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	El Canadá Hydroelectric Project
UNFCCC reference number of the project activity	0606
Version number of the PDD applicable to this monitoring report	13
Version number of this monitoring report	1
Completion date of this monitoring report	06/12/2017
Monitoring period number	07
Duration of this monitoring period	01/01/2017 – 22/11/2017, first and last days included
Monitoring report number for this monitoring report	1
Project participants	**Guatemala**: Generadora de Occidente Ltda. **Finland:** Government of Finland - Ministry of Foreign Affairs of Finland; Fortum Corporation. **Japan:** Chubu Electric Power Co., Inc; The Chugoku Electric Power Co., Inc.; Kyushu Electric Power Co., Inc.; Mitsubishi Corporation; Shikoku Electric Power Co., Inc.; Tohoku Electric Power Co., Inc.; The Tokyo Electric Power Co., Inc.; Japan International Cooperation Agency (JICA); Mitsui & Co., Ltd. **Netherlands:** Netherlands' Ministry of Infrastructure and the Environment (IenM)); Electrabel N.V.; Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&I); International Bank for Reconstruction and Development (IBRD) as Trustee of the Prototype Carbon Fund (PCF) **Norway:** Government of Norway – Ministry of Foreign Affairs; Norsk Hydro ASA; Statoil ASA. **Sweden:** Government of Sweden - Swedish Energy Agency. **France:** GDF SUEZ **Germany:** RWE Power AG; Deutsche Bank AG; BP Alternative Energy International Ltd.

Host Party	**Guatemala:** Generadora de Occidente Ltda. (GdO)	
Sectoral scopes	Sectoral Scope 1: Energy industries (renewable/non-renewable sources)	
Applied methodologies and standardized baselines	ACM0002: "Consolidated Baseline Methodology for Grid-connected Electricity Generation from Renewable Sources", version 13.0.0, EB 67.	
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
	N.A.	61,866 t CO_2
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	61,866 tCO_2	

SECTION A. Description of project activity

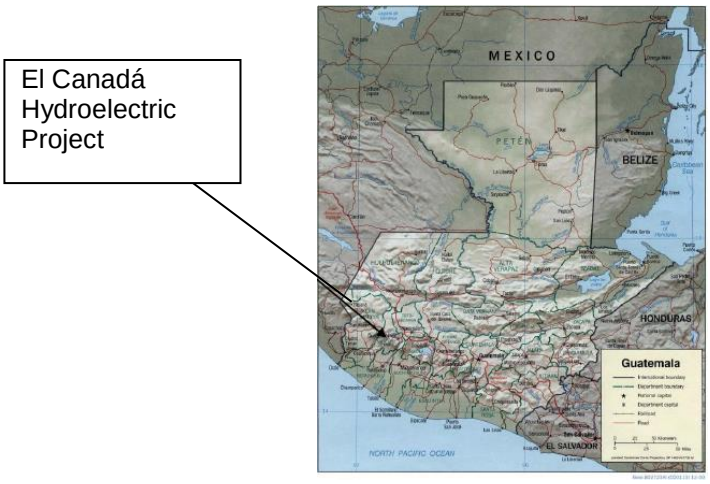
A.1. General description of project activity

El Canadá Hydroelectric Project consists of a 48.11[1] MW peaking run-of-river hydroelectric plant located on the Samalá River on the west coast of Guatemala, near the town of Santa María de Jesus. The western Guatemala region has 350 MW of demand and 31 MW of installed capacity. Construction began in February 2002 and was completed in December 2003. The Project started commercial operation per the Wholesale Market Norms on November 23rd, 2003. Since its commissioning, it has been producing an average of 175 GWh/year of electricity, which is sold to Guatemala's largest commercial distributor, COMEGSA, under a 10-year Power Purchase Agreement (PPA). The Project contributes to the sustainable development of Guatemala in various ways. First, it has increased the supply of power to the local grid, improving stability and helping reduce losses in the distribution system. Second, it is reducing greenhouse gas emissions as well as emissions of local pollutants from power generation by using a cleaner energy source than what typically would have been used in the country. Third, it is one of the first renewable energy projects to be developed after the approval of Guatemala's new General Electricity Law. Its development has provided important knowledge and experience for other project developers that are striving to participate in the competitive national and regional market. Fourth, through the agreements the Project Company has entered into with the neighbouring municipalities, the Project is conserving sub-surface water, it has re-forested parts of the land where it was constructed, and it is making annual payments to improve the conditions of the local communities. Finally, it has created 250 jobs, injecting at least US$ 30 million into the Guatemalan economy over the course of the construction period. The actual emissions reductions achieved during the actual monitoring period (01/01/2017 – 22/11/2017) are **61,866**t CO2

