

MONITORING REPORT

Version 3.0

Azhu Hydro Power Project
in Guizhou Province, China

Monitoring period: 26/07/2008 To 25/02/2010

Date: 29/06/2010

Revision history of this document

Version Number	Date	Description and reason of revision
1.0	18/03/2010	Initial edition to DOE
2.0	04/06/2010	Revised edition to DOE
3.0	29/06/2010	Revised edition to DOE

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1. Introduction

This document reports the emission reductions generated by Azhu Hydro Power Project in Guizhou Province, China, during the following monitoring period: 26/07/2008 to 25/02/2010.

2. General description of the project

2.1 Project activity

Azhu Hydro Power Project in Guizhou Province, China (here after referred as “the proposed project”) is a new hydropower project at the site. The total installed capacity of the proposed project is 27MW(2×13.5MW) and the estimated annual electricity generation is 122000 MWh, the annual electricity exported to the grid is 110000 MWh. The proposed project owner is Azhu Power Company Co. Ltd of Liupanshui Tuoyuan Group Co., Ltd.. The electricity generated by the proposed project finally connected to China Southern Power Grid (CSPG) and reduce GHG emission of CSPG which is dominated by fossil fuel power generation. The estimated annual GHG emission reductions are 84,852 tCO₂e.

2.2 Technical description of the project

Location of the project activity

The proposed project is located in the Town of Longchang, Liuzhi especial region, Liupanshui City in Guizhou Province, China. The geographical coordinates of the proposed project location are east longitude 105°27'47" and north latitude 26°20'02".

Technology employed by the project activity

The key technical data for the proposed project are summarized in the following table.

Items	Features
Installed Capacity	27MW
Expected annual electricity delivered to the grid	11000MWh
Type of the turbine	HLN276-LJ-305
Type of the generators	SF13.5-44/6100
Weighted average water head	26m

The electric power generated by the proposed project is connected to the 12km 35kV Xinyao Substation¹ and the 15km 35kV Pingzhai Substation², the proposed project can choose transformer substation it connected through switch station, finally delivered to the CSPG. Both of the two gateway meters are installed in the proposed project.

Domestic technology is adopted by the proposed project, and there is no technology transfer.

3. Monitoring methodology and plan

¹ The electricity can be measured by the gateway meter installed in the proposed project. The type of the gateway meter is DY3050A, it's serial number is 01110700359, it's precision is 0.5S.

² The electricity can be measured by the gateway meter installed in the proposed project. The type of the gateway meter is DY3050A, it's serial number is 01110700360, it's precision is 0.5S.

The methodology applied for the proposed project is “the approved methodology for CDM project-“ACM0002-Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (version 07). Furthermore, the “Tool for the Emission Factor Calculation of Electricity System”(01.1 version) is also quoted. In keeping with the monitoring methodology, the following parameter needs to be monitored for the project:

The aim of the monitoring plan

Monitoring is a key procedure to verify the real and measurable emission reductions from the proposed project. And, to guarantee the proposed project’s real, measurable and long-term GHG emission reductions, the monitoring plan is established. The monitoring plan is carried out practically in line with the referred VCS PD Monitoring Plan.

The data needs to be monitored

- Net electricity delivered to the grid (EG_y)

Net electricity delivered to the grid

ID	Data type	Data variable	Data unit	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For how long is archived data kept?
$EG_{P \rightarrow G}$	Electricity	Electricity delivered to the grid	kWh	Recorded on a monthly basis	100 %	Electronic with paper back-up	During the crediting period and two years after
$EG_{G \rightarrow P}$	Electricity	Electricity imported from the grid	kWh	Recorded on a monthly basis	100 %	Electronic with paper back-up	During the crediting period and two years after
TEG_y	Electricity	Total electricity produced by the project activity	kWh	Recorded on a monthly basis	100 %	Electronic with paper back-up	During the crediting period and two years after
Cap_{pj}	Installed capacity	Installed capacity of the proposed project	W	Recorded on a yearly basis	100%	Paper back-up	During the crediting period and two years after

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A _{PJ}	Surface area	Surface area at the full reservoir level	m ²	monitored every year	100%	Paper back-up	During the crediting period and two years after
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The power connection diagram and the parameter of the ammeters please see The Project Description of Azhu Hydro Power Project.

4. Quality Control (QC) and Quality Assurance (QA)

4.1 QA/QC procedures

Id	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary
EG _{P To G}	Low	The measurement/ monitoring equipment should adopt the colligated automation system complying with state standard and technology. These equipment and systems should be calibrated and checked. The generated electricity is delivered to 35kV Xinyao substation and 35kV Pingzhai substation. There are two gateway meter installed in the proposed project station, they can record the electricity delivered to and imported from the two substation respectively. The local power grid company is responsible for the maintenance and calibration of the gateway meters once a year. The data can be accurately measured by the gateway meter installed in the proposed power station and continuously recorded by the staffers, and it will be directly used to calculate emission reductions. The sum of monthly exported electricity and the related electricity receipts (viz. Balance Advice Note (BAN) issued by the local grid company on monthly basis) are supplied to the proposed project owner as an additional check for quality control.
EG _{G To P}	Low	The measurement/ monitoring equipment should adopt the colligated automation system complying with state standard and technology. These equipment and systems should be calibrated and checked. The electricity consumed by the proposed project is imported from 35kV Xinyao substation and 35kV Pingzhai substation. The gateway meters can record the electricity imported from the two substation respectively. The local power grid company is responsible for the maintenance and calibration of the gateway meters once a

