

**B.6.2. Data and parameters that are available at validation:**

Data / Parameter:	$F_{i,j,y}$
Data unit:	Mt, Mm ³
Description:	the amount of fuel i (in a mass or volume unit) consumed by relevant power sources j in year(s) y
Source of data used:	China Energy Statistical Yearbook (2000~2005)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	NCV_i
Data unit:	TJ/mass or volume unit of a fuel
Description:	the net calorific value (energy content) per mass or volume unit of a fuel i
Source of data used:	China Energy Statistical Yearbook (2005)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	National and official data
Any comment:	

Data / Parameter:	$OXID_i$
Data unit:	%
Description:	the oxidation factor of the fuel i
Source of data used:	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied:	see Annex3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	National data not available, so IPCC default values are used.
Any comment:	

Data / Parameter:	$EF_{CO_2,i}$
Data unit:	tCO ₂ e/TJ
Description:	the CO ₂ emission factor per unit of energy of the fuel i
Source of data used:	<i>Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories</i>
Value applied:	see Annex3 for details
Justification of the	National data not available, so IPCC default values are used.



choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	$G_{j,y}$
Data unit:	MWh
Description:	the amount of electricity generation by source j in year y
Source of data used:	China Electric Power Yearbook (2000~2005)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	$e_{i,y}$
Data unit:	%
Description:	station service power consumption rate of source j in year y
Source of data used:	See Annex 3 for details
Value applied:	Official statistical data
Justification of the choice of data or description of measurement methods and procedures actually applied :	China Energy Statistical Yearbook (2000~2005)
Any comment:	

Data / Parameter:	$EE_{coal,adv}$
Data unit:	%
Description:	Efficiency of most advanced coal-fired power technology that is commercially available
Source of data used:	Notice on the determination of emission factors of regional power grids by Chinese CDM DNA
Value applied:	36.53
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistics of state power authority
Any comment:	



Data / Parameter:	$EE_{oil,adv}$
Data unit:	%
Description:	Efficiency of most advanced oil-fired power technology that is commercially available
Source of data used:	Notice on the determination of emission factors of regional power grids by Chinese CDM DNA
Value applied:	45.87
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistics of state power authority
Any comment:	

Data / Parameter:	$EE_{gas,adv}$
Data unit:	%
Description:	Efficiency of most advanced gas-fired power technology that is commercially available
Source of data used:	Notice on the determination of emission factors of regional power grids by Chinese CDM DNA
Value applied:	45.87
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistics of state power authority
Any comment:	

Data / Parameter:	$CAP_{i,y}$
Data unit:	MW
Description:	Installed capacity of source j in year y in Northwest Power Grid
Source of data used:	China Energy Statistical Yearbook (2000~2005)
Value applied:	See Annex 3 for details
Justification of the choice of data or description of measurement methods and procedures actually applied :	Official statistical data
Any comment:	

Data / Parameter:	MM_{BL}
Data unit:	tCH ₄
Description:	Amount of methane consumed by the 15MW power plant
Source of data to be	Measured in m ³ and recorded in the log sheets and converted into tCH ₄ using



used:	IPCC value of 0.00067t/m ³
Value applied:	24,139.73
Justification of the choice of data or description of measurement methods and procedures actually applied:	Maximum annual value of the four years period prior to project implementation (year 2005-2008) is taken.
Any comment:	

Data / Parameter:	GEN _{BL}
Data unit:	MWh
Description:	Electricity generated by the 15MW power plant
Source of data to be used:	Measured
Value applied:	86,089.234
Justification of the choice of data or description of measurement methods and procedures actually applied:	Maximum annual value of the four years period prior to project implementation (year 2005-2008) is taken.
Any comment:	

B.7 Application of the monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

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Data / Parameter:	MM _{ELEC}
Data unit:	tCH ₄
Description:	Methane measured delivered to power plant in year y
Source of data to be used:	Measurements by project participants using gas flow meters, temperature & pressure transmitters and gas concentration meters.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	121,588
Description of measurement methods and procedures to be applied:	Continuous monitoring, meters in compliance with relevant standards and requirements will be used, and gas volumes, pressure, temperature and methane concentration will be read and consolidated by a digital control system (DCS).
QA/QC procedures to be applied:	Flow meters, temperature & pressure transmitters and gas concentration meters are to be checked monthly and calibrated annually to ensure accuracy.
Any comment:	The meters are indicated as points F, A and C on Figure 3.

