

Monitoring Report

Voluntary Carbon Standard 2007.1

Yangcun Hydropower Station Project

Monitoring Period: 26/05/2008-25/05/2009

Date: 12/10/2009

Version 2.2, revised based on DOE's verification findings

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1. Project Background

By means of this Monitoring Report greenhouse gas emission reductions achieved by the project activity “Yangcun Hydropower Station” are being verified and certified as per requirements of the Voluntary Carbon Standard, Version 2007.1.

Further background information on the project activity can be found in the Project Design Document (PDD) and associated documents, which had already been submitted for validation as per requirements of the Voluntary Carbon Standard, Version 1. The PDD and associated documents are available upon request.

Project Technical Characters

Turbines	Model	HLA630-LJ-152	/
	Manufacturer	Haerbin Small-Scale hydropower Development Co., Ltd.	/
	Units	3	/
	Maximal Water Head	132.9	m
	Rated Water Head	119	m
	Minimal Water Head	115.8	m
	Rated Flow Rate	20.52	m ³ /s
	Rotor Diameter	1.52	m
	Rated Power	22.68	MW
	Rated Rotating Speed	500	r/min
	Runaway Speed	950	r/min
	Serial No.	HDX002-1/2/3	/
Generators	Model	SF22-12/3480	/
	Manufacturer	Haerbin Small-Scale hydropower Development Co., Ltd.	/
	Units	3	/
	Rated Capacity	22	MW
	Rated Voltage	10500	V
	Rated Electrical Current	1423	A
	Rated Power Co-efficient	0.85	/
	Rated Frequency	50	Hz
	Isolation Class	F	/
	Load	175	T
	Serial No.	HDX002-1/2/3	/

2. Monitoring Background

Section B of the PDD (Application of the baseline and monitoring methodology) provides all details in regard to calculation of emission reductions and the monitoring plan to be followed by the project activity. Both the emission reduction calculations and the monitoring plan are based on the approved CDM methodology ACM0002, Version 6.

3. Monitoring Results

3.1. Monitoring period

This is the third monitoring report of this project activity. It covers the period 26/05/2008 to 25/05/2009.

3.2. The implementation status of the project during the monitoring period under consideration

On 8 August 2002, the first electric generator started trial run. Since 28 March 2003, all generator units started operation and generating power. No emergencies happened during this monitoring period.

3.3. Presentation of monitoring results

All monitoring data is available in an Excel spreadsheet. The spreadsheet includes:

1. A summary worksheet containing the results of the VCU calculations for every year of the monitoring period
2. Worksheets for every year of the monitoring period containing the VCU calculations

3.4. Metering equipment accuracy

Monitoring meters are periodically controlled and reach an accuracy grade of 1.0 for measurement of active power and 2.0 for measurement of reactive power. Please see Annex for more details.

3.5. Calculation methodology

Emission reductions were calculated on the basis of following formulae:

Emission Reductions = Baseline Emissions – Project Emissions – Leakage

where:

Baseline Emissions = Net Electricity Export x Grid Emission Factor

Project uses net electricity export for calculation of emission reductions; hence project emission is considered to be 0:

Project Emissions = 0

Leakage = 0

Hence, the calculation of emission reductions can be summarized in the following steps:

1. Amount of net electricity delivered to the grid based on daily recordings, which are aggregated on a monthly basis. For determination of the amount of Net Electricity Export please refer to Section 2 of Annex 1 below.
2. Monthly figure is multiplied by the Grid Emission Factor calculated as per methodology ACM0002. Grid Emission Factor was calculated in PDD to be 0.94445 t

CO₂e/MWh. This grid emission factor is determined ex-ante and fixed during the crediting period.

3. As no project emissions and no leakage need to be accounted for, net emission reductions for the specified monitoring period are equal to baseline emissions

3.6. Emission reductions

The calculated emission reductions achieved by the project activity within the covered monitoring period amount to 256,201 t CO₂e.