A.2. Location of project activity

The Project is located on the Samalá River, 12 kilometres south of the Quetzaltenango Municipality and 198 kilometres due west from Guatemala City. Quetzaltenango is Guatemala's second largest city and is responsible for a large portion of the 350 MW maximum demand of the western region. The Samalá River is nearly 130 kilometres in length, and has relatively high flows, due to intense rainstorms over the western slopes of the volcanic mountain ranges that act as the river's basin. The slopes around the Project are very steep, with small plateaus. The Project is located immediately downstream from the existing Santa María hydro powerhouse owned by the national utility, Instituto Nacional de Electrificación (INDE), and utilizes some of the existing infrastructure. The geographic coordinates for the El Canadá Power House are Latitude: 14.6857, Longitude: -91.5315.

[1] Two turbines with rated capacity of 21.95 MW each, totaling 43.9 MW for the power plant. Each generator has a nameplate capacity of 28.3 MVA with a power factor of 0.85, resulting to generators total maximum output of 48.11 MW.



A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Guatemala (host)	Generadora de Occidente, Ltda. ("GdO")	No
Finland	Government of Finland – Ministry of Foreign Affairs of Finland; Fortum Corporation	Yes
Japan	Chubu Electric Power Co., Inc; The Chugoku Electric Power Co., Inc.; Kyushu Electric Power Co., Inc.; Mitsubishi Corporation; Shikoku Electric Power Co., Inc.; Tohoku Electric Power Co., Inc.; The Tokyo Electric Power Co., Inc.; Japan International Cooperation Agency (JICA); Mitsui & Co., Ltd.	No
Netherlands	Netherlands' Ministry of Infrastructure and the Environment (IenM)); Electrabel N.V.; Netherlands' Ministry of Economic Affairs, Agriculture and Innovation (EL&I); International Bank for Reconstruction and Development (IBRD) as the Trustee of the Prototype Carbon Fund (PCF)	Yes

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Norway	Government of Norway - Ministry of Foreign Affairs; Norsk Hydro ASA; Statoil ASA	Yes
Sweden	Government of Sweden - Swedish Energy Agency; International Bank for Reconstruction and Development (IBRD) as the Trustee of the Prototype Carbon Fund (PCF)	Yes
France	GDF Suez	No
Germany	RWE Power AG; Deutsche Bank AG; BP Alternative Energy International Ltd.	No

A.4. Reference to applied methodologies and standardized baselines

Consolidated methodology for grid-connected electricity generation from renewable sources" (ACM0002), version 13. http://cdm.unfccc.int/methodologies/DB/M0CSBFOF8RQG5I84XU5Y4WX0I5LHS1

"Tool to calculate the emission factor for an electricity system", Version 3.0.0. (EB 70 Annex 22)
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v3.0.0.pdf

"Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", Version 02.
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf

A.5. Crediting period type and duration

The project is on second crediting period, which is renewable and it has 7 years length from 23/11/2010 to 22/11/2017.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

>> El Canadá Hydroelectric Project consists of a 48.11 MW peaking run-of-river hydroelectric plant located on the Samalá River on the west coast of Guatemala, near the town of Santa María de Jesus. The western Guatemala region has 350 MW of demand and 31 MW of installed capacity. Construction began in February 2002 and was completed in December 2003. The Project started commercial operation per the Wholesale Market Norms on November 23rd, 2003.

