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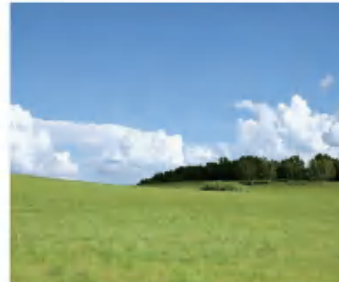
China's Environmental Protection Tax Policy Progress Report 2018

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Foreword »

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Since its opening-up and reform, China has been in the process of rapid economic development with its people enjoying an increasingly improved standard of life. Meanwhile accompanying this dramatic economic growth is the degradation of environment which has, to some extent, damaged the gains of the opening-up and reform and prevented the economy from a healthy and sustainable development. The Chinese government is increasingly aware of that without addressing the environmental issues it is facing now, will jeopardize its long term goal of the great rejuvenation of the Chinese nation. Given the magnitude and complexity of the environmental issues in China, there is no easy way in addressing them and the solution to them entails an equal priority being given to environmental protection, ecological conservation and economic development or even higher than the latter by mainstreaming the former into the

overall socio-economic decision-making process. As a matter of fact, China has been in the struggle against environmental pollution since the very beginning of its economic take-off and trying to explore a pathway that could help address China's environmental issues in the way most suitable to China's specific circumstances.

In recent years, especially since the 12th Five-Year Plan period, the enhanced measures including legislation, policy, regulatory and economic means have been taken by the Chinese government in dealing with environmental problems, of which environmental policies have played an important role in this regard. Corresponding to this situation and in meeting the demand of governments at different levels for environmental policy tools, the environmental policy research projects on topics of a wide range have been conducted by some Chinese environmental research institutions

including the Chinese Academy of Environmental Planning (CAEP).

CAEP founded in 2001, is a research advisory body supporting governments in the development of key environmental planning, national environmental policies, and major environmental engineering projects. In the past more than 10 years, CAEP has accomplished the development of the overall planning of national environmental protection for the 10th, 11th and 12th Five-Year Plan periods; water pollution prevention and control planning for key river basins; air pollution prevention and control planning for key regions; soil pollution prevention and control planning; and some regional environmental protection plans. In the same period of time, CAEP also actively engaged in research on such topics as green GDP, environmental taxation, emission trading, ecological compensation, green financing, etc. By so doing, CAEP has become an indispensable advisory body in the environmental decision-making in mainland China. According to *2013 Global Go To Think Tanks Report and Policy Advice* published by University of Pennsylvania, CAEP was ranked 31 in the field of environment in the world. Many of CAEP's research results and project outcomes regarding environmental policies have drawn great attention of decision makers and international institutions, and have been utilized to contribute to the formulation of national environmental policies concerned.

The Chinese Environmental Policy

Research Working Paper (CEPRWP) is a new internal publication produced by CAEP for the purpose of facilitating the academic exchange with foreign colleagues in this field, in which the selected research papers on environmental policies from CAEP are set out on the irregular basis. It is expected that this publication will not only make CAEP's research results on environmental policies be known by foreign colleagues but also serve as a catalyst for creating opportunity of international cooperation in the field of environmental policies, and environmental economics in particular, with a view of both the academic research and practical policy needs.

A series of economic, social and political issues have arisen with the aggravation of environmental issues. The public's higher expectations and requirements for environmental quality urge the reform for the most stringent environmental management system, which expedites the environmental tax reform. Pollutant discharge fee (PDF) is the earliest economic means adopted for environmental purpose in China. It has made important contributions to the cause of environmental protection by encouraging businesses to strengthen environmental management and reduce pollutant emissions, and raising environmental protection funds. However, some problems were revealed in the actual implementation process, such as insufficient enforcement rigidity, intervention of local governments and departments, and negotiated payment.

On January 1, 2018, China launched the environmental protection tax (EPT) policy, which was China's first green tax aimed at environmental protection, putting an end to PFD that had been in effect for the past 40 years. The policy sets different pollutant equivalent values (PEVs) for pollution factors with different levels of hazard to tax high-hazard pollution factors more heavily. This regulates corporate behavior of pollutant discharge and encourages businesses to reduce pollutant emissions. By means of rigid taxation, the policy gives full play to its regulatory functions.

Overall, the EPT policy has been smoothly implemented for over one year, with some problems encountered in the process. The paper will evaluate the policy impacts in the first year, summarize experiences and identify problems in a timely manner, and propose measures to optimize the policy design and recommendations on tax collection and management, in the hope of facilitating further reform and innovation of China's environmental tax policy.



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1. OVERVIEW OF CHINA'S ENVIRONMENTAL TAX REFORM

1.1 Background

The earliest environmental-economic policy implemented in China is not EPT, but PDF. China established the PDF system in the 1970s, and reformed it many times thereafter to meet the needs of environmental management. As environmental protection deepens in the pursuit of ecological civilization, a variety of means are needed, including legal and economic instruments, to promote energy conservation and emissions reduction of enterprises and adjustment of industrial structure. As one kind of administrative fees, the PDF system has inherent defects such as insufficient rigidity and weak control. China attaches great importance to the establishment of EPT system and regards EPT as an important fiscal and tax system for ecological civilization construction.

