

MONITORING REPORT OF YUNNAN MANGLI HYDROPOWER PROJECT

Document Prepared By CDM Department of China National Water Resources & Electric Power
Materials & Equipment Co., Ltd.

Project Title	Yunnan Mangli Hydropower Project
Version	02
Report ID	/
Date of Issue	25/10/2012
Project ID	UNFCCC Ref. No. 4821
Monitoring Period	25/01/2010–06/10/2011
Prepared By	CDM Department of China National Water Resources & Electric Power Materials & Equipment Co., Ltd.
Contact	Address: C203,Dianyan Building,No.1 Di Zang An Nanxiang, Fuxingmenwai Street, Xicheng District, Beijing, China. 100045 Tel: 86 10 5196 8593 Email: liying@cweme.com

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1 PROJECT DETAILS

1.1 Summary Description of Project

Yunnan Mangli Hydropower Project (hereafter referred as the project) is located on Mangshi River in Luxi City, Yunnan Province, P. R. China. The project is developed and operated by Datang Mangli Hydropower Development Company Limited. Totally 2 sets of 18MW hydro turbines has been installed, providing a total capacity of 36MW. It is estimated that the power supplied to the grid would be 143,652MWh annually and achieve an amount of 113,189tCO₂e emission reductions every year as per revised PDD¹. The project is to generate hydro power and deliver it to China Southern Power Grid (CSPG).

The Project started construction on 30/06/2008. The first turbine of the Project started commissioning on 13/01/2010. In the beginning period of the operation, the monitoring data of the project was not complete. Since 25/01/2010, the data have been monitored and collected following the monitoring procedure in Section 3. Therefore, starting date of the crediting period is 25/01/2010. The project operates normally and smoothly. The project was registered as a CDM project on 07/10/2011.

During the monitoring period (25/01/2010–06/10/2011), the project has supplied electricity of 218,303MWh and achieved 172,001tCO₂e emission reductions by replacing electricity generated by fossil fuel fired power plants connected to CSPG.

1.2 Sectoral Scope and Project Type

The project is not a grouped project.

The project is a Greenfield grid-connected hydropower plant and comes under sectoral scope 1, Energy Industries (renewable sources).

1.3 Project Proponent

Project Proponent	Datang Mangli Hydropower Development Company Limited
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¹ One typo error of the turbine model had been corrected in the revised PDD and submitted to EB. The change doesn't affect the monitoring activity.

Attention	Luo xianjun
Title	Project manager
Email address	18608718805@126.com

1.4 Other Entities Involved in the Project

Under VCS, there is no other entity involved in the project.

1.5 Project Start Date

13/01/2010 the date on which the Project started commissioning

1.6 Project Crediting Period

The Project crediting period is from 25/01/2010 to 06/10/2011, covering 1 year and 8 months in total of 620 days.

1.7 Project Location

The centre of the project site is located on Mangshi River, in Luxi City of Yunnan Province, P.R.China. The exact geographical coordinates of the blocking dam are 98.3145° East longitude and 24.3083° North latitude. The project is 38 km away from Mangshi City (capital of Dehong Prefecture).

1.8 Title and Reference of Methodology

ACM0002: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.1.0)

Tool to calculate the emission factor for an electricity system (Version 02.1/EB 50/Annex 14)

Tool for demonstration and assessment of additionality (Version 05.2)

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The project scenario is the implementation of the propose project which is a hydropower station with the total installed capacity of 36MW. The hydro-junction essentially consists of the water retaining structure (barrage), the sluice works, as well as the water intake and power generation system. The sluice works include free overflow spillway, flood discharging tunnel and desalting tunnel. Two turbines and two generators have been installed. It is expected that the annual electricity delivered to the grid is 143,652MWh to CSPG and replace the same amount of electricity generated by fossil fuel fired power plants connected to CSPG.

