Monitoring report form

(Version 04.0)

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	Project for the reduction of greenhouse emissions of Hidroelectrica La Confluencia S.A
Reference number of the project activity	4229
Version number of the monitoring report	1
Completion date of the monitoring report	20/10/2014
Registration date of the project activity	02/02/2011
Monitoring period number and duration of this monitoring period	Monitoring period number 3 Duration: 01/01/2013 – 30/09/2014 (638 days)
Project participant(s)	Hidroelectrica La Confluencia S.A. and Statkraft Norfund Power Invest AS
Host Party(ies)	Chile
Sectoral scope and selected methodology(ies), and where applicable, applied standardized baseline(s)	Scope 1: Energy industries Grid-connected electricity generation from renewable sources ACM0002 version 12.1: "Consolidated methodology for grid-connected electricity generation from renewable sources"
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	739,590
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	338,957
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	0
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	338,957

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

Project for the reduction of greenhouse emissions of Hidroeléctrica La Confluencia S.A. (hereafter, La Confluencia Project) was developed by Hidroeléctrica La Confluencia S.A. (HLC). La Confluencia Project was originally conceived in 2002 as part of a larger project, La Higuera, which was designed as a 300MW single scheme run of river project. However, due to the excessive risks associated with such a large project and a landowner unwilling to accept La Confluencia Project the design was modified. The resulting reengineering established two schemes, La Higuera and the upstream La Confluencia. La Confluencia was originally approved under the same environmental impact study as the La Higuera project in August 2004. Full time development and design work on La Confluencia only commenced in 2006, after La Higuera project reached financial close and was registered as a CDM project activity. Subsequent optimizations made to La Confluencia Project were submitted and approved under the Environmental Impact Assessment System (SEIA). HLC undertook additional public consultation meetings regarding these modifications, despite not being required to under the SEIA.

Construction of La Confluencia started October 2007, and the plant was fully commissioned December 16, 2010. Start of commercial operation was May 1, 2011

La Confluencia Project consists of a 163.22 MW run of river hydropower facility comprising a two branch water conveyance system. The purpose of La Confluencia Project is to utilize the hydrological resources of the Tinguiririca, Portillo and Azufre Rivers in a run of river scheme to generate and supply zero emission energy to the Chilean Central electricity grid (SIC). La Confluencia Project will deliver an average of 656 GWh p.a. into the SIC. La Confluencia Project generates certified emission reductions (CERs) by displacing electricity generation from grid connected fossil fuel-fired power plants that would otherwise be generating electricity. La Confluencia Project is immediately upstream of the La Higuera Hydroelectric Project and is designed to operate independently and in conjunction with La Higuera. When operating in conjunction water from the La Confluencia powerhouse tailrace is discharged directly into the La Higuera intake system.

La Confluencia Project has a 13 year Power Purchase Agreement (PPA) with Chile's largest distribution company, Chilectra, for 345-390 GWh p.a. This contract was required in order to raise non-recourse project financing. Delivery obligations commenced in January 2011.

La Confluencia Project uses the consolidated methodology ACM0002 version 12.3 to establish the emissions reductions resulting from La Confluencia Project Activity. Based on the ex ante application of this methodology La Confluencia Project is conservatively estimated to reduce emissions by 423,120 tonnes of CO_2 per year that would have otherwise been emitted via the baseline operation of the Chilean grid to which La Confluencia Project is connected. The emission reductions are expected to increase as the thermal electric capacity of the grid switches to coal from natural gas. As a run of river project with significant socio-economic benefits and no significant environmental impacts the additional sustainable development benefits in the face of new coal burning investments in the power sector highlight the importance of this Project to the Chilean energy sector and the global environment.

The total amount of emission reductions during this second monitoring period is 338,914 tonnes of CO_2e.

A.2. Location of project activity

La Confluencia is located in 6th Region, Chile. The nearest community to the Project is Puente Negro, approximately 40 km downstream from the powerhouse. The nearest town is San Fernando, which is on the Ruta 5 (PanAmerican Highway), 142 km south of the capital city, Santiago.

La Confluencia Project is located on the Tinguiririca, Portillo and Azufre rivers, between the elevations of 1,100 m.a.s.l. and 1,460 m.a.s.l., The powerhouse is located on the northern bank of the Tinguiririca river, some 500 m upstream from the junction with the Portillo river, at approximately UTM(PSAD56) 358,100 E; 6,144,550 S. The La Confluencia project can be divided in two branches, Tinguiririca and Portillo rivers, where the main intakes take the water from. The area of La Confluencia Project activity is shown in the Figure below:

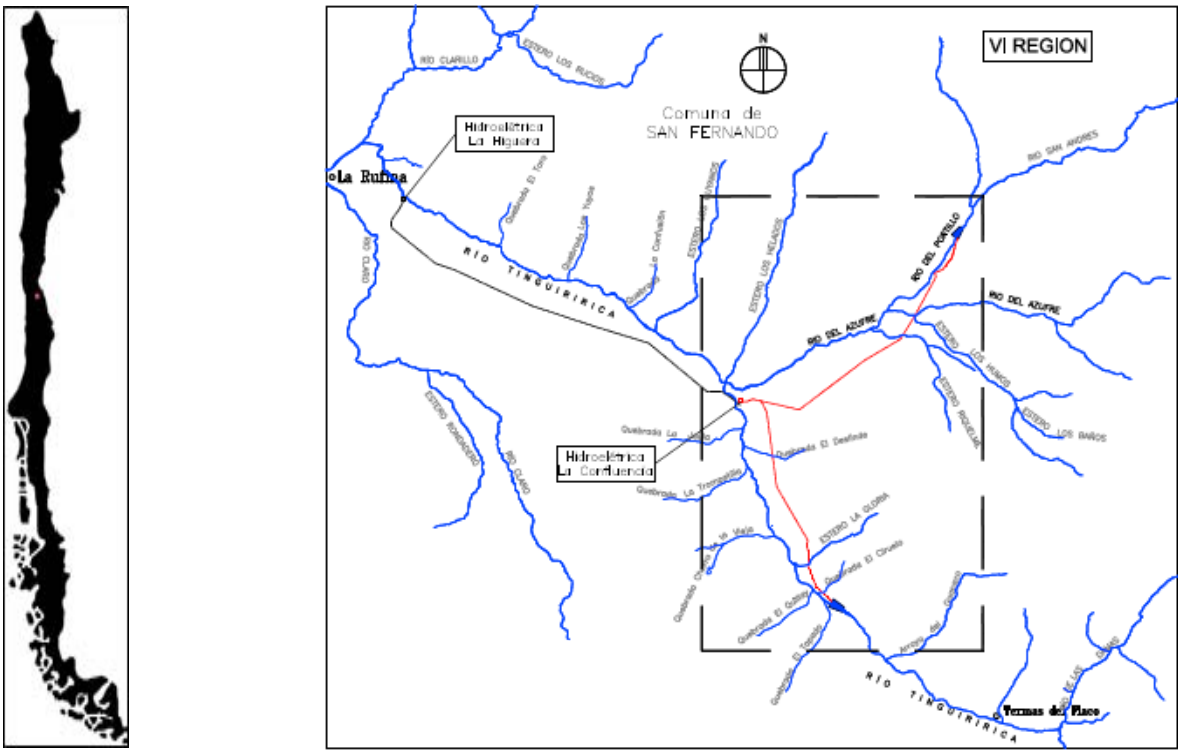

Figure 1- Project Location

The coordinate reference used is UTM 19 PSAD 56. The coordinates of the HLC power house, Portillo intake and Tinguiririca intake are as follows:

	Long	Lat
Power house	-70.55138889	-34.82972222
Portillo intake	-70.44694444	-34.76666667
Tinguiririca intake	-70.50361111	-34.91277778

Table 1 - Coordinates of the project activity

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 if the Party involved wishes to be considered as project participant (Yes/No)
Chile (host)	Private entity A: Hidroeléctrica La Confluencia S.A.	No
Norway	Statkraft Norfund Power Invest AS	No

A.4. Reference of applied methodology and standardized baseline

Version 12.1 ACM0002: "Consolidated methodology for grid-connected electricity generation from renewable sources[1]".
Version 2 of the "Tool to calculate the emission factor for an electricity system[2]"
Version 05.2 of the "Tool for the demonstration and assessment of additionality[3]"

A.5. Crediting period of project activity

02/02/2011 – 01/02/2018, 7 years - Renewable

A.6. Contact information of responsible persons/ entities

Contact Name: Francisco Martínez
Contact Position: Corporate Affairs Manager
Contact Tel: +56225194314
Contact email: fmartinez@tenergia.cl

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

La Confluencia Project consists of intakes and conveyance systems on two branches diverting flows to a surface powerhouse. The Portillo branch comprises a low weir and spillway on the Portillo River at 1,460 m.a.s.l. Water is passed through a desander and short open channel before entering an 11 km low pressure tunnel that runs to the surge chamber above the powerhouse at the confluence of the Portillo/Azufre and Tinguiririca rivers. Minor high mountain intake structures and desanders capture water from the Azufre, Los Humos and Riquelme streams and are injected into the Portillo tunnel. The Tinguiririca Branch consists of a low diversion weir and spillway across the Tinguiririca River at 1,444 m.a.s.l. that diverts partial flows through a desander and short open channel to an off-river hourly regulation pondage of 1.2 million m^3 live storage capacity. Water from this is taken via a canal to the La Gloria portal, where it enters a 9.3 km low pressure tunnel that joins the surge chamber above the powerhouse. High mountain intakes on the El Ciruelo and La Gloria capture additional flows from these minor streams.