In June 2007, the Ministry of Finance (MOF), State Administration of Taxation (SAT), and Ministry of Environmental Protection (MEP) set up a joint working group and a team of experts on environmental tax reform including the Chinese Academy of

Environmental Planning (CAEP) to start the research on introduction of environmental taxes. On December 25, 2016, the 25th meeting of the 12th Standing Committee of National People's Congress (NPC) reviewed and adopted the *Environmental Protection Tax Law of the People's Republic of China* (hereinafter referred to as the EPT Law), which came into force on January 1, 2018. On December 25, 2017, the State Council issued the *Regulations on Implementation of Environmental Protection Tax Law*, which gave refined interpretations and provisions on the implementation of EPT Law. EPT is the first independent environmental tax aimed at protecting the environment in China, but also the world's first tax with environmental protection as the primary policy objective. It is of vital significance for China to build a green fiscal and tax system, regulate the pollution control behavior of polluters, and form a green production and consumption system. In the process of formulating the EPT Law and implementing regulations, China has strictly followed the principle of statutory taxation and listened to opinions from all parties concerned to foster social consensus.





 **Tab. 1–1 EPT-related regulations and policy documents issued at the national level**

Time of issuance	Title	Document No.
2016.12.25	Environmental Protection Tax Law	NPC Standing Committee
2017.7.21	Circular of the Ministry of Finance, State Administration of Taxation and Ministry of Environmental Protection on Comprehensively Preparation for the Implementation of the Environmental Protection Tax Law	MOF & SAT [2017] No. 62
2017.12.22	Circular of the State Council on Government Income Distribution of Environmental Protection Tax	SC [2017] No. 56
2017.12.25	Regulations on Implementation of Environmental Protection Tax Law	State Council Decree No. 693
2017.12.27	Announcement of the Ministry of Environmental Protection on Publishing the Methods for Calculating Pollution Coefficient and Material Balance of Pollutant Emissions	MEP [2017] No.81
2018.1.7	Circular on Matters Relating to the Suspension of Pollutant Discharge Fee and Other Administrative Fees	MOF & SAT [2018] No. 4
2018.1.27	Announcement of the State Administration of Taxation on Publishing the Environmental Protection Tax Return	SAT [2018] No.7
2018.3.30	Circular of the Ministry of Finance, State Administration of Taxation and Ministry of Ecology and Environment on Issues Concerning Environmental Protection Tax	MOF & SAT [2018] No. 23
2018.5.15	Interim Measures for the Administration of Evaluation of Comprehensive Utilization of Industrial Solid Waste Resources and Catalogue of Products for National Comprehensive Utilization of Industrial Solid Waste Resources	MIIT [2018] No. 26
2018.10.25	Circular on Issues Concerning the Clarification of Taxable Pollutants of Environmental Protection Tax	MOF & SAT [2018] No. 117



1.2 EPT collection method

As stipulated by the EPT Law, EPT is highly consistent with PDF in terms of taxable items, tax rates and tax base. However, the two are not completely the same. EPT rectifies the PDF design defects while shifting the tax. In addition, the collection and administration methods reflect the fundamental differences between fees and taxes and the special characteristics different from other taxes.

1.2.1 Taxpayers

EPT taxpayers under the EPT Law are the same as DPF taxpayers. They are defined as enterprises, public institutions and other production and business operators who directly discharge taxable pollutants to the environment within the territory of the People's Republic of China and other sea areas under the jurisdiction of the People's Republic of China. But there are two exceptions: i) enterprises, public institutions and other production and business operators that discharge taxable pollutants to duly established sewage treatment plants and domestic garbage disposal fields. They are exempted from paying tax for such pollutants because of no direct discharge to the environment; and ii) enterprises, public institutions and other production and business operators that store or dispose of solid waste in facilities and premises that comply with environmental protection standards. They are exempted from paying tax for solid waste.

1.2.2 Taxable items

The EPT Law applies to four categories of

pollutants: air pollutants, water pollutants, solid wastes, and noise, and assigns the same PEVs to water and air pollutants as the PDF system. In specific, the taxable items include 44 air pollutants, 65 water pollutants, general solid wastes, hazardous wastes, and industrial noise.

1.2.3 Tax rates

Under the PDF system, the minimum charging standards are 1.2 yuan per PEV for sulfur dioxide (SO₂) and nitrogen oxides (NO_x) in the atmosphere and 0.6 yuan per EPV for other air pollutants; 1.2 yuan per EPV for chemical oxygen demand (COD), ammonia nitrogen (NH₃-N) and five heavy metals in water and 0.7 yuan per PEV for other water pollutants. The EPT Law raises the minimum tax rates for air and water pollutants to 1.2 yuan and 1.4 yuan per PEV respectively, and sets an upper limit of ten times, that is, the maximum tax rates shall not exceed 12 yuan and 14 yuan per EPV respectively. The tax rate for solid wastes ranges from 5 to 1,000 yuan per ton, depending on the types and reaches 25 yuan per ton for smelting slag, coal ash, cinder and other solid wastes. EPT is also levied on noise above specified decibel levels, with a tax rate range of 350 to 11,200 yuan per month divided by each three decibels.

The EPT system offers different tax reductions as incentives along with restraints. Polluters can obtain 25% and 50% cuts from the payable amount respectively if the pollutant emissions are 30% and 50% less than the local standards. The EPT system has



eliminated the provisions on additional PDF charges while providing more tax breaks. It puts more emphasis on incentives that encourage businesses to proactively curtail emissions.

1.2.4 Tax base

The EPT Law stipulates the methods for determining taxable pollutants and calculating tax payable. The taxable pollutants shall be determined based on automatic monitoring data, manual monitoring data, pollution coefficient and material balance, as well as sampling method and sequence. Taxes are levied on the top three air pollutants discharged from each outlet or without outlet, ranked according to PEVs, and the top five water pollutants of the first class and the top three water pollutants of other classes from each discharge outlet. Taxable water pollutants are classified according to the Table of Taxable Pollutants and Their Pollutant Equivalent Values provided by the EPT Law.