The Project collects power flows from the tailrace of the existing Santa María power plant that is owned by INDE and also collects spillages from the Santa María dam and local inflow from the area between the Santa María dam and the Project diversion dam. All power flows flow through a desander, located immediately downstream of the diversion dam, and are subsequently diverted through a tunnel, three meters in diameter and approximately 1200 m long, to a regulating pond. The regulating pond is designed to collect water inflows for daily peaking operation, totalling 5 hours. The live storage volume is 184,000 m3, using an 8-meter pond fluctuation. The normal operating level of the reservoir is 1,416.90 meters above sea level (masl) and the minimum operating level is 1,409 masl. An intake structure on the regulating reservoir is equipped with trash racks and a hydraulically operated gate. The gate is equipped to close during emergency conditions in the event of penstock rupture. The penstock is approximately 2,400 m long and

conveys the power flows from the regulating reservoir to the powerhouse. The penstock is comprised of a low- and a high-pressure section 1590 and 800 m long, respectively. The penstock is bifurcated into two 1.45-m diameter penstock pipes, approximately 46 m from the powerhouse.

The penstock pipe is buried over its total length. The low-pressure penstock diameter is 2.10 m, and the high-pressure section diameter 1.85 m. El Canadá powerhouse contains two 21.95-MW units. Each generating unit has a Pelton turbine and synchronous generator. The powerhouse crane has a capacity at least equal to the heaviest lift during equipment installation of 65 tons. The control room is be air conditioned and separate from the equipment area of the powerhouse. The output from the El Canadá facility is stepped up from 13.8 kV to 69 kV, before it is transmitted to Santa María substation about 3.6 km away for delivery to the INDE utility grid. The transmission line poles are steel and the guard and the power cables are 636 MCM ACSR. Each pole of the transmission line is grounded to provide a resistance of not more than 10 ohms.

All equipment utilized in the El Canadá Project is proven technology that has been successfully applied worldwide. Each of the two 21.95-MW generating units has a Pelton turbine and a synchronous generator. The rubber dam used in the diversion dam is a new technology introduced to Guatemala.

Rubber dam technology was chosen in order to properly regulate the level at the diversion dam considering the operational restrictions due to being downstream from the Santa Maria powerhouse.

This technology also has an added advantage during high volume situations during the wet season, the rubber dam can be deflated in order to avoid diverting mud, rocks, tree trunks, and other garbage into the desander.

There were no Major events occurred during the monitoring period

B.2. Post-registration changes

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

Not Applicable

B.2.2. Corrections

The parameters Cap_{BL} and A_{BL} were included as fixed parameters in the revised PDD and in section D.1 of this monitoring report, as per Post-Registration Changes “PRC-0606-001” approved on January 29th, 2015

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

Not Applicable

B.2.4. Inclusion of monitoring plan

Not Applicable

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

The parameters Cap_{PJ} and A_{pj} were included in the monitoring plan of the revised PDD and these parameters are also reported in section D.2, as per Post-Registration Changes “PRC-0606-001” approved on January 29th, 2015

B.2.6. Changes to project design

Not Applicable

SECTION C. Description of monitoring system

>> The monitoring of the emissions reductions was done according to the operational structure shown in the below chart. The first step is measuring process, followed by verification of the measurement, calculation of the emissions reductions, and finally, review and analysis of results. Generadora de Occidente, Ltda. General Manager will be the responsible for the monitoring process.

- The Plant Manager of El Canadá Hydroelectric Project is responsible of the electric energy measurement.
- The Marketing Analyst engineer of Generadora de Occidente, Ltda. is in charge of the monitoring process.
- The General Manager is responsible of the Monitoring Plan.

Personnel who carry out the monitoring function are trained in CDM procedures. New personnel have to follow up a training program and are formed in the specific skills required to carry out the Monitoring Plan.

