Annex 1

Guidelines for Accounting and Reporting Greenhouse Gas Emissions

China Electricity Generation Enterprises

(Trial)

Instruction

I. Purpose and Significance of the Guidelines

In response to the request for "establishing and improving a system for calculating the Greenhouse Gas (GHG) emissions and gradually creating a carbon emission trading market" as made in the *Outline of the 12th Five-Year Plan*, and in response to the request for "accelerating buildup of the working systems for accounting GHG emissions at national, local and enterprise levels, and implementing a system that allows the key enterprises to directly report their data on GHG emissions and energy consumption", in the *Work Plan for GHG Emission Control during the 12th Five-Year Plan Period* (No. 41 [2011] issued by the State Council), in order to ensure that the target of reducing the intensity of carbon dioxide emissions per unit of GDP by 40%-45% by 2020 relative to 2005 will be achieved, the National Development and Reform Commission (NDRC) has formulated the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Electricity Generation Enterprises (Trial)*("the Guidelines"), with the aim to help enterprises (i) scientifically calculate and report in a standard format their GHG emissions, (ii) formulate their GHG emissions control plans, (iii) actively participate in carbon trading, and (iv) enhance their social responsibilities. Meanwhile the Guidelines are designed to pave the way for the competent authorities to establish and implement the reporting system for GHG emissions from key enterprises in support of decision-making processes.

II. Preparation Process

The Guidelines have been developed by experts from the Sino Carbon Innovation & Investment Co., Ltd. (SCII), as entrusted by the NDRC. The writing team has taken into account the research findings and practical experiences for calculating and reporting GHG emissions from relevant enterprises both in China and overseas, as well as the *Guidance for Compiling Provincial Greenhouse Gas Emission Inventory (Trial)*, issued by the NDRC General Office. Through field investigations, in-depth studies and experimental accounting based on individual cases, SCII completed the development of the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Electricity Generation Enterprises (Trial).* Efforts have been made to ensure that the Guidelines are science-based, comprehensive, standardized and practical. In the course of its preparation, SCII has received strong support

from relevant experts from the China Electricity Council and Beijing Energy Investment Holding Co., Ltd. among others.

III. Main Contents

The Guidelines contain seven sections and appendices. These sections have clearly defined the application scope of the Guidelines, cited documents and references, terminology and definition, accounting boundary, accounting methodology, quality assurance and documentation, as well as report contents and format, respectively. The calculated GHG emissions for the purposes of the Guidelines is carbon dioxide (not other types of GHGs). Emission sources include fossil fuel combustion, desulfurizing process and consumption of net purchased electricity and heat. The application scope covers the enterprises with qualified legal entities and independently accounted units that are treated as legal entities, all being involved in the electricity generation industry.

IV. Issues that Need Clarification

The accounting of GHG emissions from coal-fired electricity generation enterprises is the key and difficult issue in the Guidelines. As it is common throughout the nation that various types of coal are blended as fuel for combustion, it is hard to offer default values of the emission factor for fuel coals. As a consequence, in order to accurately assess GHG emissions from coal combustion, it is required in the Guidelines that enterprises should measure the carbon content of the coal fed into the furnace. To avoid heavy burdens for electricity generators, the Guidelines allow them to collect a split sample on a daily basis, and on the last day of each month, mix the samples of the whole month and measure the elemental carbon content of the mixture. Two options are offered for the carbon oxidation rate of the coal-fired electricity generation unit: the measured value or the default value. In addition, GHG emissions from desulfurizing process only account for about 1% of the total emissions of coal-fired electricity generation enterprises, so it is agreed that default values can be used in calculating carbonate content and conversion rate for the sake of simplification.

Considering the fact that enterprise-based GHG emissions accounting and reporting are a completely new and complicated endeavor, some inadequacies may be found in practical

application of the Guidelines, and it is hoped that those application units may provide their individual feedbacks in a timely manner, all aimed at making further revision in the future.