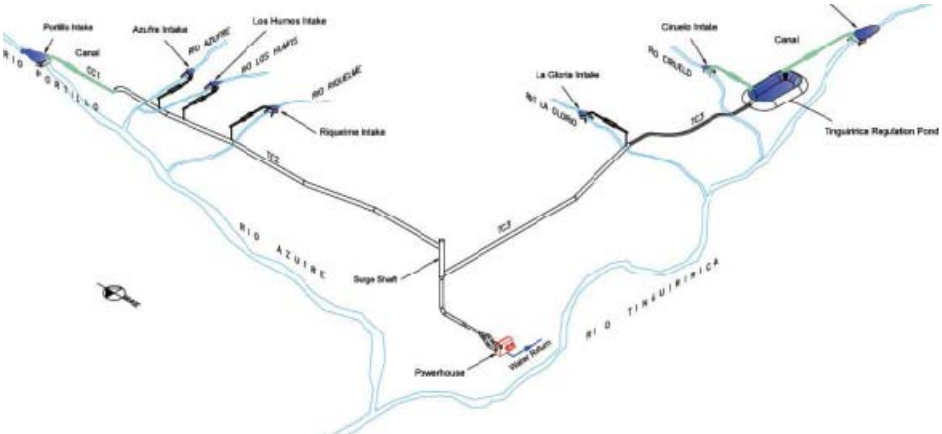

Figure 2 - Schematic layout of Project Activity.

[1] http://cdm.unfccc.int/filestorage/4/W/1/4W1SCKX3EMPO6AYGRJUTD7BQ8IVN0H/Consolidated%20baseline%20methodology%20for%20grid-connected%20electricity%20generation%20from%20renewable%20sources.pdf?t=YXN8bWQybmtofDB25ItcuKf1cXQ4wL4HuXBS
[2] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf
[3] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf

The Tinguiririca and Portillo branch tunnels terminate at a concrete lined vertical shaft dropping to the open air powerhouse via a concrete and steel lined high pressure tunnel. Two Francis type turbines convert the 52.5 m^3 per second flow into electricity via twin generators. This is conventional hydroelectric technology selected to optimize generation and efficiency based on the historical hydrological data. The water is then discharged into the La Higuera conveyance scheme on the north bank of the Tinguiririca, where it enters a pipe bridge to cross the river prior to entering the La Higuera low pressure tunnel system on the southern side of the Tinguiririca. Water can be spilled directly into the river if La Higuera project is not operating. The electricity is evacuated to the SIC via a 18 km 154/220kv transmission line to the La Higuera power project switchyard, then shares the 38 km transmission line of the La Higuera project to connect to the SIC grid near San Fernando.

Voith Siemens, a leader in hydro mechanical and electrical engineering, is providing state of the art electro-mechanical and control equipment and safety systems, while the turbines are a technology that has been utilised for more than half a century. The turbines and generators was manufactured in Brazil, while the other equipment was sourced from Brazil, Chile and other manufacturing bases.

La Confluencia Project	Unit
Gross head	347.5 m
Design Flow	52.5 m3/s
Annual average Net Generation expected	656 GWh
Generator Type	Synchronous with salient pole
Generator Capacity (each unit)	95.8MVA
Normal rotational speed	500 rpm
Frequency	50Hz
Storage facilities	Capacity
Off channel	1,200,000 m^3

Table 2- Summary of project specifications

B.2. Post registration changes

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

No temporary deviations have been applied to the monitoring plan or applied methodology.

B.2.2. Corrections

No applicable

B.2.3. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

A revision of the Monitoring Plan was approved on June 22, 2012.

B.2.4. Changes to project design of registered project activity

No applicable

B.2.5. Changes to start date of crediting period

The start date of the crediting period was changed from: April 01st 2011 to February 02nd 2011

B.2.6. Types of changes specific to afforestation or reforestation project activity

No applicable

SECTION C. Description of monitoring system

The monitoring system of La Confluencia Project activity consists of continuous measurement of the electricity generated by La Confluencia hydro power project.

Organization Structure and Responsibilities – Monitoring Team:

The following diagram represents the monitoring Structure of La Confluencia hydro power project for the current monitoring period:

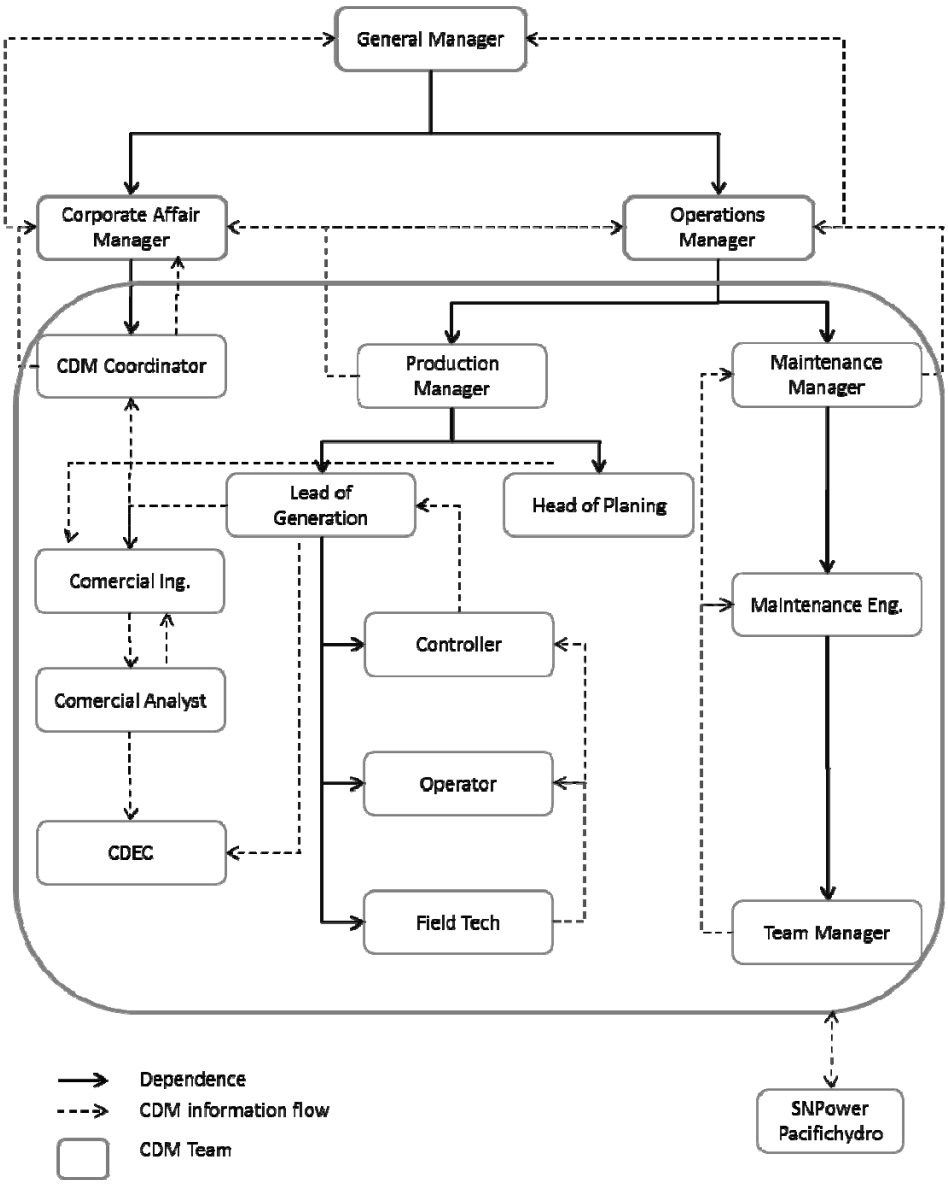

Figure 3. Monitoring structure

CDM roles and responsibilities:

General Manager:

- Legal Representative of La Confluencia Project.
- Ultimately responsible for the CDM team, allocating resources for implementation, maintenance and development.