Data / Parameter:	PC _{CH₄,y}
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Data unit:	%
Description:	Concentration of methane (in mass) in extracted gas (%), measured on wet basis
Source of data to be used:	Daily monitoring by JMC
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:	Concentration meters, optical and calorific, with accuracy in compliance with relevant national standards
QA/QC procedures to be applied:	Concentration meters will be checked monthly and calibrated annually to ensure accuracy
Any comment:	The meters are indicated as point C on Figure 3.

Data / Parameter:	PC_{NMHC,y}
Data unit:	%
Description:	NMHC concentration in coal mine gas
Source of data to be used:	To be obtained through annual analysis of the fractional composition of captured gas
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Gas samples will be extracted annually in accordance with relevant industry standard and procedures. The samples will be analyzed by a qualified laboratory.
QA/QC procedures to be applied:	A minimum of 3 samples will be collected in secure gas sample vessels, suitable for storage and transport to the laboratory. If one sample is found to be faulty (i.e. gas leakage), the replacement sample will be taken.
Any comment:	Used to check if more than 1% of emissions and to calculate r

Data / Parameter:	CEF_{NMHC}
Data unit:	tCO ₂ e/tNMHC
Description:	Carbon emission factor for combusted non methane hydrocarbons
Source of data to be used:	To be obtained through analysis of the fractional composition of captured gas
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:	To be monitored only when NMHC concentration (in mass) in coal mine gas is higher than 1%
QA/QC procedures to be applied:	This will be conducted by Qualified Organizations.
Any comment:	-

Data / Parameter:	GEN _{1,y}
Data unit:	MWh
Description:	Electricity supplied by project activity in year y to North China Grid
Source of data to be used:	Monitored with power meter to be installed by the electric grid company
Value of data applied for the purpose of calculating expected emission reductions in section B.5	823,200
Description of measurement methods and procedures to be applied:	Continuous monitoring
QA/QC procedures to be applied:	<p>The electricity delivered to the grid will be recorded in the power settlement notice issued by the grid company based on the readings of the power meters installed at the Qinchi transformer station in accordance with relevant national and sectoral standards (indicated as point E_{GRID} on Figure 3).</p> <p>The amount of electricity delivered to the grid will be double-checked by the readings of the power meters installed at the project 120MW power plant (indicated as point E_{PP} on Figure 3).</p>
Any comment:	-

Data / Parameter:	GEN _{2,y}
Data unit:	MWh
Description:	Electricity consumed by project activity in year y which is supplied by North China Grid in case of emergency
Source of data to be used:	Monitored with power meter to be installed by the electric grid company
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0
Description of measurement methods and procedures to be applied:	Continuous monitoring



QA/QC procedures to be applied:	<p>The electricity imported from the grid will be recorded in the power settlement notice issued by the grid company based on the readings of the power meters installed at the Qinchi transformer station in accordance with relevant national and sectoral standards (indicated as point E_{GRID} on Figure 3).</p> <p>The amount of electricity imported to the grid will be double-checked by the readings of the power meters installed at the project 120 MW power plant (indicated as point E_{PP} on Figure 3).</p>
Any comment:	-

Data / Parameter:	MM _{total,y}
Data unit:	tCH ₄
Description:	Total methane extracted in Sihe Coal Mine in year y
Source of data to be used:	Measurements by project participants using gas flow meters, temperature & pressure transmitters and gas concentration 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:	Continuous monitoring, flow meters in compliance with relevant standards and requirements will be used. Gas volumes, pressure, temperature and concentration will be read and consolidated by a digital control system (DCS).
QA/QC procedures to be applied:	Flow meters, temperature & pressure transmitters and gas concentration meters are to be checked monthly and calibrated annually to ensure accuracy
Any comment:	<p>The meters are indicated as points F_{EX}, A_{EX} and C_{EX} on Figure 3.</p> <p>The readings of these meters are not used for ER calculation, but for cross-checking only.</p>

