



Monitoring report form
(Version 05.1)

MONITORING REPORT

Title of the project activity	48 MW Duduluo River Hydroelectric Power Plant	
UNFCCC reference number of the project activity	2199	
Version number of the monitoring report	01	
Completion date of the monitoring report	19/04/2016	
Monitoring period number and duration of this monitoring period	The 4 th monitoring period, first and last days included (16/07/2012 - 31/12/2012)	
Project participant(s)	Lushui County Quande Hydroelectrical Power Development Ltd. (as the project owner)	
Host Party	China	
Sectoral scope(s)	Sectoral scope 1: Energy Industries	
Selected methodology(ies)	Approved consolidated baseline and monitoring methodology ACM0002 (Version 6): Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources.	
Selected standardized baseline(s)	/	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	77,042tCO ₂ e	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	76,659tCO ₂ e	0 tCO ₂ e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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48 MW Duduluo River Hydroelectric Power Plant (hereafter refer to as “the project”), is a run-of-river and deep valley hydropower plant without regulating capacity. The total installed capacity of the project is 48MW, consisting of three 16MW hydro turbine and generator units. The main structures include small weirs, diversion tunnels, channels and powerhouse.

Electricity generated from the project is sold to the China Southern Power Grid (CSPG) to replace amount of electricity that would have otherwise been generated by the operation of grid-connected plants and by the addition of new generation sources in the CSPG in the absence of the project activity, thus reduce green house gas emissions.

The project employs three units of CJA475-L-170/4×11.5 turbines, matched with three units of SF16-10/3300 generators. The surface area of the reservoir at full water level is 27,926.8m², and the power density of the project is 1,718.78W/m², which is greater than 10W/m². The implementation of the project is listed in Table 1.

Table 1 Implementation of the Project

Date	Key events
01/06/2006	The project started construction
17/09/2008	The first and second set of the generator started operation
26/10/2008	The third set of the generator started operation
12/05/2009 -11/05/2019	The fixed crediting period
12/05/2009 -14/12/2009	The 1 st verification period
15/12/2009 - 20/07/2011	The 2 nd verification period
21/07/2011 - 15/07/2012	The 3 rd verification period
16/07/2012 - 31/12/2012	The 4 th verification period

From 16/07/2012 to 31/12/2012, the project has the total net electricity supplied to the grid of **90,893.26MWh** corresponds to the emission reductions of **76,659tCO₂e**.

A.2. Location of project activity

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The proposed project is located in Chenggan Town, Lushui County, Nujiang Lisu Ethnic Autonomous Prefecture, Yunan Province, China. The geographical coordinate of the project is: 98°40'10"-98°54'36" East, 26°13'36"-26°21'36" North.

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
China (host)	Lushui County Quande Hydroelectrical Power Development Ltd. (as the project owner)	No

A.4. Reference of applied methodology and standardized baseline

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Approved consolidated baseline methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, Version 6, dated 19 May 2006.

Approved consolidated monitoring methodology ACM0002 "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources", Version 6, dated 19 May 2006.

The "Tool for the demonstration and assessment of additionality" (version 05).

The methodologies and tool can be found from:

<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>

A.5. Crediting period of project activity

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The project activity employs the fixed crediting period, and the starting date of the crediting period is May 12, 2009. The crediting period of the project is from May 12, 2009 to May 11, 2019.

A.6. Contact information of responsible persons/entities

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Company name: Lushui County Quanyi Hydro Power Development Co., Ltd.

Contact person: ShiMao Lai

Tel: +86 13988683058

Fax: 86 0886-3637133

Email: quande@vip.163.com

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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All facilities and equipments as described in the registered PDD have been installed. Over this monitoring period, the hydro turbine and generator units as well as monitoring meters have operated normally.

The project employs three units of CJA475-L-170/4×11.5 turbines, matched with three units of SF16-10/3300 generators. The specific technical data is listed in Table 2.

Table 2 Technical Data of the Turbine / Generator Units

Key Technical Parameters		Value
Hydro Turbine	Type	CJA475-L-170/4×11.5
	Number of units	3
	Rated head	593.18m
	Rated flow	3.95m ³ /s
	Rated Power	16.053MW
	Rated Speed	600r/min
Generator	Type	SF16-10/3300
	Number of units	3
	Rated Capacity	16MW
	Rated Voltage	10.5kV
	Rated Speed	600r/min

The first and second generators of the project have been put into operation on 17/09/2008, and the third generator was put into operation on 26/10/2008. Other information is listed in details in table 1 in A.1.

