



2nd Revision of Monitoring Plan

Xiaogushan Hydropower Project in People's Republic of China (Reference No.0378)

Background of 2nd Revision

On July 18, 2008, 407,596 CERs were issued for the China Xiaogushan Hydropower Project activity in the monitoring period (01 Jan 07 – 31 Dec 07).

In the request for issuance of above CERs, the ex-ante grid emission factor of 0.862 tCO₂/ MWh was appropriately applied as stated in the PDD.

However, the parameters required for emission factor calculation are listed in the 1st revised monitoring plan to be calculated yearly.

To avoid above inconsistency, it is necessary to revise the 1st revised monitoring plan.

2nd Revision of the Section D and Annex 4 are attached.

Annex 4 is the same as that of 1st revision but as an integral part of the monitoring plan, it is attached.

**2nd Revision of “Section D. Application of a monitoring methodology and plan”****SECTION D. Application of a monitoring methodology and plan****D.1. Name and reference of approved monitoring methodology applied to the project activity:**

>>

“Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources (ACM0002)”

The above methodology is hereafter referred to as the “Monitoring Methodology”.

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

>>

The Project is a grid-connected zero-emission renewable power generation activity and meets all the following conditions that are stated in the Monitoring Methodology (ACM0002):

- The Project supplies electricity capacity addition from hydropower source from a run-of-river hydropower plant resource;
- The Project is not an activity that involves switching from fossil fuels to renewable energy at its Project site;
- The electricity grid is clearly identified (as the Gansu Power Grid) and information is publicly available on the characteristics of the grid.

No leakages were identified and hence will not be monitored.

The following variables will be monitored as stipulated by the Monitoring Methodology:

- Electricity generation from the Project (double checking through quality control/assurance procedures).

In addition, a detailed Environmental Management and Monitoring Plan (EMMP) have been developed by Eastern China Investigation and Design Institute in May 2004 and are currently implemented by Xiaogushan Hydropower Company. The EMMP responds to requirements of the Chinese Environmental Impact Assessment as well as World Bank Standards. This EMMP was made publicly available via the World Bank Infoshop on its website on June 21, 2004 and an English version of the EMMP is attached as an annex to this PDD. The progress report of the EMP shall be submitted on a quarterly basis within one month after the quarter, and the report of the 4th quarter shall include a summary report for the whole calendar year. The task team at the World Bank will carry out annual supervision mission to monitor environmental management practice according to the monitoring plan.¹

Additional information regarding maintenance and calibration procedures can be found in Section D.4.

¹ Source:

http://wdsbeta.worldbank.org/external/default/WDSContentServer/IW3P/IB/2004/06/21/000160016_20040621115347/Rendered/PDF/E9660vol03.pdf

**D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario****D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:**

ID number (Please use numbers to ease cross-referencing to D.3)	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO₂ equ.)

>>

As a run-of-river hydro power project, no emissions from the Project Activity were identified. There are therefore no formulae included here.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :

ID number (Please use numbers to ease cross-referencing to table D.3)	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording Frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment



1. EG _{gy}	Electricity supplied to the Grid by The Project	Gansu Power Grid	MWh	Directly Measured at the the 110kV Heihe Switch Yard	Hourly measurement and monthly recording	100%	electronic	Electricity supplied by The project activity to the grid monitored by the receipts of sales. Double check with electricity generation after deducting parasitic consumption and transmission loss
2. EG _{plant}	Electricity generated by The Project	Monitored at the hydro plant	MWh	Directly Measured at the plant	Monthly recording	100%	electronic	Electricity generation monitored by the engineering department
3. ES _{plant}	Electricity consumption of the project	Monitored at the hydro plant	MWh	Directly Measured at the plant	Monthly recording	100%	electronic	Electricity used on site monitored by the engineering department
4. EG _{aux}	Electricity generated by The Project	Monitored at the hydro plant	MWh	Directly Measured at the plant	Monthly recording	100%	electronic	Electricity generation excluding electricity consumption of the project, monitored using Auxiliary Meter by the engineering department

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO₂ equ.)