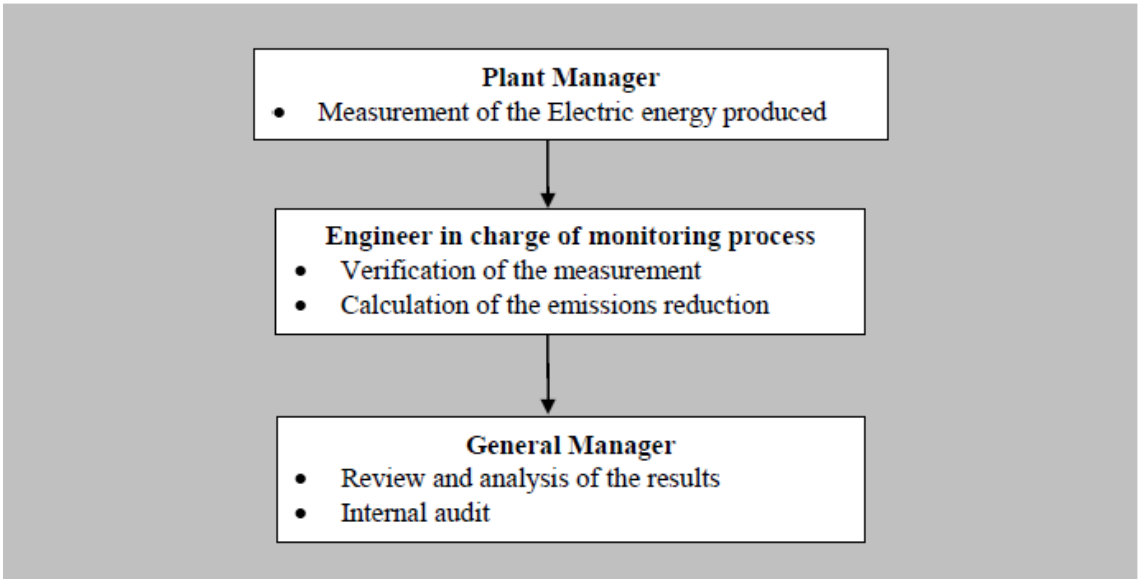


Figure 1. Information Flow Diagram

1. Measuring

The Plant Manager collects electronically and monthly the generation data from the commercial energy meter installed in the El Canadá Substation, which measures the energy produced by El Canadá Hydroelectric Project and Montecristo Hydroelectric Project. In the Montecristo Substation in the 69 KV bus is installed the energy meter of Montecristo Hydroelectric Project, therefore El Canadá Hydroelectric Project could be calculated by difference. The generation data is reported in a spreadsheet for measuring control and register. The commercial meter data collection of the monitored month takes place during the first week of the following month.

The Plant Manager collects electronically and monthly the generation data from the commercial energy meter installed in the Montecristo Substation, which measures the energy produced by Montecristo Hydroelectric Project. The generation data is reported in a spreadsheet for measuring control and register. The commercial meter data collection of the monitored month takes place during the first week of the following month.

Therefore El Canadá Hydroelectric Project could be calculated by difference. Calculated the difference the generation data is reported in a spreadsheet for measuring control and register. The commercial meter data collection of the monitored month takes place during the first week of the following month.

2. Calculation energy produced and verification

The person in charge of the monitoring process verifies the accuracy of the recorded energy data. For this purpose, is necessary to compare the data recorded against the information of the commercial measurement published by the Administrador del Mercado Mayorista (AMM) in Certificates emitted by

them.

3. Calculation of emissions reductions

The person responsible of perform the Monitoring Process calculated the emissions reductions for the observation period using the ex ante emission factor according to the Table A.4.7 on the PDD

Location of monitoring points

The metering point is located at El Canadá substation, therefore the power output for El Canadá and Montecristo are monitored at El Canadá Substation as stated in the registered PDD.