No overhaul or equipment exchange or downtimes of equipment happened during the monitoring period.

No events or situations that occurred during the monitoring period, which may impact the applicability of the methodology.

B.2. Post-registration changes

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

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No any temporary deviations have been applied during this monitoring period.

B.2.2. Corrections

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No any corrections to project information or parameters fixed at validation have been approved during this monitoring period or submitted with this monitoring period.

B.2.3. Changes to start date of crediting period

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No any changes to start date of crediting period have been applied during this monitoring period.

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

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No any inclusion of a monitoring plan to the registered PDD that was not included at registration during this monitoring period.

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

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A permanent change from the registered monitoring plan has been approved by EB on December 10, 2012. The approved revised PDD can be found from:

<http://cdm.unfccc.int/Projects/DB/DNV-CUK1218657254.09/view>

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

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No any changes to the project design of the project activity have been approved during this monitoring period or submitted with this monitoring period.

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

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Not applicable

SECTION C. Description of monitoring system

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Monitoring points

The monitoring points are showing on Fig. 1.

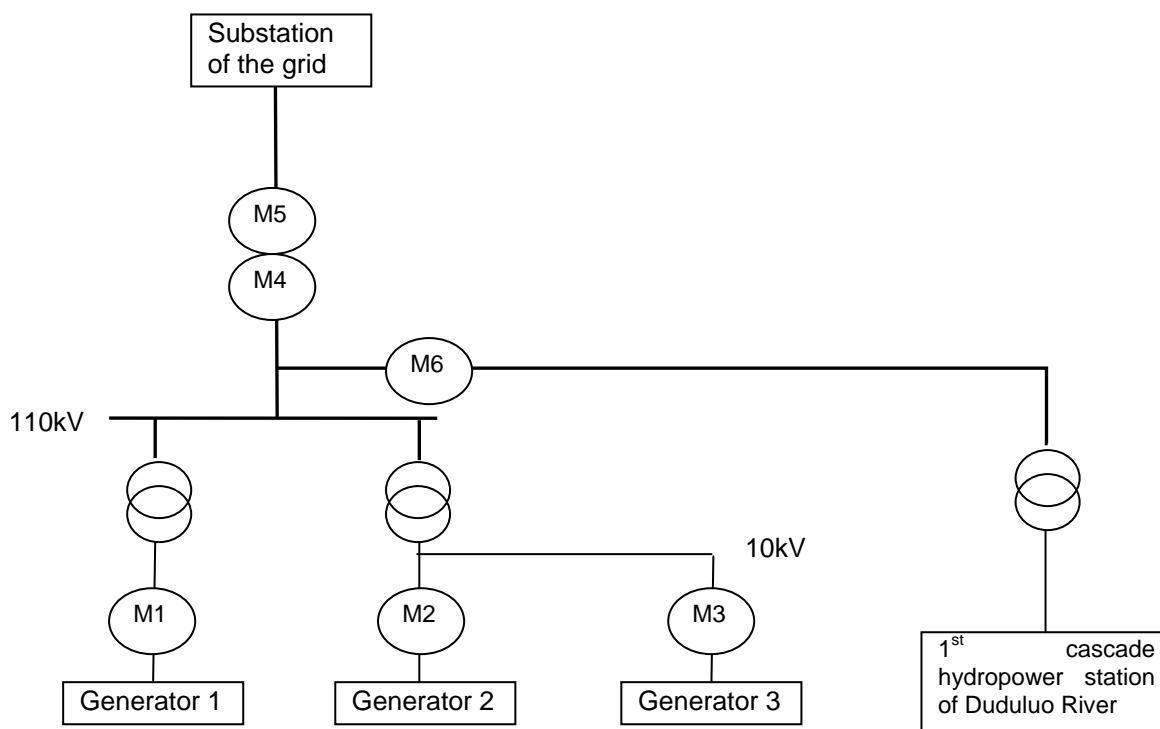


Fig. 1 Diagram of the monitoring system

After the 1st Cascade Hydropower Station of Duduluo River put into operation, the electricity supplied by the project can be calculated as the difference between the electricity delivered to the substation via the common transmission line (measured by M5) and the electricity input from the 1st Cascade Hydropower Station of Duduluo River (measured by M6).