>>

See Section E.4. on baseline emission calculations

D. 2.2. Option 2: Direct monitoring of emission reductions from the project activity (values should be consistent with those in section E).

Option 2 is not selected as it is not appropriate to ACM0002

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

ID number (Please use numbers to ease cross-referencing to table D.3)	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment



D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO₂ equ.):

>>

D.2.3. Treatment of leakage in the monitoring plan

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

ID number (Please use numbers to ease cross-referencing to table D.3)	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	Comment

According to ACM0002, the main indirect emissions potentially giving rise to leakage in the context of electricity sector projects are resulted from power plant construction, fuel handling (mining, processing, and transportation), and land inundation (for hydroelectric projects). The project developer does not need to consider such indirect emissions when applying the methodology. Project activities using this baseline methodology shall not claim any credit for the project on account of reducing these emissions below the level of the baseline scenario. So the proposed project takes no account of such leakage, $L_y = 0$

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO₂ equ.)

>>

As described above, the proposed project can take no account of leakage, $L_y = 0$

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO₂ equ.)

>>

The proposed project activity will generate GHG emission reductions by avoiding CO₂ emissions from electricity generated by fossil fuel power plants. The emission reductions ER_y , during a given year y is the difference of baseline emission BE_y , deduce the project emission PE_y , and the leakage L_y , calculated as

$$ER_y = BE_y - PE_y - L_y$$

Since the project emission PE_y for the proposed project and the leakage L_y is considered as zero, the emission reduction is equal to baseline emission BE_y , i.e.

$$ER_y = BE_y = EG_y \times EF_y$$



Where BE_y is (in the absence of the proposed project activity) the GHG emission of the baseline GHG emission from electricity generation (EG_y), which is equivalent to that of the proposed project, of the Gansu Power Grid, i.e. annual emission reductions of the proposed project