Data / Parameter:	MM _{release,y}
Data unit:	tCH ₄
Description:	Total methane still released to the atmosphere in Sihe Coal Mine in year y
Source of data to be used:	Measurements by project participants using gas flow meters, temperature & pressure transmitters and gas concentration 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:	Continuous monitoring, flow meters in compliance with relevant standards and requirements will be used. Gas volumes, pressure, temperature and concentration will be read and consolidated by a digital control system (DCS).
QA/QC procedures to be applied:	Flow meters, temperature & pressure transmitters and gas concentration meters are to be checked monthly and calibrated annually to ensure accuracy.
Any comment:	<p>The meters are indicated as points F_{EX}, A_{EX} and C_{EX} on Figure 3.</p> <p>The readings of these meters are not used for ER calculation, but for cross-</p>



	checking only.
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Data / Parameter:	MM _{BL,y}
Data unit:	tCH ₄
Description:	Amount of methane consumed by the 15MW power plant in year y or during the monitoring period
Source of data to be used:	Measured and recorded in log sheets
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:	Continuous monitoring, flow meters in compliance with relevant standards and requirements will be used. Gas volumes, pressure, temperature and concentration will be read and consolidated by a digital control system.
QA/QC procedures to be applied:	Flow meters, temperature & pressure transmitters and gas concentration meters are to be checked monthly and calibrated annually to ensure accuracy
Any comment:	The meters are indicated as points F _{BL} , A _{BL} and C _{BL} on Figure 3. The readings of these meters are not used for ER calculation, but for cross-checking only. MM _{BL,y} value will be compared against MM _{BL} to ensure no leakage (MM _{BL,y} ≥ MM _{BL}). In case MM _{BL,y} < MM _{BL} , the difference will be calculated in terms of the contributing emission reductions, which will be deducted from the total claimed emission reductions.

Data / Parameter:	GEN _{BL,y}
Data unit:	MWh
Description:	Electricity generated by the 15MW power plant in year y or during the monitoring period
Source of data to be used:	Measured
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:	Continuous monitoring
QA/QC procedures to be applied:	The power meter will be calibrated in accordance with relevant national standard.
Any comment:	The meter is indicated as point E _{BL} on Figure 3. The readings of the meter are not used for ER calculation, but for reference only. GEN _{BL,y} value will be compared against GEN _{BL} to ensure no leakage (GEN _{BL,y} ≥ GEN _{BL}). In case GEN _{BL,y} < GEN _{BL} , the difference will be calculated in terms of the contributing emission reductions, which will be deducted from the total claimed emission reductions.