1.2.5 Tax collection and administration

The EPT Law standardizes the tax collection and administration procedures. Taxpayers file the tax return according to law and bear liability for the authenticity and integrity of tax return. Tax authorities are responsible for tax collection and administration, and environmental authorities assist. As a non-tax department, however, the responsibilities of environmental authorities have been repeatedly emphasized. This is related to the particularity of EPT tax base. Faced with high environment-related technical requirements and larger workload brought by tax collection and administration, tax authorities lack knowledge and experience, but environmental authorities have obvious data and technical advantages. In view of this, without compromising tax attributes, the EPT Law stipulates that environmental authorities shall share environmental data, develop methods for calculating pollution coefficient and material balance and sampling, and when necessary, review taxpayer materials.





2. TAX REVENUE

The EPT revenue in 2018 stood at 15.1 billion yuan, according to the 2018 Fiscal Revenue and Expenditure published by MOF in January 2019. Since EPT was levied in the first year and on a quarterly basis, the data actually cover the first three quarters of 2018 only. The EPT collected in the fourth quarter was 5.6 billion yuan, as shown in the *Fiscal Revenue and Expenditure for January and February 2019* released by MOF in March 2019. Hence, the combined number of 20.7 billion yuan represented the actual EPT revenue in 2018, a slight increase compared with the PDF amount collected according to the same criteria in recent years.

According to the SAT data on the first three quarters of 2018, the tax return was filed by 76,000 taxpayer-times, involving a taxable amount of 21.84 billion yuan. The tax reductions came to 6.86 billion yuan, accounting for one-third of the taxable amount, the largest share among all taxes in China, so the actual tax collected was 14.98

yuan. In particular, 40% of the tax reductions or 2.73 billion yuan are offered to urban and rural sewage treatment plants and garbage treatment plants that have met the emission standards. This reflects the positive incentive mechanism that polluters are subject to more tax for more pollutant emissions and more hazardous waste and exempted from tax if no emissions. With such mechanism, the environmental tax reform has yield results.

In terms of taxable items, the tax on air pollutants attained 13.5 billion yuan, accounting for 89.8%. Among them, SO₂, NO_x, and dust took up a combined share of 85.7%. The tax revenue from water pollutants registered 1.06 billion yuan and solid waste and noise, 470 million yuan, accounting for 7.2% and 3.0% respectively. The proportion of various categories of taxable pollutants is roughly consistent with the PDF income structure. Provinces with high tax revenues included Jiangsu, Hebei, Shandong, Shanxi, Henan, and Inner Mongolia.



3. EPT POLICY IMPACT ASSESSMENT

3.1 Inter-provincial differences in tax rate

As stipulated by the EPT Law, the tax rate ranges from 1.2 to 12 yuan for air pollution equivalent value and from 1.4 to 14 yuan for water pollution equivalent value in various provinces and autonomous regions. Local authorities may add taxable items according to the special needs of emissions reduction.

The paper analyzes the relationship of

tax rate with economic development, environmental quality and pollutant emissions in various areas. The results show regional inconsistency in the relationship between tax rate and environmental quality & pollutant emissions. At present, tax rates in various areas are generally compatible with environmental quality. Areas with poor environmental quality set relatively high tax rates, particularly the Beijing-Tianjin-Hebei region with more prominent environmental problems.

Tab. 3–1 Tax rate in 31 provinces

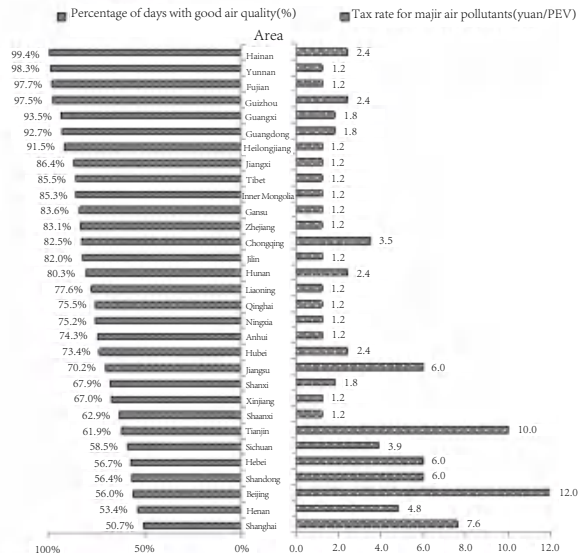
No.	Area	Air pollutants / (yuan/EPV)	Water pollutants / (yuan/EPV)	Tax rate change.
1	Beijing	12	14	Higher
2	Tianjin	NO _x , 8; SO ₂ , soot, and dust, 6; other pollutants, 1.2	COD and NH ₃ -N, 7.5; other pollutants, 1.4	Unchanged
3	Hebei	Classified by area. First class: major pollutants, 9.6; other pollutants, 4.8 Second class: major pollutants, 6; secondary pollutants, 4.8 Third class: 4.8	Classified by area. First class: major pollutants, 11.2; other pollutants, 5.6 Second class: major pollutants, 7; other pollutants, 5.6 Third class: 5.6	Higher
4	Shanxi	1.8	2.1	Higher
5	Inner Mongolia	1.2	1.4	Unchanged
6	Liaoning	1.2 currently; to be determined for years beyond 2020	1.4 currently; to be determined for years beyond 2020	Unchanged
7	Jilin	1.2	1.4	Unchanged
8	Heilongjiang	1.2	1.4	Unchanged
9	Shanghai	2018: SO ₂ , 6.65; NO _x , 7.6; other pollutants 1.2 2019: SO ₂ , 7.6; NO _x , 8.55; other pollutants, 1.2	COD, 5; NH ₃ -N, 4.8; other pollutants, 1.4	Unchanged
10	Jiangsu	Nanjing, 8.4; Wuxi, Changzhou, Suzhou and Zhenjiang, 6; other cities, 4.8	Nanjing, 8.4; Wuxi, Changzhou, Suzhou and Zhenjiang, 7; other cities, 5.6	Higher