The Guidelines are published by the National Development and Reform Commission, which is responsible for their interpretation and revision when appropriate.

Contents

1. Application Scope

The Guidelines apply to the accounting and reporting of GHG emissions from electricity generation enterprises in China. Enterprises operating in electricity generation within the Chinese territory may calculate and report their GHG emissions, and formulate their individual GHG emissions reports by using the methods provided in the Guidelines. If the electricity generation enterprises also produce other products leading to GHG emissions, they should calculate and report those emissions according to the GHG emissions accounting and reporting guidelines for the relevant sectors.

2. References

The references cited or quoted in the Guidelines mainly include:

Guidance for Compiling Provincial Greenhouse Gas Emission Inventory (Trial);

China Energy Statistical Yearbook2012; and

China's Studies on Greenhouse Gas Emissions Inventory.

The following documents have been taken into consideration in the development process of the Guidelines as reference:

2006 IPCC Guidelines for National Greenhouse Gas Inventories;

GHG Protocol: A Corporate Accounting and Reporting Standard (2004); and

European Union Guidelines for Monitoring and Reporting GHG Emissions from EU ETS Installations.

3. Terminology and Definitions

3.1 Greenhouse gases (GHGs)

A greenhouse gas is natural or man-made atmospheric component in gaseous state that absorbs and emits radiation within the thermal infrared range. The GHGs addressed in the Guidelines refer to the six types of GHGs which are controlled under the Kyoto Protocol, and they are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

3.2 Reporting entity

A reporting entity shall be an enterprise with a legal person status or an independently accounted unit that can be deemed a legal person, which has performed as a GHG emission actor and therefore should calculate and report its GHG emissions.

3.3 Emissions from fuel combustion

Emissions from fuel combustion are the GHG emissions generated from the reaction of fuel to oxygen in a combustion process.

3.4 CO_2 emissions from consumption of net purchased electricity and heat

CO_2 emissions from consumption of net purchased electricity and heat refer to the CO_2 emissions from the electricity generation process corresponding to the consumption of net purchased electricity by an electricity generation enterprise.

3.5 Activity level

Activity level refers to the quantitative amount of production or consumption activities, which lead to GHG emissions, for examples, amount of fossil fuel consumption, usage amount of raw materials, amount of purchased electricity, etc.

3.6 Emission factor

Emission factor refers to the factor used to quantify the GHG emissions per unit of activity level. An emission factor is usually derived from sample measurements or statistical analysis, indicating the representative emission rate at a particular activity level under given operating conditions.

3.7 Rate of carbon oxidation

The rate of carbon oxidation is the ratio at which carbon in fuel(s) has been oxidized into CO_2 in a combustion process.

4. Accounting Boundary

A reporting entity should regard its legal entity as the boundary for identifying, calculating and reporting all relevant emissions from its facilities within it, while any double or missing accounts should be avoided. If the reporting entity produces other products that cause GHG emissions, it should calculate and report its emissions according to the GHG emissions accounting and reporting guidelines for those corresponding sectors.

The scope of GHG emissions accounting and reporting by electricity generation enterprises include CO_2 emissions from fuel combustion, CO_2 emissions from desulfurization process, as well as CO_2 emissions generated from consumption of net purchased electricity.

Emissions from domestic consumption within the enterprise boundary are not included in the accounting boundary in principle.

5. Accounting Methodology

The total GHG emissions of an electricity generation enterprise equal to the CO_2emissions from fossil fuel combustion, the CO_2emissions from desulfurizing process and the CO_2emissions from consumption of net purchased electricity. For CO_2 emissions from biomass-blend fuels, only that from fossil fuels (eg. coal) is calculated; for CO_2emissions from waste incineration, only that from fossil fuels (eg. coal) used is calculated.