4. Summary of Monitoring Data and Results

A summary of monitoring data and emission reductions based on aggregated data on a monthly basis are provided in the table below:

Year	Month		Total Electricity ported (kWh)	Transmission Losses (kWh)	Net electricity ex-ported (kWh)	Emission Reductions (tCO ₂ e)
2008	26/05/2008 - 25/06/2008	-	42,119,900	3,466,468	38,653,432	36,506
	26/06/2008 - 25/07/2008	-	33,855,800	2,786,332	31,069,468	29,344
	26/07/2008 - 25/08/2008	-	40,232,192	3,311,109	36,921,083	34,870
	26/08/2008 - 25/09/2008	-	25,905,088	2,131,989	23,773,099	22,453
	26/09/2008 - 25/10/2008	-	29,641,920	2,439,530	27,202,390	25,691
	26/10/2008 - 25/11/2008	-	26,837,428	2,208,720	24,628,708	23,261
	26/11/2008 - 25/12/2008	-	16,019,008	1,318,364	14,700,644	13,884
	Total		214,611,336	17,662,513	196,948,823	186,008

Year	Month		Total electricity exported (kWh)	Transmission Losses (kWh)	Net electricity ex-ported (kWh)	Emission Reductions (tCO ₂ e)
2009	26/12/2008 - 25/01/2009	-	11,278,860	928,250	10,350,610	9,776
	26/1/2009 - 25/2/2009	-	11,563,600	951,684	10,611,916	10,022
	26/2/2009 - 25/3/2009	-	10,281,500	846,167	9,435,333	8,911
	26/3/2009 - 25/4/2009	-	19,182,460	1,578,716	17,603,744	16,626
	26/4/2009 - 25/5/2009	-	28,680,960	2,360,443	26,320,517	24,858
	Total		80,987,380	6,665,261	74,322,119	70,193

The calculated ER from values above is 256,201 t CO₂e.

Comparison of the actual emission reduction claimed in this monitoring period (from 26/05/2008 to 25/05/2009) with the estimation in the registered PDD:

Monitoring Period: From 26/05/2008 to 25/05/2009	Total Electricity Generation (kWh)	Net Electricity Supplied to grid (kWh)	Emission Reductions (tCO ₂ e)
Monitoring Report (Monitoring Data spreadsheet)	311,823,880	271,270,942	256,201
Registered PDD	303,600,000	258,060,000	243,725
Difference Comparison between actual data in MR and estimation in PDD	2.64%	4.87%	4.87%

From the above table, it can be clearly seen that there are only minor increases from the estimated values of power generation and net electricity supplied in PDD to the actual values in this monitoring report. The increases are still in the reasonable fluctuation ranges (<5%).

5. Crosscheck

Four types of evidences have been collected in order to crosscheck the amount of net electricity supplied to the grid:

- A. Electricity meter readings from meters installed right after generators
- B. Historical electricity data verified by E'bian Water Conservation Bureau
- C. Reservoir Area Fund Declaration Document verified by E'bian County Tax Authority
- D. Electricity data from both sales receipts and internal invoices

The four data sources indicated above confirm that the calculation of the net electricity supply amount to the grid is very conservative. For more details please refer to Annex 2