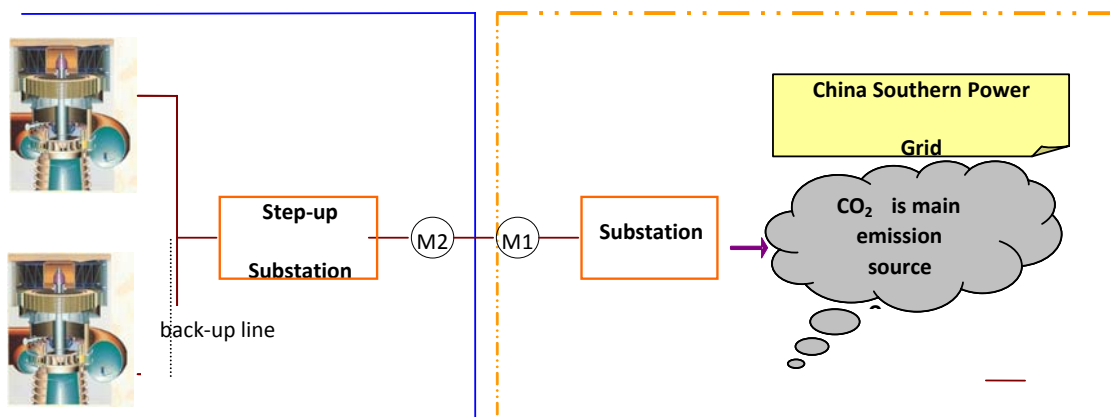
Relevant dates for the project activity are listed as below:

Starting date of the construction	28/10/2006
Restart date of the construction	02/07/2008
Registration of CDM	07/10/2011
The date on which the turbines and Generators started operation	13/01/2010

The specific parameters of turbines and generators are as follows:

Parameters		Value
Turbine	Amount	2
	Model	HLA551c-LJ-262
	Rated Capacity	18.66 MW
	Rated Water Head	37 m
	Rated Flow Rate	55.42 m ³ /s
	Rated Rotational Speed	200 r/min
Generator	Amount	2
	Model	SF-J18-30/5050
	Rated Power	18 MW
	Rated Voltage	10.5kV
	Rated Rotational Speed	200 r/min

The flow diagram of the project boundary is delineated as FigureB-1²:



FigureB-1 The flow diagram of the project

During the monitoring period, the project was in normal operational status, no special events or situations may impact the applicability of the methodology occurred, and the project is implemented in accordance with the submitted and revised PDD (The model of generator in the registered PDD contains a typographical error. According to the CDM Project Cycle Procedure, correction (Post registration change) has been requested and the PDD has been revised and submitted in this verification.).

2.2 Project Description Deviations

N. A.

2.3 Grouped Project

N. A.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO ₂ e/MWh

² During the construction period, there is a back-up line at the project site used as a power resource for emergency. Although the back-up line did not need to be used during this monitoring period, Electricity imported via the back-up line will still be measured by $M_{back-up}$.

Description:	Emission factor of the Grid
Source of data:	Registered CDM PDD
Value applied:	0.7879
Purpose of the data:	Used for Baseline emission calculations
Any comment:	The value of $EF_{grid,CM,y}$ calculated is determined ex-ante and is fixed during the crediting period.

Data Unit / Parameter:	CAP_{BL}
Data 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:	ACM0002 version 12.1.0 and registered PDD
Value applied:	0
Purpose of the data:	Calculation of project emissions or actual net GHG removals by sinks
Any comment:	Determined ex-ante and fixed for the first crediting period

Data Unit / Parameter:	A_{BL}
Data unit:	m ²
Description:	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full. For new reservoirs, this value is zero.
Source of data:	ACM0002 version 12.1.0 and registered PDD
Value applied:	0
Purpose of the data:	Calculation of project emissions or actual net GHG

	removals by sinks
Any comment:	Determined ex-ante and fixed for the first crediting period

