

Research on the Establishment of Greenhouse Gas Emissions Key Enterprises Statistical Index System and Reporting system

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Abstract. In our country's research and activities carried out for the climate change from place to place at present, because state and local statistical system on climate change is still in constant research and improvement, carrying out activities and research lacks reference and guidance from authoritative greenhouse gas emissions data statistics. Based on the national clean development mechanism fund(CDMF) research project "Hainan cope with climatic change accounting and statistical power system research", this article extracts various dynamic basis variables in calculation methods, establish greenhouse gas emissions statistics index system around demand of all climate change activities and design the system of statistics reports on climate change for the reference of our country's activities and research work to cope with climate change according to the greenhouse gas emissions accounting standards in key enterprises issued by our country.

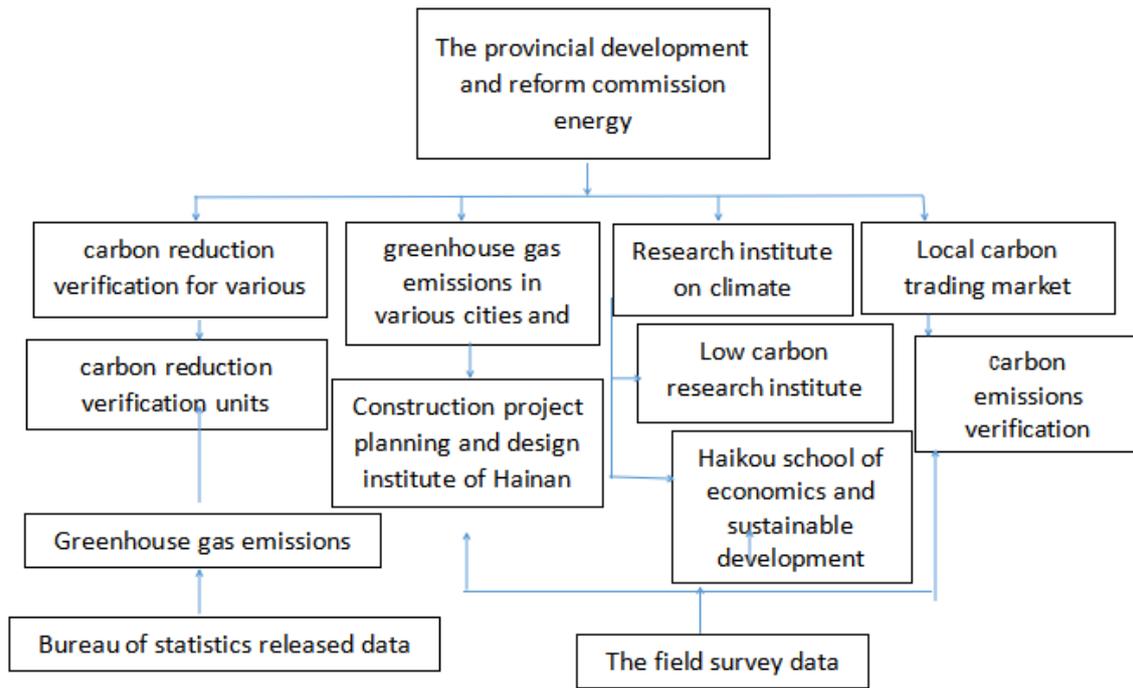
Introduction

From 70-80s of the 20th century the international society's realizing the seriousness and urgency of the issue of climate change, the United Nations Environment Programme(UNEP) and the world meteorological organization (WMO) established the intergovernmental panel on climate change in November 1988, brought together hundreds of first-class experts in the field of study on warming world to evaluate the potential environmental and socio-economic impact of human activities on climate change. Until April 22, 2016, the climate change agreement signed in New York- Paris Agreement, a growing number of countries (more than 170 countries) gathered in the United Nations to participate in the activities in the global response to climate change.