No.	Area	Air pollutants / (yuan/EPV)	Water pollutants / (yuan/EPV)	Tax rate change.
11	Zhejiang	1.2; 1.8 for four heavy metal pollutants	1.4; 1.8 for five heavy metal pollutants	Unchanged
12	Anhui	1.2	1.4	Unchanged
13	Fujian	1.2	Five heavy metals, COD and NH ₃ -N, 1.5; other pollutants, 1.4	Unchanged
14	Jiangxi	1.2	1.4	Unchanged
15	Shandong	SO ₂ and NO _x , 6; other pollutants, 1.2	COD, NH ₃ -N, and five heavy metals, 3; other pollutants, 1.4	Higher
16	Henan	4.8	5.6	Higher
17	Hubei	SO ₂ and NO _x , 2.4; other pollutants, 1.2	COD, NH ₃ -N, total phosphorus, and five heavy metals, 2.8; other pollutants, 1.4	Unchanged
18	Hunan	2.4	3	Higher
19	Guangdong	1.8	2.8	Unchanged
20	Guangxi	1.8	2.8	Higher
21	Hainan	2.4	2.8	Higher
22	Chongqing	3.5	3	Higher
23	Sichuan	3.9	2.8	Higher
24	Guizhou	2.4	2.8	Higher
25	Yunnan	2018: 1.2; 2019 and beyond: 2.8	2018: 1.4; 2019 and beyond: 3.5	Unchanged
26	Tibet	1.2	1.4	Unchanged
27	Shaanxi	1.2	1.4	Unchanged
28	Gansu	1.2	1.4	Unchanged
29	Qinghai	1.2	1.4	Unchanged
30	Ningxia	1.2	1.4	Unchanged
31	Xinjiang	1.2	1.4	Unchanged

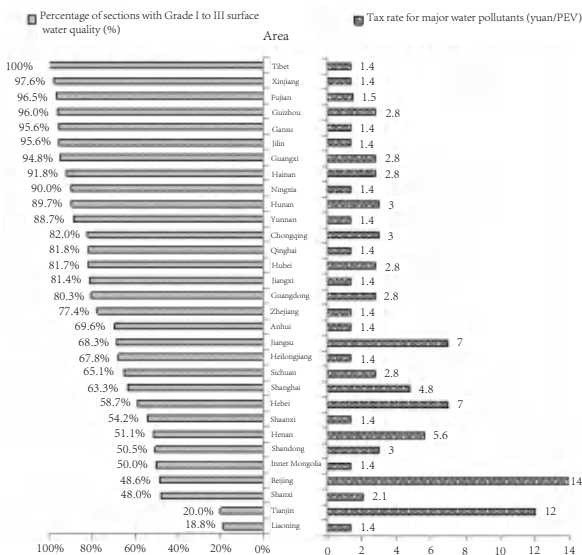


Fig. 1 Comparison of the percentage of days with air quality in 2016 and the tax rate for major air pollutants in various areas



(Note: The figures indicate Class II tax rates in areas that are subject to differential tax rate (Hebei, Jiangsu), and the highest tax rates for major pollutants in areas where pollutants are subject to differential tax rate (Tianjin, Shanghai, Shandong, Hubei), the same below).

Fig. 2 Comparison of the percentage of sections with Grade I to III surface water quality in 2016 and the tax rate for major water pollutants in various areas



(1) Relationship between tax rate and air quality in provinces

Higher tax rates apply to air pollutants in areas with low percentage of days with good air quality, as shown in Fig. 1. By means of curve fitting, it can be seen that the tax rate in some area is below the trend curve, implying the tax rate represented by this point is relatively low. Shanxi, Xinjiang and Shaanxi have relatively poor air quality and set lower tax rate compared with cities with similar air situation.

(2) Relationship between tax rate and water quality in provinces

As shown in Fig. 2, tax rates for air pollutants are higher in cities where sections with Grade I to III surface water quality take up a low proportion, but the trend curves are not well fit ($R^2 < 0.4$). There is no rule observed in the determination of tax rates for water pollutants. Many areas with poor water quality apply low tax rates and have room for further improvement, such as Heilongjiang, Inner Mongolia, Shaanxi, and Liaoning.

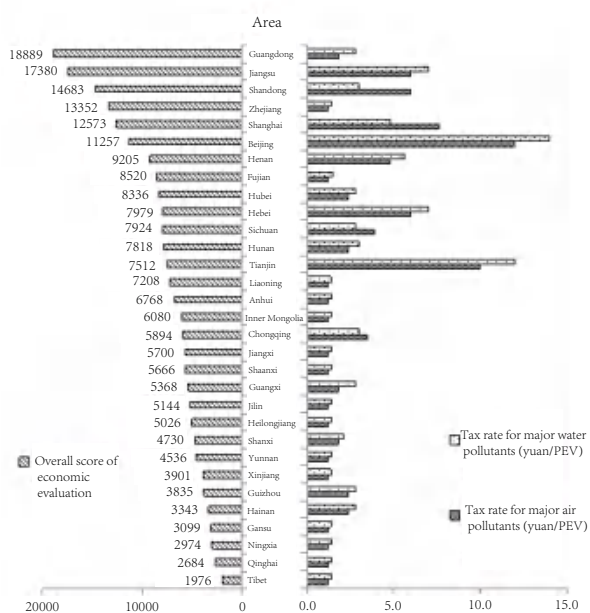
(3) Relationship between tax rate and economic development