The meter M5 (bi-directional, 0.2S) located at the outside of the project is the main meter, which can monitor the power supplied to the grid by the project and the 1st Cascade Hydropower Station of Duduluo River (M5a) and the power imported to the project and the 1st Cascade Hydropower Station of Duduluo River from the grid (M5b). M6 (bi-directional, 0.2S) is located at the input point from the 1st Cascade Hydropower Station of Duduluo River to the project. The meter M4 (bi-directional, 0.2S) is installed at the same site with M5 and used as the backup meter for M5.

The three meters are calibrated every year. When the main meter M5 is in trouble, the data monitored by the backup meter M4 will be employed.

QA/QC procedures

The quality assurance and quality control procedures for recording, maintaining and archiving data shall be implemented as part of this CDM project activity according to EB rules and real practice in terms of the need for verification of the emission reductions on an annual basis according to PDD. The measuring meters will be calibrated at least once in a year by an officially accredited entity in accordance with relevant national standards and sectoral regulations to ensure the accuracy. The measuring meters must be pasted with seal after calibration. And all the calibration records will be documented and archived by the project owner for DOE's verification. Hence, high quality is ensured for all the above parameters.

The value presented on sales invoices will be used as a cross check of the value measured by meters. For conservative principle, the lower value would be taken as E_{Gy} and would be used in the calculation of the project's emission reductions after the crosscheck.

In case of the malfunction of meters M5 or M6, the project owner will adopt a conservative way to measure the electricity supplied to the grid (E_{Gy}), such as the sales invoices. M4 is deemed as the backup meter of M5.

In addition, the management will introduce an internal audit system for the GHG compliance. The auditor so appointed will be given clear instructions about his scope of work and reporting requirements. He will carry out his work on a periodic basis. His report will indicate the compliance requirements and achievements. He will work directly under the control of the Board of Directors and all his reports will be addressed to the Board. The internal auditor will report to the management in particular on noncompliance of corrective actions, if any, by the operating staff.

All the data monitored under the monitoring plan will be kept in electronic and hard copy format for 2 years after the end of crediting period or the last issuance of CERs for this project activity, whichever occurs later. The monitored data will be presented to the verification agency or DOE to whom verification of emission reductions is assigned.

Roles and responsibilities

As described in the monitoring plan of the registered PDD, the project owner has established a CDM team to do the monitoring work. A CDM project management and monitoring manual describing the main tasks and procedures related to monitoring has been prepared under the responsibility of the Board of Directors. Detailed managing and operational structure is presented in Figure 2:

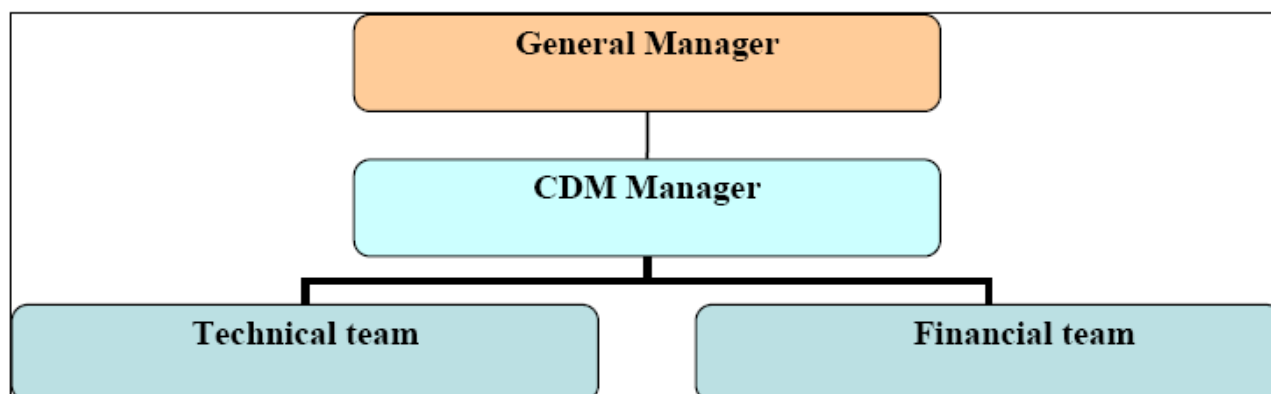


Fig. 2 Management structure of monitoring system

The CDM manager is fully responsible for CDM related matters, especially:

- 1) Tracking the development of the CDM project;
- 2) Supervising and checking the process of parameter measuring, data collection, instrument calibration and calculation of emission reduction;
- 3) Ensuring monitoring data integrity and accuracy, and carrying out the tasks related to CERs issuance.

The technical team is responsible for calibration and maintenance of the meters, data recording, verification, and archiving, periodical data summarizing according to the request of the CDM manager.

The financial team is responsible for collecting and preserving financial document used for verification, including power sale invoices and power purchase invoices.

All the monitoring staffs have been trained according to the monitoring manual issued by the project owner.

Training

The training of monitoring measurement was performed before the project registration. In addition, the monitoring officer received support from Beijing Tianqing Power International CDM Consulting, Co., Ltd. through the following actions:

- Initial training on CDM, monitoring methodology, monitoring procedures and requirements and archiving, using among others a detailed Monitoring manual and QA/QC procedure that will be made available to the validator for review.
- Provide the monitoring officer with a calculation template in electronic form for calculation of annual emission reductions.
- Continuous advice to the monitoring officer on a need basis.
- Review of monitoring reports.

SECTION D. Data and parameters

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

Data/parameter:	EF_y
Unit	tCO ₂ e/MWh
Description	The combined emission factor of the CSPG to which the electricity generated by the project activity is delivered
Source of data	Registered PDD
Value(s) applied)	0.8434
Choice of data or measurement methods and procedures	Official Statistical Data
Purpose of data	The data is used for baseline emissions calculation
Additional comments	The data is fixed ex ante before registration and not be renewed in the fixed crediting period of the project.

D.2. Data and parameters monitored

Data/Parameter	EG_y																												
Unit	MWh																												
Description	Net power supplied to the grid in the years y																												
Measured/Calculated /Default	Measured and calculated																												
Source of data	The net power supplied to the grid (EG_y) is calculated and recorded monthly.																												
Value(s) of monitored parameter	The actual net power supplied to the grid by the project is 90,893.26MWh from 16/07/2012 to 31/12/2012																												
Monitoring equipment	<p>The meter M5 (bi-directional, 0.2S) located at the outside of the project is the main meter, which can monitor the power supplied to the grid by the project and the 1st Cascade Hydropower Station of Duduluo River (M5a) and the power imported to the project and the 1st Cascade Hydropower Station of Duduluo River from the grid (M5b). M6 (bi-directional, 0.2S) is located at the input point from the 1st Cascade Hydropower Station of Duduluo River to the project. The meter M4 (bi-directional, 0.2S) is installed at the same site with M5 and used as the backup meter for M5. When the main meter is in trouble, the project owner employs the data monitored by the backup meter.</p> <table border="1"> <thead> <tr> <th>Parameters</th><th>M5</th><th>M4</th><th>M6</th></tr> </thead> <tbody> <tr> <td>Type</td><td>DTSD341</td><td>DTSD341</td><td>DTSD341</td></tr> <tr> <td>Accuracy class</td><td>0.2S</td><td>0.5S</td><td>0.2S</td></tr> <tr> <td>Serial number</td><td>2007102 5020024</td><td>2007078 0110150</td><td>1106073618000015</td></tr> <tr> <td>Calibration frequency</td><td>Once a year</td><td>Once a year</td><td>Once a year</td></tr> <tr> <td>The last calibration date</td><td>19/01/2012</td><td>19/01/2012</td><td>19/01/2012</td></tr> <tr> <td>The last calibration valid until</td><td>18/01/2013</td><td>18/01/2013</td><td>18/01/2013</td></tr> </tbody> </table> <p>These calibration reports are all covered the monitoring period from 16/07/2012 to 31/12/2012.</p>	Parameters	M5	M4	M6	Type	DTSD341	DTSD341	DTSD341	Accuracy class	0.2S	0.5S	0.2S	Serial number	2007102 5020024	2007078 0110150	1106073618000015	Calibration frequency	Once a year	Once a year	Once a year	The last calibration date	19/01/2012	19/01/2012	19/01/2012	The last calibration valid until	18/01/2013	18/01/2013	18/01/2013
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Measuring/Reading/Recording frequency	Measured continuously (M5) and reported on a monthly basis.																												
Calculation method (if applicable)	(M5a-M6a)-M5b (M5b used as the power imported to the project from the grid for conservative purpose)																												
QA/QC procedures	<ul style="list-style-type: none"> ✧ The three meters (M4, M5 and M6) are calibrated every year. ✧ Power supplied to the grid and power imported to the project from the grid is measured and double checked with the balance bills and sales invoices. ✧ Data record and relevant documents will be archived for a period of 2 years after the crediting period. 																												
Purpose of data	Calculation of baseline emissions																												
Additional comment	/																												

