Policy suggestions to carry out the research on the standards of greenhouse gas emission allowances in key industries

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Abstract: On the basis of summarizing and combing the functions and effects of the long-term implementation of the serial standards on the limitation of energy consumption per unit product in China, this paper focuses on the analysis of the practical demands of the greenhouse gas emission allowances for key industrial enterprises, and puts forward the suggestions on the formulation of relevant standards. The differences and connections between the present standards of the energy consumption per unit product and future standards of greenhouse gas emission allowances in the key industries are discussed. The proposal is provided to the administrations with helpful guidelines and promotes enterprises to establish the clearer GHG emission reduction strategies and to reduce their greenhouse gas emissions. These suggestions will provide guarantee for realizing the target of reducing greenhouse gas emissions in China.

1. Introduction

As the GHG emission reduction targets gradually becomes clearer in China, all major emission industries are generally under pressure to undertake GHG emission reduction tasks. However, there is still no good grasp on the carbon emission regulation of key emission industries. In the field of energy conservation, one of the key drivers in the regulation of energy-consuming industries is the implementation of the mandatory standards of energy consumption per unit product, which has been proved to be effective for many years. In view of this, the competent authorities may consider setting allowance standards for GHG emissions per unit product for certain key industries, especially for those industries that have great non-CO2 GHG emissions and non-energy related CO2 emissions, so that enterprises can promote to set clearer emission strategies and reduce the GHG emissions [1].

2. Domestic and international development status

The allowance standards of GHG emissions per unit product are similar to the quota of energy consumption per unit product. It mainly refers to the limit value of the total amount of GHG emissions per unit product that can be discharged when a qualified product is produced, namely the total amount of GHG emissions shared by each unit of product calculated based on the unit of measurement of qualified products. Its function is mainly manifested in four aspects. Firstly it provides enterprises with the lowest threshold (limited value) of total GHG emissions per unit product; if this value is not reached, a company must carry out rectification. Secondly it provides the advanced level (advanced value) of the total amount of GHG emissions per unit product that can be reached through hard work; this is the direction in which a company aims to achieve emission reduction targets. Thirdly it provides an important measure for carbon emission intensity assessment, and also provides the access basis (access value of total GHG emissions per unit product in new projects) for the carbon emissions...
assessment and review of fixed assets investment projects. Fourthly it regulates the indicator concept, accounting scope and method for the total amount of GHG emissions per unit product to facilitate the benchmarking of GHG emission levels among the peers and to provide an important reference for the industry authorities \[2\].

2.1. **There is currently no standard for the allowances of GHG emission per unit product for the industry.**

The current practice is to manage and control the total amount of GHG emissions. Although some countries and regions have proposed the concept of carbon emission intensity based on GDP \[3, 4\], this concept cannot fully reflect the level of carbon emissions based on the actual production capacity of enterprises. Moreover, there are certain uncertainties in the comparability of GDP indicators \[5, 6\].

2.2. **China has the basis for the limit standards of energy consumption per unit product for the industry, which provides a good reference for the formulation and implementation of GHG emission allowance standards.**

It is proved by practice that the energy consumption control measures based on the industry allowance are energy-saving measures and play an important role in meeting China’s energy-saving indicators. In the year to March 2015, China had issued 79 mandatory national standards for energy consumption allowances, covering key high-energy-consuming and high-emission industries such as electricity, heating, steel, non-ferrous metals, chemicals, and building materials, which are the major sources of GHG emissions. The energy conservation supervisory agencies in China have also systematically conducted law enforcement supervision on the energy consumption allowance at key energy-using entities based on these standards, ensuring the implementation of relevant policies. For an industry that mainly consumes fossil fuels and emits the GHG as carbon dioxide \[7\], the energy consumption allowance standards can be converted into GHG emission allowances through some form of transformation. However, for those industries that have non-carbon dioxide and other GHG emissions in addition to the carbon dioxide emissions from energy consumption, they can refer to the standards for the allowance of energy consumption.