3.2 Data and Parameters Monitored

Data Unit / Parameter:	EG _{export,y}				
Data unit:	MWh				
Description:	Electricity supplied by the project activity to the grid in year y				
Source of data:	Project site				
Description of measurement methods and procedures to be applied:	Measured by bidirectional meters with accuracy of 0.2S				
Frequency of monitoring/recording:	Continuous measurement and monthly recording.				
Value monitored:	218,541.928				
Monitoring equipment:	Meter	Type	Serial Number	Calibration date	Calibration due on
	M ₁	Power meter	02299816	22/07/2009	21/07/2010
				10/05/2010	09/05/2011
				30/01/2011	29/01/2012
	M ₂	Power meter	20081167020135	30/12/2009	29/12/2010
				22/12/2010	21/12/2011
QA/QC procedures to be applied:	The meters are calibrated annually according to the sectoral requirement. Data measured by the meter is cross checked by Electricity Transaction Notes (ETNs), the conservative data between the measured data and data from ETNs are used to calculate CERs during the verification.				
Calculation method:	-				
Any comment:	-				

Data Unit / Parameter:	EG _{import,y}																									
Data unit:	MWh																									
Description:	Electricity imported by the project activity from the grid in year y																									
Source of data:	Project site																									
Description of measurement methods and procedures to be applied:	Measured by bidirectional meters with accuracy of 0.2S																									
Frequency of monitoring/recording:	Continuous measurement and monthly recording.																									
Value monitored:	238.656																									
Monitoring equipment:	<table><tr><th>Meter</th><th>Type</th><th>Serial Number</th><th>Calibration date</th><th>Calibration due on</th></tr><tr><td rowspan="3">M₁</td><td rowspan="3">Power meter</td><td rowspan="3">02299816</td><td>22/07/2009</td><td>21/07/2010</td></tr><tr><td>10/05/2010</td><td>09/05/2011</td></tr><tr><td>30/01/2011</td><td>29/01/2012</td></tr><tr><td rowspan="2">M₂</td><td rowspan="2">Power meter</td><td rowspan="2">20081167020135</td><td>30/12/2009</td><td>29/12/2010</td></tr><tr><td>22/12/2010</td><td>21/12/2011</td></tr></table>					Meter	Type	Serial Number	Calibration date	Calibration due on	M ₁	Power meter	02299816	22/07/2009	21/07/2010	10/05/2010	09/05/2011	30/01/2011	29/01/2012	M ₂	Power meter	20081167020135	30/12/2009	29/12/2010	22/12/2010	21/12/2011
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M ₂	Power meter	20081167020135	30/12/2009	29/12/2010																						
			22/12/2010	21/12/2011																						
QA/QC procedures to be applied:	The meters are calibrated annually according to the sectoral requirement. Data measured by the meter is cross checked by ETNs, the conservative data between the measured data and data from ETNs are used to calculate CERs during the verification.																									
Calculation method:	-																									
Any comment:	-																									

Data Unit / Parameter:	EG _{backup,y}				
Data unit:	MWh				
Description:	Electricity imported through backup line from the grid in year y				
Source of data:	Project site				
Description of measurement methods and procedures to be applied:	Measured by the meter with accuracy of 1.0				
Frequency of monitoring/recording:	Continuous measurement and monthly recording.				
Value monitored:	0				
Monitoring equipment:	Meter	Type	Serial Number	Calibration date	Calibration due on
	M _{backup}	Power meter	060001004134	12/10/2009	11/10/2010
				12/06/2010	11/06/2011
				23/05/2011	22/05/2012
QA/QC procedures to be applied:	The meter is calibrated annually according to the sectoral requirement. Data measured by the meter are confirmed by Grid Company and crosschecked by ETN.				
Calculation method:	-				
Any comment:	-				

Data Unit / Parameter:	Cap_{PJ}
Data unit:	MW
Description:	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data:	Project site
Description of measurement methods and procedures to be applied:	Measured. Determine the installed capacity based on recognized standards yearly, i.e. nameplates of the turbines and generators installed at the project site and the equipment purchase contract
Frequency of	Yearly

monitoring/recording:	
Value monitored:	36
Monitoring equipment:	-
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

