

Research on the Method of Emission Trading in Harbin

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Abstract: In order to alleviate the environmental problems in Harbin, we need to establish a more perfect system of emissions trading. Although China's introduction of emissions trading system in 2014, after several years of development has made great progress, but because of geographical, environmental, economic differences can not form a unified model, in the initial distribution method of emissions trading, the initial distribution price, trading years and secondary market trading prices are different. Therefore, in the establishment of emissions trading system should be based on Harbin's environmental indicators, economic development and etc situation, analysis of the study the initial distribution of emissions permits, the initial price customization, and trading years, to draw up a fair and reasonable, sustainable development methods to solve environmental pollution problems.

1. Introduction

With the continuous development of emission trading in China's pilot cities, it is also urgent to establish a relatively perfect emission trading system in the governance of environmental problems in Harbin. Although China has introduced emissions trading in 1997, it was not until 2014 that the country introduced the first administrative regulations on the use and trading of emissions permits: <Guiding Opinions of the General Office of the State Council on Further Promoting Paid Use and Pilot Work on Trading of Emission permits> (State Council issued [2014] No. 38). Although has obtained certain achievements, although some achievements have been made, the initial allocation, but the initial price, the trading period, the secondary market transaction mode and the price method are different in the emission trading, which can not form a unified model. These factors will have a great impact on the emission trading market, develop a reasonable method to the maximum extent stimulated the activity of the market [1].

2. Determination of Total Emission Permits

2.1. Allow the Total Amount of Emission

In the establishment of emission trading of a primary market of In the Songhua River Harbin municipal area control unit, allow the pollutants emission amount according to < Harbin city "12th Five-Year" energy-saving emission reduction requirements in planning >, by 2015, COD emissions controls within 67930t/a, ammonia nitrogen emission control is within 12897t/a, to determine the total allowable emission amount of the primary market of emission trading in Harbin. Before the next term of use of the emission permits, the total amount of emission permits should be re-approved in accordance with the Harbin Environmental Standards and Economic Development Goals.



2.2. Emission Permits That Can be Initially Allocated

According to the determination of the total amount of emissions allowed, at the same time, in order to ensure the normal economic development of the next term of emission permits, according to the economic development data. Calculate the government should reserve the emission permits, at the same time, after deducting the emission permit of the social public utilities, the initial emission permits shall be allocated. The government reserve can be calculated according to the growth rate of GDP in Harbin, the calculation formula is as follows:

$$W_{reserved} = W \cdot \left(\frac{D_{target\ year}}{D_{planning\ year}} \right) \quad (1)$$

In the formula: $W_{reserved}$: the amount of emissions reserved by the government; W : the total area of emission permits; $D_{target\ year}$: the area GDP of the target year; $D_{planning\ year}$: the area GDP of the planning year.

At the same time, based on the investigation of pollution source data, calculation of public utilities emissions and reserved. Among the 26 sewage draining exit in the Harbin municipal area control unit, the public utilities which are not for profit are mainly urban sewage treatment plants, and the total pollutant emission is the emission amount of public utilities required. The calculation formula is as follows:

$$W_{dispensability} = W - W_{reserved} - W_{utilities} \quad (2)$$

In the formula: W : the total area of emission permits; $W_{reserved}$: the amount of emissions reserved by the government; $W_{utilities}$: emission permits of public utilities in the region; $W_{dispensability}$: the amount of emission permits that can be initially allocated.

3. Initial Allocation Method of Emission Permits and Computing Method of Allocation Quantity

3.1. Initial Allocation Method of Emission Permits

The emission permit is a property in the definition of economics, emission permit allocation means the distribution of property interests. So, how to carry on the initial allocation of emission permits is an important issue of emissions trading. The initial allocation scheme of emission permits has three categories: free allocation, public auction allocation and fixed price selling[2].

Free allocation has certain rationality, in a longer period of time will exist, but contrary to the basic principles of polluter-paid environmental law, making the enterprise without the power and pressure to reduce emissions, not only make the environment resources not optimal allocation, and but also hinder the emission reduction technology research and development innovation, from the perspective of efficiency is not desirable. In the meantime, enterprises from the government departments in charge of free distribution of emissions, often can't satisfy the production scale of enterprises and want to get more free emission permits, so as to give the "enterprises rent seeking" and "government rent-creating" creation opportunities, resulting in emissions of corruption, And ultimately can not guarantee the allocation of fairness, and even affect the normal production of enterprises[3].