Generally speaking, tax rates for major pollutants are relatively high in economically advanced areas. Guangdong and Zhejiang set lower tax rates than areas with similar levels of economic development. The tax rate is reasonable in Guangdong owing to superior environmental quality, but has room for increase in Zhejiang since its environmental



quality is moderate. The Beijing-Tianjin-Hebei region with typical composite pollution applies high tax rate, noticeably in Beijing. The three areas in the region have obvious gradient differences in industrial structure due to different stages of economic development. In Beijing, the secondary industry accounted for 19.2% in 2016 and traffic exhaust contributes most to air pollution, so the application of maximum tax rate has little impact on the tax burden of businesses. Hebei, however, attributes air pollution to industrial sources in the middle stage of industrialization and will face both opportunities and challenges brought by high tax rate. On one hand, a high tax rate is conducive to the optimization and upgrading of industrial structure and the development of emerging industries and service industries. On the other hand, it adds the burden on businesses and hinders to a certain extent

Fig. 3 Comparison of the overall score of economic evaluation in 2016 and the tax rate for major water pollutants in various areas

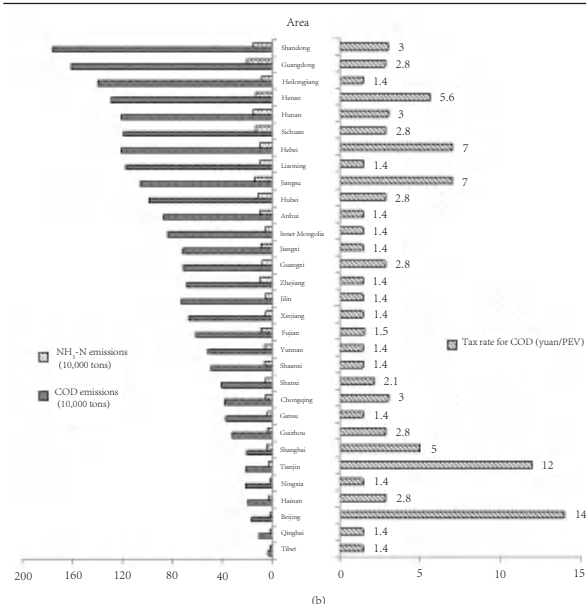
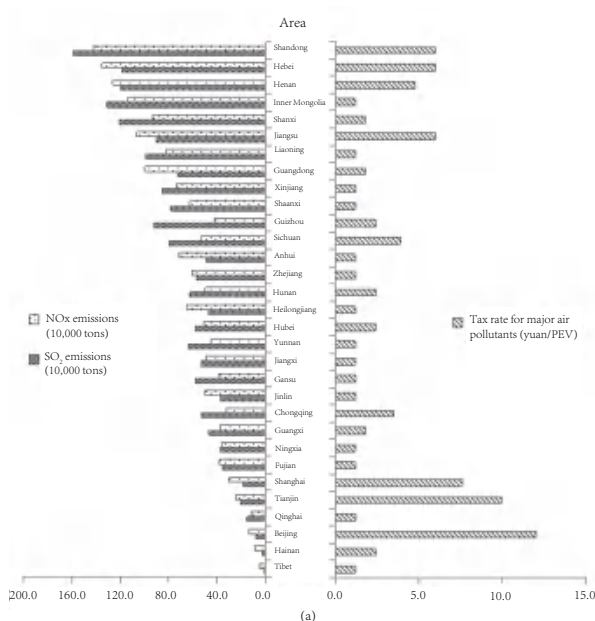


economic development in the short term.

(4) Relationship between tax rate and pollutant emissions

The tax rates currently applicable in various areas do not fully reflect the characteristics

Fig. 4 Comparison of major pollutant emissions and tax rates in various areas in 2015





of pollutant emissions. The curves for major pollutants (NO_x , SO_2 , COD, and $\text{NH}_3\text{-N}$) and corresponding tax rates do not fit well ($R^2 < 0.4$). As shown in Fig. 4, high tax rates are found in areas with varying emission levels, and low tax rate in emission-intensive areas. For example, Inner Mongolia, Guangdong and Liaoning apply low tax rates though they discharge as high as Shandong, Shanxi, Henan and Hebei. In contrast, Beijing, Tianjin and Shanghai implement the highest tax rates in the country, despite low emissions.

3.2 Impact on the burden of businesses

The overall impact on the burden of businesses is small. First, the PDF levels in various provinces have been raised above the minimum standards. Generally, the EPT tax rates applicable in most provinces are the same as or slightly higher than the PDF levels, and expected to have little overall impact on the burden of companies. Second, PDF accounts for a small proportion of taxes and fees paid by businesses, generally below 1%.

The impact is more obvious on businesses that fail to comply with the PDF regulations or invest less in pollution control. First, the fee-to-tax reform greatly enhances legal rigidity and tax collection and administration, and thereby addresses problems associated with inappropriate PDF enforcement by businesses, such as negotiated payment, overdue payment, and inadequate payment. Second, if not scale up investment in pollution control to reduce the quantity

and concentration of emissions, emission-intensive businesses are difficult to obtain tax reductions and unlikely to evade full tax payments under the rigid tax system.

Tax breaks will partially alleviate the burden on businesses. The EPT policy offers a 25% tax reduction, in addition to the 50% tax reduction of the PDF system, which enables more enterprises to enjoy preferential tax treatments. Besides, the EPT Law eliminates the provisions on multiplied fees, which also reduces the burden on enterprises.

