



Annex 4

REVISED MONITORING PLAN

1. Introduction

The Zhangbei Manjing Windfarm Project adopts the approved baseline methodology AM0005 “monitoring methodology for small grid-connected zero-emissions renewable electricity generation” to determine the baseline and calculate the emission reductions from the net electricity generation from the windfarm. The approved monitoring methodology AM0005 is therefore used for developing the monitoring plan. This revised plan describes in detail the monitoring process for this project as set out in Section D of the Project Design Document.

This revision is necessary as the Zhangbei Manjing Windfarm Project is no longer the only project connected at the substation, but it now shares some facilities, including the 110 kV power line, and thus the connection at the 220 kV substation and electricity meter installed there, with a second windfarm project owned by the same project entity. This revised monitoring plan is in line with the plan accepted for the Zhangbei Mijiagou 49.5 MW Windfarm Project (reference number 0845).

2. Responsibility

Overall responsibility for monitoring and carrying out the monitoring following this monitoring plan lies with the Beijing Guotou Energy Conservation Company (BG).

Mr. Liu Bin, Head of the Management Office of the Zhangbei Manjing Windfarm, is responsible for the monitoring and reporting of the windfarm project.

Ms. Chen Dongjuan, CDM Project Manager, is responsible for the daily monitoring and reporting.

Beijing Guotou Energy Conservation Company (BG), in co-operation with Carbon Resource Management Ltd and the North China Power Grid Company, will train the staff carrying out the monitoring work.

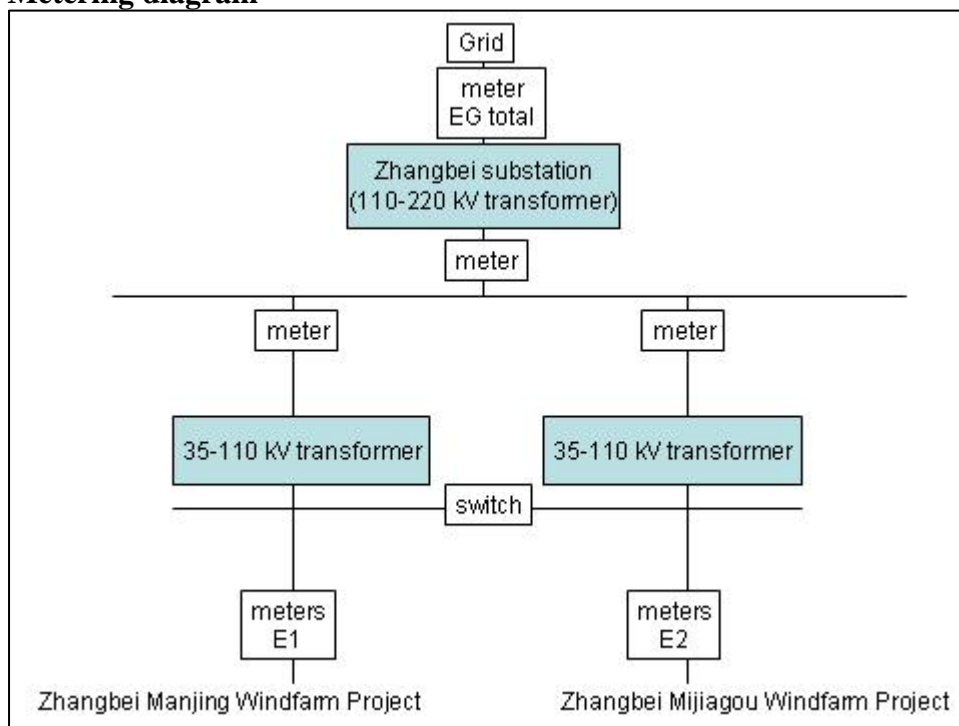
3. Installation of meters

The net electricity supplied from the two BG projects combined to the NCPG will be monitored through the use of on site metering equipment at the 220 kV substation. The main metering system equipment will be owned, operated and maintained by North China Power Grid. The Zhangjiakou Electric Power Company is responsible for the operation of and meter readings at the sub-station. Zhangjiakou Electric Power Company reports electricity supply figures to both NCPG and BG.



Back-up metering equipment at the project site is owned, operated and maintained by BG. A metering diagram is presented below, giving an overview of these meters. Separate meters for the two projects exist at the 35 kV-110 kV transformer stations at the project site exist, as well as several separate meters at the 35 kV level, each metering the generation from a subset of turbines.

Metering diagram



The back-up metering equipment is used to calculate the share of each of the projects of the net supply to the grid at 220 kV. This means that any transmission and transformer losses and any consumption by the onsite offices are accounted for and are shared between the project activities on the basis of electricity generation. The net electricity supply from the project activity (EG_1) can now be calculated as follows:

$$EG_1 = EG_{total} * E1 / (E1 + E2)$$

Where:

- EG_1 is the calculated net electricity supply from the project activity;
- EG_total is the total net electricity supplied to the grid at the Zhangbei substation metered by the main meter;
- E1 is the electricity generation metered from the Zhangbei Manjing Windfarm Project from the onsite meters; and
- E2 is the electricity generation metered from the Zhangbei Mijiagou 49.5MW Windfarm Project from the onsite meters.