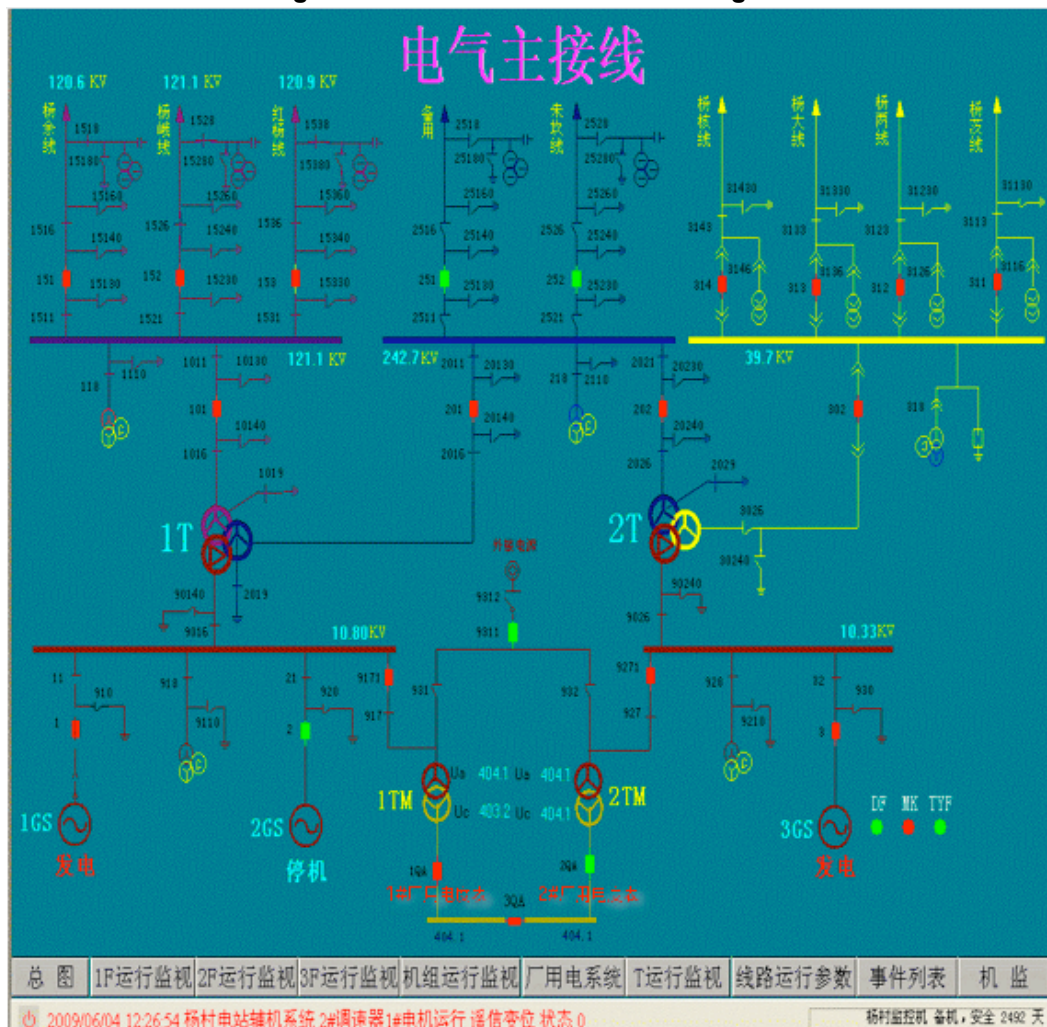
Annex 1 Information of Monitoring Plan

1. Description of Main Electric Connection

Following is the Main Electric Connection Diagram displayed on the interface of the computer-based monitoring system. Power generated by the project is exported to grid via the 110 kV transmission line through YangE line and HongYang line (top-left of the diagram). YangYu Line is also exporting power via 110 kV transmission line through YangE line and HongYang line to the grid at present, so this part of bypass power is deducted from ER calculation. The 220 kV transmission line (top-middle of the diagram) is another optional path of power export, which was planned during construction but never used in operation. On the top-right of the diagram there is a 35 kV transmission line, to which a transformer station and three power stations are connected (the yellow lines).

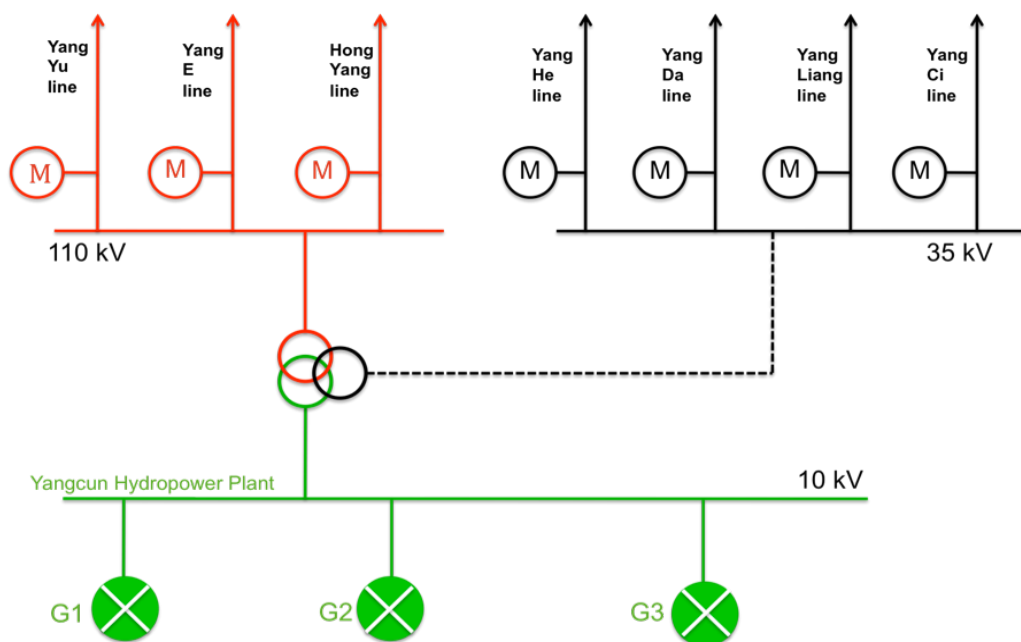
Under normal conditions, 35 kV transmission line is disconnected with Yangcun hydropower station. When transformer station on 35 kV transmission line is in maintenance or malfunction, these three hydropower stations connected will export power via Yangcun hydropower station and the 110 kV transmission line through YangE line and HongYang line to the grid. This amount of bypass power is regarded as “electricity imported from grid” of Yangcun station during monitoring and is deducted from ER calculation.