With the rapid development of China's economy and society, the total energy consumption and greenhouse gas emissions increased rapidly. Demands and expectations from international parties for our country to control greenhouse gas emissions and bear bigger international responsibilities are rising constantly. In this process, the key of whether we can point out problems and find out the contradiction between our greenhouse gas emissions and the rapid economic and social development, whether we can achieve our commitment to greenhouse gas emissions in the world by formulation and implementation of policy and system for controlling gas emission, improvement of production technology as well as improvement of greenhouse gas emissions monitoring technology, lies at whether the scientificity of statistical index system and reporting system establishment for coping with climate change can get guarantee, especially the establishment of statistics index system and the reporting system in the field of industry is the top priority.

The system of controlling greenhouse gas emissions in the field of current industry of our country administrative management system

Taking Hainan province as an example, the government control system for the work of dealing with climate change is as follows:



The administrative management system shows that except for the assessment of carbon reduction dominated by the government adopts the statistical data released by statistical bureau for coping with climate change, the formulation of greenhouse gas emissions lists in various cities and counties, activity research on climate change and local carbon emissions verification all adopt field survey data.

The current key enterprises of greenhouse gases emissions statistical index system in our country [1]

Table 1

Classification	Index	Name of statement	Material source	Department in charge
(two) industrial processes	1.The principal source of greenhouse gas emissions products production in industrial enterprises above designated size	19.The principal source of greenhouse gas emissions products production in industrial enterprises above designated size	Industrial statistics statement system(table B104-3)	State Statistics Bureau
	2.raw materials consumption related to greenhouse gas emissions in the process of iron and steel production	20.ron and steel enterprises greenhouse gases related situation	Department statistics statement system on climate change (trial)(table P708)	China Iron and Steel Association
	3.including import and export amount of fluoride gas	21.including import and export amount of fluoride gas	Department statistics statement system on climate change (trial)(table P709)	Ministry of Environmental Protection
	4.including production and handling amount of fluoride gas	22.including production and handling amount of fluoride gas	Department statistics statement system on climate change (trial)(tableP710)	the same as above
	5.including using amount of fluoride gas	23.including using amount of fluoride gas	Department statistics statement system on climate change (trial)(table P711)	the same as above

It can be seen from table 1 that the covering content of statistical indicators of greenhouse gas emissions in industrial production process is very limited. And actually in the process of China's industrial development, the key units of greenhouse gas emissions are involved in many fields, including dozens of areas such as electricity, oil, metals, ceramics, coal, and so on. In different areas, in the future there will be more and more enterprises emission greenhouse gas involved in the assessment and carbon trading market.

Our country's industry report system for coping with climate change[2]

Table 2: industrial enterprises' main greenhouse gas emissions source products production statistics

Product name	unit of measurement	code	Output
Party A	Party B	Party C	1
portland cement clinker	Ten thousand tons	01	
Among: Cement clinker kiln outside the decomposition kiln	Ten thousand tons	02	
Cement	Ten thousand tons	03	
lime	Ten thousand tons	04	
Steel	Ten thousand tons	05	
calcium carbide(300L/kg for account)	Ten thousand tons	06	
adipic acid	Ten thousand tons	07	
nitric acid	Ten thousand tons	08	
Aluminium	Ten thousand tons	09	
Mg	Ten thousand tons	10	

Head of the unit: the preparer: quote date: 20 (date) (month) (year)

The domestic research status

At present, it is rare to see the domestic literature engaged in statistical research on climate change with most concentrated in the last three years. For example, Tian Xinru (2015) interpreted the statistic related international and domestic theory coping with the climate change and put forward ideas on system construction and implementation security; Huang Qiang (2016) analyzed the Guangxi statistical indicator system for coping with climate change and user demand gap and put forward suggestions. In addition to the above literature, literature targetedly research on coping with climate change statistical problem is not much. This article does not carry out the interpretation from the aspects of theory and put forward suggestions but extracts the dynamic basis variables in accounting standards system directly according to the demand of accounting requirements, constructs statistical indicators and statistical reporting system.