Corporate Affairs Manager:

- Contact Person for the CDM project activity.
- Responsible for advising the General Manager on CDM issues.
- Responsible for monitoring the progress of the CDM team's performance.
- Responsible for consolidating the information generated by the CDM project.
- Internal audit's coordinator.

Operations Manager:

- Coordinates all the Operations Staff.
- Ultimately responsible for the Operations CDM team, allocating resources for implementation, maintenance and development.
- Reports operation performance.

CDM Coordinator:

- Responsible for completing the Monitoring Report Form (CDM-MR).
- Gathers and reviews the information sent by operators and controllers.
- Reviews the ER calculation sent by the Commercial Engineer.
- Reports to the Corporate Affairs Manager on CDM issues.
- Monitors the implementation of CDM procedures.
- Responsible for staff training on CDM issues.
- Develops a Monthly Report of CDM project.
- Elaborate Reports ER calculation.
- Calculates the Build Margin for the grid with data from CDEC-SIC, at the beginning of each crediting period.
- Calculates the Emission Factor and Operating Margin for the grid with data from CDEC-SIC, in a monthly basis.

Maintenance Manager:

- Coordinates and leads the maintenance and contractors.
- Reports the CDM maintenance activities of the area to the Operations Manager.

Production Manager:

- Coordinates and directs all staff, contractors and equipment in the production area to ensure the generation of electric power.
- Reports maintenance activities of the area to the Operations Manager related to the CDM project.

Maintenance Engineer:

- Technical and logistical support on site. Reviews technical information related to the equipment and systems of each generation plant, so as to:

(a) Ensure the availability and reliability of equipment, systems and projects in operation,
(b) Supports the processes associated with the projects going into operation, and
(c) Provides technical support for projects to be developed in the future as part of La Confluencia hydro power project.

- Reports maintenance activities of CDM project to the Maintenance Manager.

Head of Planning:

- Responsible for the relationship with CDEC-SIC, programming of generation, applications disconnection, scheduled maintenance and reports of failures.
- Responsible for the development of reports of production management, in a weekly and monthly basis.
- Responsible for implementation of the procedures for the operation of the Software Maintenance management Jobtech in Production.
- Responsible for the development, changes and upgrades of operational procedures and guide to maneuvers.

- Responsible for procedures of environmental management in functions related to production and CDM project.

Commercial Analyst:
- Responsible for sending a copy of the monthly billing record to the Commercial Engineer and CDM Coordinator.
- Informs the Lead of Generation in a timely manner if an anomaly is detected in the information after the secondary review.
- Responsible for processing, organizing and summarizing information provided by the Lead of Generation to generate the billing record and sending to CDEC-SIC[4] before the 5th working day of the month following the month of measurement, making the allocation of energy charged to La Higuera hydro power project and La Confluencia hydro power project.

Lead of Generation:
- Responsible for management of daily office operations and La Higuera hydro power project and relationships in real time with the CDEC-SIC.
- Verifies the consistency of data sent and received, detecting losses of data or gaps between meters sent by the operator.
- Sends the register of generation hourly to the Commercial Engineer.
- Responsible for the water flow management for daily schedule of generation adhering to water rights.
- Responsible for the safety management in operations, maintenance and third party's work.
- Reports operations activities to the Production Manager.

Controller:
- Responsible for performing the crossed verification of the data in the meters.
- Sends data to the Commercial Engineer.
- Responsible for uploading data in ".rpn" format, directly via the CDEC-SIC website.
- Resolves shortcomings in the systems' operation and maintenance of the power plant, in addition to recommend and develop solutions to avoid or prevent its recurrence.

Operator:
- Responsible for processing raw data within the first three days of the month after the measurements (Generation Data) and sending it to the controller.
- Verifies the consistency of data sent and received, detecting losses of data or gaps between meters.

Field Tech:
- Collects raw data from the meters.
- Sends information to the Operator.

Electricity measurement:

The Electricity produced by La Confluencia hydro power project is transmitted to La Confluencia Substation, which is located next to the power plant. This substation is connected via a double circuit transmission line (of approximately 18 km in length) with la Higuera Substation. This last Substation is connected to the grid through the Tinguiririca Substation located near San Fernando. There is a double circuit transmission line (of approximately 38 km in length) between La Higuera substation and the Tinguiririca substation (SIC's injection substation).

As shown in Figure 4, the system has twelve energy meters relevant for the CDM monitoring, located at different stages, nine of which were installed for this monitoring period. First, an energy meter is placed at the terminals of each generator of La Confluencia hydro power plant (meters $M1_{HLC}$ and $M2_{HLC}$). These meters are used for cross-check only. Second, two energy meters (M3

[4] Economic Load Dispatch Centre of the SIC

and M4) are located in La Higuera Substation measuring electricity injected from La Higuera Substation and another two energy meters (M7 and M8) measure electricity submitted from La Confluencia Substation. A set of two energy meters are placed in the Tinguiririca Substation (M5 and M6) in order to measure the energy generated by all connected power plants. As the electricity produced by La Confluencia hydro power project is injected to the grid through the Tinguiririca Substation, main meters are considered to be M5 and M6. Furthermore, La Confluencia substation will be equipped with meters for the electricity submission of La Confluencia hydro power plant (meters M9 and M10) and for the electricity submission of the external power plants that are not yet in operation (meters M11 and M12). Meters M9 and M10 have not yet been installed, as they are part of Monitoring procedure B. The meters at La Confluencia substation will only be activated once the both external power plants start operation and inject electricity into the La Confluencia substation.

External hydro power plant began operating in December 2013, and to date has installed only one meter (M11).

A diagram of the location of these meters is presented in the following figure:

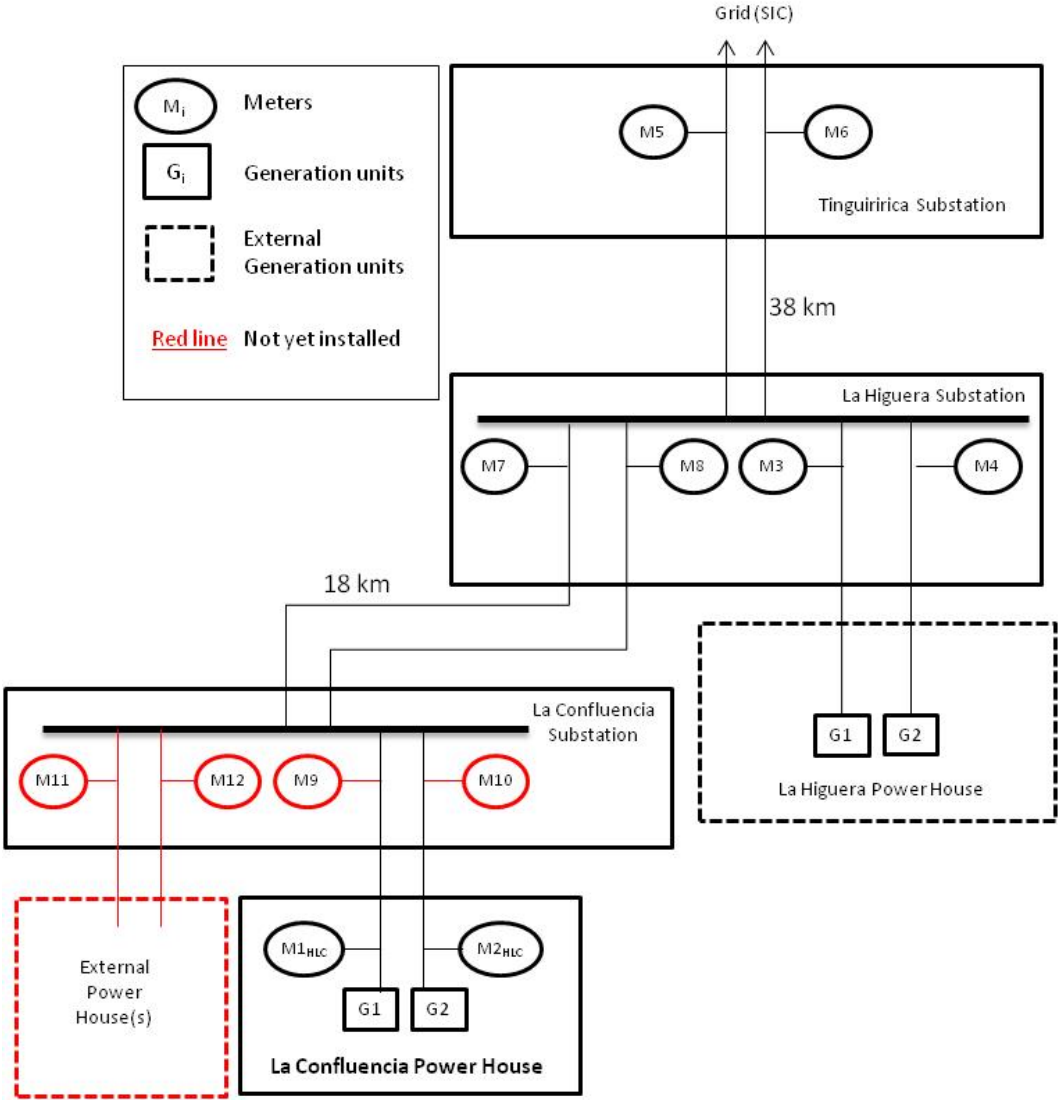

Figure 4. Diagram of Monitoring points

The amount of electricity supplied to the grid by La Confluencia hydro power project is measured along with the electricity supplied by La Higuera hydro power project at the injection point located at the Tinguiririca substation owned by Transelec (meters M5 and M6). The electricity generated

by external plants are also fed into the grid via the Tinguiririca substation. In order to determine the amount of electricity supplied to the grid by La Confluencia hydro power project at the injection point, the electricity injected by La Higuera hydro power project is deducted from the measurements of meters M5 and M6 (Monitoring procedure A). Once the both external projects are in operation, related electricity generation of this external hydro power plant has to be also deducted (Monitoring procedure B). Only one plant is in operation.

The meters located at Tinguiririca substation (M5 and M6), the meters located at La Higuera substation (M3, M4, M7 and M8) and the meter (M11) placed at the La Confluencia Substation and the meters that will be placed (M9, M10 and M12) are bi-directional meters. This means that for every pulse the raw data from each meter contains a value associated to electricity injected and electricity retired. The net electricity value for each meter is the difference between the raw data of electricity injected and electricity retired.

Monitoring procedure A

The monitoring procedure A (i.e. before the start of operation of the external hydro power plant) is as follows (**this formula is applied between the months of January 2013 and November 2013**):

Using the net electricity values from each meter, **the net electricity injected by La Confluencia hydro power project at Tinguiririca substation** is calculated by the Commercial Analyst using the following equation:

$$\text{Energy for invoicing HLC} = EG_{facility,y} = (M5 + M6) \bullet \frac{(M7 + M8)}{(M7 + M8) + (M3 + M4)} \quad (1)$$

Where,

Mi = Amount of electricity generation measured at electricity meter number *i*.

$EG_{facility,y}$ = Quantity of net generation supplied by La Confluencia Project to the grid in year y.

Monitoring procedure B

The monitoring procedure B (i.e. after the start of operation of the external power plant) is as follows:

Using the net electricity values from each meter, the **net electricity injected by La Confluencia hydro power project at Tinguiririca substation** is calculated by the Commercial Analyst using the following equation:

$$\text{Energy for invoicing HLC} = EG_{facility,y} = (M5 + M6) \cdot \frac{(M7 + M8) \cdot \frac{M9 + M10}{(M9 + M10) + (M11 + M12)}}{(M3 + M4) + (M7 + M8)} \quad (2)$$

Where,

M_i: Amount of electricity generation measured at energy meter number i (according to Figure 9).

$EG_{facility,y}$: Quantity of net electricity generation supplied by the Project to the grid in year y

This calculation assumes the proportional distribution of transmission losses in the transmission line from La Higuera substation to Tinguiririca substation in function of the hourly energy injected by each power plant to La Higuera substation and as well proportional distribution of transmission losses in the transmission line from La Confluencia substation to La Higuera substation.

Since the external power plant has installed only one meter (M11), La Confluencia has not installed their meters M9 and M10 at the la Confluencia substation.

Therefore, it has held the following alternative for the energy difference of La Confluencia power plant with external power plant.

The calculation of the energy generated by the La Confluencia power plant is determined at the La Confluencia substation. Two virtual gauges MV1 and MV2 are calculated by the following expression:

$$MV_i = M_i - \text{Perdida teórica Trafo}$$
$$MV_i = M_i - [76 + 322 * (Mi/0.85/96000)^2]$$

Where,
MVi = Virtual meter
Mi = meter at the terminals

Then, the total energy at the La Confluencia subestation:

$$E_{t\ SE\text{-}HLC} = MV_1 + MV_2 + M_{External\ power\ plant}$$

Where,
$E_{t\ SE\text{-}HLC}$ = theoretical energy
$M_{External\ power\ plant}$ = meter at the terminals

Finally, the energy provided by the la Confluencia power plant at the La Higuera substation is,

$$E_{t\ HLC\text{-}SE\ HLH} = E_{t\ SE\text{-}HLC} - \text{Perdida Línea} = M8 + M7$$

Procedures in case of meter failures

In case of emergencies and/or faulty meters, corresponding corrective actions will take place by restoring and/or replacing erroneous measurements with data not affected, i.e. in the unlikely case meter M5 and M6 accounting the net generation will fail data from meters M3, M4, M7 and M8 or from M1HLC and M2HLC could be used to estimate the net electricity fed into the grid. If the restoring of data will not be possible, erroneous measurements will not be considered for calculating CERs.

In case of any failure on the data recording of Tinguiririca substation electricity meters (owned by Transelec) the generation data of the project at the injection point (M5+M6) should be obtained by using the electricity measured at La Higuera substation with meters M7 + M8 (as in Figure 9 of the MP) and deducting the typical average value of transmission losses between La Higuera substation and Tinguiririca substation. The typical average value for transmission losses will be obtained based on previous records of the measurements at Tinguiririca substation and La Higuera substation, as follows:

Transmission losses

According to the FAR N° 1 the PP was requested to the following: "*The actual transmission losses shall be clearly and precisely determined for La Confluencia hydropower project, given the sharing of some components/equipment with La Higuera hydropower station prior to delivering to the energy to the grid from the Tinguiririca substation. Given that the determination of the losses will be done based on actual measurements it shall be done for the each verification, and also prior and after at the moment when the transmission voltage level is increased from 154 kV to 220 kV*".

The transmission losses are calculated and reported, as follows:

Equation (1) is based on the implicit deduction of all transmission losses up to the grid connection point at Tinguiririca substation. It assigns all transmission losses up to the La Higuera substation to La Confluencia hydropower and assumes the proportional distribution of transmission losses in the transmission line from La Higuera substation to Tinguiririca substation in function of the hourly energy injected by each power plant to La Higuera Substation.

The transmission losses attributed to La Confluencia are determined in these equations:

$$TL_{1,HLC} = \left[\left(M3 + M4\right) + \left(M7 + M8\right) - \left(M5 + M6\right)\right] \cdot \frac{(M7 + M8)}{(M3 + M4) + (M7 + M8)} \quad (\mathbf{3})$$

$$TL_{2,HLC} = \left[\left(M1_{HLC} + M2_{HLC}\right) - (M7 + M8)\right] \quad (\mathbf{4})$$

Where,

$TL_{1,HLC}$ = Transmission Losses for La Confluencia from La Higuera substation to Tinguiririca substation.
$TL_{2,HLC}$ = Transmission Losses for La Confluencia from La Confluencia substation to La Higuera substation.

Because meters M9 and M10 are not installed yet under Monitoring procedures A, meters $M1_{HLC}$ and $M2_{HLC}$ can be used for estimating the transmission losses along the 18 km line as a conservative approximation, as in equation (4). Own consumption at the La Confluencia powerhouse will, however, be counted as transmission losses. In Table 4 below, estimated losses are presented. Transmission losses in the 38 km transmission line between the La Higuera substation and the Tinguiririca substation are estimated at 0.1% of the energy transmitted. Compared to this rate, the 18 km transmission line from La Confluencia substation to the La Higuera substation is clearly over-estimated at -2.1%, due to the inclusion of “own consumption” at the powerhouse.

