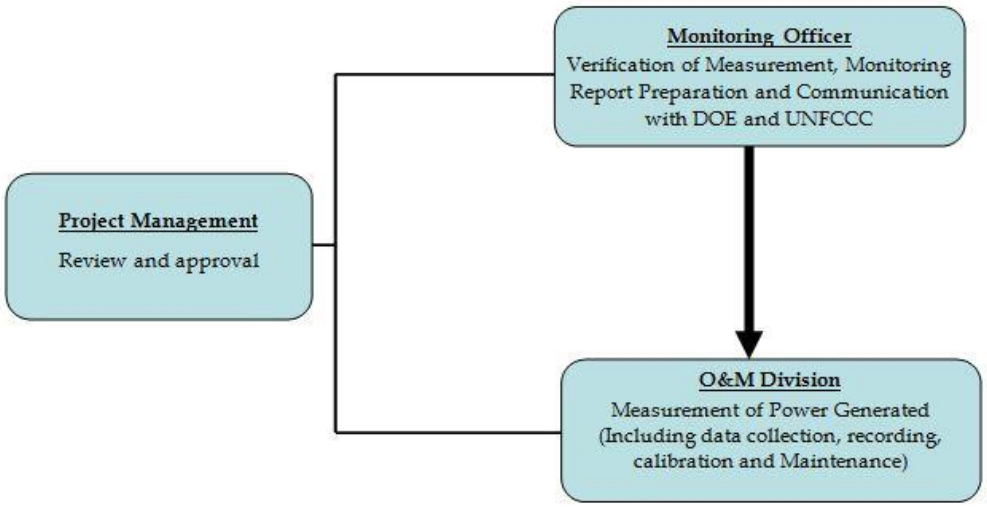

Figure 4: Organizational Structure – Monitoring of the Project

Monitoring Equipment and Program

The electricity generated by the Project and supplied to the grid is being monitored using the energy meters (main meter and check meter) installed at the DHPC powerhouse. DHPC submits a day-ahead schedule for the electricity that is expected to be generated and supplied to NEWNE grid, to National Load Dispatch Centre (NLDC) of Bhutan and NLDC later submits the schedule to Eastern Region Load Dispatch Centre (ERLDC) of India. The readings from the energy meters installed at DHPC powerhouse are submitted to ERLDC on weekly basis. ERLDC compares the scheduled energy and the actual energy supplied by Dagachhu HPP to the grid. Any difference in the actual and the scheduled energy is being treated as Deviation. The check meter is used as back up for the main meter. The reading of the main meter is cross checked with the check meter installed on the same core of CTs & VTs.