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		year. The data can be accurately measured by gateway meter installed in the proposed power station and continuously recorded by the staffers, and it will be directly used to calculate emission reductions. The sum of monthly imported electricity and the related electricity receipts are supplied to the proposed project owner as an additional check for quality control.
TEG _y	Low	The measurement/ monitoring equipment should adopt the colligated automation system complying with state standard and technology. These equipment and systems should be calibrated and checked. The local power grid company is responsible for the calibration of the ammeters. The data of total electricity can be accurately measured by the ammeter and recorded.
Cap _{pi}	Low	It will be verified by DOE every year.
A _{pJ}	Low	The data was measured every year by professional design institute is reliable and creditable.

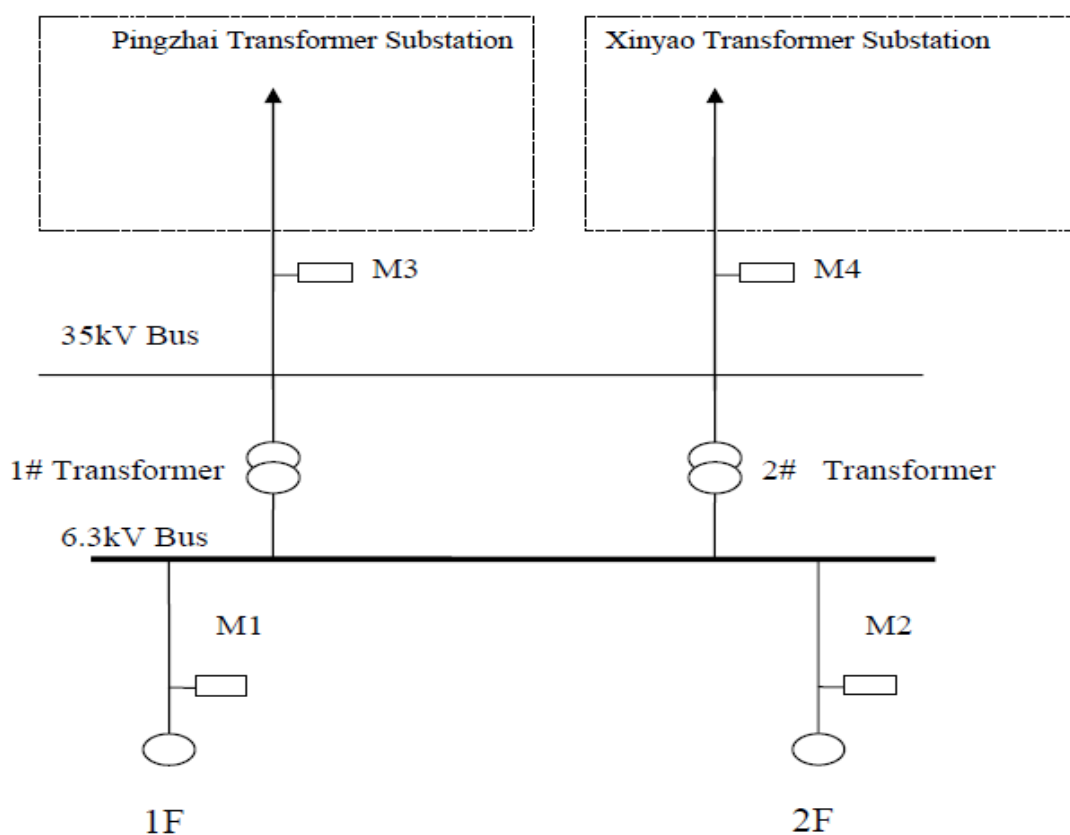


Figure 1 power connection diagram

4.2 Information about the meters

	M1	M2	M3 Gateway meter	M4 Gateway meter
Function	1# Generator	2# Generator	In the station	In the station
Type/Model	DS862-2	DS862-2	DY 3050A	DY 3050A
SN	2004-980085	2004-980092	100360	100359
Precision	2	2	0.5s	0.5s
On-site calibration	05/06/2008	05/06/2008	09/05/2008	09/05/2008
	05/06/2009	05/06/2009	09/05/2009	09/05/2009

Before operation, the ammeters were delivered to the third authorised party for calibration. After calibration certificates of the ammeters issued, the ammeters are sealed with a qualification label by the local grid company.

4.3 Roles and responsibilities

Mr. Wuchao is responsible for confirm the net electricity and the area of the reservoir for calculation of emission reductions. Mr. Linglong is in charge of checking the ammeter data, the electricity Balance Advice Note. Mr. Lei Debing is in charge of gathering the electricity Balance Advice Note issued by the power grid company, he is also in charge of the recording, collection and checking the monitoring data, which includes the power generation and the external power consumption.