Data/parameter:	Surface area
Unit	m ²
Description	The area of the run-of-river reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Measured/calculated/default	Measured
Source of data	Surveys

Value(s) of monitored parameter	27,926.8m ²
Monitoring equipment	/
Measuring/reading/recording frequency:	At start of the project
Calculation method (if applicable):	/
QA/QC procedures:	The power density of the project is well above 10 W/m ² and therefore substantial deviations from the calculated design surface area will not affect the calculation of emission reductions by the project. Therefore no further QA/QC procedures will be applied.
Purpose of data:	The data is used for project emission calculation
Additional comments:	/

D.3. Implementation of sampling plan

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Not applicable

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

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

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According to methodology ACM0002 (version 6), the baseline emissions of the project are equal to:

$$BE_y = EG_y \times EF_y$$

With:

BE_y : Baseline emissions in year y (tCO₂e/yr);

EF_y is the emission factor in year y, calculated according to the registered PDD;

EG_y : Net electricity supplied to the grid by the project activity (MWh).

$$EG_y = EG_{s,y} - PR_{g,y}$$

Of which: $EG_{s,y}$ is the electricity supplied to the grid.

$PR_{g,y}$ is the electricity supplied to the project by the grid.

The emission factor has been determined ex ante as **0.8434tCO₂e/MWh**. Therefore, baseline emission can be calculated with the formula:

$$BE_y = (EG_{s,y} - PR_{g,y}) \times 0.8434 = 90,893.26 \times 0.8434 = 76,659 \text{ tCO}_2\text{e}$$

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

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PE_y is project emissions during a given year y. According to the 1st Monitoring Report, the surface area at full reservoir level is 27,926.8m². The installed capacity of this project is 48MW, therefore, the specific project is hydropower station with power density of 1,718.78W/m², which is higher than 10W/m², according to ACM0002 (Version 6), the project greenhouse gas emissions from the project activity are zero. Hence $PE_y = 0 \text{ tCO}_2\text{e}$.

E.3. Calculation of leakage

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L_y is leakage, according to ACM0002 (Version 06), there is no leakage calculation is required.

Hence $L_y = 0$.

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

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	76,659	0	0	76,659	0	76,659

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

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	The estimated emission reduction is 77,042 ¹ tCO ₂ e in 169 days based on registered PDD.	Actual emission reduction is 76,659tCO ₂ e during the monitoring period.

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

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Not applicable (the actual emission reduction is less than the emission reduction expected in PDD).

¹ The annual estimated emission reduction is 166,393tCO₂e in registered PDD (77,042=166,393*169/365).

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

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	Lushui County Quanyi Hydro Power Development Co., Ltd.
Street/P.O. Box	Bayi Road of Liuku Town, Lushui County
Building	/
City	Nujiang Lisu Ethnic Autonomous Prefecture
State/region	Yunnan
Postcode	673200
Country	P.R. China
Telephone	86-3988683058
Fax	86-886-3637133
E-mail	quande@vip.163.com
Website	/
Contact person	ShiMao Lai
Title	Project Manager
Salutation	/
Last name	Lai
Middle name	/
First name	Shimao
Department	/
Mobile	86-3988683058
Direct fax	/
Direct tel.	/