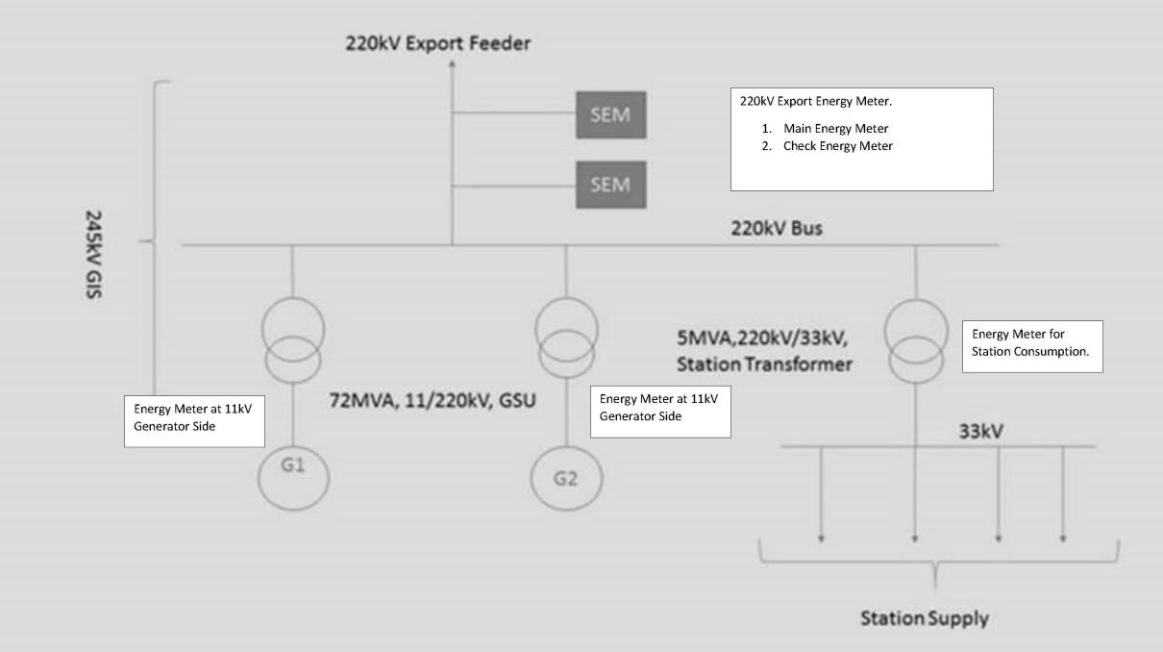

Figure 5: Monitoring Location

The electricity generated from two generator units (Unit I and Unit 2) at 11 kV is step up to 220kV and connected to a 220kV bus bar. The generated electricity is then exported to India using the regional grid of Bhutan which feeds the electricity into Indian grid at India-Bhutan border. The main meter and check meter are installed on the 220kV export feeder at DHPC powerhouse and being measured for the net electricity generated by the Project and supplied to the grid.

The electricity generated from Dagachhu HPP is being exported to India on day-ahead schedule basis. However, the actual electricity exported to India is measured using the export meter (i.e. main meter) installed at 220kV Ex-bus bar (outgoing 220kV export feeder) at DHPP powerhouse on weekly basis and submitted to ERLDC of India. The energy measured through the export meter is net of the auxiliary consumptions.

Calibration

Both the energy meters are calibrated in accordance with the national standards to ensure its accuracy and are meeting the requirements of these standards. The calibration of energy meters before commissioning of the Project was conducted by Center of Excellency for Control and Protection (CoECaP), Druk Green Power Corporation Limited in presence of DHPC, Bhutan Power Corporation (BPC) and Tata Power Trading Company Limited.

The details of the Main Meter and the Check Meter are as follows:

Table: Parameter of Meters

	Main Meter	**Check Meter**
Type	ER300P	ER300P
Make	L&T	L&T
Accuracy class	0.2S	0.2S
Serial No.	NP-8703A	NP-8702A
Configuration	3 Phase-4 wire	3 Phase -4 wire
Calibration Dates	24/09/2015 21/09/2016	24/09/2015 21/09/2016
Calibration Frequency	Annual	Annual

The main export energy meter and the check energy meter are tested annually by Center of Excellency for Control and Protection (CoECaP), Druk Green Power Corporation Limited in presence of DHPC, Bhutan Power Corporation (BPC) and representatives from shareholders. In case main meter shows discrepancies beyond the permissible limits, the readings of the check energy meter will be used for accounting. If both the energy meters are faulty, the energy can be calculated using energy recorded at the receiving end through Joint Energy Meter Reading of same date and time and by adding network losses to it. The network losses can be obtained from Bhutan Power System Operator.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

(Copy this table for each piece of data and parameter)

Data/parameter:	There is no ex ante parameter as per the registered PDD and hence this table is left blank.
Unit	NA
Description	NA
Source of data	NA
Value(s) applied)	NA
Choice of data or measurement methods and procedures	NA
Purpose of data	NA
Additional comments	NA

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter:	EG_y
Unit:	MWh
Description:	Net annual electricity generated at Dagachhu HPP and supplied to the grid
Measured/ Calculated / Default:	• The electricity supplied to grid is measured using the export meter (i.e. main meter) installed at DHPC powerhouse and the transmission loss till India-Bhutan Border is been net off.
Source of data:	• Joint Energy Meter Reading (JEMR)
Value(s) of monitored parameter:	01/01/2016-31/12/2016= 362,898.90