Data Unit / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Source of data:	Project site
Description of measurement methods and procedures to be applied:	The data is measured by professional design institute annually
Frequency of monitoring/recording:	Annually
Value monitored:	On 15/04/2010, monitored data is 2,735,390 m^2 . On 12/04/2011, monitored data is 2,732,305 m^2 .
Monitoring equipment:	-
QA/QC procedures to be applied:	-
Calculation method:	-
Any comment:	-

3.3 Description of the Monitoring Plan

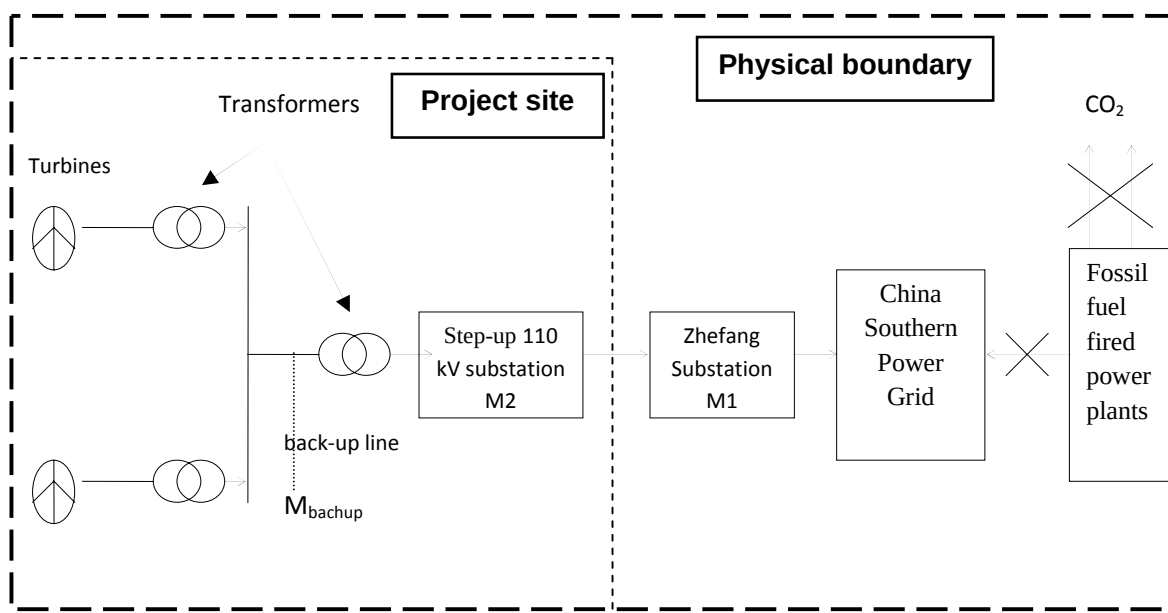
This monitoring plan assures the completeness, consistency, and accuracy of monitoring and calculation of emission reductions of project activity during the crediting period. The project owner has assigned special persons for this process, with cooperation of the power grid.

1. Data collection procedures:

Data generation:

Metering equipment has been installed at the substation of Grid Company and project site. The meter at Zhefang substation of Grid Company (M_1) has been used to monitor the supplied and imported electricity. If the metering equipment of the Grid Company failed to monitor the electricity, the

metering equipment at the project site (M_2) has been used to report the data. The electricity imported through backup line from the grid could be measured by the meter (M_{backup}). Figure B-2 illustrates the positioning of monitoring equipment. The above mentioned monitoring parameters $EG_{\text{export},y}$, $EG_{\text{import},y}$, EG_{backup} have been measured continuously. The implementation of the monitoring system has been strictly in line with the Power Purchase Agreement signed between the project company and the grid company.



FigureB-2 Positioning of monitoring equipment

The installed capacity of the hydro power plant after the implementation of the project activity (Cap_{pj}) is yearly determined based on recognized standards i.e. by nameplates of the turbines and generators installed at the project site and the equipment purchase contract.

The area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (A_{pj}) is measured by professional design institute annually.