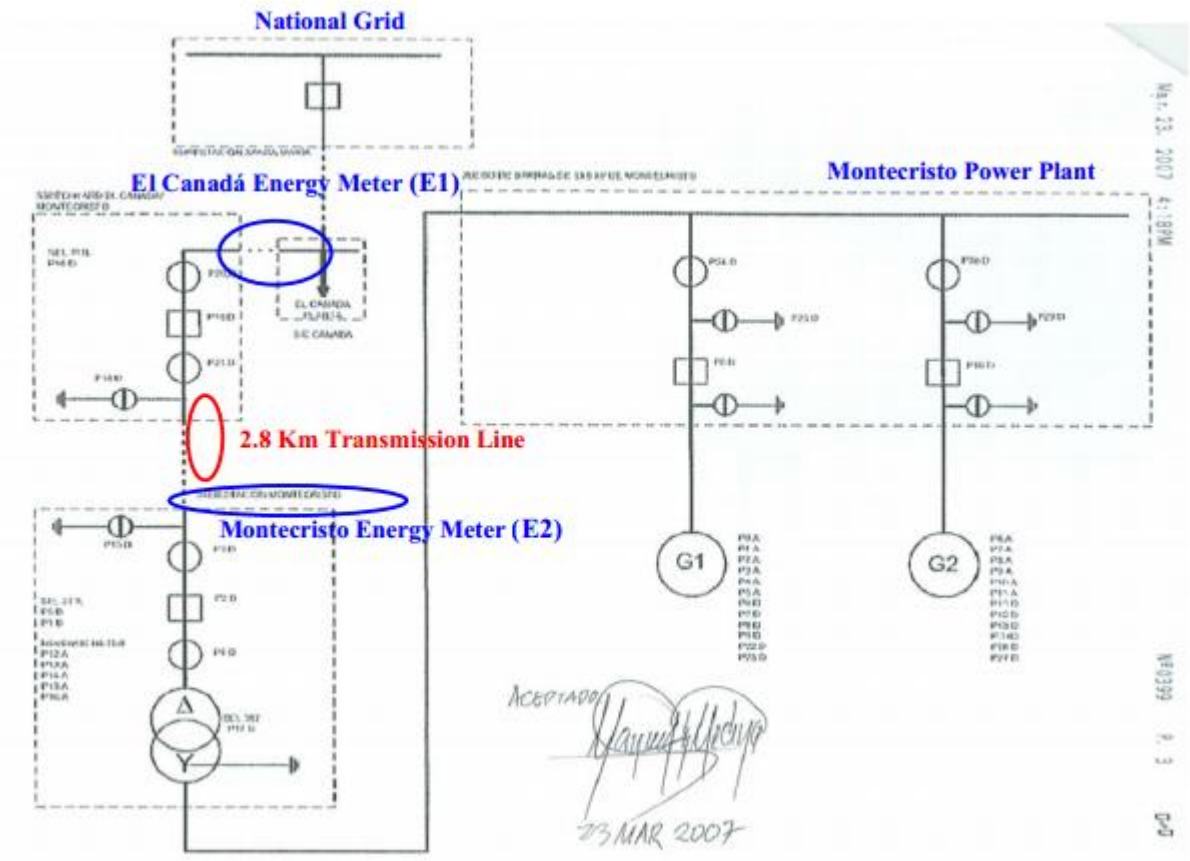


Figure 2. Monitoring System Diagram

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	tCO_2/MWh
Description	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".

Source of data	Calculated. Official statistics from AMM for electricity generation clustered by technology 2006, 2007, and 2008
Value(s) applied)	0.495 tCO_2/MWh
Choice of data or measurement methods and procedures	*(This section is intentionally left blank)*
Purpose of data	This value was calculated according to "Tool to calculate the emission factor for an electricity system" (version 3.0.0). Applied value was calculated by referring to Official AMM Statistics for electricity generation (2006, 2007, and 2008).
Additional comments	*(This section is intentionally left blank)*

Data/parameter:	**Cap_{BL}**
Unit	W
Description	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero.
Source of data	Project Site
Value(s) applied)	Zero W
Choice of data or measurement methods and procedures	*(This section is intentionally left blank)*
Purpose of data	Calculation of project emissions
Additional comments	*(This section is intentionally left blank)*

Data/parameter:	**A_{BL}**
Unit	m^2
Description	Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2).
Source of data	Project Site
Value(s) applied)	Zero m^2
Choice of data or measurement methods and procedures	*(This section is intentionally left blank)*
Purpose of data	Calculation of project emissions
Additional comments	*(This section is intentionally left blank)*

D.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/parameter:	**$EG_{PJ,y}$ ($=EG_{facility,y}$) = E1 – E2**
Unit	MWh
Description	Net electricity supplied to the grid by the project
Measured/calculated/default	Calculated(as a difference between 2 measured data) EGPJ,y = E1- E2
Source of data	Calculated based on measured readings of E1 and E2