5. GHG Calculations

According to the methodology: $ER_y = BE_y - PE_y - L_y$

5.1 Project activity emissions

The installed capacity of the proposed project is 27MW, the area of the reservoir is 2700536.728m² and the power density is thus 9.99W/m², greater than 4 W/m² and lower than 10 W/m². According to the methodology ACM0002 (version 07), it is needed to calculate project emissions. The project emissions (PE) during the VER crediting time is calculated as follow:

$$PE_y = EF_{Res} \times TEG_y / 1000 = 90 \times 178944.89 / 1000 = 16,105 \text{ (tCO}_2\text{e)}$$

Were:

PE_y = Emission from reservoir expressed as tCO₂e/year

EF_{Res} = is the default emission factor for emissions from reservoirs, and the default value as per EB23

is 90 Kg CO_{2e} /MWh.

TEG_y = Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y (MWh).

5.2 Leakages

According to ACM0002 (version 07), there is no need for the proposed project to consider leakage. Besides there is no fossil fuel engine/generator which is in place for emergency purpose during the monitoring period. The leakage from the project is zero.

$$L_y=0$$

5.3 Baseline emissions

Table 1 The comparison between the generated electricity and the exported electricity

Period	Generated Electricity (MWh)	Exported Electricity (MWh)	Imported Electricity (MWh)	EG _{G to P} (MWh)
	A	B	C	D
26/07/2008-25/08/2008	19586.07	19270.44	2.52	19267.92
26/08/2008-25/09/2008	16799.90	16529.10	5.46	16523.64
26/09/2008-25/10/2008	19195.16	18902.52	0.84	18901.68
26/10/2008-25/11/2008	17777.66	17317.86	3.36	17314.5
26/11/2008-25/12/2008	6581.61	6319.32	8.40	6310.92
26/12/2008-15/01/2009	3266.87	3155.88	6.30	3149.58
16/01/2009-25/02/2009	4320.86	4185.72	20.16	4165.56
26/02/2009-25/03/2009	2476.85	2384.76	14.70	2370.06
26/03/2009-25/04/2009	4776.03	4606.56	13.86	4592.7
26/04/2009-25/05/2009	10570.46	10243.80	12.18	10231.62
26/05/2009-25/06/2009	14503.23	14076.72	13.02	14063.7
26/06/2009-25/07/2009	18650.21	18159.54	2.52	18157.02
26/07/2009-25/08/2009	16873.61	16441.95	1.68	16440.27
26/08/2009-25/09/2009	10158.75	9902.16	7.56	9894.6
26/09/2009-25/10/2009	4226.98	4105.92	17.22	4088.7
26/10/2009-25/11/2009	3036.92	2982.42	21.00	2961.42
26/11/2009-25/12/2009	2420.46	2369.22	22.68	2346.54

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26/12/2009-25/01/2010	2086.88	2024.40	23.52	2000.88
26/01/2010-25/02/2010	1636.42	1589.70	32.76	1556.94
Total (from 26/07/2008-25/02/2010)	178944.89	174567.99	229.74	174338.25

The baseline emission BE during the monitoring period results from:

$$BE = EG \times EF$$

$$EG = EG_{P \text{ to } G} - EG_{G \text{ to } P}$$

Where

EG – net power transmitted to the grid (MWh);

EF – emission factor (tCO₂e/MWh)

$EG_{P \text{ to } G}$ – exported electricity to the grid

$EG_{G \text{ to } P}$ – imported electricity from the grid

The baseline emission BE during the monitoring period can be calculation by the formula below:

$$EG = EG_{P \text{ to } G} - EG_{G \text{ to } P} = 174567.99 - 229.74 = 174338.25 \text{ (MWh)}$$

$$BE = EG \times EF = 174338.25 \text{ MWh} \times 0.8712 \text{ tCO}_2\text{e/MWh} = 151,883.486 \text{ (tCO}_2\text{e)}$$

The final GHG emission reduction (ER) is calculated as follows:

$$ER = BE - PE - L = 151,883.5 - 16,105 = 135,778 \text{ (tCO}_2\text{e)}$$

5.4 Emission reductions

Emission reduction in the monitoring period is 135,778 tCO₂e.

We have checked the monitoring report of Azhu 27MW hydro power project. We think that the data mentioned in the report is accurate and description of the report is real.

6. Description of emission reductions

It is indicated in PD that the runoff from 26/07/2008 to 25/02/2010 accounts for a year and seven months. Thus the estimated electricity exported to the grid during this period is:

$$84,852 \text{ tCO}_2\text{e (in PD)} \times (1 + \frac{7}{12}) = 134,349 \text{ (tCO}_2\text{e)};$$

$$\frac{135,778 - 134,349}{135,778} * 100\% = 1.03\%$$

The actual emission reductions slightly higher than the estimated emission about 1.03% .We can see that the estimated results are basically in agreement with the actual results.

Signature of Authorized representative: Liu Yunfan