Transmission losses		$TL_{1,HLC}$	$TL_{2,HLC}$	$TL_{1,HLC}$	$TL_{2,HLC}$
		MWh		Share of power transmitted	
January	2013	125.5	654.9	0.0	0.0
February	2013	218.3	644.9	0.0	0.0
March	2013	100.5	411.9	0.0	0.0
April	2013	-178.4	474.3	0.0	0.0
May	2013	-6.2	301.4	0.0	0.0
June	2013	-91.1	210.6	0.0	0.0
July	2013	-3.5	189.8	0.0	0.1
August	2013	-9.5	216.6	0.0	0.0
September	2013	28.6	225.9	0.0	0.0
October	2013	242.9	309.6	0.0	0.0
November	2013	170.5	5.7	0.0	0.0
December	2013	809.7	-15,960.6	0.0	-0.2
January	2014	672.2	-24,142.9	0.0	-0.4
February	2014	598.7	-19,403.3	0.0	-0.4
March	2014	154.0	-15,575.2	0.0	-0.6
April	2014	393.3	-4,028.1	0.0	-0.5
May	2014	-43.3	-579.2	0.0	0.0
June	2014	-6.7	-586.9	0.0	-0.1
July	2014	4.4	-792.7	0.0	-0.1
August	2014	47.5	-928.5	0.0	-0.1
September	2014	72.1	-660.4	0.0	0.0
Average MR2		**3,300**	**-79,012**	**0.1**	**-2.1**

Table 3 - Transmission losses

Data collection, recording, calculation:

Electricity generated by La Confluencia hydro power project and supplied to the grid is measured in the injection point at Tinguiririca Substation (meters M5 and M6). As mentioned above, meters located at this point are owned by Transelec.

A Field Technician from La Confluencia hydro power project collects the data (electricity measurements every 15 minutes recorded in the memory of the meter) from the meters located in the Tinguiririca substation once a month, and delivers the data to the Operator of the power plant. The Operator is responsible for verifying the data collected is accurate and complete for every day of the month, in order to detect and inform any failure in the meters that needs to be repaired. Afterwards, the processed data is sent by the Operator to the Controller to cross check it with the meters of La Confluencia substation. After his approval the data is uploaded in the server.

The Controller sends the processed data to the Generation Supervisor, who is responsible for reviewing this information on a monthly basis, as well as processing, organizing and summing up the information so as to generate the billing act and send it to the Commercial Engineer. Equation 1 is applied by the Commercial Engineer in order to calculate the electricity generated by La Confluencia hydro power project by deducting electricity from La Higuera hydro power project.

Finally, the Commercial Analyst is responsible for organizing and summarizing information provided by Commercial Engineer. Once the data is ready, the Commercial Analyst sends the

information on a monthly basis to the CDEC-SIC (Economic Load Dispatch Centre of the SIC) for invoicing purposes and to the CDM Coordinator for emissions reduction calculations.

In all meters ($M1_{HLC}$, $M2_{HLC}$ and M3 to M11) the measurements every 15 minutes are registered in an hourly basis with a daily recording frequency. Accuracy class of all meters ($M1_{HLC}$, $M2_{HLC}$ and M3 to M11) is 0.2s.

Data Quality Control:

As a quality control procedure for the monitored data from the meters of Tinguiririca Substation (M5 and M6 in Figure 4), which represents the electricity injection point to the grid where electricity from La Higuera hydro power project and La Confluencia hydro power project is provided, the monitored data is cross checked against the total of the data measured at the meters installed at the La Higuera Substation (M3+M4+M7+M8). Accordingly data from the meters at the La Confluencia Substation is used for cross-checking once one of the external hydro power plants starts operation. In case of any inconsistency detected in the monitored data, wrong data or missing data will be completed as described in the same procedure.

For additional back-up and potential cross-checking $M1_{HLC}$ and $M2_{HLC}$ at the La Confluencia project site are monitored.

Calibration/Verification procedures:

Grid connected generation projects are obliged under the *Normas Técnicas* establish the minimum requirements for Information Systems and Communications, mentioning that an accuracy of only 2% error is required on equipment of data acquisition, yet more specifically billing meters are government by “Manual of Procedures for Metering systems and supervision systems in the CDEC-SIC”, from July 2000, which establishes that the accuracy class required for equipment to the measurement of active and reactive energy is 0.2s (according to norm IEC 687).

This equipment is tested at Complete commissioning prior to the Owner Takeover of La Confluencia Project for commercial operation. Meters are tested according to requirements of the system operator, but at least once every two years according to La Confluencia Project’s maintenance procedures.

Meters are calibrated periodically according to local standards for electricity transactions in CDEC-SIC. The data is utilised by CDEC-SIC for determining the energy balance between generators.

Emergency procedures for the monitoring system:

In case of emergencies and/or faulty meters, corresponding corrective actions will take place by restoring and/or replacing erroneous measurements with data not affected. For example, if meters M5 and M6 fail, or the recording of these meters fail, data from meters M3, M4, M7 and M8 or from M1HLC and M2HLC could be used to estimate the net electricity fed into the grid, by applying typical transmission loss factors based on historic data. If the restoring of data is not possible, erroneous measurements will not be considered for calculating CERs. For more details, please see pages 8 and 9 of the RMP.

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:	$EF_{grid,CM,y}$
Unit:	tCO_2/MWh
Description:	Combined margin CO2 emission factor for grid connected power generation in year y, which is ex-ante according to the applied methodology
Source of data:	Calculated with Equation 8 in PDD
Value(s) applied):	0.645
Purpose of data:	Baseline emissions
Additional comment:	

Data / Parameter:	$EF_{CO2,diesel}$
Data unit:	tCO_2/TJ
Description:	CO_2 emission factor of diesel used in emergency diesel generators
Source of data:	IPCC default values at the upper limit of the 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
Value(s) of monitored parameter	72.6 tCO_2/TJ
Purpose of data:	Project emission calculation
Additional comment:	No official/specific information available, thus IPCC default values are applied

Data / Parameter:	NCV_{diesel}
Data unit:	GJ/mass or volume unit
Description:	Net calorific value (energy content) of diesel used in emergency diesel generators
Source of data:	IPCC default values at the upper limit of the 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) of monitored parameter	41.4 TJ/Gg
Purpose of data:	Project emission calculation
Additional comment:	No official/specific information available, thus IPCC default values are applied.

D.2. Data and parameters monitored

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

Data / Parameter:	$EG_{,PJ,y} = EG_{facility,y}$
Unit:	MWh/y
Description:	Quantity of net electricity generation supplied by La Confluencia Project plant/unit to the grid in year y
Measured/Calculated / Default:	Calculated
Source of data:	Project activity site

Value(s) of monitored parameter:

$EG_{facility,y}$ is calculated using equation 1 of Section C and the monitoring plan in Section B7.2, respectively, which is based on continuous measurements of net electricity generation quantities measured at meters M3-M8 according to Monitoring procedure A of the Monitoring Plan. Monthly recorded meter values are given below:

	M8	M7	M6	M5	M4	M3	HSA en S/E HLC
Jan-13	22,610.1	22,574.9	22,438.7	22,458.1	-108.4	-54.7	
Feb-13	24,792.2	24,789.0	24,612.0	24,609.3	-84.3	-57.9	
Mar-13	14,296.6	14,306.6	14,178.8	14,177.9	-62.7	-83.9	
Apr-13	7,146.5	6,940.8	7,050.5	7,047.1	-63.1	-102.9	
May-13	6,466.2	6,368.0	12,143.8	12,160.3	8,239.6	3,218.6	
Jun-13	3,581.5	3,562.3	11,329.5	11,308.7	7,550.5	7,658.9	
Jul-13	845.1	801.9	9,796.7	9,837.2	4,764.8	13,180.5	
Aug-13	2,649.3	2,605.8	13,310.3	13,340.6	6,515.0	14,832.7	
Sep-13	4,258.9	4,033.7	17,776.2	17,818.7	8,224.0	19,201.5	
Oct-13	12,995.4	12,787.5	30,516.8	30,005.9	16,398.7	18,916.8	
Nov-13	24,968.0	24,600.2	50,682.5	51,426.0	45,097.8	7,794.9	
Dec-13	47,171.4	47,142.7	89,740.1	89,756.4	45,743.9	40,992.9	17,061.9
Jan-14	42,171.8	41,929.6	70,966.0	71,028.7	19,362.7	39,674.9	25,213.6
Feb-14	31,835.4	31,776.2	56,475.7	56,518.3	36,502.3	13,953.7	20,085.6
Mar-14	20,251.3	20,094.6	35,561.8	35,763.4	18,787.2	12,465.4	15,961.1
Apr-14	6,241.2	6,259.2	13,159.5	13,310.7	10,269.2	4,560.6	4,214.4
May-14	6,797.0	6,832.3	16,864.7	17,293.9	19,773.0	648.1	1,366.9
Jun-14	6,004.6	6,005.2	15,984.0	15,332.2	8,882.9	10,406.2	908.3
Jul-14	6,099.3	7,146.7	12,050.7	12,339.6	6,153.1	4,999.3	1,034.3
Aug-14	8,841.4	8,409.1	8,462.3	8,579.4	-69.4	-92.3	1,190.2
Sep-14	9,034.5	9,410.6	21,040.3	21,006.8	21,069.6	2,697.4	904.8
3nd Monitoring period	291,182	290,557	524,638	525,533	261,946	212,206	87,941

Emergency procedures:
For this period is not applied the emergency procedure approved RMP.