Fig.1 Main Electric Connection Diagram



A clear and simplified diagram is provided below in Fig.2 with monitoring meters indicated.

Fig.2 A Simplified Diagram of Main Electric Connection Diagram



Position	YangE Line	YangHe Line	YangDa Line	YangYu Line	YangLiang Line	YangCi Line	HongYang Line
Meter No.	0317	0422	0313	0431	0478	0255	0301
Monitored Parameters	$EG_{\text{export, YangE}, y}$ $EG_{\text{import, YangE}, y}$	$EG_{\text{import, YangHe}, y}$ $EG_{\text{export, YangHe}, y}$	$EG_{\text{import, YangDa}, y}$	$EG_{\text{import, YangYu}, y}$	$EG_{\text{YangLiang}, y}$	$EG_{\text{YangCi}, y}$	$EG_{\text{import, HongYang}, y}$ $EG_{\text{export, HongYang}, y}$
Model	DSSD331-1	DSSD331-1	DSSD331-1	DSSD331-1	DSSD331-1	DSSD331-1	DSSD331-1
Accuracy grade (Active)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Accuracy grade (Reactive)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Serial No.	200106287A0317	200106287A0422	200104265A0313	200106287A0431	200106287A0478	200104265A0255	200106287A0301
Calibration Valid Period	30-07-2007 to 29-07-2008	30-07-2007 to 29-07-2008	30-07-2007 to 29-07-2008	30-07-2007 to 29-07-2008	30-07-2007 to 29-07-2008	30-07-2007 to 29-07-2008	30-07-2007 to 29-07-2008
Certificate No.	E20070730	E2007073004	E2007073005	E2007073006	E2007073002	E2007073003	E2007073007
Calibration Valid Period	27-07-2008 to 26-07-2009	27-07-2008 to 26-07-2009	27-07-2008 to 26-07-2009	27-07-2008 to 26-07-2009	27-07-2008 to 26-07-2009	27-07-2008 to 26-07-2009	27-07-2008 to 26-07-2009
Certificate No.	E2008072701	E2008072704	E2008072705	E2008072706	E2008072702	E2008072703	E2008072707
Certified by	Ebian Measurement and Examination Station						
Manufacture	Changsha Wasion Meters Co., Ltd.						
Meter reading time	24:00, 25 th of each month						

2. Calculation of Net Electricity Export of Yangcun Station

The Net Electricity Export amount is calculated based on the Total Electricity Export multiplied by a default Transmission Loss Factor, which is further explained in Annex 3 below.

$$EG_{Yangcun,net,y} = EG_{Yangcun,total,y} \times (1-TLF)$$

$EG_{Yangcun,net,y}$	Net electricity export of Yangcun hydropower station to the grid, accounting for transmission losses, in year y (kWh);
$EG_{Yangcun,total,y}$	Total electricity generation of Yangcun hydropower station exported to the grid in year y (kWh);
TLF	Transmission Loss Factor (%);

Based on diagram above, calculation of the Total Electricity Export of Yangcun hydropower station will be calculated as follows:

$$EG_{Yangcun,total,y} = Elec_{export,110kV,y} - Elec_{import,110kV,y} - Elec_{import,35kV,y} \quad (1)$$