Data recording: The electricity exported to and imported from the grid are measured continuously and at least monthly recorded. The readings of the meters have been normally recorded by the grid company and the PP together on 24:00 of 25th of each month in 2010 and on 24:00 of 10th of each month in 2011 except in a few months (refer to ER sheet) a different date could be selected which were decided by the grid company. All data including calibration records are kept until 2 years after the end of the total credit time of the CDM project.

Data aggregation: The net electricity supplied to the grid is summed over the monitoring period. Physical document such as paper-based maps, diagrams and environmental assessments have been collected in a central place, together with this monitoring plan. All paper-based information and the electronic records are stored by the technology department of the project owner and will be kept until 2 years

after the end of the crediting period of the CDM project.

Calculation: See part 4. Electricity supplied by the project activity to the grid ($EG_{\text{export},y}$) and electricity imported by the project activity from the grid ($EG_{\text{import},y}$) are monitored by the bi-directional meter (M1). The electricity imported through backup line ($EG_{\text{backup},y}$) is monitored by M_{backup} . Net electricity supplied by the project activity to the grid ($EG_{\text{facility},y}$) can be calculated by $EG_{\text{import},y}$ and $EG_{\text{export},y}$ and $EG_{\text{backup},y}$.

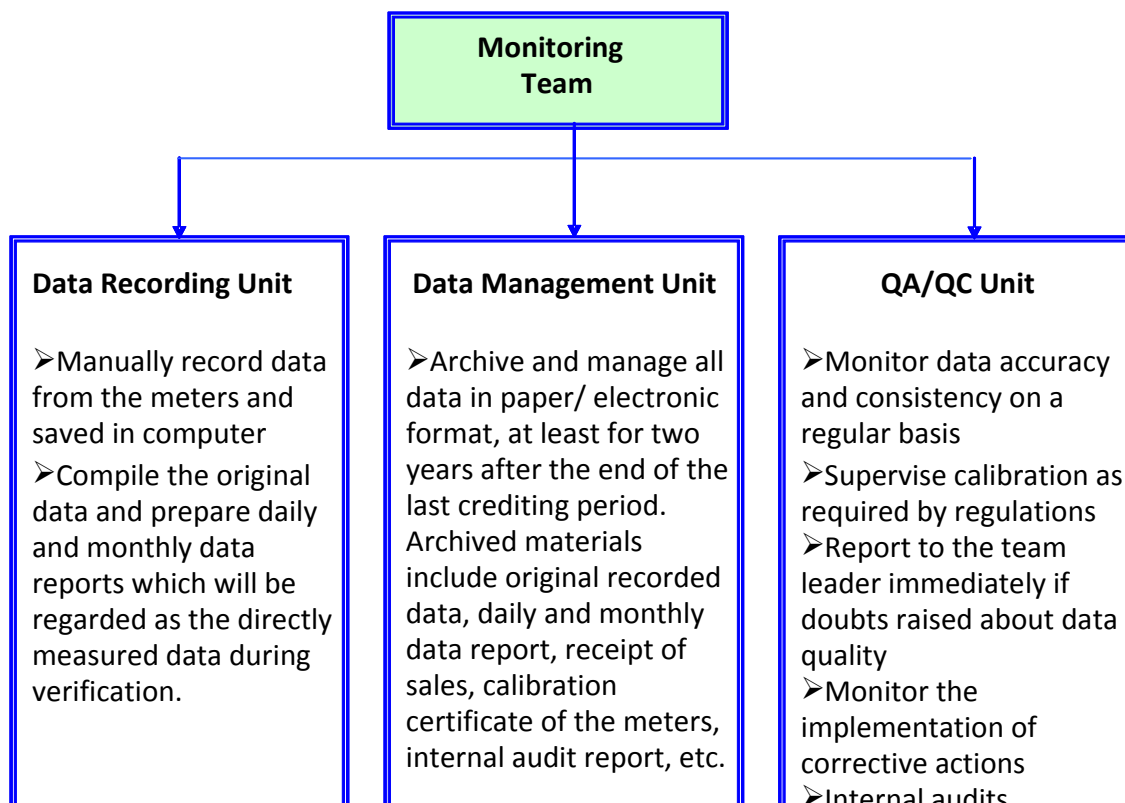
$$EG_{\text{facility},y} = EG_{\text{import}} - EG_{\text{export}} - EG_{\text{backup}}$$

See part 4 for calculations of emission reductions.