Value(s) of monitored parameter	<table><tr><td></td><td></td><td>MWh</td></tr><tr><td>Generation Measurement</td><td>01/01/2017 – 22/11/2017</td><td>124,983</td></tr></table>
Monitoring equipment	Electricity meters
Measuring/reading/recording frequency:	Monthly
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Uncertainty of data is low as this value is calculated based on the meter readings at El Canadá and Montecristo substations. Electricity supplied by the project activity to the grid. Double check by COMEGSA receipt of sales and certificates from AMM . As established in the NCC14, the measurement equipment has to comply with Norms: IEC 687 or ANSI/IEEE 12.2. Its exactitude must be of 0.2%. Data Registry: The measurement equipment must register the information in periods of 15 to 60 minutes. This equipment must have a non-volatile memory that allows the storage of information for at least the last 37 days and it has to have a battery capable of keeping these data during a period of at least 7 days, in case of failure of the auxiliary power feeding. The generated energy is monitored by AMM as well as by the generator, and there is the secondary measurement equipment in case there is any divergence in the information.
Purpose of data:	Calculation of baseline emissions
Additional comments:	*(This section is intentionally left blank)*

Data/parameter:	**E1**
Unit	MWh
Description	Net electricity supplied to the grid by El Canadá and Montecristo Plants measured at El Canadá substation
Measured/calculated/default	Measured – Hourly measurement and monthly recording
Source of data	Measured; Official metering data sent monthly to the AMM. Invoices to the final COMEGSA, a third part or the Economical Transaction Report submitted by AMM was compared with the official data to AMM.
Value(s) of monitored parameter	<table><tr><td></td><td></td><td>MWh</td></tr><tr><td>Generation Measurement</td><td>01/01/2017 – 22/11/2017</td><td>169,741</td></tr></table>

Monitoring equipment	- Type: Principal Meter – ION 8650 Power Measurement Accuracy Class: +/- 0.20% Serial: MW -1605A132-02 Calibration frequency: As per to AMM Commercial Coordination Norm NCC -14 and Annual Meter Verification Procedure from AMM Calibration dates: - 08/11/2016 - 23/06/2017 Type: Back up Meter – ION 8650 Power Measurement Accuracy Class: +/- 0.20% Serial: MT-1206A252-01 Calibration frequency: As per to AMM Commercial Coordination Norm NCC -14 and Annual Meter Verification Procedure from AMM Calibration dates: - 08/11/2016 - 23/06/2017[2]
Measuring/reading/recording frequency:	According to AMM Commercial Coordination Norm NCC -14 and Annual Meter Verification Procedure from AMM
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Electricity supplied by the project activity to the grid. Double check by COMEGSA receipt of sales and certificates from AMM. As established in the NCC14, the measurement equipment has to comply with Norms: IEC 687 or ANSI/IEEE 12.2. Its exactitude must be of 0.2%. Data Registry: The measurement equipment must register the information in periods of 15 to 60 minutes. This equipment must have a non-volatile memory that allows the storage of information for at least the last 37 days and it has to have a battery capable of keeping these data during a period of at least 7 days, in case of failure of the auxiliary power feeding. The generated energy is monitored by AMM as well as by the Generator, and there is the secondary measurement equipment in case there is any divergence in the information. The measurement and calibration of the meters are subject to regular maintenance and testing to ensure accuracy and compliance with AMM Commercial Coordination Norm NCC -14 and Annual Meter Verification Procedure from AMM
Purpose of data:	Calculation of baseline emissions
Additional comments:	*(This section is intentionally left blank)*

Data/parameter:	**E2**
Unit	MWh
Description	Net electricity supplied to the grid by Montecristo Plant measured at Montecristo substation
Measured/calculated/default	Measured – Hourly measurement and monthly recording

[2] During the meter substitution, a calibration procedure was carried out complying with AMM Commercial Coordination Norm NCC – 14,