Where,

$EG_{Yangcun,total,y}$	Total electricity generation of Yangcun hydropower station exported to the grid in year y (kWh);
$Elec_{export,110kV,y}$	electricity exported via 110 kV transmission line through YangE line and HongYang line to the grid in year y (kWh);
$Elec_{import,110kV,y}$	electricity imported via 110 kV transmission line through YangE line, HongYang line and YangYu line from the grid in year y (kWh);
$Elec_{import,35kV,y}$	electricity imported from 35 kV transmission line in year y (kWh), which indicates electricity input from 35 transmission line to the grid via 110 kV transmission line through YangE line and HongYang line in year y (kWh).

Electricity exported via 110 kV transmission line through YangE line and HongYang line to the grid is calculated as following:

$$Elec_{export,110kV,y} = EG_{export,YangE,y} + EG_{import,HongYang,y} \quad (2)$$

Where:

$EG_{export,YangE,y}$	electricity exported via 110 kV transmission line through YangE line to the grid in year y (kWh);
$EG_{import,HongYang,y}$	electricity imported from HongYang line in year y (kWh), which indicates electricity exported via 110 kV transmission line through HongYang line to the grid in year y (kWh);

Electricity imported from YangE line, HongYang line and YangYu line is calculated as following:

$$Elec_{import,110kV,y} = EG_{import,YangYu,y} + EG_{import,YangE,y} + EG_{export,HongYang,y} \quad (3)$$

Where:

$EG_{import,YangYu,y}$	electricity imported from YangYu line in year y (kWh), which indicates electricity exported by YangYu line via 110 kV transmission line through YangE line and HongYang line to the grid in year y (kWh);
$EG_{import,YangE,y}$	electricity imported via 110 kV transmission line through YangE line from the grid in year y (kWh);
$EG_{export,HongYang,y}$	electricity exported via HongYang line in year y (kWh), which indicates electricity imported via 110 kV transmission line through HongYang line from the grid in year y (kWh);

Electricity input from 35 kV transmission line to the grid via 110 kV transmission line through YangE line and HongYang line is calculated as following:

$$Elec_{import, 35kV, y} = EG_{import, YangDa, y} + EG_{YangLiang, y} + EG_{YangCi, y} - EG_{export, YangHe, y} + EG_{import, YangHe, y} \quad (4)$$

Where:

$EG_{import, YangDa, y}$	electricity imported from YangDa line in year y (kWh), which indicates electricity input from YangDa line to the grid via 110 kV transmission line through YangE line and HongYang line in year y (kWh);
$EG_{YangLiang, y}$	electricity exported via YangLiang line in year y (kWh), which indicates electricity input from YangLiang line to the grid via 110 kV transmission line through YangE line and HongYang line in year y (kWh);
$EG_{YangCi, y}$	electricity exported via YangCi line in year y (kWh), which indicates electricity input from YangCi line to the grid via 110 kV transmission line through YangE line and HongYang line in year y (kWh);
$EG_{export, YangHe, y}$	electricity exported via YangHe line in year y (kWh).
$EG_{import, YangHe, y}$	electricity imported from YangHe line in year y (kWh).

3. Parameters to be monitored

Parameters that are directly used in emission reductions calculation:

Data / Parameter:	$EG_{export, YangE, y}$
Data unit:	kWh
Description:	Electricity exported via 110 kV transmission line through YangE line to the grid in year y (kWh)
Source of data to be used:	Measured by electricity meter with serial number of No. 200106287A0317
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Exported electricity to the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{import, YangE, y}$
Data unit:	kWh
Description:	Electricity imported via 110 kV transmission line through YangE line from the grid in year y (kWh)
Source of data to	Measured by electricity meter with serial number of No.