The index system extraction

At present, the national development and reform commission (NDRC) addressing climate change law office department policy section launched greenhouse gas emissions accounting method and report guidelines in 24 industries(trial implementation) which put forward technical standards for greenhouse gas emissions accounting in 24 industries. At the same time, greenhouse gas emissions listing, assessment of carbon reduction and quota for approval for carbon units participating in carbon trading in local governments need to refer to this. In order to better serve the demand party by providing more timely, accurate, and dynamic data of greenhouse gas emissions, combined with climate change activities' carrying out and the corresponding research, the statistics department at all levels are in urgent need of a set of standard, unified statistical report system on climate change. The following is extracting the dynamic variables based on emissions accounting method, establishing index system for greenhouse gas emissions to provide basis for formulating system of statistical report for coping with climate change.

Table 3: Industry area key enterprises greenhouse gas emissions accounting dynamic basic variable extraction table

	type of enterprise	Emissions accounting methods	Emissions accounting dynamic basic variables
01	generate electricity	$E=E_{\text{燃烧}}+E_{\text{脱硫}}+E_{\text{电}}$ [3]	FC _i , CAL _k , AD _电 [3]
02	Grids	$E=ESF_6+E_{\text{网损}}$ [4]	REC容量, REC回收, REP容量, REP容量, EL上网,EL输入,EL输出,EL售出[4]
03	Steel production	$E=E_{\text{燃烧}}+E_{\text{过程}}+E_{\text{电和热}}-R_{\text{固碳}}$ [5]	FC _i , P溶剂, P电极, M原料[5]
04	chemical industry production	$EGHG=ECO_2\text{-燃烧}+EGHG\text{-过程}-RCO_2\text{-回收}+ECO_2\text{-净电}+ECO_2\text{-净热}$ [6]	AD _p , AD _r , AD _w , AD _{硝酸} [6]
05	electrolytic aluminium production	$E=E_{\text{燃烧}}+E_{\text{原材料}}+E_{\text{过程}}+E_{\text{电和热}}$ [7]	FC化石净消耗量, p, l, AD _{电力} , AD _{热力} , [7]
06	Magnesium smelting production	$E=E_{\text{燃烧}}+E_{\text{原材料}}+E_{\text{过程}}+E_{\text{电和热}}$ [8]	FC化石净消耗量, S, D, AD _{电力} , AD _{热力} , [8]
07	flat glass processing	$E=E_{\text{燃烧}}+E_{\text{原材料}}+E_{\text{过程}}$ [9]	FC化石净消耗量, Q _c , M _i , AD _{电力} , AD _{热力} , [9]
08	cement manufacture	$E=E_{\text{燃烧}}+E_{\text{过程}}+E_{\text{电和热}}$ [10]	Q _i , Q _{ckd} , Q _{bpd} , FR ₁ , FR ₁₀ , FR ₂ , FR ₂₀ , Q _{生料} , AD _{电力} , AD _{热力} , [10]
09	ceramic production	$E=E_{\text{燃烧}}+E_{\text{工业}}+E_{\text{电力}}$ [11]	Q _{燃料,购入} , Q _{燃料,期初} , Q _{燃料,期末} , Q _{燃料,外销} , Q _{原料,购入} , Q _{原料,期初} , Q _{原料,期末} , Q _{原料,外销} , Q _{电量,外购} , Q _{电量,输出} , [11]
10	aviation	$E=E_{\text{燃烧}}+E_{\text{电和热}}$ [12]	FC _{化石,i} , FC _{生物质混合,j} , AD _{电力} , AD _{热力} , [12]
11	Independent coking	$EGHG=ECO_2\text{-燃烧}+\sum ECO_2\text{-过程}-RCO_2\text{-回收}+ECO_2\text{-净电}+ECO_2\text{-净热}$ [13]	AD _i , PM _r ,COK[13]
12	Coal production	$E=ECO_2\text{-燃烧}+ECO_2\text{-火炬}+ECH_4\text{-逃逸}\times GWPCH_4+ECO_2\text{-逃逸}+ECO_2\text{-净电}+ECO_2\text{-净热}$ [14]	AD _{ij} , Q _{瓦斯-火炬} , Q _{瓦斯-排放} , Q _{瓦斯-利用} , Q _{瓦斯-抽放} , Q _{CO2-排放} , Q _{CO2-利用} , Q _{CO2-抽放} , AD _{原煤-露天} , [14]
13	petrochemical engineering	$EGHG=ECO_2\text{-燃烧}+ECO_2\text{-火炬}+ECO_2\text{-过程}-RCO_2\text{-回收}+ECO_2\text{-净电}+ECO_2\text{-净热}$ [15]	AD _{ij} , Q _{正常火炬} , GF _{事故} , j, T _{事故,j} , AD _{电力} , AD _{热力} , Q _{外供} , Q _{自用} [15]
14	oil and gas producing	$EGHG=ECO_2\text{-燃烧}+ECO_2\text{-火炬}+\sum_{s=1}^5 (EGHG\text{-工艺}+EGHG\text{-逃逸})_s-RCH_4\text{-回收}\times GWPCH_4-RCO_2\text{-回收}+ECO_2\text{-净电}+ECO_2\text{-净热}$ [16]	AD _{ij} , Q _{正常火炬} , GF _{事故} , j, T _{事故,j} , Q _k , H _k , Num _{oil,j} , Num _{gas,j} , Q _{gas} , Q _{in,k} , Q _{out,k} , Q _{re} , AD _{电力} , AD _{热力} , M _{aw} , M _{ast} [16]