Reporting: The recordings of electricity are collected in an Excel sheet and reported in the VCS-MR. All the events or situations that occurred during the monitoring period, which may impact the accuracy of data, have been detailed recorded by the project owner in the run log and summarized in VCS-MR.

2. Management Structure

A Monitoring Team has been established consisting of three units, which are data recording, data management and QA/QC. The staffs of the team have been selected from different departments of the project company. The Team Leader holds the overall responsibilities to the monitoring of the project. His/her role is to ensure that the data monitored are accurately recorded, properly archived, QA/QC procedure is timely carried out and the entire monitoring process is strictly in line with the CDM requirements. He/she also acts as a liaison with the project manager of the consultancy company on a needy basis.



3. Quality Assurance and Quality Control (QA/QC)

QA/QC is to ensure the accuracy of data collected through measures including periodic calibration of monitoring meters, corrective actions, and internal audits.

3.1 Data quality monitoring

QA/QC unit is responsible for comparing monthly data reports from Grid company with on-site original data, crosschecking ETNs with data reports to ensure data consistency and accuracy before transferring data to the data management unit. If problems occur, QA/QC unit manager will report to the team leader immediately.

3.2 Calibration

Procedure about calibration is consistent with what is stipulated in the Power Purchase Agreement. The metering equipments are calibrated by an accredited calibration agency according to the sectoral requirement. Calibration Certificates and relevant documents are collected by the QA/QC unit and transferred to data management unit for archiving.

3.3 Corrective actions

If the metering equipment of the Grid Company (M_1) failed to monitor the electricity, the metering equipment at the project site (M_2) will be used to report the data and the QA/QC unit manager will initiate and supervise the implementation of corrective actions. For instance, metering equipment installed shall be inspected by an accredited inspection agency after the repair of all or part of meter caused by the failure of one or more parts to operate in accordance with the specifications.

3.4 Internal audits

Internal audit procedure will be initiated under any of the below circumstances:

- modification of the monitoring system
- two months prior to verification

Firstly, the monitoring system will be checked on if the system functions properly and if the monitored results are correct. Secondly, spot check of daily/monthly data report will be undertaken. Internal audit report will be submitted upon completion of the procedure.

4. Monitoring Training

Monitoring training is critical to ensure that all members of the CDM Monitoring Team has a thorough understanding of the monitoring procedure and are able to carry out the monitoring tasks strictly in line with the CDM requirements. The team leader is responsible for evaluating training outcome. Only qualified staffs can work on duty. The training includes:

- Training on operation and monitoring system of the wind farm

This is the type of training which are routinely carried out by the wind farm itself for new staffs.

- Training on CDM basics with focus on monitoring

It is carried out by the CDM consultancy company before the project is implemented. The CDM monitoring manual is used as the primary training materials. The training includes the following contents:

- ✧ CDM project cycle and the significance of monitoring
- ✧ Management structure and work scope of each team member
- ✧ Components of the monitoring plan
- ✧ QA/QC procedure
- ✧ Monitoring report template
- ✧ Preparation for verification
- ✧ Questions and answers

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The baseline emission BE_y during the monitoring period results from:

$$BE_y = EG_{facility,y} * EF_{grid,CM,y} = (EG_{export,y} - EG_{import,y} - EG_{backup,y}) * EF_{grid,CM,y}$$

Where:

BE_y = Baseline emissions in year y (tCO₂)

$EG_{facility,y}$ = Net electricity supplied by the project activity to the grid in year y

$EG_{export,y}$ = Electricity supplied by the project activity to the grid in year y

$EG_{import,y}$ = Electricity supplied to the project activity from the Grid in year(y)

$EG_{backup,y}$ = Electricity imported through backup line from the grid in year y