The total GHG emissions of an electricity generation enterprise equal the CO_2 emissions from fossil fuel combustion, desulfurizing process and consumption of the net purchased electricity within the boundary of the accounted enterprise, which can be calculated according to Equation (1):

$$E = E_{\text{combustion}} + E_{\text{desulfurization}} + E_{\text{electricity}} \quad \text{(1)}$$

where,

E is the total CO_2 emissions of the enterprise (t);

$E_{\text{combustion}}$ represents the CO_2 emissions(t) from fuel combustion (including electricity generation and other emission sources using fossil fuels);

$E_{desulfurization}$ is the CO_2 emissions (t) from the desulfurizing process; and

$E_{\text{electricity}}$ represents the CO_2 emissions(t) from consumption of the net purchased electricity.

5.1 Emissions from fossil fuel combustion

The CO_2emissions from fossil fuel combustion can be calculated with Equation (2):

$$E_{\text{combustion}} = \sum_{i} (AD_i \times EF_i) \quad \text{(2)}$$

where,

$E_{combustion}$ is the CO_2emissions (t) from fossil fuel combustion;

AD_i is the activity level (TJ) of the *i*type of fossil fuel, as indicated in calorific value;

EF_i is the emission factor (tCO_2/TJ) for the *i*type of fossil fuel; and

i represents the type of fossil fuel.

5.1.1 Data and sources of activity level

The activity level (AD_i) of fossil fuel type *I* is calculated in Equation (3):

$$AD_i = FC_i \times NCV_i \times 10^{-6} \quad \ldots\ldots (3)$$

where,

AD_i is the activity level of fossil fuel i (TJ);

FC_i is the consumption of fossil fuel i (ton, 10^3 normal cubic meter);

NCV_i is the average lower calorific value of fossil fuel I (kJ/kg, kJ/Nm^3); and

i is the type of fossil fuel.

5.1.1.1 Consumption of fuels

The consumption amount of fossil fuels should be derived from the energy consumption records or statistical statements of the enterprise. The standard adopted in specific instruments for measuring fuel consumption shall comply with relevant regulations provided in the *General Principles for Equipping and Managing the Energy-Measuring Instruments in Energy-Using Organizations(GB 17167-2006)*.

5.1.1.2 Lower calorific value

The methods, laboratory and instruments adopted for measuring the lower calorific value of coal shall comply with relevant regulations provided in the *Determination of Calorific Value of Coal(GB/T 213-2008).* The measurement should take place at least once a day. The annual average lower calorific value of coal is derived from the weighted average of daily average lower calorific values. The weight is daily coal consumption amount.

The methods, laboratory and instruments adopted for measuring the lower calorific value of liquid fuel shall comply with relevant regulations provided in the *Test Methods for Calorific Value of Liquid Fuel (DL/T 567.8-95).* The measurement should take place once per batch. Otherwise, the annual average lower calorific value in the settlement agreement of transactions with the supplier should be adopted. The annual average lower calorific value of liquid fuel is the weighted average of average lower calorific values of all batches. The weight is consumption of liquid fuel per batch. For the lower calorific value of diesel or gasoline used by enterprises, the recommended values are provided in Table in 2.1 in Appendix II.

The methods, laboratory and instruments adopted for measuring the lower calorific value of natural gas shall comply with relevant regulations provided in the *Natural gas—Calculation of Calorific Values, Density, Relative Density and Wobbe Index from Composition (GB/T 11062-1998).* The lower calorific value of natural gas can be either measured by enterprises or provided by the fuel suppliers, at least once

a month. If in a certain month, several lower calorific values are available for the enterprise, the lower calorific value of that month is the weighted average of those values. The annual average lower calorific value of natural gas is the weighted average of monthly average lower calorific values. The weight is the monthly consumption of natural gas.

In terms of electricity generation units using bio-blend fuels and waste incineration, the measurement and calculation of the lower calorific value should refer to those of coal, liquid fuel and natural gas mentioned above.