3. **Domestic demand analysis**

3.1. **China has already set clear GHG emission reduction targets.**

By 2020, the total carbon dioxide emissions per unit GDP will fall by 40-45% compared with 2005. The outline of the “Thirteenth Five-Year Plan” proposes the goal of curtailing the carbon dioxide emissions per unit GDP by 18% during the Thirteenth Five-Year Plan period; it will effectively control over the carbon emissions in key industries such as electricity, steel, building materials, and chemicals, and promote low-carbon development in key areas such as industry, energy, construction, and transportation. Non-carbon dioxide GHG emissions will be reined in. Efforts are made to promote the establishment of a unified carbon emissions trading market in China and to implement the carbon emission reporting, verification, inspection, and allowance management systems for key entities. China will improve the system of statistical accounting, evaluation and accountability, and improve the carbon emission standards system. All these reflect the development needs of China's greenhouse gas emission quota standards in key industries.

3.2. **Non-CO2 emissions and non-energy consumption emissions account for a high proportion of total GHG emissions in China.**

It is difficult for the existing national standards for energy consumption allowance in key industries to effectively monitor emissions in this part. According to the data from the 2005 National Information Circular on GHG, non-carbon dioxide GHG emissions (methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride) account for 21.18% of total emissions in China, as is shown in figure 1. At the same time, GHG emissions caused by non-energy consumption in the industrial
processes account for 10.89% of total emissions, as is shown in figure 2. This part of GHG emissions cannot be directly monitored through the energy consumption allowance standards. In addition, due to the problems of energy structure, there is no direct and explicit correlation between the energy consumption allowance requirements and the GHG emissions. This hampers the assessment of GHG emissions through energy consumption allowance standards.

**Figure 1.** The ratio of non-carbon dioxide GHG emissions

**Figure 2.** The ratio of GHG emissions caused by non-energy consumption in the industrial processes

### 4. Policy suggestions

#### 4.1. GHG emission is controlled based on the energy consumption allowance standard for industries that focus on energy-related GHG emissions.

In the light of the existing energy consumption allowance standards, we suggest to consider combining the GHG emission allowance requirements and the energy consumption allowance requirements, such as converting energy indicators into carbon emission indicators in a certain ways. This not only enhances the unity of work, but also lowers the company’s costs.
4.2. The formulation of GHG emission allowance standards are made for industries involving non-energy carbon dioxide emissions.
For key industries involved in non-energy carbon dioxide emissions, such as cement, lime, calcium carbide and other manufacturing industries, which emit carbon dioxide in their processes, the allowance standards for energy-related (carbon emission generated by this part is converted based on the energy consumption allowance standards) and non-energy-related GHG emission are formulated based on the energy consumption allowance standards.

4.3. The GHG emission allowance standards are formulated for industries involving non-CO2 GHG emissions.
The key industries involved in non-CO2 GHG emissions, such as refrigerants, adipic acid, and nitric acid, will carry out extensive industrial research on the characteristic GHG emission sources in the industry, whereby the GHG emission allowance standards are studied and formulated.

4.4. The formulation of GHG emission allowance standards for key high-emission industries shows China’s GHG emission control policy and should be combined with the control work of other GHG emissions.
The development of GHG emission allowance standards in key industries should be carried out on the basis of existing work to ensure the balance between the allowance of GHG emissions and the industrial development. At the same time, GHG emission allowance standards will inevitably have many links with other GHG emission control measures. Therefore, it is necessary to consider the connection with the company’s quantification methods of GHG emissions, energy consumption allowance standards, and others to enhance the integrity of the work. For example, the GHG emission allowance standards can be organically combined with domestic carbon emission trading. The preliminary cross-conformance verification of carbon emission data reported by companies involved in carbon trading can be achieved through data such as allowance standards and the corporate output. The degree of conformance between the actual level of emissions and the advanced value and reference value in the allowance standards can serve as the main basis for the distribution of quotas.

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