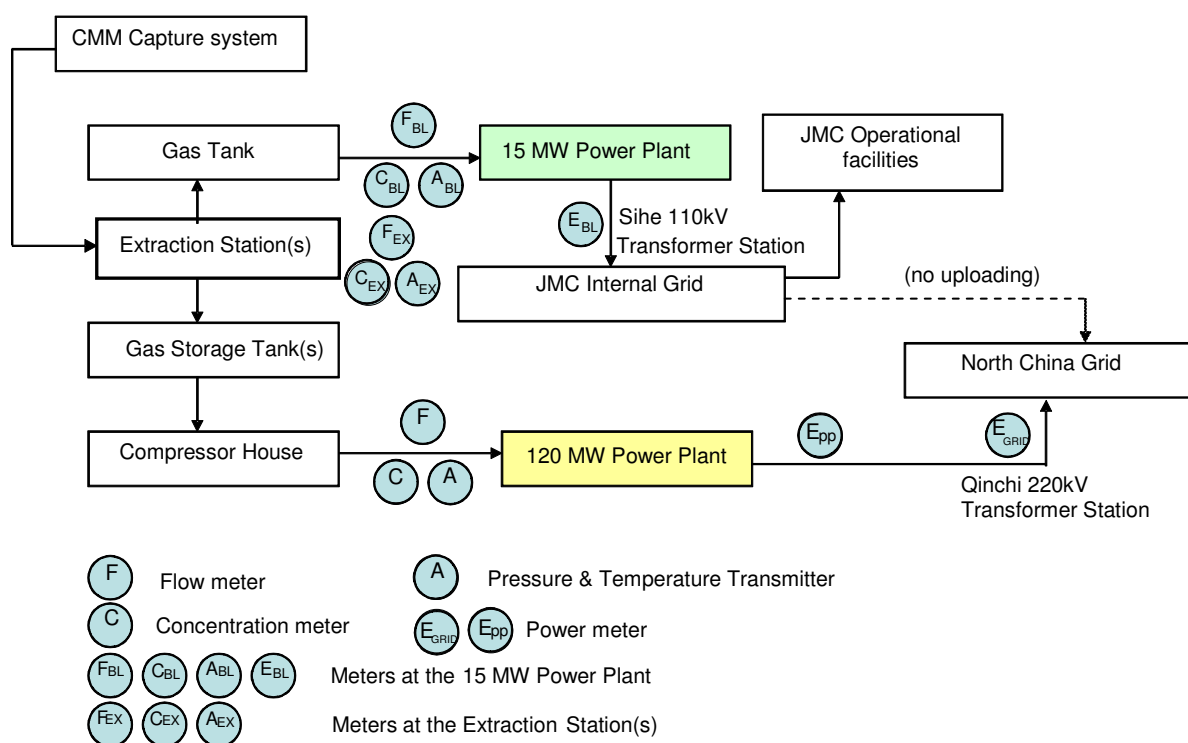
**B.7.2 Description of the monitoring plan:**

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The following monitoring plan will be implemented by the project owner, JMC, to ensure that real, measurable, long-term GHG emissions reductions will be monitored, recorded and reported.

1. Data to be monitored

The data that will be monitored are shown in Section B.7.1. The following figure (Figure 3) represents the generic diagram of flows and monitoring points of the new 120MW power plant and the existing 15MW experimental power plant. The Table 1 provides a list of monitoring meters, the corresponding parameters measured and the installed location. The Table 1 separately indicates the meters providing data used for calculation of emission reductions and other meters providing data not used for emission reduction calculation (e.g., used for cross-checking purposes).

Figure 3 Flow diagram and monitoring points at Sihe mining site**Table 1: Monitoring meters and parameters.**

Symbol	Description	Monitored parameter	Installed location
Main meters used for calculation of emission reductions			



F	Gas Flow Meters	MM _{ELEC}	120MW power plant
A	Pressure & Temperature Transmitters	MM _{ELEC}	120MW power plant
C	Concentration Meters	PC _{CH4,y}	120MW power plant
E _{GRID}	Power Meters (main and backup meter)	GEN _{1,y} , GEN _{2,y}	Grid Company Qinchu 220kV transformer station
Monitoring meters not used for calculation of emission reductions			
E _{PP}	Power Meters (main and backup meter) (used for cross-checking)	GEN _{1,y} , GEN _{2,y}	120MW power plant
F _{EX} , C _{EX} , A _{EX}	Gas Flow Meters, Concentration Meters, Pressure & Temperature Transmitters	MM _{total,y} MM _{release,y}	Extraction Station(s)
F _{BL} , C _{BL} , A _{BL}	Gas Flow Meters, Concentration Meters, Pressure & Temperature Transmitters	MM _{BL,y}	15MW Power Plant
E _{BL}	Power Meters	GEN _{BL,y}	15MW Power Plant

2. Monitoring, recording and management of data

All instruments installed in the proposed project will be in compliance with relevant national/sectoral standards and will be calibrated and maintained in accordance with the manufacturers' instructions and relevant national/sectoral standards. All relevant records will be kept for check.

JMC will establish a CDM project management office, consists of 4-6 people, and appoint an office director who will be responsible for checking, reviewing and issuing related data, documents and reports. Under the CDM project management office, a monitoring team, led by the director, will be established and is responsible for checking and maintaining related instruments, data recording, data handling and preparing reports. The monitoring staff will receive specific technical training before assuming their responsibilities. Each team will include at least one employee that has received comprehensive training.