5.1.2 Data and sources for emission factor

The CO_2emission factor EF_i for fossil fuel *i* is calculated with Equation(4):

$$EF_i = CC_i \times OF_i \times \frac{44}{12} \quad \text{……(4)}$$

where,

EF_i is the CO_2 emission factor (tCO_2/TJ) of fossil fuel*i*;

CC_i is the carbon content (tC/TJ) per unit of calorific value of the fossil fuel*i*;

OF_i is the rate of carbon oxidation (%) of fossil fuel*i*; and

$\frac{44}{12}$ shows the ratio of CO_2 to carbon molecule weight.

5.1.2.1 Carbon content per unit of calorific value

To calculate the carbon content per unit of calorific value for coal, the electricity generation enterprise should collect a reduced/split sample every day, and on the last day of every month, mix those split samples in order to measure carbon content. The standard adopted for measurement shall comply with relevant regulations provided in *Determination of Carbon and Hydrogen in Coal (GB/T476-2008).* The monthly average carbon content per unit of calorific value for coal is calculated as given in Equation (5), below:

$$CC_{coal} = \frac{C_{coal} \times 10^6}{NCV_{coal}} \quad \text{……（5）}$$

where,

CC_{coal} is the monthly average carbon content per unit of calorific value for coal (tC/TJ);

NCV_{coal} is the monthly average lower calorific value for coal (kJ/kg); and

C_{coal} is the monthly average elemental carbon content (%).

The monthly average lower calorific value of coal is the weighted average of daily average lower calorific values. The weight is daily coal consumption. The annual

average carbon content per unit of calorific value for coal is the weighted average of monthly average carbon content per unit of calorific value. The weight is monthly consumption of coal in the furnace.

For the carbon content per unit of calorific value for liquid fuel and natural gas, the recommended value in Table 2.1 in Appendix II should be used.

For electricity generation units using bio-blend fuels and waste incineration, the measurement and calculation of average carbon content per unit of calorific value for fossil fuels should refer to the above mentioned method.

5.1.2.2 Rate of carbon oxidation

The rate of carbon oxidation for electricity generation units using coal is calculated using Eequation (6):

$$OF_{coal} = 1 - \frac{(G_{cinder} \times C_{cinder} + G_{ash} \times C_{ash} / \eta_{dust\ removel}) \times 10^{6}}{FC_{coal} \times NCV_{coal} \times CC_{coal}} \quad \cdots\cdots (6)$$

where,

OF_{coal} is the rate of carbon oxidation for coal (%);

G_{cinder} is the annual cinder output (t);

C_{cinder} is the average carbon content of cinder (%);

G_{ash} is the annual fly ash production (t);

C_{ash} is the average carbon content of fly ash (%);

$\eta_{dust\ removel}$ is the average dust removal efficiency of the dust removal system (%);

FC_{coal} is the amount of coal consumption (t);

NCV_{coal} is the average lower calorific value for coal (kJ/kg); and

CC_{coal} is the average carbon content per unit of calorific value for coal (tC/kJ).

The output of cinder and fly ash should be the measured values and recorded monthly. If no measured value is available, the evaluation method provided in the *Code for Designing Ash Handling System of Electricity Plant* can be adopted. In the evaluation, the measurement standard of ash (arb) of coal ($A_{ar,m}$)should be in line with the *GB/T 212-2001Proximate Analysis of Coal*. The heat loss $q_4$due to incomplete burning of solid matter in the furnace should be calculated according to data provided by the factory. If no data are provided, the recommended values in Table 2.4 in Appendix II can be used. The amount of the ash generated by different parts of the furnace should be calculated according to the ash distribution ratio. And if no data are provided, the recommended values in Table 2.5 in Appendix II can be adopted. The efficiency of an electric precipitator should be the value provided by the manufacturer, and if it is not available, the value is regarded as 100%.The carbon content of cinder and fly ash is the arithmetic average of all samples in the whole month, and the frequency of monthly sampling should be no less than once. The measurement of fly ash and cinder samples should abide by the requirements in the *DL/T 567.6-95 Test Methods for Combustible Matter in Fly Ash and Cinder from Coal*. If some of the above-mentioned measurements are not viable, the rate of carbon oxidation for coal can be the recommended value in Table 2.1 in Appendix II.