be used:	200106287A0317
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Imported electricity from the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity import data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{import,HongYang,y}$
Data unit:	kWh
Description:	Electricity imported from HongYang line in year y (kWh), which indicates electricity exported via 110 kV transmission line through HongYang line to the grid in year y (kWh).
Source of data to be used:	Measured by electricity meter with serial number of No. 200106287A0301
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Imported electricity from the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity import data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{export,HongYang,y}$
Data unit:	kWh
Description:	Electricity exported via HongYang line in year y (kWh), which indicates electricity imported via 110 kV transmission line through HongYang line from the grid in year y (kWh)
Source of data to be used:	Measured by electricity meter with serial number of No. 200106287A0301
Value of data ap-	

plied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Exported electricity to the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{import, YangYu, y}$
Data unit:	kWh
Description:	Electricity imported from YangYu line in year y (kWh), which indicates electricity exported by YangYu line via 110 kV transmission line through YangE line and HongYang line to the grid in year y (kWh)
Source of data to be used:	Measured by electricity meter with serial number of No. 200106287A0431
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Imported electricity from the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity import data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{YangCi, y}$
Data unit:	kWh
Description:	Power generation of Cizhu hydropower station (YangCi line) in year y (kWh), which indicates electricity input from YangCi line to grid via 110 kV transmission line through YangE line and HongYang line in year y, when transformer station on 35 kV transmission line is in maintenance or malfunction.
Source of data to	Measured by electricity meter with serial number of No.

be used:	200104265A0255
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Exported electricity to the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{YangLiang,y}$
Data unit:	kWh
Description:	Power generation of Lianghekou hydropower station (YangLiang line) in year y (kWh), which indicates electricity input from YangLiang line to grid via 110 kV transmission line through YangE line and HongYang line in year y, when transformer station on 35 kV transmission line is in maintenance or malfunction.
Source of data to be used:	Measured by electricity meter with serial number of No. 200106287A0478
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Exported electricity to the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{Import,YangDa,y}$
Data unit:	kWh
Description:	Power generation of Dabao hydropower station (YangDa line) in year y (kWh), which indicates electricity input from YangDa line to grid via 110 kV transmission line through YangE line and HongYang line in year y, when transformer station on 35 kV transmission line is in maintenance or malfunction.

Source of data to be used:	Measured by electricity meter with serial number No. 200104265A0313
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Exported electricity to the grid is measured by electricity meters, which are managed and maintained by the projected owner; - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{import, YangHe, y}$
Data unit:	kWh
Description:	Electricity imported from YangHe line in year y (kWh)
Source of data to be used:	Measured by electricity meter with serial number of No. 200106287A0422
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Imported electricity to the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity import data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EG_{export, YangHe, y}$
Data unit:	kWh
Description:	Electricity exported via Hetaoping substation (YangHe line) in year y (kWh)
Source of data to be used:	Measured by electricity meter with serial number of No. 200106287A0422
Value of data applied for the purpose of calculating	

expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Exported electricity to the grid is measured by electricity meters, which are managed and maintained by the project owner; - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Parameters monitored and recorded for crosscheck/backup purpose:

Data / Parameter:	$EG_{i,Yangcun,y}$
Data unit:	kWh
Description:	Electricity generation by generator i ($i = 1,2,3$) at Yangcun hydropower station in year y
Source of data to be used:	Measured by electricity meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	Measured continuously by electricity meters and recorded on a monthly basis by monitoring personnel. Meter reading time is 24:00 of 25 th each month.
QA/QC procedures to be applied:	- Electricity generated from the generators is measured by electricity meters, which are controlled by the project owner; - Trained and qualified staff is responsible for recording electricity export data from the kilowatt meter; - Meters will be calibrated periodically according to relevant national standards.
Any comment:	

Data / Parameter:	$EC_{Yangcun,y}$
Data unit:	kWh
Description:	Electricity consumption by Yangcun hydropower station in year y
Source of data to be used:	Measured by electricity meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	
Description of measurement	Measured continuously by an electricity meter and recorded on a monthly basis by monitoring personnel. Meter reading time is

methods and procedures to be applied:	24:00 of 25 th each month.
QA/QC procedures to be applied:	▪ Electricity consumption is measured by electricity meters, which are controlled by the project owner; ▪ Trained and qualified staff is responsible for recording electricity export data from the kilowatt meter; ▪ Meters will be calibrated periodically according to relevant national standards.
Any comment:	Electricity consumption by equipments at powerhouses, dam and municipal power consumption will be continuously monitored and recorded on monthly basis.