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation

Table 1 Electricity supplied to grid by the project ($EG_{export,y}$, MWh)

Period	By M1 Meter Reading	By Electricity Transaction Note	The lower value
	A	B	C=Min(A,B)
25/01/2010~25/02/2010	1,299.848	1,299.848	1,299.848
26/02/2010~25/03/2010	1,979.472	1,979.472	1,979.472
26/03/2010~25/04/2010	3,884.320	3,884.320	3,884.320
26/04/2010~25/05/2010	3,550.272	3,550.272	3,550.272
26/05/2010~25/06/2010	8,441.312	8,441.312	8,441.312
26/06/2010~25/07/2010	14,846.656	14,846.656	14,846.656
26/07/2010~25/08/2010	25,676.992	25,676.992	25,676.992
26/08/2010~25/09/2010	20,524.240	20,524.240	20,524.240

26/09/2010~25/10/2010	21,196.736	21,196.736	21,196.736
26/10/2010~25/11/2010	12,482.448	12,482.448	12,482.448
26/11/2010~31/12/2010	10,026.544	10,026.544	10,026.544
Subtotal in 2010	123,908.840	123,908.840	123,908.840
01/01/2011~10/01/2011	3,241.040	3,241.040	3,241.040
11/01/2011~30/01/2011	2,351.008	2,351.008	2,351.008
31/01/2011~10/02/2011	1,791.680	1,791.680	1,791.680
11/02/2011~10/03/2011	3,529.680	3,529.680	3,529.680
11/03/2011~10/04/2011	3,849.120	3,849.120	3,849.120
11/04/2011~10/05/2011	3,446.080	3,446.080	3,446.080
11/05/2011~10/06/2011	6,225.120	6,225.120	6,225.120
11/06/2011~10/07/2011	12,992.320	12,992.320	12,992.320
11/07/2011~10/08/2011	19,306.320	19,306.320	19,306.320
11/08/2011~10/09/2011	21,506.320	21,506.320	21,506.320
11/09/2011~06/10/2011	16,394.400	16,394.400	16,394.400
Subtotal in 2011	94,633.088	94,633.088	94,633.088
Total	218,541.928	218,541.928	218,541.928

Table 2 Electricity imported to the project from the grid ($EG_{import,y}$ MWh)

Period	By M1 Meter Reading	By Electricity Transaction Note	The higher value
	E	F	G=Max(E,F)
25/01/2010~25/02/2010	20.592	20.592	20.592
26/02/2010~25/03/2010	20.856	20.856	20.856
26/03/2010~25/04/2010	21.032	21.032	21.032
26/04/2010~25/05/2010	16.544	16.544	16.544
26/05/2010~25/06/2010	12.760	12.760	12.760
26/06/2010~25/07/2010	2.992	2.992	2.992
26/07/2010~25/08/2010	0.000	0.000	0.000
26/08/2010~25/09/2010	2.552	2.552	2.552
26/09/2010~25/10/2010	0.088	0.088	0.088
26/10/2010~25/11/2010	11.088	11.088	11.088
26/11/2010~31/12/2010	15.488	15.488	15.488
Subtotal in 2010	123.992	123.992	123.992
01/01/2011~10/01/2011	0.088	0.088	0.088
11/01/2011~30/01/2011	23.936	23.936	23.936
31/01/2011~10/02/2011	6.160	6.160	6.160
11/02/2011~10/03/2011	16.720	16.720	16.720
11/03/2011~10/04/2011	18.480	18.480	18.480

11/04/2011~10/05/2011	22.880	22.880	22.880
11/05/2011~10/06/2011	14.080	14.080	14.080
11/06/2011~10/07/2011	7.040	7.040	7.040
11/07/2011~10/08/2011	1.760	1.760	1.760
11/08/2011~10/09/2011	2.640	2.640	2.640
11/09/2011~06/10/2011	0.880	0.880	0.880
Subtotal in 2011	114.664	114.664	114.664
Total	238.656	238.656	238.656