Auction allocation is compared with free allocation, the advantage of auction is very obvious: Firstly, the auction can obtain the emission reduction marginal cost information of the auction enterprises, so that the enterprises with higher economic benefit have priority to obtain environmental resources, so as to achieve the optimal allocation of emission permits; Second, the auction price of the auction can also be used as a reference standard for the secondary market trading of the emission permits, that is the price signal; Third, the auction process automatically realized by the market, effectively avoiding the "rent-seeking and rent-creating" behaviors inherent in the free allocation. However, due to the auction will increase the cost burden of polluters, and therefore face political resistance; Meanwhile, if the government does not limit the management, it will make a small number of strong financial strength enterprises to auction and hoard, and then monopolize the emission permits, so as to achieve the monopoly of the product market. Therefore, despite the great advantage of the theory of auction, but in practice the development is relatively slow.

The fixed price refers to: The emission enterprises shall purchase the emission permit of by the price standard for the use of the paid use emission permits set by the government, The establishment of the

price standard is very important for the paid use of emission permits and the pilot work of emission trading. Considering condition that China's current emission collection cost is difficult to encourage enterprises to treasure the environment constraints and incentive mechanisms, the environmental capacity of resource value based paid use of the standard price to effectively establish paid use price standard machine-made of emission permits including reflects the relationship between market supply and demand, the degree of scarcity of environmental resources and pollution governance cost. Adhere to the scarcity of environmental resources and the ability to withstand combine the affordability of the principle. According to my national conditions and the various regions different industries, adaptation to local condition to establish the use of emission pricing standards.

Each one has its own merits of three ways of distribution, but according to <Guiding Opinions of the General Office of the State Council on Further Promoting Paid Use and Pilot Work on Trading of Emission permits>: "The introduction of emission permits paid to obtain" provisions of the initial allocation of emission permits. The emission permits free of charge to those social utilities, small sewage and not more than a certain emission standards of polluters, but they can not be traded on the market; For the business unit, the emission large amount of polluters, government should implement the distribution in the form of a fixed price to sell at the present stage, after the theory and the system are gradually improved then use the fixed price and the auction of the mixed way distribution. In the recent years, the central government has put forward the policy of "revitalizing the old industrial base", Harbin, as the old industrial base in northeast China, so in some projects to support enterprises in the allocation of emission permits should be given certain concessions, such as preferential price: only pay 1/2 of the price to use the same emission permits, but can not be traded.

3.2. *Computing Method of Allocation Quantity*

It is should to calculate allocation the emission permits of each enterprise after the allocation method is determined, There are two initial distribution accounting methods for emission permits: The first is the "grandfather system" model, it shows the recognition of the work and respect for the history. It is easy to operate and the enterprise has high recognition; The second is the "output value" model, reflecting the current rules of occupation, relatively fair, but also can promote the enterprise pollution control and emission reduction work. Although it is necessary to rely on a large number of pollution sources survey data, but the allocation of accounting methods are relatively objective, close to the reality.

Harbin has a lot of old industrial enterprises that have good credit, also have a comprehensive range of pollution data, so for these enterprises to adopt the first method, this method is convenient and quick, and easy to accounting calculation, but also affirmation and continuation of past EIA approval work, enterprise recognition is higher; As for the rest of the emission information is not complete, credit degree is not high and some emerging enterprises in accordance with the second methods of accounting.

4. **Initial Allocation of Prices and Secondary Market Transaction Prices**

4.1. *The Initial Price and the Determination of Secondary Market Price Method*

Based on the emission permits allocation method already established above, the government considers the endurance capacity of existing emission units and the local environmental quality improvement requirements to price the initial emission permit. There are three methods of initial pricing: the first is the use of (social average or the region of some pollutants) unit pollutant management costs to calculate the initial price of emissions (called the social average cost of governance); The second is through the different industries and enterprises in the emission of shadow price (sewage performance) accounting to determine the price of initial emission permits; The third is the use of auction value discovery function, through the average auction price over the years to develop guidance prices [4].