For the rates of carbon oxidation for liquid fuel and natural gas, the recommended values in Table 2.1 in Appendix II can be used.

For the rate of carbon oxidation for fossil fuels in electricity generation units using bio-blend fuels and waste incineration, refer to the measurement and calculation method of the rate of carbon oxidation mentioned above.

5.2 Emissions from desulfurization process

For coal-fired electricity generation units, the CO_2emissions from the desulfurization process should be considered. The amount of emissions is equal to the consumption of carbonate multiplied by the emission factor, as is calculated in Equation (7):

$$E_{desulfurization} = \sum_{k} CAL_k \times EF_k \quad \text{.....（7）}$$

where,

$E_{desulfurization}$ is the CO_2 emissions during the desulfurization process (t);

CAL_k is the consumption of carbonate in desulfurizer k (t);

EF_k is the emission factor of carbonate in desulfurizer k (tCO_2/t); and

K is the type of desulfurizer.

5.2.1 Data and sources of activity level

The annual consumption of carbonate in the desulfurizer is calculated with Equation (8):

$$CAL_{k,y} = \sum_{m} B_{k,m} \times I_k \quad \text{.....（8）}$$

where,

$CAL_{k,y}$ is the consumption of carbonate in the desulfurizer for the whole year (t);

$B_{k,m}$ is the consumption of the desulfurizer in a given month (t);

I_k is the carbonate content in the desulfurizer;

y is the accounting and reporting year;

k is the type of desulfurizer; and

m is the month of the accounting and reporting year.

The consumption of desulfurizer used in the process (eg. limestone) can be calculated by taking the sum of the measured values of every batch or day, thus recording its monthly consumption. If the enterprise hasn't taken any measurements or

the measured values are not available, the invoice of settlement accounts can act as a substitute.

The carbonate content of the desulfurizer should be regarded as the default value of 90%.

5.2.2 Data and sources for emission factor

The emission factor during the desulfurization process is calculated using Equation (9):

$$EF_k = EF_{k,t} \times TR \quad \text{……（9）}$$

where,

EF_k is the emission factor in the desulfurization process (tCO_2/t);

$EF_{k,t}$ is the emission factor in the desulfurization process with complete transformation (tCO_2/t); and

TR is the transformation rate.

The emission factor in the desulfurization process with complete transformation can be found in Table 2.2 in Appendix II.

The transformation rate of the desulfurization process is as assumed to be 100%.

5.3Emissionsfrom consumption of net purchased electricity

The CO_2 emissions from consumption of the net purchased electricity by an electricity generation enterprise is equal to the net purchased electricity multiplied by the emission factor for the mean electricity supply by the regional electricity grids according to Equation (10):

$$E_{electricity} = AD_{electricity} \times EF_{electricity} \quad \text{……(10)}$$

where,

$E_{electricity}$ is the amount of CO_2 emissions from the electricity generation process corresponding to the consumption of net purchased electricity by the enterprise (t);

$AD_{electricity}$ is the net-purchased electricity by the enterprise(MWh); and

$EF_{electricity}$ is the CO_2 emission factor for the annual mean electricity supply by the regional electricity grid(tCO_2/MWh).

5.3.1 Data and sources of activity level

The data concerning the activity level for net purchased electricity should correspond to the readings of the electricity meter of the electricity generation enterprise, and if they are not available, data on the invoice of electricity bills or settlement accounts provided by the supplier can be adopted.

5.3.2 Data and sources for emission factor

The emission factor for electricity should be determined in accordance with the location of the enterprise, in relation to the current geographical division of electricity grids, i.e. those in the Northeast, North China, East China, Central China, Northwest, and Southern China. The emission factor of the relevant electricity grid published by the national authority in the most recent year should be chosen.