Changes in accounting methods have a certain impact on businesses. On December 27, 2017, MEP issued the Announcement on Publishing the Methods for Calculating Pollution Coefficient and Material Balance of Pollutant Emissions (MEP [2017] No.81), which set forth the methods for calculating emission coefficient and material balance applicable to taxpayers covered by the PDF scheme and beyond respectively. These methods may differ from PDF calculation methods adopted by businesses, resulting in changes in the tax payable.

3.3 Impact on emission reduction

The EPT policy has begun to produce green effects. First, pollutant emissions have been reduced by encouraging cleaner production. Jiangsu Province, for example, ranked first in the country of EPT tax revenue in 2018. The $\text{PM}_{2.5}$ concentration declined to $48 \mu\text{g}/\text{m}^3$; state-controlled sections with Grade III or better water quality accounted for 68.3% and those inferior to Grade V accounted for 1%, with all indicators accomplished more than



tasked. Second, sewage treatment efficiency has been raised by promoting centralized treatment. Tax exemptions are given to urban and rural domestic sewage centralized treatment sites that meet the emission standards. Given this policy, businesses are encouraged to discharge to urban pipeline networks instead of directly discharging water pollutants to the environment, which improves the centralized treatment efficiency of sewage. Third, governance benefits are magnified by promoting comprehensive utilization. Taxpayers that perform comprehensive utilization of solid waste are exempted from the tax. Give this incentive, businesses carried out comprehensive utilization of more than 10 million tons of solid waste in the first half of 2018. Tax exemptions are also applicable to large-scale livestock and poultry producers that are important to people's well-being and have introduced comprehensive utilization of sewage. As a result, the EPT tax payable in this industry decreased by 15.9% in the first half of 2018, compared with the PDF amount of the same period last year.

Energy conservation and emission reduction become "profitable". The EPT system implements the norm quota tax rate. In other words, the tax rate depends on the amount of pollutant emissions. Businesses are forced to transform and upgrade for the "survival of the fittest". They are required to fulfill environmental responsibility and produce green and low-carbon products with higher added value, thus promoting economic restructuring and development

mode change. In the long run, the emission reduction capacity of polluters will continue to improve as the efforts are deepened to promote ecological progress and protect the environment. The EPT revenue will gradually decline and stabilize, which reduces the burden on businesses while bring benefits to pollution control and emission reduction.

The cost of environmental violations has sharply increased. It is of greatest significance that the EPT Law establishes the principle of "polluter pays" by legislation. Tax authorities strictly enforce the law according to the legal provisions, and taxes increasing with emissions become a constraint on the production rigidity of businesses. As stipulated by law, if an enterprise is found to have evaded taxes, tax authorities will demand the payment of such taxes and overdue fine, and impose a fine of 50% to 5 times of the evaded taxes, and the enterprise will be held criminally responsible where a crime is constituted. Regardless of terms, the fee-to-tax reform will make the environmental protection mechanism more standardized and effective, and inject an impetus to national economic optimization and upgrading for higher quality development.

3.4 Impact of tax reductions on businesses and innovation

(1) Impact mechanism of tax reductions on businesses

Tax reductions form an incentive mechanism. The EPT policy serves as a core means for promoting more efficient and fair allocation



of environmental resource by internalizing the external costs of environmental pollution. It restricts the emissions of businesses through punishments and stimulates the innovation through awards. Tax incentives are an indirect subsidy. By meeting certain emission requirements, companies can enjoy the tax incentives and get them deducted from the taxable income. Tax rate manifests the intensity of punishments and awardsⁱ. At a reasonable level of tax burden, a higher tax rate enables tax incentives to produce greater effects. National emission standards and differences in tax incentives also influence the incentive effect. The concentration of emissions discharged by enterprises and the marginal cost of governance are inversely proportionalⁱⁱ. More stringent emission standards will require companies to invest more in reducing contaminants, which outweighs the stimulus of tax incentives to pollution control.

Tax reductions contribute to environmental innovation. By increasing pollutant discharge costs of enterprises, EPT urges the transformation of the economic development model characterized by high input, low output, and large pollution. At the same time, tax incentives reflect the government's differential tax policy for different levels of production technology, and encourage the environmental innovation of enterprises in the form of tax reductions and exemptionsⁱⁱⁱ.

The preferential tax policy creates conditions for market development. Since tax incentives can not directly intervene in the emission reduction activities of enterprises, businesses can independently decide and choose whether or not to scale up environmental governance investment and obtain tax incentives to different extents.

(2) Tax reductions and environment service contract

Due to information asymmetry between the government and the market^{iv}, the EPT policy has limited effects in stimulating the emissions reduction and technological innovation of enterprises, which leaves space for the development of environmental governance market. In the field of emissions reduction, the support for enterprises to meet the conditions of tax incentives can be incorporated as an outcome into contract environment service (CES). Enterprises can sign such contracts with service providers. Under the contract signed, service providers reduce the concentration of pollutants pre-treated and discharged by enterprises to a level that meets the preferential tax conditions, and then the two parties share the tax reductions and emissions reduction costs therein. The study supposes that C indicates the concentration of pollutants discharged; V and t represent the the velocity and time of pollutant discharge respectively; and R is the

ⁱ Chu Ruigang. Discussion on Fiscal and Tax Incentives in Environmental Science and Technology Innovation—A Perspective of Environmental and Economic Win-win [J]. Reform of Economic System, 2018(02): 112–117.

ⁱⁱ Cao Dong. China's Industrial Pollution Economics [M]. Beijing: China Environmental Science Press, 1999: 96–97.

ⁱⁱⁱ Liao Zhongju, Cheng Hua. Study of the Influencing Factors and Performance of Enterprise Environmental Innovation—A Perspective of Environmental Policies and Corporate Background Characteristics [J]. Studies in Science of Science, 2014, 32(05): 792–800+716.