Annex 2 Crosscheck

Four types of evidences have been collected in order to crosscheck the amount of net electricity supplied to the grid:

- A. Electricity meter readings from meters installed right after generators
- B. Historical electricity data verified by E'bian Water Conservation Bureau
- C. Reservoir Area Fund Declaration Document verified by E'bian County Tax Authority
- D. Electricity data from both sales receipts and internal invoices

An overview of values derived from all four approaches listed above is provided in the table below. More details about each data source are provided further below.

Data Source>	Monitoring Report	Crosscheck approach A	Crosscheck approach B	Crosscheck approach C	Crosscheck approach D	
	MR calculations ¹	Electricity generated by generators, from onsite meters readings ²	Electricity data from historic statistics ³	Effective Electricity data from Reservoir Area Fund ⁴ Declaration Forms issued by local Tax Authority	Electricity data from Sales Receipts of Provincial power grid + internal invoices ⁵	Most Conservative Value
Monitoring Period	Net supply to grid (kWh)	Gross generation (kWh)	Net supply to grid (kWh)	Net supply to grid (kWh)	Net supply to grid (kWh)	
2008-05-26 to 2008-12-25	214611336	228688720	221887030	-	223302441	Revised MR calculations
2008-12-26 to 2009-05-25	80987380	83135160	-	81887140	83549439	
Total	295598716	311823880	-	-	306851880	

¹ The calculation approach described in Section 2 of Annex 1 below is based on meter readings of 7 main meters and the actual electricity connection diagram of Yangcun hydropower plant. The calculation approach is clearly described in Monitoring Report. Please refer to the Monitoring Report and the calculation excel sheets for more information.

² Based on data of electricity generators from the Electricity Generation Monthly Reports provided from the project owner. Auxiliary consumption and transmission losses are not taken into account but the idea is to provide a figure for crosschecking purposes. A comparison of approach A to approaches B, C and D indicates that transmission losses would be in the range of 1.5%~3%, assuming auxiliary consumption as zero to be conservative. This comparison indicates that the assumed value for transmission losses under Approach in the Monitoring Report (8.23%) are very conservative as compared to the calculated values of 1.5% to 3% based on crosschecking information.

³ The electricity data from the historic statistics (from 2003 to 2008) were checked and certified by the local Water Conservancy Bureau.

⁴ Data according to official submission to Reservoir Area Fund as per requirements of local tax authorities.

⁵ The internal invoices were prepared for cross-checking the part of electricity generated by Yangcun hydropower plant and supplied to the local power grid. These invoices are financial documents for internal electricity sales transaction within the project owner's company system.

Information on different approaches applied in the table above:

A) Electricity meter readings from meters installed right after generators

Meter readings of the onsite power generators are used. The data of these meter readings are all from the Electricity Monthly Reports, which have been already provided to DOE.

B) Historical electricity data

The historic electricity data of the Yangcun Hydropower Plant (for the years 2003 to 2008) are available for cross checking purposes.

Summary of Historical electricity data (2003~2008):

Year	Electricity supplied (10000 kWh)
2003	29574.655
2004	33349.739
2005	33390.775
2006	29261.486
2007	30650.758
2008	34037.267

Month of 2008	Electricity supplied (10000 kWh)
1	1246.975
2	926.432
3	2599.322
4	3053.904
5	4021.931
6	4350.985
7	3521.003
8	4196.217
9	2670.814
10	3073.867
11	2740.101
12	1635.716

The numbers above confirm that that the current level of electricity supplied to the grid is in line with values in the past.

It should be noted that during the Reservoir Area Fund declaration processes (see explanation below), the local tax authority also imposes an obligation on the project owner to provide the historic statistics of electricity supplied by the project activity as a reference for approving the declaration for the Fund; and the local Water Conservancy Bureau has already verified and approved these historic electricity data, which is evident from the stamps on the documents,

C) Reservoir Area Fund Declaration Document

The reservoir of Yangcun Hydropower Plant falls within the category of large or medium-sized reservoirs. According to the official document "Chuanbanfa [2008] No. 34" issued by the local government in Sichuan province, the local tax authority of E'bian County shall verify the monthly effective electricity supplied by the Yangcun Hydropower plant, starting from January 2009, in order to collect the "reservoir fund" tax, which is proportional to the electricity supplied to the grid. The verified Electricity Declaration Forms from January to May 2009 are available for cross check purposes. It should be noted that the project owner is liable for any wrong information provided to tax authorities. Furthermore, there is no incentive whatsoever for the project owner to report overestimated figures to tax authorities since this would result in higher taxes. Hence, this documentation can be regarded as a plausible and credible data source for crosschecking purposes.