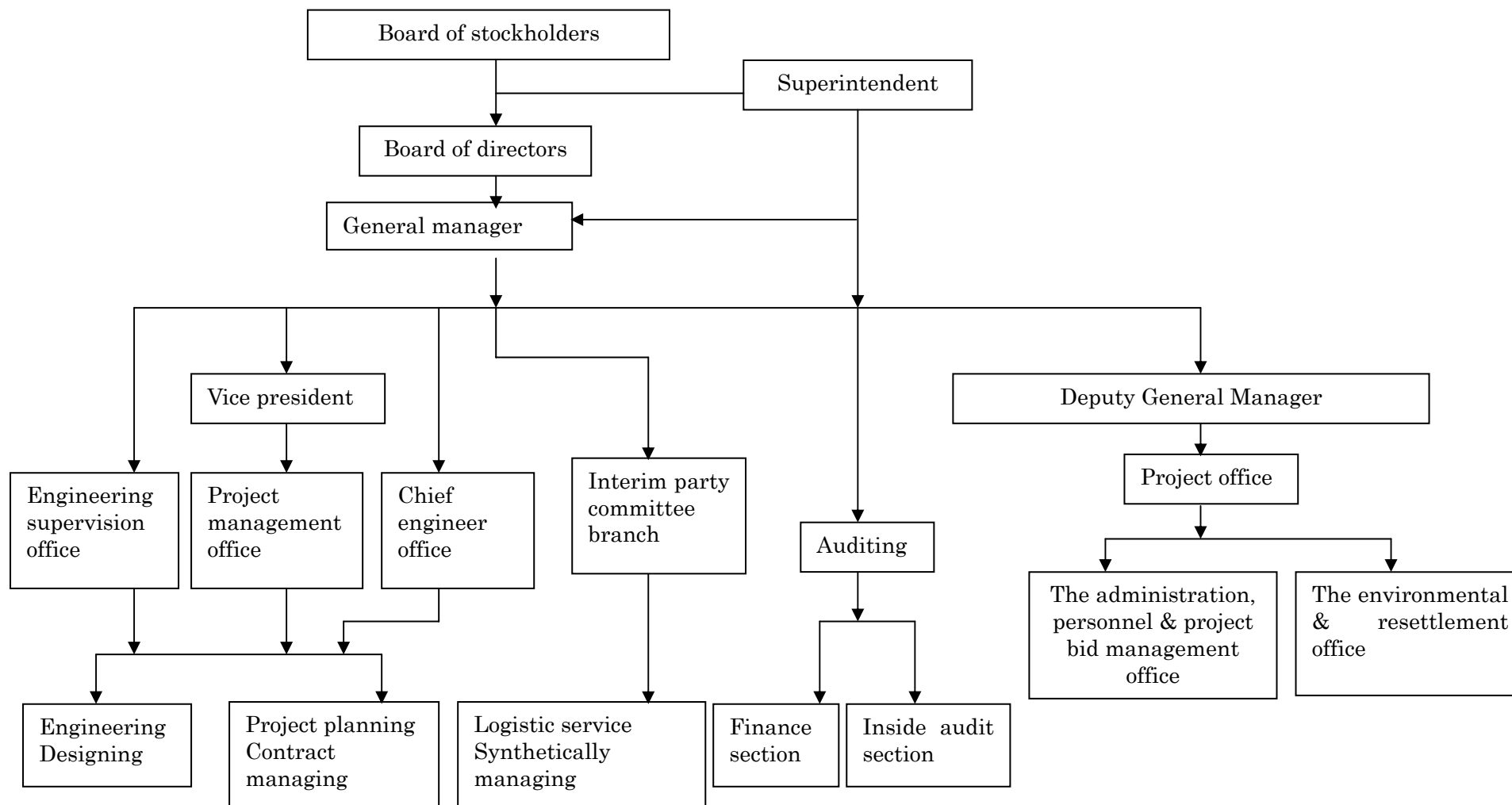
D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored		
Data (Indicate table and ID number e.g. 3.-1.; 3.2.)	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
D.2.1.3-1	Low	<i>Sales record to the grid (Gansu Power Grid) or final client (XHP) and other records are used to ensure consistency. Namely, data will be cross checked between the metering system at the plant site, and the grid to assure correctness.</i>
Others	Low	<i>In accordance with national and sectoral criteria with detailed monitor plan (see Annex 4). Data is acquired from the China Electric Power Yearbook, (published by State Power Grid Corporation), IPCC Guideline and China Energy Statistical Yearbook. These sources will be checked against other sources.</i>

D.4 Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

>>

Figure 1 outlines the operational and management structure that the project owner will implement for the Project Activity and for the monitoring of project emissions and any leakage effects. The nominated CDM responsible person for the Project who will ensure that the Monitoring and Verification Plan are implemented is initially Mr. Ding Jianjun, Deputy General Manager of Xiaogushan Project Activity.

Training is described in Section A.4. 3, and is therefore not repeated in this section.

**Organization Chart of Xiaogushan HPP (Fig.6-1)**



The PCF will provide XHP with a Monitoring Plan and pre-programmed spreadsheets so the operator will just need to collect the information as described and apply the formulas as directed in the Monitoring Plan. The collection sources of the data will not be in any case the Project's own records but the final client records of monthly production to keep the highest transparency and accuracy of the data. The Project staff designated will confirm these data with own records and own records will be double checked with sales receipts.

