

Annex 2

**Guidelines for Accounting and Reporting
Greenhouse Gas Emissions**

China Electricity Grid 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”, as spelled out in the *Work Plan for GHG Emissions 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 Grid 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 process.

II. Preparation Process

The Guidelines have been developed by experts from the Sino Carbon Innovation & Investment Co., Ltd. (SCII), as entrusted by the National Development and Reform Commission. 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 Emissions Inventory (Trial)*, issued by 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 Grid 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 State Grid Corporation of China among others.

III. Main Contents

The *Guidelines for Accounting and Reporting Greenhouse Gas Emissions from China Electricity Grid Enterprises (Trial)* contain seven sections and appendices. The Guidelines 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 GHGs for the purposes of the Guidelines are carbon dioxide and sulfur hexafluoride (no other types of GHGs). Emission sources include the emissions

generated from the repairing and decommissioning processes for equipment using sulfur hexafluoride as well as emissions due to electricity transmission and distribution. The application scope covers the enterprises with qualified legal entities and independently accounted units that are treated as legal entities, all being involved in electricity transmission and distribution.

IV. Issues that Need Clarification

The GHG emissions from electricity grid enterprises include carbon dioxide emissions as a result of electricity loss during its transmission and distribution and sulfur hexafluoride emissions generated from the process of repairing and decommissioning equipment using sulfur hexafluoride. Though equipment using sulfur hexafluoride may leak sulfur hexafluoride during its operation, such leakage will not be taken into account as the leakage rate is low and it is difficult to detect the leakage.

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 feedback in a timely manner, all aimed at making further revision in the future.

The Guidelines are published by the NDRC, which is responsible for their interpretation and revision when appropriate.

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1. Application Scope

The Guidelines apply to the accounting and reporting of GHG emissions from electricity grid enterprises in China. Enterprises operating in electricity transmission and distribution 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 grid 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 Emissions Inventory (Trial);
China Energy Statistical Yearbook 2012; 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 a 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 (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆).

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 calculates and reports its GHG emissions. The reporting entity under the Guidelines includes provincial electric power companies or electric power companies of municipalities under the direct administration of the central government.

3.3 Activity level

Activity level refers to the amount of electricity loss during transmission and distribution, the capacity of SF₆-driven equipment repaired or decommissioned, and the amount of SF₆ recycled.

3.4 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.

4. Accounting Boundary

The electric power companies of municipalities under the direct administration of the central government or provincial electric power companies are considered as the independent boundaries in calculating and reporting greenhouse gas emissions. If the reporting entity engages in activities other than electricity transmission and distribution that cause GHG emissions, it should calculate and report those emissions according to the GHG emissions accounting and reporting guidelines for those corresponding sectors.

The scope of GHG emissions accounting and reporting by electricity grid enterprises include SF₆ emissions from repairing and decommissioning SF₆-driven equipment, and CO₂ emissions from electricity loss during transmission and distribution, which corresponds to the CO₂ emissions required to generate an equivalent quantity of electricity.

5. Accounting Methodology

The GHG emissions of an electricity grid enterprise refers to SF₆ emissions from repairing and decommissioning SF₆-driven equipment, and CO₂ emissions from electricity loss during transmission and distribution, which corresponds to the CO₂ emissions required to generate an equivalent quantity of electricity. The emissions can be calculated with Equation (1):

$$E = E_{SF6} + E_{grid\ loss} \dots \dots \dots (1)$$

where

- E — is the total CO₂ emissions of the enterprise (t CO₂);
- E_{SF6} — SF₆ emissions from repairing and decommissioning SF₆-driven

- equipment (t CO₂);
- $E_{grid\ loss}$ — CO₂ emissions from electricity loss during transmission and distribution (t CO₂);

5.1 SF₆ emissions from repairing and decommissioning SF₆-driven equipment

The SF₆ emissions from repairing and decommissioning SF₆-driven equipment used by electricity grid enterprises can be calculated with Equation(2):

$$E_{SF_6} = \left(\sum_i (REC_{Capacity,i} - REC_{Recycle,i}) + \sum_j (REP_{Capacity,j} - REP_{Recycle,j}) \right) \times GWP_{SF_6} \times 10^{-3} \quad \dots (2)$$

where

- E_{SF_6} — SF₆ emissions from repairing and decommissioning SF₆-driven equipment (t CO₂);
- $REC_{Capacity,i}$ — SF₆ capacity of decommissioned equipment i , represented by the data shown on nameplate (kg);
- $REC_{Recycle,i}$ — SF₆ volume recycled from decommissioned equipment i (kg);
- $REP_{Capacity,j}$ — SF₆ capacity for repaired equipment j , represented by the data shown on nameplate (kg);
- $REP_{Recycle,j}$ — SF₆ volume recycled from repaired equipment j (kg);
- GWP_{SF_6} — SF₆ global warming potential: 23900