Data Summary of the Declaration Forms:

Imposition Period	Unit tax amount (CNY/kWh)	Tax amount payable (CNY)	Effective electricity (10000 kWh)
2009-01-01 to 2009-01-31	0.008	93000.00	1162.50
2009-02-01 to 2009-02-28	0.008	94830.40	1185.38
2009-03-01 to 2009-03-31	0.008	83040.00	1038.00
2009-04-01 to 2009-04-30	0.008	154880.00	1936.00
2009-05-01 to 2009-05-31	0.008	229346.72	2866.83
2009-06-01 to 2009-06-30	0.008	221352.16	2766.90
2009-07-01 to 2009-07-31	0.008	271496.80	3393.71
2009-08-01 to 2009-08-31	0.008	250717.92	3133.97
Total			17483.3
Total for first five months			8188.714

The effective electricity figures from the table above are in line with the monitoring data provided by the project owner. Furthermore, the revised calculations in the latest version of the monitoring report are more conservative than the values listed above.

D) Electricity data according to sales receipts and internal invoices

The electricity exported by the project activity is sub-divided in electricity exported to the Central China Power Grid, which can be crosschecked by sales receipts, and electricity supplied to the local grid, which is owned and managed by the same entity that owns the Yangcun Hydropower Plant. Given the fact that both the power generator and the grid company are the same, the amount of electricity exported to the grid can be crosschecked by using internal invoices from the power plant to the grid company. Since the electricity generation data and the data for crosschecking purposes are ultimately from the same company and the fact that there are no clear regulations for issuing invoices (see also comments below), we feel that the other alternatives described above, are more reliable and sufficient.

Annex 3 Transmission Losses

The meter readings used for determination of the electricity supply to the grid are one level below sub-station level, which would be the ideal point for verification of the net amount of electricity supplied to the grid. Even though the amount of net electricity supplied at sub-station level to the Central China Power Grid can be crosschecked through the available sales receipts (which are based on meters owned by the Sichuan Power Grid Company at sub-station level), there is still some level of uncertainty related to the share of electricity supplied to the local grid since there are no third party sales receipts for this portion of the electricity supply.

The comparison provided in Annex 2 between the amount of generated electricity (approach A) and all available crosscheck documents for confirmation of the net electricity export amount to the grid (approaches B, C and D) indicate that a value of 1.5% to 3% would be realistic and conservative since auxiliary consumption is assumed to be zero for this calculation (see footnote describing Approach A in the table above). However, given remaining uncertainties about these figures, project participants propose to apply the most conservative transmission loss value according to relevant literature. For the sake of simplification and conservativeness, the discount factor is applied over the entire electricity generation amount, even though the uncertainty to be addressed is only related to electricity exports to the local grid.

A list of potential values according to the China Electric Power Yearbooks for the last three years, indicate a value of 8.23% as the highest value and therefore the most conservative choice. Project participants would like to point out that the values provided below refer to transmission losses for the entire power grid covering very large distances, whereas the uncertainty to be addressed in the verification report relates to transmission losses between the seven main meters used as primary data source and the sub-station where the electricity is actually transferred to the grid. It is clear that these losses are typically lower than 8.23% (due to shorter line as compared to the grid system), which is also confirmed by the crosscheck calculations described above. By adopting this value, project participants are applying a very high penalty to account for uncertainties in the monitoring procedures, which result in a significantly lower value of net electricity supply to the grid (and ultimately emission reductions) as compared to official documents used for confirmation of the net electricity supply figures (documents used under Approaches B, C and D described in Annex 2 above).

Source: China Electric Power Yearbooks (2006, 2007, 2008):

Yearbook	Which Data	Year's	National Power Grid Transmission Loss Rate	Central China Power Grid or Sichuan Power Company Transmission Loss Rate
2006	2005		7.15%	7.30% (CCPG)
2007	2006		7.08%	8.23% (comprehensive, SPG)
2008	2007		6.97%	8.1% (comprehensive, SPG)