<table>
<tr><td>Monitoring equipment:</td><td>Energy meters with an accuracy level of 0.2s are installed on the outgoing feeder of 220kV line. Information on the meters is listed below
Main Meter
<table>
<tr><td>Type</td><td>ER300P</td></tr>
<tr><td>Make</td><td>L&T</td></tr>
<tr><td>Accuracy class</td><td>0.2S</td></tr>
<tr><td>Serial No.</td><td>NP-8703A</td></tr>
<tr><td>Configuration</td><td>3 Phase -4 wire</td></tr>
<tr><td colspan="2">Check Meter</td></tr>
<tr><td>Type</td><td>ER300P</td></tr>
<tr><td>Make</td><td>L&T</td></tr>
<tr><td>Accuracy class</td><td>0.2S</td></tr>
<tr><td>Serial No.</td><td>NP-8702A</td></tr>
<tr><td>Configuration</td><td>3 Phase -4 wire</td></tr>
</table></td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>The electricity is monitored continuously and recorded every 15 minutes and reported on monthly basis in form of JEMR taken by DHPC, BPC (Transmission Utility and Druk Green).
The export meter is bidirectional meter and monitors import and Export energy and automatically deducts the import from export and display the net electricity.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>The net electricity is calculated using the 220kv ex-bus bar meter reading taking into account the transmission loss till India-Bhutan border.
2% transmission loss is considered as per the Connection Agreement signed with BPC and Power Purchase Agreement signed with TPTCL</td></tr>
<tr><td>QA/QC procedures:</td><td>The electricity generated and supplied to grid is cross-checked by main meter and check meter and by the monthly invoice of TPTCL.</td></tr>
<tr><td>Purpose of data:</td><td>Calculation of baseline emissions.</td></tr>
<tr><td>Additional comment:</td><td>The data is archived both in electronic and hard paper format for crediting period + 2 years.</td></tr>
</table>

Data / Parameter:	Cap_{PJ}
Unit:	MW
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Measured/ Calculated / Default:	Measured
Source of data:	The nameplate of the power units
Value(s) of monitored parameter:	63 X 2 MW
Monitoring equipment:	Determined in accordance with the nameplates on the generator equipment supplied by the manufacturer
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	NA
QA/QC procedures:	NA
Purpose of data:	For baseline emission reduction calculation

Additional comment:	Nil

Data / Parameter:	A_{PJ}
Unit:	m^2
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
Source of data:	Survey Report submitted by Lot-I Civil Contractors
Value(s) of monitored parameter:	30,967m^2
Monitoring equipment:	Survey Equipment
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	Calculated by multiplying the length and width of the reservoir
QA/QC procedures:	NA
Purpose of data:	For the calculation of the project emission if applicable.
Additional comment:	The Power Density greater than 10 W/m^2 therefore project emission is not applicable.

Data / Parameter:	$EF_{grid,CM,y}$
Unit:	tCO_2/MWh
Description:	CO_2 combined emission factor of the regional power grid
Measured/ Calculated / Default:	Calculated
Source of data:	The data is taken from the Database Version 11 (April 2016) of Central Electricity Authority of India and Bhutan Power data book 2016
Value(s) of monitored parameter:	0.9624
Monitoring equipment:	NA
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	Calculated based on 50%: 50% weight of EF_{OMy} & EF_{BMy} following the methodological tool: Tool to calculate the emission factor for an electricity system. Please refer ER sheet for detail calculation
QA/QC procedures:	NA
Purpose of data:	Calculation of baseline emissions
Additional comment:	Nil

Data / Parameter:	$EF_{grid,OMy}$
Unit:	tCO_2/MWh
Description:	CO_2 operating margin emission factor of the regional power grid
Measured/ Calculated / Default:	Calculated
Source of data:	The data is taken from the Database Version 11 (April 2016) of Central Electricity Authority of India and Bhutan Power data book 2016
Value(s) of monitored parameter:	0.9962
Monitoring equipment:	NA
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	Simple OM method has been applied following the methodological tool: Tool to calculate the emission factor for an electricity system. Please refer ER sheet for detail calculation
QA/QC procedures:	NA
Purpose of data:	Calculation of Combined Margin
Additional comment:	Nil

Data / Parameter:	$EF_{grid,BMy}$
Unit:	tCO_2/MWh
Description:	CO_2 operating margin emission factor of the regional power grid
Measured/ Calculated / Default:	Calculated
Source of data:	The data is taken from the Database Version 11 (April 2016) of Central Electricity Authority of India and Bhutan Power data book 2016
Value(s) of monitored parameter:	0.9285
Monitoring equipment:	NA
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	Built margin for the year 2014-15 is considered in accordance with tool to calculate emission factor, latest CEA database Version 11 was used. Please refer ER sheet for detail calculation
QA/QC procedures:	NA
Purpose of data:	Calculation of Combined Margin
Additional comment:	Nil