5.2 CO₂ emissions from electricity loss during transmission and distribution

The CO₂ emissions caused by electricity grid enterprises are mainly due to electricity loss occurring over the transmission and distribution lines. Such loss can be calculated by the electricity supply minus electricity sales (in MWh units). The measurement methods and equipment standards for electricity should follow the

relevant regulations provided in *Technical Specification on Electricity Metering Device (DL/T 448-2000)*, *General Principles for Equipping and Managing the Energy-Measuring Instruments in Energy-Using Organizations(GB 17167-2006)*, *Monitoring System on the Status of Overhead Transmission Lines (GB/T 25095-2010)*, *Series Standards on Electricity Energy Meter (GB 17215)*, and *Electricity Energy Metering Cabinet (GB 16934-1997)*.

The emissions from electricity loss due to transmission and distribution by electricity grid enterprises can be calculated with Equation(3):

$$E_{\text{grid loss}} = AD_{\text{grid loss}} \times EF_{\text{grid}} \dots \dots \dots (3)$$

where

- $E_{\text{grid loss}}$ — The total emissions from electricity loss due to transmission and distribution (tCO₂)
- $AD_{\text{grid loss}}$ — Electricity loss due to transmission and distribution (MWh)
- EF_{grid} — Emission factor for annual mean electricity supply by The regional electricity grids (tCO₂/MWh)

The electricity loss due to transmission and distribution can be calculated with Equation(4):

$$AD_{\text{loss}} = EL_{\text{supply}} - EL_{\text{sales}} \dots \dots \dots (4)$$

where

- AD_{loss} — Electricity loss due to transmission and distribution (MWh)
- EL_{supply} — Electricity supply(MWh)
- EL_{sales} — Electricity sales, namely the electricity consumption by end users(MWh)

The electricity supply can be calculated with Equation (5):

$$EL_{\text{supply}} = EL_{\text{feed-in}} + EL_{\text{import}} - EL_{\text{export}} \dots \dots \dots (5)$$

where,

EL_{supply}	—	Electricity supply(MWh)
$EL_{\text{feed-in}}$	—	Electricity fed by power plants into grid(MWh)
EL_{import}	—	Electricity imported from other provinces(MWh)
EL_{export}	—	Electricity exported to other provinces(MWh)

The annual mean electricity supply can be calculated in accordance with the current geographical divisions of electricity grids, i.e. those in the Northeast, North China, East China, Central China, Northwest, and Southern China. The emission factors of the relevant electricity grid, which are published by the national authority in the most recent year, should be selected.

6. Quality Assurance and Documentation

A reporting entity 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 statistical record system for enterprise GHG emissions;
- 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 should report the following information in accordance with the format provided in the Appendix I:

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 the emissions from repairing and decommissioning SF₆-driven equipment, and CO₂ emissions from electricity loss during transmission and distribution.

7.3 Activity level and their sources

A reporting entity should report the capacity and volume of SF₆ actually recycled for each piece of repaired and/or retired SF₆-driven equipment, as well as the amount of electricity generated by power plants within the provincial grid, electricity imported from other provinces and electricity exported to other provinces.

If an electricity grid 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 emission factor for its own regional grid.

If an electricity grid 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.

Appendix I: Report Format Template

**Greenhouse Gas Emissions Report
China Electricity Grid 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 Grid 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 of a Reporting Entity

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

Total CO₂Emissions (tCO₂) of the Enterprise	
Emissions from repairing and decommissioning SF ₆ -driven equipment (tCO ₂)	
CO ₂ emissions from due to electricity transmission and distribution (tCO ₂)	

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

SF₆Recycling*					
Repaired equipment	Equipment capacity (Kg)	Recycled amount (Kg)	Retired equipment	Equipment capacity (Kg)	Recycled amount (Kg)
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
Loss due to transmission and distribution					
Electricity fed by power plants to grid(MWh)					
Electricity imported from foreign provinces(MWh)					
Electricity exported to foreign provinces (MWh)					
Electricity sales (MWh)					
Transmitted and distributed electricity(MWh)					

* The enterprise should add any additional repaired or decommissioned SF₆-driven equipment, if the number of such equipment is more than 10.

Table 1-3: Emission Factors of a Reporting Entity

Loss due to transmission and distribution		Data	Unit
	Electricity		tCO ₂ /MWh

Appendix II: Relevant Default Values

Table 2-1: Emission Factors and Default Values for Parameters

Name	Emission factor unit	CO₂Emission factor
Electricity	tCO ₂ /MWh	Using most recent official values