^{iv} Zhang Guangming, Wen Xingqi, Zhao Xibin. Enterprise Environmental Innovation: A Study Based on Cases [J]. Science & Technology Progress and Policy, 2014, 31 (2): 83–86.



EPT tax rate.

If the pollutant concentration is reduced by service providers from C_0 that does not enjoy tax incentives to 30% below the emission standard (C_1), then:

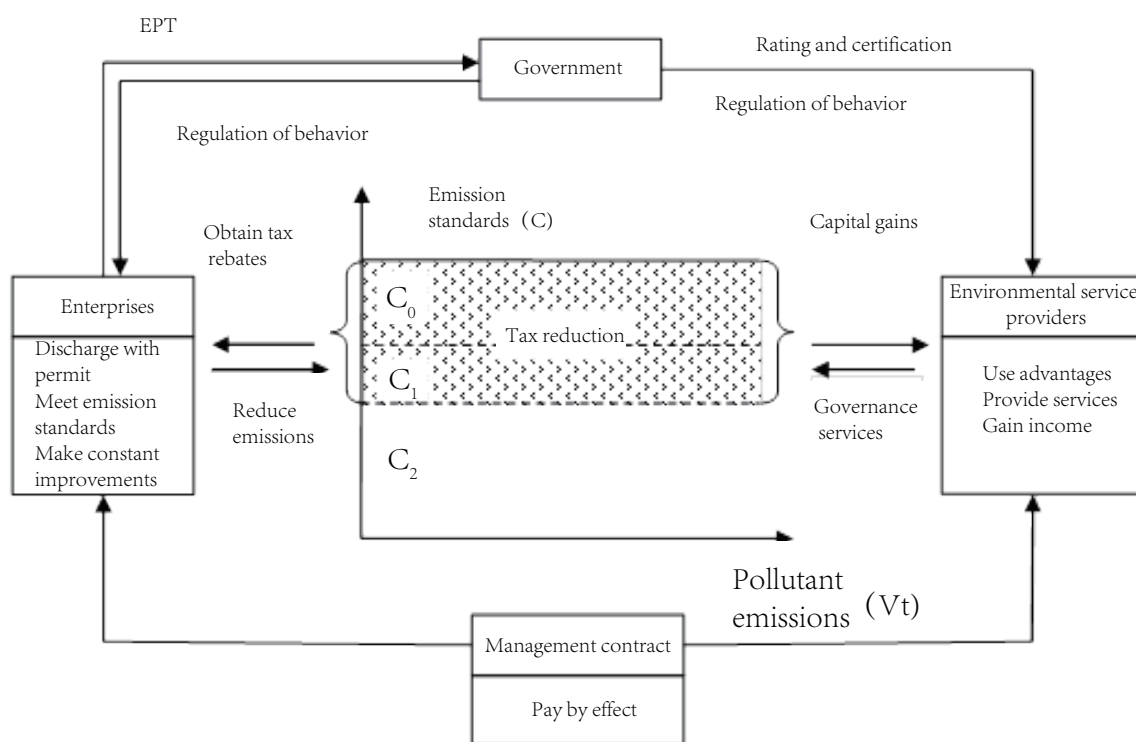
$$\text{Tax reductions} = C_0V_0tR - 0.75C_1V_1tR$$

If the pollutant concentration is reduced by service providers from C_0 that does not enjoy tax incentives to 50% below the emission standard (C_2), then:

$$\text{Tax reductions} = C_0V_0tR - 0.5C_2V_2tR$$

Fig.5 shows the CES model for tax reductions of enterprises for smaller pollutant emissions. The CES model takes tax incentives as profit margins, and links the interests of implementing entities and responsible entities. It encourages joint governance and stimulates technological innovation in environmental governance, thereby reducing governance costs and increasing marginal income.

■ Fig. 5 EPT tax reductions and CES conceptual model





4. PROBLEMS IN EPT COLLECTION AND ADMINISTRATION

4.1 Measures for data review are absent

As stipulated by the EPT Law, tax authorities may request data review by environmental authorities if they find that the data in the tax return of taxpayers are abnormal or taxpayers fail to file the tax return within the prescribed deadline. However, the implementing regulations do not further specify the review procedures and requirements. Tax authorities reported poor departmental coordination after the transfer of cases to them, though exchange visits were carried out tax and environmental authorities before the EPT policy took effect in January 2018. In some provinces, the tax department and the environmental department have jointly issued relevant notices on review, but at the national level, data review urgently needs to be standardized.

4.2 Tax incentives need to be strengthened

The fee-to-tax reform enhances legal rigidity and gives greater incentive to businesses, especially tax incentives. Nevertheless, the two levels of tax reduction stipulated by the EPT Law are too different to create sufficient stimulus. Tax reductions are far smaller than investments and unable to produce obvious incentive effect. Therefore, it is necessary to study and develop more effective incentive measures. The preferential tax policy still has room for improvement compared with international measures such as direct tax

cuts, investment tax credits, accelerated depreciation, and tax rebates.

4.3 PEVs need update

PEVs used in the EPT Law were determined in the 1990s. After more than two decades of development, there have been significant progress in environmental protection technologies, change in pollution control costs, and improvement in monitoring and testing capabilities. Meanwhile, new pollutants subject to control have emerged in the new era. In view of this, PEVs urgently need to be examined and updated.^v

4.4 Volatile organic compounds (VOCs) are not included in the scope of taxable items

VOCs are not a taxable item under the EPT system as they have not been included in the fee-to-tax reform framework. VOCs pose extreme hazards to the environment by significantly contributing to PM_{2.5} pollution and high O₃ concentration. The inclusion of VOCs into the EPT system is urgently necessary for upgrading the VOCs pollution control. The tax on VOCs will serve as a long-term economic means that encourages businesses to control pollution and offset environmental externalities.