The above three kinds of initial allocation of emission permits pricing methods have advantages and disadvantages, The first method is through the various industries units of pollutants management costs accounting for the price of emission permits, is the emission of the lowest price, if the emission trading price below this price will not help to promote the enterprise independent reduction,

technological innovation and control unit Water pollution control; The third method is through the average auction price over the years to develop the initial allocation price, because the emission permits is an essential resource in the production process, is a scarce resource, and in the auction process has increased the cost, so the auction price must gradually increase high trend, but not conducive to the initial allocation of emissions and trading to promote the work. At the same time, for some poor strength, smaller enterprises, facing enormous pressure, that is not conducive to the growth of small and medium-sized enterprises and the sustainable development of the economy, so will the price as the highest price of emission trading; The second method is through different industries and enterprises of the sewage performance that the shadow price (unit amount of emissions effectiveness) accounting for the initial price, relatively close to the enterprise production and management of the actual situation, but in the actual operation process, such as the same industry to the emission enterprises pricing, will affect the development of certain pollutants larger enterprises; according to different industries on the emission enterprises were priced, it will affect the initial allocation of emissions permits fairness.

According to the above points, in the Songhua River Harbin section of the control unit emission permits in the initial allocation of price development, adopt the hybrid approach: at the early stage of implementation emission permits mechanism, the initial allocation of emission permits pricing method should be used unit pollutant management cost. When the emission permit useful life period expires, the government sets the initial allocation price according to the average auction value over the years [5]. But the price of the secondary market is determined by the market: if the two enterprises have already negotiated, the transaction will be carried out according to the agreement price; There is did not reach an agreement, the government reserves and other parts of the emission permits are free auction, according to supply and demand conditional free bid.

4.2. Calculation Method of Initial Price

Environmental capacity is a kind of natural resources, but there is no price in the market, also can't use other resources pricing method for pricing, and recovery cost method is the existing method used in the pricing of emissions trading [6]. This method is to restore the environment has been damaged to the original state, the cost of recovery process to measure the cost of environmental capacity has the value, because this method only restore environment to original state and without causing other costs, so this value is the lowest value of environmental resources.

Owing to environmental pollution is a complex pollution, is a variety of pollutants common pollution, so this method is to take the average cost of different pollutants governance as this pollution factor emission permit initial transaction price. Considering the economic development, industry level and enterprise fairness etc factor of Harbin, the initial price calculation of emission permits is calculated as follows:

$$\text{Initial Price of Emission Rights (ten - thousand - yuan / t)} = \sum_{i=1}^{i=n} \left[\frac{\text{Social Average Pollution Control Cost}}{(1 + \text{Discount Rate})^{n-1}} \right] \quad (3)$$

(Note: n: The useful life of emission permits, The discount rate is the central bank's current n-year loan benchmark interest rate)

The initial price of the emission permits is calculated from the formula 3-1, and the social pollution control cost is a certain pollution factor for a certain region. In order to reduce this pollution factor by 1 tonne, the various industries of the region need to invest in unit pollutant management costs, the unit is:

(ten-thousand-yuan / t • year). There are two ways to calculate the cost of unit pollutant treatment: The first one is according to the region to control pollutant the consumption total operating costs and the total handling capacity of the ratio obtained; The second is to calculate the cost of all the enterprises in the region to deal with this pollutant, and then weighted average, which is the average cost of the treatment of this pollutant in this area. Owing to each enterprise sewage discharge in time, quantity is different, so the former calculation method is more difficult, the latter is relatively simple.

The calculation formula of the unit governance cost of a certain pollutant for certain industry enterprise in the region is as follows:

$$C_a = C_{a,i} / T_{a,i} \quad (4)$$

(note: a :is an enterprise; i : the length of time, years or months; C_a :is the 'a' enterprise pollutant management costs; $C_{a,i}$:is 'a' enterprises in the 'i' period of time to run the total cost of governance; $T_{a,i}$:is 'a' enterprises in the 'i' period of time to total handling capacity)

By the formula 3-2 to calculate the region of all industries of a business of this pollutant management costs, and then weighted average, obtain the industry to some of the pollutant management costs; Similarly calculation of other industries, then, the weighted average of some pollutant treatment costs in different industries, which is the average cost of treatment of some pollution factor in the region [7].

5. Determination of the Useful Life of the Emission Permits

Many provinces and cities in China have launched a pilot emissions trading in 2014, but there are great differences in the rules for the use of the emission permits, there's one year, three years, five years, twenty years, and there's a permanent use of emission permits. In the guidance of<Guiding Opinions of the General Office of the State Council on Further Promoting Paid Use and Pilot Work on Trading of Emission permits>(State Council issued [2014] No. 38), after the initial approval of the emission permits of all sewage enterprises at the end of 2015, "once every five years in principle" is approved again [8]. Therefore, in the Songhua River Harbin section control unit emissions trading, the proposed emission permits useful life for five years, and synchronized with the "Five Year Plan", is conducive to the production of national economy and the construction of the combination, and promote the development and construction of Harbin city.

6. References

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