Electricity supply to the Gansu power grid will be measured continuously by watt-hour meter and be read once every month in the Heihe Switch Yard, where there is an interface between Gansu Grid Company (GPGC) and XHC. Two sealed watt-hour meters called "Main meter" used as revenue meters are installed in the Heihe Switch Yard, at the end of 110 kV transmission lines "Heihe-Xiaogushan line". The main meters are ELSTER (USA) made with 0.2 class accuracy, and are monitored by the data acquisition system of the Gansu Provincial Power Dispatching & Communication Center. In addition, two sealed watt-hour meters called "Auxiliary meters" are installed in Xiaogushan Power station, which are Shenzhen Lodian Electrics (China) made with 0.5S class accuracy. These auxiliary meters are the part of the monitoring and control system of the Xiaogushan generation plant, which is supplied by NARI (Nanjin Automation Research Institute (China)). The meters are recalibrated once every year and will be replaced once every three years. The meter reading of electricity supply at Xiaogushan hydropower station and Heihe switch yard will take place on the same day. A three-person team with representatives from the Gansu Power Company, its Zhangye branch, and Xiaogushan will record the electricity supply by reading the same record on the watt-hour meter. Xiaogushan Company will read the meter in its station for double-checking purpose. Staff responsible for monitoring will be trained for using the meters.

Xiaogushan Company installed a watt-hour meter in its plant to record the electricity used for plant operation. The company has a detailed generator maintenance schedule set according to the variance of water flow for different seasons. This document can be presented to the validator on request. All three generators have regular maintenance twice every year, scheduled before and after the peak season that lasts for 15 days. Scheduled major maintenance of the generators takes place once every 5-6 years and last 45 days. The three generators will be scheduled for major maintenance in different years. The Engineering Department will be in charge of recording and monitoring the electricity supply to the Gansu power grid, electricity generated at the plant, electricity used for plant operation and maintenance schedule.

D.5 Name of person/entity determining the <u>monitoring methodology</u>:

>>

Masaya Inamuro, Jie Tang, & Nuyi Tao

Carbon Finance Business

World Bank

Washington DC

USA

E-mail: minamuro@worldbank.org, jtang@worldbank.org, ntao@worldbank.org



Annex 4

REVISED MONITORING PLAN

In accordance with the monitoring methodology ACM0002, there is one key type of information that must be monitored ex-post since the emission factor has been calculated ex ante, namely:

- The electricity supply to the Gansu Grid from the Project Activity EGy

Electricity sales invoices from the commercial metering system that is installed in the 110 kV Heihe Switch Yard with an interface between Gansu Grid Company (GPGC) and XHC will be obtained. Because the metering system is owned and maintained by the Gansu Power Grid Company, the qualified staff of XHP Company will collect the electricity sales invoice on a monthly basis to monitor the generated electricity sold to the grid.

It is confirmed that these meters measuring the main electricity supplied to the grid operate in compliance with the National Guidelines for accuracy and reliability.

To double check the monitored data from the metering system at the Heihe Switch Yard, the electricity generated from each turbine will also be monitored. Because it is assumed 1% of electricity generated will be consumed on-site and 5% lost in transmission, only 94% of the electricity measured by the meters installed in each turbine will be taken as a reference for monitoring whether the generation output read from the transform station is within reasonable range and consistent with direct hydro electricity output on the site.

Procedures for ensuring effective monitoring of the proposed project are described in a CDM manual that the Project Owner and Project Developer has developed. The manual contains the following sections:

- 1.0 Introduction
- 2.0 Overall Project Management
- 3.0 CDM Project Management and Calculations
 - 3.1 Data to be monitored and recorded (as per the PDD)
 - 3.2 Emissions Reduction calculation for the Project
- 4.0 Procedures to be followed
 - 4.1 Monitoring Procedures
 - 4.2 Calibration Procedures
 - 4.3 Maintenance Procedures
 - 4.4 Procedure for Training of Personnel engaged in this MVP
- 5.0 Records Keeping, Error Handling and Reporting Procedures
 - 5.1 Records Keeping and Internal Reporting Procedure
 - 5.2 Error Handling Procedure
 - 5.3 External Reporting Procedure
 - 5.4 Procedure for corrective actions arising
 - 5.5 Change of CDM Responsible Person
- 6.0 Confirmation of the adoption of these CDM Operating Procedures