JMC will establish a dedicated control centre at Sihe Coal Mine from where all electronic data will be remotely monitored and all records kept. Staff at the control centre will prepare a daily report on the operations of the project activity and the monitoring systems. This daily report will record data readings, equipment defects, outages, repairs and maintenance activities. All relevant information and documents will be kept at the controlling centre of the monitoring team.

The data are analyzed on a daily basis. In case of possible problems, the monitoring team will take quick and appropriate corrective actions.

Procedures for ensuring effective monitoring of this project are described in a document "CDM Project Management and Operating Procedures" which will be followed during the monitoring process. The document contains the following sections:

Chap 1 Introduction

Chap 2 Overall Project Management

Chap 3 CDM Project Management and Calculations

Sec 3.1 Data to be monitored and recorded

Sec 3.2 Emissions Reduction Calculation for the Project



Chap 4 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 the monitoring and verification processes

Chap 5 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 Manager

Chap 6 Confirmation of the Adoption of these CDM Operating Procedure.

3. Monitoring of power generation and CMM consumption of the existing experimental 15MW power plant

Monitoring of power generation and CMM consumption of the existing experimental 15MW power station is intended to demonstrate that the project 120MW power plant does not impose any limitations on the availability of CMM gas and the 15MW power plant remains to be in normal operation as part of the baseline gas usage.

The existing experimental 15MW power plant utilizing CMM at the Sihe mine generates electricity for the internal need of the Sihe mine (captive usage by JMC operational facilities). The electricity generated is supplied to the JMC internal 110 kV grid through the Sihe 110kV transformer station.

The electricity flows from 15MW and 120 MW power plants are separate: The JMC internal grid is connected to the North China Grid to comply with the Chinese grid requirements (however no uploading to the grid is taking place). The JMC internal grid is connected to the North China Grid in the point different from the Qinchi 220 kV transformer station, which is used as the monitoring point for the 120 MW plant.

To monitor power generation and CMM consumption of the existing experimental 15MW power plant, the following monitoring equipment will be used by JMC:

- § Electricity metering: electricity meters (point E_{BL} on Figure 3) have been installed at the outlet of the existing 15MW power plant to continuously monitor the electricity generated. The electricity meters at the Sihe 110 kV transformer station are monitoring the electricity supplied to/imported from the internal JMC Power Grid.
- § Gas concentration meter: to be installed at the inlet to the existing power plant (point C_{BL} on Figure 3). This meter will monitor the concentration of the CMM gas sent to the existing 15MW power plant.
- § Gas flow meter: to be installed at the inlet to the existing power plant (point F_{BL} on Figure 3) to meter the volume of CMM supplied to the existing 15 MW power plant.



- § Separate meters to measure respectively the temperature and pressure of the CMM sent to existing power plant will be installed (point A_{BL} on Figure 3).

All the above monitoring equipment will be installed before the starting date of the crediting period. The accuracies of the equipment will be in compliance with the relevant national standards. The metering equipment will be maintained under JMC regular maintenance regime and calibrated and monitored according to the Chinese regulation and manufacturer specifications.

The relevant gas and electricity data will be monitored by JMC qualified staff. Data will be backed up and archived in two different locations, where it will be stored for the longer of two years longer than the crediting period or two years after the last issuance of CERs.

4. Details of checking the flow and concentration meters

Flow meters and concentration meters will be calibrated annually and regularly maintained to ensure accuracy. There is a dedicated control centre at the project site which will read all the measured parameters. JMC staff in charge of the monitoring will manually record the readings hourly and archive the data daily. The archived data will be sent to the CDM manager every month for his review.

The monthly checking and maintenance of the flow meter and concentration meter by JMC staff will include:

- § Checking the physical appearance of the meters;
- § Checking whether the shelters for these meter are in good condition;
- § Checking the condition of the sensors and whether they are well connected and the connection lines are in good condition;
- § Checking whether the lead-seal of these meters are in good condition.

5. Consistency with the monitoring methodology in monitoring of methane fraction in CMM gas

The percentage of methane (%) in CMM will be measured in volumetric units by a continuous gas analyzer, on wet basis. These data will be recorded hourly and archived daily.