6. Quality Assurance and Documentation

A reporting entity from the electricity generation industry should establish a quality assurance and documentation system for its GHG emissions reports, the content of which includes:

- Designation of special staff responsible for accounting and reporting GHG emissions;
- Establishment of a sound programme for monitoring enterprise GHG emissions. Qualified enterprises should regularly monitor the lower calorific value and elemental carbon content of main fossil fuels as well as the rate of carbon oxidation for key combustion equipment;
- Establishment of a sound statistical record system for enterprise GHG emissions and energy consumption;
- Establishment of a management mechanism for documenting and archiving GHG data; and
- Establishment of internal auditing for GHG emissions reports.

7. Content and Format of Report

The reporting entity from the electricity generation industry should report the following information in accordance with the format provided in the AppendixI:

7.1 Basic information of the reporting entity

The basic information of the reporting entity should include the name or title, business nature, reporting year, industrial sector, Organization Code Certificate, legal representative, person responsible for completing the report, and focal point of the reporting entity.

7.2 Amount of GHG emissions

A reporting entity should report the total GHG emissions of the enterprise for the accounting and reporting period. It should also report emissions from fossil fuel combustion, emissions from the desulfurization process and emissions from consumption of net purchased electricity.

7.3 Activity level and their sources

A reporting entity should report net consumption amount of various fossil fuels and their corresponding lower calorific values, the consumption of the desulfurizer, as well as the amount of net purchased electricity.

If an electricity generation enterprise produces other products, it should report its activity level data and sources as requested in the GHG emissions accounting and reporting guidelines for the enterprises in the relevant sectors.

7.4 Emission factors and their sources

A reporting entity should report the carbon content per unit of calorific value, and data about the carbon oxidation rate of the various fossil fuels consumed, the emission factor of desulfurizer, as well as the emission factor corresponding to the consumption of net purchased electricity.

If an electricity generation enterprise produces other products, it should report its emission factor data and sources as requested in the GHG emissions accounting and reporting guidelines for the enterprises in the relevant sectors.

AppendixI: Report Format Template

Greenhouse Gas Emissions Report
China Electricity Generation Enterprises

Reporting Entity (Official Seal):

Reporting Year:

Date of Production: **(Day/Month/Year)**

In accordance with the *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Electricity Generation Enterprises(Trial)*("The guidelines") issued by the National Development and Reform Commission (NDRC), this reporting entity has accounted the total GHG emissions amount of its enterprise for the year _____, and filled in the data in the relevant tables. The reporting entity herewith reports the relevant information as follows:

I. Basic Information of Enterprise

II. Greenhouse Gas Emissions

III. Explanatory Description of Activity Level Data and Sources

IV. Explanatory Description of Emission Factors and Sources

This report is true and reliable. If the information provided in this report fails to reflect the reality, this enterprise represented by its legal person will bear the corresponding legal responsibility.

Legal Person (Signature):

(Day/Month/Year)

Attachments:

Table 1-1: Carbon Dioxide Emissions Report of a Reporting Entity in Year __

Table 1-2: Emissions Activity Level Data of a Reporting Entity

Table 1-3: Emission Factors and Calculation Co-efficient of a Reporting Entity

Appendix I: Template of Report Format

Table1-1: Carbon Dioxide Emissions Report of a Reporting Entity in Year

Total CO_2Emissions (tCO_2) of the Reporting Entity	
Emissions (tCO_2) from fuel combustion	
Emissions (tCO_2) from desulfurization process	
Emissions (tCO_2) from consumption of net purchased electricity	

Table 1-2: Emissions Activity Level Data of a Reporting Entity

		Net consumption （t, 10^4Nm^3）	Lower calorific value (GJ/t, GJ/10^4Nm^3)
Fossil fuel combustion[*1]	Fuel Coal		
	Crude oil		
	Fuel oil		
	Gasoline		
	Diesel		
	Refinery gas		
	Other petroleum products		
	Natural gas		
	Coke oven gas		
	Other gases		
Desulfurization process[*2]		**Data**	**Unit**
	Consumption of desulfurizers		t
Net purchased electricity		**Data**	**Unit**
	Net purchased electricity		MWh

*1The enterprise should add any other types of energy actually used by the enterprise in its operations, which are not listed in this table.