Data / Parameter:	$COEF_i$
Unit:	$tCO_2/mass$ or volume unit
Description:	CO_2 emission coefficient of each fuel type i

Measured/ Calculated / Default:	Ex-post Monitoring of CEA database
Source of data:	CEA database
Value(s) of monitored parameter:	Refer ER sheet for Indian grid (Tab Assumption). In Bhutan all the power Plant are Hydro.
Monitoring equipment:	NA
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	Following the methodological tool: Tool to calculate the emission factor for an electricity system. Please refer ER sheet for detail calculation
QA/QC procedures:	NA
Purpose of data:	Calculation of baseline emissions
Additional comment:	Nil

D.3. Implementation of sampling plan

>> Not applicable

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

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

>> The Baseline emission BE_y is calculated as follows:

$ER_y = BE_y - PE_y - L_y$
$ER_y = BE_y$ since $PE_y=0$, and $L_y=0$ (in accordance with ACM0002, Version 07)

$BE_y = EG_y * EF_y$
$EF_y = EF_{grid,CM,y=} W_{OM} * EF_{OM,y} + W_{BM} * EF_{BM,y}$
$W_{OM}=W_{BM}=0.5$ as per ACM0002

ER_y - Emission reduction for the year y
BE_y - Baseline emission factor for the year y
EF_y - Emission factor of the grid (tCO2e/MWh)
EG_y - Net electricity generated and supplied to the grid during the year y
L_y - Leakage emission
PE_y - Project Emission
$EF_{grid,CM,y}$ - CO_2 Combined emission factor of the regional power grid
$EF_{OM,y}$ - CO_2 Operating margin emission factor of the grid
$EF_{BM,y}$ - CO_2 Build margin emission factor of the grid

EG_y for the period from 01/01/2016 – 31/12/2016 = 362,898.90 MWh

EF_y for the year 2016 as per the CEA database version 11 (April 2016) and Bhutan Power data book 2016.

$ER_y = 362,898.90 * 0.9624 = 349,239\ tCO_2e$

Parameter	Values
$EF_{BM,y}$	0.9285
$EF_{OM,y}$	0.9962

EF_y or $EF_{grid, CM,y}$	0.9624
EG_y	362,898.90 MWh
ER_y	**349,239** tCO_2e

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

>> The "Power Density" (W/m²) of the project is 4,068 W/m² (126,000,000 W / 30,967 m^2) which is by far above the threshold of 10 W/m². Therefore, project emissions from the reservoir may be neglected therefore;

PE_y= 0, as per ACM0002 (Version 07)

During the shutdown of the plant, for auxiliary consumption, the Power from the Bhutan grid is used as backup. The DG set is used only in case of shutdown of plant and failure of the Bhutan grid. The total emission from the DG is less than 1% (8 tCO_2e) of the total generation which is within the allowable limit of para 96 of VVS, version 09, therefore it is not accounted in the ER calculation. The demonstration of diesel consumption in DG and corresponding project emission is submitted in separate spreadsheet to DOE.

E.3. Calculation of leakage

>> No leakage as per ACM0002 (Version 7)

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	GHG emission reductions or net GHG removals by sinks (t CO_2e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	349,239	0	0	0	349,239	349,239

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

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	514,955	349,239

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

>> The Difference in the estimated value and the actual value is due to following reasons;

i) Change in the emission factor of the grid.
ii) Shut down of units for rectification and due to failure of 220kV transformer.

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

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	Dagachhu Hydro Power Corporation Limited
Street/P.O. Box	
Building	
City	Dagana
State/region	
Postcode	
Country	Bhutan
Telephone	+975-17116137
Fax	
E-mail	dhpcl@google.com
Website	
Contact person	
Title	Mr.
Salutation	
Last name	Dorji
Middle name	
First name	Thinley
Department	
Mobile	+975-17114660
Direct fax	
Direct tel.	
Personal e-mail	Thinley06@gmail.com