The temperature and pressure indicators will also be measured and recorded. These indicators will be used to normalize the measurements obtained from the gas analyzer. As a result, the concentration in mass of methane in extracted gas will be obtained.

The monitoring of the PC_{NMHC} can be clarified as follows:

- § Gas samples will be extracted annually in accordance with relevant industry standard and procedures. The samples will be analyzed by a qualified laboratory.
- § QA/QC procedures: A minimum of 3 samples will be collected in secure gas sample vessels, suitable for storage and transport to the laboratory. If one or more samples are found to be faulty (i.e. leaking gas sample vessel) replacement samples will be taken. Scanned copies of the analyses will be backed up and archived in two different locations. The data will be stored for the longer of two years after the crediting period or two years after the last issuance of CERs.

6. Monitoring of electricity to be supplied to and imported from the grid for the project activity



Total amount of electricity generated from each power house installed by the project will be sent to the North China Power Grid. As clarified above in item 3, the power generated by the existing 15MW experimental power plant is not supplied to the grid and is monitored separately.

The 220kV transformer station of the project power plant will be connected to Qinchi 220kV transformer station of the grid.

At the 220kV transformer station of the project power plant, 3 electricity meter cupboards (#1, #2, #3) are installed.

Meter cupboard #1

Four multi-function digital electricity meters (0.2 grade) are the Gate Meters installed by the Power Grid at the Project site. All the 4 meters are two-way digital meters so they can monitor the electricity supplied to and imported from the Grid. The functions of these meters (including 2 back-up meters) are as follows:

- § 2 meters monitoring the electricity supplied to/imported from the grid (point E_{PP} on Figure 3),
- § 2 meters monitoring the electricity through each of the two 220KV main transforming lines to the Power Grid.

The readings from these meters will not be counted as the basis for invoicing and settlement with the Grid.

Meter cupboard #2

Four multi-function digital electricity meters (0.5 grade) are installed by JMC. These 4 meters have the same functions as the 4 meters in cupboard #1, but have lower accuracy. These meters will be used for the internal performance review purpose only.

Meter cupboard #3

Eleven digital electricity meters (0.5 grade) with the following functions:

- § monitoring the power generations from each of the 4 power houses (4 meters),
- § monitoring the electricity consumed by 6 on-site workshops (compressor station, water pumping station, chemical water workshop and maintenance workshop),
- § monitoring the total electricity used by the power plant and other on-site auxiliary needs.

The cupboard in Qinchi 220kV transformer station of the Power Grid (off-site)

Two multi-function two-way electricity meters (0.2 grade): one main and one backup meter. These meters will monitor the electricity supplied to/imported from the Power Grid. These meters are installed and operated by the Grid company (point E_{GRID} on Figure 3), responsible for the maintenance and annual calibration. The readings from the E_{GRID} meters will be used by the Grid Company to issue the power settlement notice every month.

The power amounts in the power settlement notice will be cross-checked by JMC using the readings from meters installed at the project 120MW power plant, in cupboard #1 (point E_{PP} on Figure 3).

Usually, the difference of the readings between meters in points E_{GRID} and E_{PP} represents the transmission loss. Thus, the power amounts in the power settlement notice (readings from E_{GRID} meters) will be used for calculation of the emission reductions, which is conservative.

7. Calibration of Instruments



The following procedures will be followed to calibrate the equipment used in this project:

- 1) The metering instruments will be calibrated in accordance with relevant national/sectoral and manufacturers' requirements;
- 2) The electricity meters will be calibrated by authorized entities and tested by the local grid company.

8. Combined Measurement of pre-mining CMM and post-mining CMM

As stated in the registered PDD, MM_{ELEC} , $MM_{total,y}$, $MM_{release,y}$ are the consolidated monitoring parameters, which combine pre-mining CMM and post-mining CMM flows given that common extraction systems are used in the underground mine. This is in line with the decision of the CDM EB55 meeting (Paragraph 22 (i) of the Report), which allows project proponents to measure the pre-mining CMM together with the post-mining CMM.