*2In case the enterprise uses multiple types of desulfurizers, it should specify each of them.

Table 1-3: Emission Factors and Calculation Coefficients

		Carbon content per unit of calorific value （tC/GJ）	Rate of carbon oxidation （%）
Fossil fuel combustion[*1]	Fuel Coal		
	Crude oil		
	Fuel oil		
	Gasoline		
	Diesel		
	Refinery gas		
	Other petroleum products		
	Natural gas		
	Coke oven gas		
	Other gases		
		Data	**Unit**
Desulfurization process[*2]	Emission factor of desulfurization process		tCO2/t
		Data	**Unit**
Net purchased electricity	Emission factor of annual average electricity supplies by regional electricity grid		tCO_2/MWh

*1The enterprise should add any other types of energy actually used by the enterprise in its operations, which are not listed in this table.

*In case the enterprise uses multiple types of desulfurizers, it should specify each of them.

Appendix II : Relevant Default Values

Table 2-1: Default Values of Relevant Parameters for Commonly Used Fossil Fuels

Type of fuel	Average Lower calorific value（KJ/Kg）	Carbon content per unit of calorific value (tC/TJ)	Carbon oxidation rate (%)
Fuel Coal			98②
Crude oil	41816③	20.08②	98②
Fuel oil	41816③	21.1②	
Gasoline	43070③	18.9②	
Diesel	42652③	20.2②	
Refinery gas	45998③	18.2②	
Natural gas	38931③	15.32②	99②
Coke oven gas	12726~17981③	13.58②	
Other gases	52270①	12.2②	

Note: The above data come from: ①*China's Studies on Greenhouse Gas Inventory (2007);* ②*Guidance for Compiling Provincial Greenhouse Gas Emissions Inventory (Trial);* and ③*China Energy Statistical Yearbook 2011*.

Table 2-2: Default Values of Emission Factors for Carbonate

Carbonate	Emission Factor (tCO_2/tCarbonate)
$CaCO_3$	0.440
$MgCO_3$	0.522
Na_2CO_3	0.415
$BaCO_3$	0.223
Li_2CO_3	0.596
K_2CO_3	0.318
$SrCO_3$	0.298
$NaHCO_3$	0.524
$FeCO_3$	0.380

Table 2-3:Default Values of Other Emission Factors and Parameters

Name	**Unit**	**CO_2 Emission Factor**
Net purchased electricity	tCO_2/MWh	Using the official emission factor(s) published for the most recent year

Table 2-4: Heat Loss (q4) Value for Incomplete Solid Combustion

Type of boiler	Type of Fuel	q_4(%)
Dry-bottom boiler fired by pulverized coal	Anthracite	4
	Lean coal	2
	Bituminous coal($V_{daf}\leq 25\%$)	2
	Bituminous coal($V_{daf}>25\%$)	1.5
	Lignite (brown coal)	0.5
	Washed coal($V_{daf}\leq 25\%$)	3
	Washed coal($V_{daf}>25\%$)	2.5
Wet-bottom boiler	Bituminous coal	1
	Anthracite	3
Circulating fluidized bed furnace	Bituminous coal	2.5
	Anthracite	3

Table 2-5: Distribution of Cinder/Slag and Ash for Different Types of Boilers/Furnaces

Type of boiler/furnace	Unit	Pulverized-coal-fired boiler	W-shaped flame furnace	Wet-bottom boiler	Circulating fluidized bed furnace
Cinder/slag	%	10	15	40	40
Ash	%	90	85	60	60
	Note: When an economizer hopper is equipped, its ash content can amount to 5% of the total ash and cinder; when grinding mill operates with medium speed, pebble coal can be selected within the range of 0.5% to 1% of the total coal at the maximum continuous evaporation in coal-fired boiler.				