Table 3 Electricity imported through backup line from the grid ($EG_{\text{backup},y}$, MWh)

Period (monthly data is 0 hence annual data is used)	By M_{backup} Reading(MWh)	By Electricity Transaction Note	The higher value
	H	I	J=Max(H,I)
25/01/2010~31/12/2010	0.000	0.000	0.000
Subtotal in 2010	0.000	0.000	0.000
01/01/2011~06/10/2011	0.000	0.000	0.000
Subtotal in 2011	0.000	0.000	0.000
Total	0.000	0.000	0.000

The baseline emissions during this monitoring period are calculated as following:

Total: $BE_y = EG_{\text{facility},y} * EF_{\text{grid},CM,y} = (EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backup},y}) * EF_{\text{grid},CM,y} = (218,541.928 - 238.656 - 0.000) \text{ MWh} \times 0.7879 \text{ tCO}_2\text{e/MWh} = 172,001 \text{ tCO}_2\text{e}$

Year 2010: $BE_y = EG_{\text{facility},y} * EF_{\text{grid},CM,y} = (EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backup},y}) * EF_{\text{grid},CM,y} = (123,908.840 - 123.992 - 0.000) \text{ MWh} \times 0.7879 \text{ tCO}_2\text{e/MWh} = 97,530 \text{ tCO}_2\text{e}$

Year 2011: $BE_y = EG_{\text{facility},y} * EF_{\text{grid},CM,y} = (EG_{\text{export},y} - EG_{\text{import},y} - EG_{\text{backup},y}) * EF_{\text{grid},CM,y} = (94,633.088 - 114.664 - 0.000) \text{ MWh} \times 0.7879 \text{ tCO}_2\text{e/MWh} = 74,471 \text{ tCO}_2\text{e}$

4.2 Project Emissions

On 15/04/2010, area of the reservoir measured in the surface of the water of the project is $2,735,390 \text{ m}^2$, Installed capacity of the project is $36,000,000 \text{ W}$, the power density of the project $= (Cap_{PJ} - Cap_{BL}) / (A_{PJ} - A_{BL}) = 13.161 \text{ W/m}^2$, greater than 10 W/m^2 .

On 12/04/2011, area of the reservoir measured in the surface of the water of the project is $2,732,305 \text{ m}^2$, Installed capacity of the project is $36,000,000 \text{ W}$, the power density of the project $= (Cap_{PJ} - Cap_{BL}) / (A_{PJ} - A_{BL}) = 13.176 \text{ W/m}^2$, greater than 10 W/m^2 .

According to ACM0002, the Power Density of the power plant is greater than 10 W/m², the project emissions is zero.

4.3 Leakage

According to the ACM0002, Leakage (L_y) is not considered.

4.4 Summary of GHG Emission Reductions and Removals

The total Emission Reduction (ER_y) during this monitoring period is calculated as follow:

Total: $ER_y = BE_y - PE_y - L_y = 172,001 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} = 172,001 \text{ tCO}_2\text{e}$

Year 2010: $ER_y = BE_y - PE_y - L_y = 97,530 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} = 97,530 \text{ tCO}_2\text{e}$

Year 2011: $ER_y = BE_y - PE_y - L_y = 74,471 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} - 0 \text{ tCO}_2\text{e} = 74,471 \text{ tCO}_2\text{e}$

Vintage	BE _y (tCO ₂ e)	PE _y (tCO ₂ e)	L _y (tCO ₂ e)	ER _y (tCO ₂ e)
2010	97,530	0	0	97,530
2011	74,471	0	0	74,471
Total	172,001	0	0	172,001

5 ADDITIONAL INFORMATION

As per ex-ante calculation of the registered CDM-PDD, the average of annual emission reductions is 113,189 tCO₂e. The estimated ERs during this period are 192,266 tCO₂e (=113,189*620/365). The actual emission reductions during this monitoring period are 172,001 tCO₂e, which is less than the estimated value in the revised PDD. There is not any significant increase compared with the estimated emission reduction in the revised PDD.