Statistic statement preparation on climate change

According to the index system of emissions greenhouse gas emissions above, combined with the national statistics unified format requirements, 14 kind of corporate greenhouse gas emissions based data statistical statements are established. The enterprises include manufacturing enterprises such as power generation, power grids, civil aviation, steel, chemical industry, electrolytic aluminum and

magnesium smelting, cement, ceramics, glass, petroleum and gas, petrochemical industry, the independent coking, coal etc. Power generation company greenhouse gas emissions basic data statistics statement(table 4 is as follows) is an example for other 13 kind of statistical statements.

Table 4:1. The power generation company greenhouse gas emissions basic data statistics statement

		Table number:	Qiong P06table	
		formulation office:	Hainan Provincial Bureau of Statistics	
		approval number		
name of comprehensive unit:		20 year	date of expiry: June, 2016	
Index name	unit of measurement	code	This year	
Party A	Party B	Party C	1	
The consumption of fossil fuels	t; ten thousand Nm3	01		
The total output of the slag in the whole year	t	02		
The total output of the fly ash in the whole year		03		
The consumption of coal		04		
The consumption of carbonas in desulfurizer		05		
The consumption of Desulfurizer in some month in the whole year		06		
The buying power of the enterprise	MWh	07		
Head of the unit:	the preparer:	quote date: 20 (date) (month) (year)		

Description: 1. This form shall be submitted by the responsibility of the Hainan power grid companies ; 2. The statistical range: thermal power enterprise with the capacity of 6000 kw or more; 3. Submitting time: the next year on March 31.

Conclusion

To sum up, the research of this article is based on the research of national clean development mechanism fund(CDMF). Around he assessment of carbon reduction, formulation of greenhouse gas emissions listing, carbon trading verification and activities demand coping with climate change, combined with 14 kind of key enterprises greenhouse gas emissions accounting standards, the article extracts the emission statistic index system and formulates system of statistical report coping with climate change hoping this set of system of statistical report and research methods and paths can provide some thoughts reference and work reference for government statisticians and researchers.

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