The average transmission loss factor for the historical period from start of commercial operations till the end of the current monitoring period was applied to the recorded values for (M7+M8).

In May 2013 La Higuera power plant started operating after 18 months in detention for the repair of the main tunnel.

Values of $EG_{facility,y}$ on a monthly basis are:

Jan-13	45,059.5
Feb-13	49,362.8
Mar-13	28,502.7
Apr-13	14,265.6
May-13	12,840.4
Jun-13	7,234.9
Jul-13	1,650.6
Aug-13	5,264.6
Sep-13	8,264.0
Oct-13	25,540.0
Nov-13	49,397.7
Dec-13	76,589.0
Jan-14	58,417.1
Feb-14	43,116.3
Mar-14	24,291.7
Apr-14	8,025.3
May-14	12,301.4
Jun-14	11,107.6
Jul-14	12,207.6
Aug-14	16,016.1
Sep-14	17,471.7
3st MP	**526,926.62**

Monitoring equipment:

Two Electricity meters located at Tinguiririca substation (M5 and M6):

Type	Jemstar
Model	JS-09R5102 B6
Serial numbers	08 43 10966 (M5) and 08 43 10974(M6)
Accuracy class	0.2s
Date of last verification	Both on March 3th 2014
Validity of last verification	March 3th 2016 (inclusive)
Verification frequency	Every 2 years

Two Electricity meters located at La Higuera substation for La Higuera hydro power project electricity generation (M3 and M4):

Type	SCHNEIDER ELECTRIC
Model	ION 8600
Serial numbers	MW1209A388-01(M3) and MW1209A387-01 (M4)
Accuracy class	0.2s
Date of last verification	March 24th 2014 and March 24th 2014
Validity of last verification	March 24th 2016 (inclusive)
Verification frequency	Every 2 years.

Two Electricity meters located at La Higuera substation for La Confluencia hydro power project electricity generation (M7 and M8):

Type	SCHNEIDER ELECTRIC
Model	ION 8600B
Serial numbers	PT-0811A787-01(M7) and PT-0811A800-01(M8)
Accuracy class	0.2s
Date of last verification	Both on March 20th 2014
Validity of last verification	March 20th 2016 (inclusive)
Verification frequency	Every 2 years.

Two Electricity meters located at La Confluencia power plant ($M1_{HLC}$ and $M2_{HLC}$), used to estimate transmission losses:

Type	SCHNEIDER ELECTRIC
Model	ION 8600B
Serial numbers	PT-0811A033-01($M1_{HLC}$) and PT-0811A187-01($M2_{HLC}$)
Accuracy class	0.2s
Date of last verification	March 21th 2014 and March 17th 2014
Validity of last verification	March 17th 2016 (inclusive)
Verification frequency	Every 2 years.

Auxiliary services meters were calibrated on 03/24/2014. These meters are not used to calculate the energy of the La Confluencia power plant.

The meters of M9, M10 and M12 are not installed

Measuring/ Reading/ Recording frequency:

Continuous measurement and at least monthly recording

Calculation method (if applicable):

$$(M5 + M6) \cdot \frac{(M7 + M8)}{(M3 + M4) + (M7 + M8)}$$

QA/QC procedures:

The *Normas Tecnicas establish* the minimum requirements for Information Systems and Communications, mentioning that an accuracy of only 2% error is required on equipment of data acquisition, yet more specifically billing meters are government by "Manual of Procedures for Metering systems and supervision systems in the CDEC-SIC", from July 2000, which establishes that the accuracy class required for equipment to the measurement of active and reactive energy is 0.2s (according to norm IEC 687). Meters are calibrated periodically according to local standards for electricity transactions in CDEC-SIC. The data is utilised by CDEC-SIC for determining the energy balance between generators.

QA/QC procedures:

Generation data of La Confluencia Project was cross checked on a monthly level versus CDEC-SIC billing records to ensure data reliability. Wherever there was a discrepancy, the more conservative value was retained and used to calculate baseline emissions.

Cross-check 1: Compare EG_{PJy} to invoices

Period	EGy MWh	Cross check				EGy (conservative) MWh
		CDEC-SIC records MWh	Difference		Comment	
Jan-13	45,059.5	45,057.0	2.5	0.0 %	Small difference. Will use most conservative value	45,056.97
Feb-13	49,362.8	49,362.3	0.5	0.0 %	Small difference. Will use most conservative value	49,362.32
Mar-13	28,502.7	28,495.9	6.8	0.0 %	Small difference. Will use most conservative value	28,495.91
Apr-13	14,265.6	14,261.1	4.5	0.0 %	Small difference. Will use most conservative value	14,261.11
May-13	12,840.4	12,865.4	-25.0	-0.2 %	Small difference. Will use most conservative value	12,840.39
Jun-13	7,234.9	7,118.0	116.9	1.6 %	Small difference. Will use most conservative value	7,117.99
Jul-13	1,650.6	1,671.4	-20.9	-1.2 %	Small difference. Will use most conservative value	1,650.57
Aug-13	5,264.6	5,277.7	-13.1	-0.2 %	Small difference. Will use most conservative value	5,264.61
Sep-13	8,264.0	8,239.1	24.9	0.3 %	Small difference. Will use most conservative value	8,239.09
Oct-13	25,540.0	25,776.9	-236.9	-0.9 %	Small difference. Will use most conservative value	25,539.95
Nov-13	49,397.7	49,042.5	355.3	0.7 %	Small difference. Will use most conservative value	49,042.46
Dec-13	76,589.0	76,711.3	-122.3	-0.2 %	Small difference. Will use most conservative value	76,589.01
Jan-14	58,417.1	58,497.4	-80.3	-0.1 %	Small difference. Will use most conservative value	58,417.08
Feb-14	43,116.3	43,286.1	-169.7	-0.4 %	Small difference. Will use most conservative value	43,116.33
Mar-14	24,291.7	24,381.0	-89.3	-0.4 %	Small difference. Will use most conservative value	24,291.68
Apr-14	8,025.3	8,296.8	-271.5	-3.3 %	Small difference. Will use most conservative value	8,025.29
May-14	12,301.4	12,844.0	-542.6	-4.2 %	Small difference. Will use most conservative value	12,301.35
Jun-14	11,107.6	11,180.7	-73.1	-0.7 %	Small difference. Will use most conservative value	11,107.62
Jul-14	12,207.6	12,215.7	-8.1	-0.1 %	Small difference. Will use most conservative value	12,207.64
Aug-14	16,016.1	16,018.0	-1.9	0.0 %	Small difference. Will use most conservative value	16,016.08
Sep-14	17,471.7	17,416.1	55.6	0.3 %	Small difference. Will use most conservative value	17,416.13
3st Monitoring Period	**526,926.62**	**528,014.34**	**-1,087.72**	**-0.2 %**	**Difference not material. Cross-check passed**	**526,359.58**

For additional back-up and potential cross-checking M1HLC and M2HLC at the La Confluencia project site are monitored. The table below shows that all monthly values pass the cross check.

Cross-check 2: Compare EG_{PJy} to electricity measured at the generation site

Period	EGy	Cross check			
		M1HLC+M2HLC	Difference		Comment
Jan-13	45,059.5	45,839.9	780.5	1.7 %	Larger than zero - OK
Feb-13	49,362.8	50,226.0	863.2	1.7 %	Larger than zero - OK
Mar-13	28,502.7	29,015.1	512.4	1.8 %	Larger than zero - OK
Apr-13	14,265.6	14,561.6	295.9	2.1 %	Larger than zero - OK
May-13	12,840.4	13,202.2	361.8	2.8 %	Larger than zero - OK
Jun-13	7,234.9	7,354.5	119.5	1.7 %	Larger than zero - OK
Jul-13	1,650.6	1,836.8	186.3	11.3 %	Larger than zero - OK
Aug-13	5,264.6	5,471.7	207.0	3.9 %	Larger than zero - OK
Sep-13	8,264.0	8,518.5	254.5	3.1 %	Larger than zero - OK
Oct-13	25,540.0	26,092.5	552.5	2.2 %	Larger than zero - OK
Nov-13	49,397.7	49,573.9	176.1	0.4 %	Larger than zero - OK
Dec-13	76,589.0	78,353.5	1,764.5	2.3 %	Larger than zero - OK
Jan-14	58,417.1	59,958.5	1,541.4	2.6 %	Larger than zero - OK
Feb-14	43,116.3	44,208.3	1,092.0	2.5 %	Larger than zero - OK
Mar-14	24,291.7	24,770.7	479.1	2.0 %	Larger than zero - OK
Apr-14	8,025.3	8,472.3	447.0	5.6 %	Larger than zero - OK
May-14	12,301.4	13,050.0	748.7	6.1 %	Larger than zero - OK
Jun-14	11,107.6	11,422.8	315.2	2.8 %	Larger than zero - OK
Jul-14	12,207.6	12,453.3	245.7	2.0 %	Larger than zero - OK
Aug-14	16,016.1	16,322.0	306.0	1.9 %	Larger than zero - OK
Sep-14	17,471.7	17,784.8	313.0	1.8 %	Larger than zero - OK
3st Monitoring Period	493,439	504,382	10,943	58.6 %	Larger than zero - OK

<u>Transmission loss factor</u>

Determination of the transmission losses going through the 38 km transmission line linking La Higuera substation with Tinguiririca substation (equation (3) of RMP).