4.5 The EPT Law and implementing regulations need to be further refined at the operational level

The EPT-related regulations and documents

^v Zhou Yangsheng, Zhang Guoning. Discussion on Several Issues Concerning the Environmental Protection Tax Law (Draft) [J]. Chinese Journal of Environmental Management, 2016, (6): 38–42.



issued by the State Council and relevant departments (Table 1–1) make the EPT Law more operable. Nevertheless, there are still some specific issues to be clarified by means of documents or unified training, in order to avoid the confusion of taxpayers and the inconsistency of enforcement by tax authorities in practice due to different interpretations.

The supporting policies at the local level also need to be improved. At the provincial level, neither taxable pollutants from the same discharge outlet are added, nor the scope of other solid wastes in the region specified. The local clarification of sampling and measurement methods is not optimistic, which is unable to support tax collection. Local governments should be proactive and initiated.

4.6 Businesses fail to file the tax return as required

In the data reporting process, some businesses do not follow the procedures as required, but directly apply for tax verification to tax authorities. Some companies ignore automatic monitoring or third-party monitoring methods, and file the

tax return based on the PDF results verified by environmental bureaus. Some enterprises copy the information from pollutant discharge permit to tax return. Such information reflects only partial monitoring results of environmental departments and does not match with the data on taxable pollutants required by tax authorities, which is likely to result in underreporting.

4.7 Training and consulting services need to be further aligned

Under the PDF system, environmental authorities verify pollutant emissions and corresponding charges. Under the EPT system, taxpayers calculate, report and pay the tax themselves. A considerable part of taxpayers is not fully prepared for the changes in the mode of collection and administration. Since the EPT Law came into force in December 2016, the social community has paid increasing attention to the tax. Among them, taxpayers became more eager for tax-related knowledge after the second half of 2017. However, tax collection training and consulting and agency services still can not meet the market needs.





5. POLICY RECOMMENDATIONS FOR SMOOTH EPT COLLECTION AND ADMINISTRATION

5.1 Link local tax rates with environmental quality attainment

Appropriately raising the EPT tax rate can stimulate the environmental innovation of businesses. Businesses can enjoy tax incentives by stepping up pollution control to reduce the amount and concentration of pollutant emissions. First, the tax rate should be gradually adjusted for areas with poor environmental quality and large pollutant emissions. All localities should set reasonable tax rates according to environmental carrying capacity, economic development level and pollutant emissions situation, so that the tax rates become negatively correlated with environmental quality and pollutant emissions, and positively related to economic development level. Second, taking a river basin as a whole and reflecting regional joint air pollution prevention and control, an EPT coordination mechanism should be put in place for inter-provincial river basins and key areas for air pollution prevention and control. Tax rates should be set through negotiations to match the responsibilities for regional environmental protection while taking into account regional development and environmental economics.

5.2 Expand the influence of tax incentives

More levels of tax incentives can give full play to tax incentives, so that more businesses

can obtain tax reductions by taking further measures to curtail emissions. For example, taxpayers can enjoy a 30% cut in tax if their emissions of taxable air or water pollutants are less than 70% of the national and local emission standards. In addition, the preferential tax policy can be implemented in various forms, such as tax incentives to taxpayers adopting advanced process or control technology. Tax incentives are closely related to the regulation of pollutant concentrations. The law should be strictly enforced and relevant work well preformed, including tax return, environmental monitoring, and information sharing, in order to prevent frauds.

5.3 Enhance the cooperation capabilities of tax and environmental departments

First, tax and environmental departments should further strengthen cooperation to address the imperfections of tax review mechanism. Relevant documents at the national level are expected to make clear review-related matters, which will regulate and guide local tax and environmental departments for smooth tax collection and administration and improve the tax comparison and review mechanism. Second, tax and environmental departments should release clarification documents or organize studies in a timely manner, where problems are encountered in the implementation



process, such as solid waste, pollution coefficient, sampling and estimation, and PEVs. Third, information technology should be applied to advance data platform construction and information disclosure of pollutant discharge permit, environmental monitoring, supervision and enforcement, and tax collection and administration. Big data should be well used to improve the efficiency of tax collection and administration.

5.4 Add taxable items according to the needs of environmental protection

The scope of EPT application should be gradually adjusted in practice to give play to the initiative of local governments while fully considering the burden of businesses. First, when appropriate, VOCs should be added as a taxable item in line with the national requirements for VOCs control. Second, the scope of taxable items can be enlarged according to the degree of urgency of pollutant control and the difficulty of tax collection. For example, carbon dioxide and construction noise can be included in the scope based on research.

5.5 Strengthen impact assessment of EPT policy implementation

Close attention should be paid to EPT

policy implementation, so as to timely identify problems and good practices and take measures to improve tax collection and administration. Since EPT is a tax based on behavioral incentives, it is also necessary to further strengthen basic research and conduct impact assessment to facilitate optimal policy design that gives full play to the incentive role of tax.

5.6 Change the mindset of taxpayers to actively respond to environmental taxes

First of all, tax and environmental departments should establish platforms for sharing tax-related information, while taxpayers should file the tax return based on accurate and scientific calculations without pushing their luck. Second, EPT as an incentive policy aims to regulate the pollution control behavior of businesses rather than increase government revenue. Taxpayers should keep abreast of tax collection and administration policies and relevant local regulations, proactively adjust pollutant discharge and treatment strategies in the hope of tax reductions and exemptions, and report and pay tax as required. If any difficulty in calculating or reporting, they can seek advisory services from specialized agencies in a timely manner.



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