The total net electricity supplied to the grid at the Zhangbei substation (EG_total) is calculated from the meter reading at the substation for Generation and Consumption.

This approach is flexible to accommodate potential future installations which also share transmission facilities with this project.

All electricity generation sharing the same 110 kV transmission facilities to the Zhangbei substation will be monitored. The monthly electricity generation from each facility will be compiled and confirmed monthly by the Zhangjiakou Electric Power Company.

4. Calibration

The metering equipment are calibrated and checked annually so that the metering equipment shall have sufficient accuracy. The net electricity supplied to NCPG registered by the meters alone will suffice for the purpose of billing and emission reduction verification as long as the error in the meters is within the agreed limits.

Calibration is carried out by North China Power Grid with the records being supplied to Zhangbei Manjing Wind Farm, and these records will be maintained by Zhangbei Manjing Wind Farm and the appointed third party.

All meters shall be jointly inspected and sealed on behalf of the parties concerned and shall not be interfered with by either party except in the presence of the other party or its accredited representatives.

All the meters installed shall be tested by North China Power Grid within 10 days after:

- (a) the detection of a difference larger than the allowable error in the readings of the meters;
- (b) the repair of all or part of meter caused by the failure of one or more parts to operated in accordance with the specifications.

If any errors are detected the party owning the meter shall repair, recalibrate or replace the meter giving the other party sufficient notice to allow a representative to attend during any corrective activity.

Should any previous months reading of the main meter be inaccurate by more than the allowable error, or otherwise functioned improperly, the net energy output shall be determined by (a) first, by reading the Zhangbei Manjing backup meter, unless a test by either party reveals it is inaccurate; (b) if the backup system is not with acceptable limits of accuracy or is otherwise performing improperly the Zhangbei Manjing Wind Farm and North China Power Grid shall jointly prepare an estimate of the correct reading; and (c) if North China Power Grid and Zhangbei Manjing Wind Farm fail to agree then the matter will be referred for arbitration according to agreed procedures.

5. Monitored data



On site the net electricity generation (EG_1) will be monitored and recorded following the procedures above.

Off site, further data that needs to be monitored refers to the displaced grid electricity. Data variables to be monitored are presented in Section D of the PDD and in the table below. This data is required to accurately calculate the grid CO₂ emission factor using the combined operating and build margins.

The main data source is the latest issue of the China Electric Power Yearbook.

- All electricity generation from each fuel in the North China Power Grid on an annual basis
- All electricity generation from each fuel in the North China Power Grid in the last several years earlier to determine the last (approximately) 20% added generation
- Fuel emission factors and carbon contents for each fuel
- Imports and exports from the North China Power Grid, confirming that the amounts that are negligibly small

The data from several historic years is used to calculate the growth in generation, determining the historic years from which added generation is nearest to 20% (below and above 20%). The most conservative build margin of the two is adopted. For example, electricity generation increase from 2000 to 2002 was 18.5%, while that from 1999 to 2002 was 26.6%. Since build margin obtained from the data from 1999 to 2002 is more conservative, this build margin result is adopted.

6. Quality control

Monthly net generation data will be approved and signed off by Mr. Liu Bin before it is accepted.

This audit will check compliance with operational procedures in this monitoring plan and Section D of the PDD.

This internal audit will also identify potential improvements to procedures to improve monitoring and reporting in future years. If such improvements are proposed these will be reported to the DOE and only operationalised after approval from the DOE.

7. Data management system

Physical document such as paper-based maps, diagrams and environmental assessments will be collated in a central place, together with this monitoring plan. In order to facilitate auditors' reference of relevant literature relating to Zhangbei Manjing Wind Farm project, the project material and monitoring results will be indexed. All paper-based information will be stored by the technology department of Zhangbei Manjing Wind Farm and all the material will have a copy for backup.



And all data including calibration records is kept until 2 years after the end of the total credit time of the CDM project.

8. Reporting

The steps required to derive at the emissions reductions are:

- Zhangjiakou Electric Power Company reads the main meter and reports the meter readings to NCPG and BG
- BG reads the meters at the Zhangbei Manjing Windfarm Project (E1) and Zhangbei Mijiagou 49.5 MW Windfarm Project (E2) and reports the reading to Zhangjiakou Electric Power Company (and any future projects).
- Zhangjiakou Electric Power Company compiles and confirms the monthly generation from the projects, and reports the data to NCPG and BG.
- BG with the help of Carbon Resource Management Ltd records the required grid data for the CDM project, and calculates the grid CO₂ emissions factor based on the latest grid data available.
- BG with the help of Carbon Resource Management Ltd calculates emission reductions at the end of the year.
- BG with the help of Carbon Resource Management Ltd carries out an internal audit on the readings, grid data and calculations.
- BG with the help of Carbon Resource Management Ltd reports annually the readings, grid data and calculations to the DOE for verification.

9. Verification

The contracted DOE will receive the annual emission reduction report after year end.

BG will facilitate the verification through providing the DOE with all required necessary information.