The historical average would be calculated using the latest available 2-year period. Please note that the line is available from September 2010, when the Hidroeléctrica La Higuera begins operating.

This average historical transmission loss factor represents the transmission losses as a share of energy injected in La Higuera substation.

Purpose of data:	
Additional comment:	

<table>
<tr><td>Data / Parameter:</td><td>TEG_y</td></tr>
<tr><td>Data unit:</td><td>MWh</td></tr>
<tr><td>Description:</td><td>Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y</td></tr>
<tr><td>Measured /Calculated /Default:</td><td>Measure</td></tr>
<tr><td>Source of data:</td><td>Direct measurement at the project site</td></tr>
<tr><td>Value(s) of monitored parameter:</td><td>
<table>
<tr><td>Period</td><td>M2HLC MWh</td><td>M1HLC MWh</td><td></td></tr>
<tr><td>Jan-13</td><td>9,851.0</td><td>35,989.0</td><td></td></tr>
<tr><td>Feb-13</td><td>27,263.2</td><td>22,962.8</td><td></td></tr>
<tr><td>Mar-13</td><td>17,051.1</td><td>11,964.0</td><td></td></tr>
<tr><td>Apr-13</td><td>12,968.5</td><td>1,593.1</td><td></td></tr>
<tr><td>May-13</td><td>11,609.1</td><td>1,593.1</td><td></td></tr>
<tr><td>Jun-13</td><td>2,873.4</td><td>4,481.0</td><td></td></tr>
<tr><td>Jul-13</td><td>0.0</td><td>1,836.8</td><td></td></tr>
<tr><td>Aug-13</td><td>5,049.5</td><td>422.2</td><td></td></tr>
<tr><td>Sep-13</td><td>6,339.7</td><td>2,178.8</td><td></td></tr>
<tr><td>Oct-13</td><td>12,024.6</td><td>14,067.9</td><td></td></tr>
<tr><td>Nov-13</td><td>40,392.7</td><td>9,181.1</td><td></td></tr>
<tr><td>Dec-13</td><td>44,831.1</td><td>33,522.5</td><td></td></tr>
<tr><td>Jan-14</td><td>31,408.9</td><td>28,549.6</td><td></td></tr>
<tr><td>Feb-14</td><td>29,827.7</td><td>14,380.6</td><td></td></tr>
<tr><td>Mar-14</td><td>15,324.3</td><td>9,446.4</td><td></td></tr>
<tr><td>Apr-14</td><td>5,238.9</td><td>3,233.3</td><td></td></tr>
<tr><td>May-14</td><td>5,862.1</td><td>7,187.9</td><td></td></tr>
<tr><td>Jun-14</td><td>7,856.0</td><td>3,566.8</td><td></td></tr>
<tr><td>Jul-14</td><td>6,534.1</td><td>5,919.2</td><td></td></tr>
<tr><td>Aug-14</td><td>16,109.0</td><td>213.0</td><td></td></tr>
<tr><td>Sep-14</td><td>14,612.2</td><td>3,172.6</td><td></td></tr>
<tr><td>3st Monitoring Period</td><td>323,027</td><td>215,462</td><td>538,489</td></tr>
</table>
</td></tr>
<tr><td>Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)</td><td>Continuous measurement and monthly recording</td></tr>
<tr><td>Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)</td><td>Two Electricity meters located at La Confluencia power plant ($M1_{HLC}$ and $M2_{HLC}$), used to estimate transmission losses:
<table>
<tr><td>Type</td><td>SCHNEIDER ELECTRIC</td></tr>
<tr><td>Model</td><td>ION 8600B</td></tr>
<tr><td>Serial numbers</td><td>PT-0811A033-01($M1_{HLC}$) and PT-0811A187-01($M2_{HLC}$)</td></tr>
<tr><td>Accuracy class</td><td>0.2s</td></tr>
<tr><td>Date of last verification</td><td>March 21th 2014 and March 17th 2014</td></tr>
<tr><td>Validity of last verification</td><td>March 21th 2016 (inclusive)</td></tr>
<tr><td>Verification frequency</td><td>Every 2 years.</td></tr>
</table>
</td></tr>
<tr><td>Measuring/ Reading/ Recording frequency:</td><td>Continuous measurement and at least monthly recording</td></tr>
<tr><td>Calculation method (if applicable):</td><td>-</td></tr>
<tr><td>QA/QC procedures applied:</td><td>The table below shows that all monthly values pass the cross check.
Cross-check 2: Compare EG_{PJy} to electricity measured at the generation site</td></tr>
</table>

Period	EGy	Cross check			
		M1HLC+M2HLC	Difference		Comment
Jan-13	45,059.5	45,839.9	780.5	1.7 %	Larger than zero - OK
Feb-13	49,362.8	50,226.0	863.2	1.7 %	Larger than zero - OK
Mar-13	28,502.7	29,015.1	512.4	1.8 %	Larger than zero - OK
Apr-13	14,265.6	14,561.6	295.9	2.1 %	Larger than zero - OK
May-13	12,840.4	13,202.2	361.8	2.8 %	Larger than zero - OK
Jun-13	7,234.9	7,354.5	119.5	1.7 %	Larger than zero - OK
Jul-13	1,650.6	1,836.8	186.3	11.3 %	Larger than zero - OK
Aug-13	5,264.6	5,471.7	207.0	3.9 %	Larger than zero - OK
Sep-13	8,264.0	8,518.5	254.5	3.1 %	Larger than zero - OK
Oct-13	25,540.0	26,092.5	552.5	2.2 %	Larger than zero - OK
Nov-13	49,397.7	49,573.9	176.1	0.4 %	Larger than zero - OK
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Jan-14	58,417.1	59,958.5	1,541.4	2.6 %	Larger than zero - OK
Feb-14	43,116.3	44,208.3	1,092.0	2.5 %	Larger than zero - OK
Mar-14	24,291.7	24,770.7	479.1	2.0 %	Larger than zero - OK
Apr-14	8,025.3	8,472.3	447.0	5.6 %	Larger than zero - OK
May-14	12,301.4	13,050.0	748.7	6.1 %	Larger than zero - OK
Jun-14	11,107.6	11,422.8	315.2	2.8 %	Larger than zero - OK
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Aug-14	16,016.1	16,322.0	306.0	1.9 %	Larger than zero - OK
Sep-14	17,471.7	17,784.8	313.0	1.8 %	Larger than zero - OK
3st Monitoring Period	493,439	504,382	10,943	58.6 %	Larger than zero - OK

Data / Parameter:	$FC_{gen\text{-}set,i,y}$
Data unit:	tonnes/yr
Description:	Fuel consumption of each diesel emergency generators *i* in year *y*
Measured /Calculated /Default:	Calculated
Source of data:	Project activity side
Value(s) of monitored parameter:	

	1	2	3	4	5	6	
Period (Month/year)*	**La Confluencia Power House**	**Portillo Intake Center**	**Tinguiririca Intake Center**	**Azufre Intake Center**	**Portátil 40**	**Portátil 20**	**All emergency generators**
January 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
February 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
March 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
April 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
May 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
June 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
July 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
August 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
September 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
October 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
November 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
December 2013	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
January 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
February 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
March 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
April 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
May 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
June 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
July 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
August 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
September 2014	0.8	3.9	0.4	3.3	0.1	0.1	**8.6**
TOTAL	**2.4**	**11.8**	**1.3**	**10.0**	**0.2**	**0.2**	**25.9**

Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	The data recorded on a monthly basis.
Calculation method (if applicable):	Calculated based on hours of operation and default diesel consumption at full load (according to the manufacturer). $FC_{gen\text{-}set,i,y}$ = Hours of operation of gen-set *i* in year y * specific diesel consumption at full load of gen-set *i*

	Specific diesel consumption at full load of each diesel generator *i* in litre diesel per hour is obtained from manufacturer information, as follows:

ID	Location	Brand	Model	Serial number	MVA	Specific fuel consumption Lt/hr	Specific fuel consumption t/hr
1	La Confluencia Power House	Stemac generators	PA1888	1022585	0.954	188.7	0.160395
2	Portillo Intake Center	FG Wilson Ltd	P150E2	FGWPEP10AG	0.15	33.2	0.02822
3	Tinguiririca Intake Center	FG Wilson Ltd	P150E2	FGWPEP10LGR	0.15	33.2	0.02822
4	Azufre Intake Center	FG Wilson Ltd	P150E2	FGWPEP10LGR B00979	0.15	33.2	0.02822
5	Portátil 40	Atlas Copco	BF 4M 2011	11202427	0.4	5.3	0.004505
6	Portátil 20	Perkins	GN 65732R	1202089	0.23	3.5	0.002975

QA/QC procedures applied:	The specific fuel consumption data are obtained from manufacturer information and can be deemed very accurate.

Data / Parameter:	$T_{gen\text{-}set,i,y}$
Data unit:	Hr/yr
Description:	Hours of operation of each diesel emergency generator *i* in year *y*
Measured /Calculated /Default:	Measured
Source of data:	Project activity site
Value(s) of monitored parameter	**Parameter: T (Hours of operation of each diesel emergency generator)**

	1	2	3	4	5	6	
Period (Month/year)*	**La Confluencia Power House**	**Portillo Intake Center**	**Tinguiririca Intake Center**	**Azufre Intake Center**	**Portátil 40**	**Portátil 20**	**All emergency generators**
January 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
February 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
March 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
April 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
May 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
June 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
July 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
August 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
September 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
October 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
November 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
December 2013	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
January 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
February 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
March 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
April 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
May 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
June 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
July 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
August 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
September 2014	5.1	139.7	14.8	118.0	16.6	19.3	**313.4**
Monitoring period	**106.9**	**2,934.0**	**311.0**	**2,477.4**	**348.4**	**404.3**	**6,582.0**

Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emission calculation
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Hour-meters of the diesel emergency generators do not require calibration.
Measuring/ Reading/ Recording frequency:	Measured and obtained from hour-meter of each gen-set *i.* The data are recorded on a monthly basis.
Calculation method (if applicable):	This value are used to calculated the fuel consumption of each diesel emergency generator *i* in years *y*.
QA/QC procedures applied:	This data is obtained directly from the meters at each gen-set and can be deemed very accurate. Parameter T was not monitored monthly during the first monitoring period. As an emergency procedure, and a conservative approach, the values monitored for four of the gen-set in November 2011 were used as a conservative estimate of the overall value of the parameter for the first monitoring period. The value is conservative because the gen sets were installed during the construction period of the power plant, so a significant part of the total hours had occurred before the start of the monitoring period. One of the gen-sets was last monitored on 13 September 2011. For conservativeness, the maximum amount of hours left till the end of the monitoring period (September 30) was added to the hours recorded. The result was a very conservative addition of 432 hours on top of the 174 hours recorded in September.

	Total hours of operation were distributed equally over the 8 months of the monitoring period During this period began operating a new generator:

Location	Brand	Model	Serial number	MVA
Portátil 40	Atlas Copco	BF 4M 2011	11202427	0.4

D.3. Implementation of sampling plan

No 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 emissions calculations are calculated according to ACM0002 version 12.3, using the following equation:

$$BE_y = EG_y X\ EF_y \qquad \textbf{(2)}$$

Then,

$BE_{January2013}$ = 45,056.97 X 0.645 tCO_2/MWh = 29,061.74
$BE_{February2013}$ = 45,056.97 X 0.645 tCO_2/MWh = 29,061.74
$BE_{March2013}$ = 49,362.32 X 0.645 tCO_2/MWh = 31,838.70
$BE_{April2013}$ = 28,495.91 X 0.645 tCO_2/MWh = 18,379.86
$BE_{May2013}$ = 14,261.11 X 0.645 tCO_2/MWh = 9,198.42
$BE_{June2013}$ = 12,840.39 X 0.645 tCO_2/MWh = 8,282.05
$BE_{July2013}$ = 7,117.99 X 0.645 tCO_2/MWh = 4,591.10
$BE_{August2013}$ = 1,650.57 X 0.645 tCO_2/MWh = 1,064.62
$BE_{September2013}$ = 5,264.61 X 0.645 tCO_2/MWh = 3,395.67
$BE_{October2013}$ = 8,239.09 X 0.645 tCO_2/MWh = 5,314.21
$BE_{November2013}$ = 25,539.95 X 0.645 tCO_2/MWh = 16,473.27
$BE_{December2013}$ = 49,042.46 X 0.645 tCO_2/MWh = 31,632.39
$BE_{January2014}$ = 76,589.01 X 0.645 tCO_2/MWh = 49,399.91
$BE_{February2014}$ = 58,417.08 X 0.645 tCO_2/MWh = 37,679.02
$BE_{March2014}$ = 43,116.33 X 0.645 tCO_2/MWh = 27,810.03
$BE_{April2014}$ = 24,291.68 X 0.645 tCO_2/MWh = 15,668.13
$BE_{May2014}$ = 8,025.29 X 0.645 tCO_2/MWh = 5,176.31
$BE_{June2014}$ = 12,301.35 X 0.645 tCO_2/MWh = 7,934.37
$BE_{July2014}$ = 11,107.62 X 0.645 tCO_2/MWh = 7,164.41
$BE_{August2014}$ = 12,207.64 X 0.645 tCO_2/MWh = 7,873.93
$BE_{September2014}$ = 16,016.08 X 0.645 tCO_2/MWh = 10,330.37

Where
BE_y: Baseline emissions during the period y (tCO_2e)
EG_y: Electricity supplied by the project to the grid during the period y (MWh)
EF_y: Baseline emission factor (tCO_2e / MWh) determined as follows:

Electricity Generation calculation

The net electricity injected by La Confluencia Hydro power plant (EGy), at Tinguiririca substation is calculated using the equation (1), as defined in section C of this monitoring report:

$$\text{Energy for invoicing HLH = EGy} = (M5 + M6) \cdot \frac{(M7 + M8)}{(M3 + M4) + (M7 + M8)}$$

For example the calculation for the generation of electricity from January 2013 is as follows:
$EG_{January}$= (22,458.1+22,438.7)*((22,574.9+22,610.1)/((-54.7)+(-108.4))+(22,574.9+22,610.1)) = 45,059.5

E.2. Project emissions calculation

The project activity does not consider any project emmissions, PEy = 0.

E.3. Calculation of leakage

According to the applied methodology ACM0002 version 04 and the registered PDD, leakage is not considered in this project.

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

Emission reductions are calculated according to the following formulae:

$$BE - PE - LE = ER \quad \textbf{(7)}$$

Where,
BE = Baseline emissions (tonnes of CO_2).
PE = Project emissions (tonnes of CO_2).
LE = Leakage emissions (tonnes of CO_2)
ER = Emissions reductions (tonnes of CO_2).

As it was mentioned and according to the methodology ACM0002, emission reductions are equal to baseline emissions since there are no project emissions because generation is based on a renewable source and no leakage is expected.
Therefore:

$$ER_y = BE_y \quad \textbf{(8)}$$

Then there are estimated the baseline emissions:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \quad \textbf{(9)}$$

Where

$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM}, y \times w_{BM}$ **(10)**
$EF_{grid,CM,y}$ = 0.797 * 0.5 + 0.494 * 0.5
$EF_{grid,CM,y}$ = 0.645 tCO_2/MWh
And
$EG_{PJ,y}$= 526,926.62 MWh
Emission reductions achieved during the monitoring period:

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)	Emission reductions or net anthropogenic GHG removals by sinks (t CO_2e)
Total	339,502	545	0	338,957

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

Total baseline emissions: 339,502tCO_2
Total project emissions: 545tCO_2
Total leakage: 0 tCO_2
Total emission reductions: 338,957tCO_2

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)	739,590	338,957

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

Actual values of emission reductions are less than the expected value given that years 2011 and 2014 had a dry hydrology.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO_2e)	0	338,957

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

Project participant and/or responsible person/ entity	☐ Project participant ☒ Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Hidroeléctrica La Confluencia S.A.
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