Source of data	Measured; Official metering data sent monthly to the AMM. Invoices to the final COMEGSA, a third part or the Economical Transaction Report submitted by AMM was compared with the official data to AMM.
Value(s) of monitored parameter	<table><tr><td></td><td></td><td>MWh</td></tr><tr><td>Generation Measurement</td><td>01/01/2017 – 22/11/2017</td><td>44,758</td></tr></table>
Monitoring equipment	**From 19/07/2013 onwards** Type: Principal Meter – ION 8600 Schneider Electric Accuracy Class: +/- 0.20% Serial: MT-1206A250-01 Calibration frequency: As per to AMM Commercial Coordination Norm NCC -14 and Annual Meter Verification Procedure from AMM Calibration dates: - 08/11/2016 - 23/06/2017 Type: Back up Meter – ION 8600 Schneider Electric Accuracy Class: +/- 0.20% Serial: MT-1206A251-01 Calibration frequency: As per to AMM Commercial Coordination Norm NCC -14 and Annual Meter Verification Procedure from AMM Calibration dates: - 08/11/2016 - 23/06/2017
Measuring/reading/recording frequency:	Monthly
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Electricity supplied by the project activity to the grid. Double check by COMEGSA receipt of sales and certificates from AMM. As established in the NCC14, the measurement equipment has to comply with Norms: IEC 687 or ANSI/IEEE 12.2. Its exactitude must be of 0.2%. Data Registry: The measurement equipment must register the information in periods of 15 to 60 minutes. This equipment must have a non-volatile memory that allows the storage of information for at least the last 37 days and it has to have a battery capable of keeping these data during a period of at least 7 days, in case of failure of the auxiliary power feeding. The generated energy is monitored by AMM as well as by the Generator, and there is the secondary measurement equipment in case there is any divergence in the information. The measurement and calibration of the meters are subject to regular maintenance and testing to ensure accuracy and compliance with AMM Commercial Coordination Norm NCC -14 and Annual Meter Verification Procedure from AMM
Purpose of data:	Calculation of baseline emissions
Additional comments:	Not Applicable

Data/parameter:	Cap_{PJ}
Unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity[3]
Measured/calculated/default	Default
Source of data	Project Site
Value(s) of monitored parameter	47.203 MW
Monitoring equipment	Determine the installed capacity based on recognized standards
Measuring/reading/recording frequency:	Yearly
Calculation method (if applicable):	*(This section is intentionally left blank)*
QA/QC procedures:	*(This section is intentionally left blank)*
Purpose of data:	Calculation of project emissions
Additional comments:	*(This section is intentionally left blank)*

Data/parameter:	A_{PJ}
Unit	m^2
Description	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.[4]
Measured/calculated/default	Default
Source of data	Project site
Value(s) of monitored parameter	Year: 01/01/2017 – 22/11/2017; APj (m^2): 28,273.10
Monitoring equipment	Measured from topographic surveys, maps, satellite pictures, etc.
Measuring/reading/recording frequency:	Yearly
Calculation method (if applicable):	*(This section is intentionally left blank)*
QA/QC procedures:	*(This section is intentionally left blank)*
Purpose of data:	Calculation of project emissions
Additional comments:	*(This section is intentionally left blank)*

Calibration of energy meters

According to the NCC-14 clause 14.12 ""Periodic Verifications" the participant will verify his meters to fulfil the requirement of the Administrador del Mercado Mayorista, AMM (Wholesale Market Administrator) or of the manufacturer". As a result, Generadora de Occidente, Ltda. arranges for the calibration of its energy meters, the principal meter and the support meter. Both meters thus fulfil the requirements of the norm ANSI C12.20 and they are certified by a contratctor authorized by the AMM

[3] http://www.amm.org.gt/portal/?page_id=145 . In "Resultados de operacion" tab, then "anuales" tab

[4] Even if it is a parameter given by default, maximum reservoir level data and reservoir curves were delivered to the DOE

D.3. Implementation of sampling plan

Not applicable

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

The Plant Manager collects electronically and monthly the generation data from the commercial energy meter installed in the El Canadá Substation, which measures the energy produced by El Canadá Hydroelectric Project and Montecristo Hydroelectric Project.

Generation (MWh) from El Canadá and Montecristo plants at El Canadá Substation	
Year	01/01/2017 – 22/11/2017
Generation	169,741

The Plant Manager collects electronically and monthly the generation data from the commercial energy meter installed in the Montecristo Substation, which measures the energy produced by Montecristo Hydroelectric Project. The generation data is reported in a spreadsheet for measuring control and register. The commercial meter data collection of the monitored month takes place during the first week of the following month. From the period, 01/01/2017 to 22/11/2017 the commercial energy meter installed in the Montecristo Substation registered the following information:

Generation (MWh) from Montecristo plant at Montecristo Substation	
Year	01/01/2017 – 22/11/2017
Generation	44,758

Therefore El Canadá Hydroelectric Project could be calculated by difference. The generation data is reported in a spreadsheet for measuring control and register. The commercial meter data collection of the monitored month takes place during the first week of the following month. From the period , 01/01/2017 to 22/11/2017, the energy produced by El Canadá Hydroelectric Project registered the following information:

Generation (MWh) from El Canadá Hydroelectric Project	
Year	01/01/2017 – 22/11/2017
Generation	124,983

Calculation energy produced and verification

The person in charge of the monitoring process verifies the accuracy of the recorded energy data. For this purpose, is necessary to compare the data recorded against the information of the commercial measurement published by the *Administrador del Mercado Mayorista* (AMM) in Certificates emitted by them.

The measuring verification is carried out as below shown:

El Canada and Montecristo Hydroelectric Measurement Control			
Year: 2017			
Month	**El Canadá and Montecristo Generation (MWh)**	**AMM Comercial Measurement (MWh)**	**El Canada an Montecristo validated generation**
January	10,704	10,704	Validated
February	8,058	8,058	Validated
March	9,666	9,666	Validated
April	15,416	15,416	Validated
May	12,640	12,640	Validated
June	19,828	19,828	Validated
July	17,704	17,704	Validated
August	17,342	17,342	Validated
September	23,404	23,404	Validated
October	25,594	25,594	Validated
November	9,385	9,385	Validated
December	0	0	Validated
Annual Total	**169,741**	**169,741**	

Montecristo Hydroelectric Measurement Control			
Year: 2017			
Month	**Montecristo Generation (MWh)**	**AMM Comercial Measurement (MWh)**	**Montecristo validated generation**
January	2,946	2,946	Validated
February	2,183	2,183	Validated
March	2,631	2,631	Validated
April	2,476	2,476	Validated
May	3,445	3,445	Validated
June	5,341	5,341	Validated
July	5,021	5,021	Validated
August	4,757	4,757	Validated
September	6,440	6,440	Validated
October	6,965	6,965	Validated
November	2,554	2,554	Validated
December	0	0	Validated
Annual Total	**44,758**	**44,758**	

The person responsible of perform the Monitoring Process calculated the emissions reductions from 01/05/2014 to 31/12/2016 using the ex ante emission factor according to the Table A.4.7 on the PDD. The chart prepared for the calculation is:

El Canadá Hydroelectric Project. Second Crediting Period.			
Period	**Period Validated Generation (MWh)**	**Emission Factor (tCO_2e/MWh)**	**Baseline Emissions (tCO_2e)**

01/01/2017 - 22/11/2017	124,983	0.495	61,866
Total	124,983	0.495	61,866

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

>> According to the consolidated approved methodology ACM0002 version 13.0.0, project emissions for this project are zero since the project is a hydropower plant with a run-of-river reservoir and the power density of the power plant is greater than 10W/m^2.

The project emissions from the run-of-river reservoir are negligible (PE HP,y = 0) since the power density of the project activity is great than 10W/m^2.

$PE_y = PE_{HP,y}$

$$PD = \frac{Capp_J - Cap_{BL}}{A_{PJ} - A_{BL}}$$

PD = Power density of the project activity (W/m^2)
Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W)
Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero
A_{PJ} = Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2)
A_{BL} = Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2).
For new reservoirs, this value is zero

The run-off river reservoir occupies an area of approximately 2.83 ha. (at maximum capacity) .The power density (PD) is calculated as follows:

PD = 47,203,000/ 28,273.10 = 1,669.53 W/m^2

Since power density is greater than 10 W/m^2 the project emissions from the run-off river reservoir are negligible ($PE_{HP,y} = 0$)

E.3. Calculation of leakage emissions

>> Not Applicable.

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	61,866	N.A.	N.A.	N.A.	61,866	61,866

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 (t CO_2e)
61,866 t CO_2e	85,891 t CO_2e

E.6. Remarks on increase in achieved emission reductions

>> The ex-ante Emission Reductions was estimated according to the number of days equivalent to the monitoring period

For example:

$$\frac{Annual\ ex-ante\ ER}{365} * Number\ of\ days\ in\ the\ monitoring\ period$$

So, we obtain 96,463 / 365 * 325 = 85,891 t CO2 ex-ante for the monitoring period.

Difference between Actual value and Estimated Value from PDD is **-27.97%** change in the emission reductions.

Document information

Version	*Date*	*Description*
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.
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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