

IMPACT OF AIR POLLUTION FEE RATES ON ENTERPRISES IN THE CZECH REPUBLIC

Egor Sidorov, Iva Ritschelová

J. E. Purkyne University in Usti nad Labem, Faculty of the Environment

Abstract: *This article presents the partial results of the most extensive analysis ever made in the Czech Republic focusing among others at the impact of air pollution fee rates on enterprises. The authors consider the history as well as the current purposes of the environmental protection fees system in the Czech Republic. The conclusion is made that air pollution fees in the Czech Republic at the current level as well as the possible update being prepared are too low to positively stimulate enterprises to environmentally positive behaviour.*

Keywords: *Air pollution fees, environmental policy, enterprise, economic impact, Czech Republic*

1. Introduction

During the transformation of the Czech Republic after 1989 aims of environmental improvement were highly prioritised among other important political, social and economic goals. In order to improve the environmental situation the specific environmental legislation was developed and/or updated. This legislation had a significant impact as at macroeconomic, as well as at enterprise level.

One can state that initial tools of environmental policy in almost all European countries were primarily of normative nature. The Czech Republic is not an exception. However, the experience shows that in comparison to them the *economic* tools have greater capabilities of changing the decision making patterns of economic agents and, what is also important, with relatively lower costs. That is why in addition to traditional *administrative* the set of *economic* tools is being consequently introduced in the Czech Republic.

2. Environmental fees in the Czech Republic

In the former “Eastern Block” countries a traditional part of environmental policy tools mix comprises the collection of fees for pollution and the use of natural environmental components from producers and final users.

According to economic theory, fees enable regulation of emitted pollutant volumes in case the fee level is equal to the external costs caused by pollutants. These costs should be paid by the polluter either directly or in the form of fiscal redistribution. In both cases, this involves internalization of negative externalities, i.e. the polluter pays principle.

One should notice that determination of externalities under real-life economic conditions is a quite controversial and data-intensive process. This is the reason why existing rates and amounts of fees set and used in practice are rather the result of various (rough) approximations often influenced by a political context.

In the contemporary Czech Republic one can find the following types of environmental fees (and charges):

- for air pollution (by exceptionally large, large, medium and small stationery pollution sources);
- for import and export of chlorofluorocarbon containing regulated substances and products;

- for surface waters withdrawal;
- for discharge of waste water into surface water;
- for permitted discharge of waste waters into ground waters;
- for waste deposition;
- for support of collection, processing, use and disposal of wrecked vehicles;
- for operating of communal waste collecting, transporting, separating, using and disposing systems;
- for registration and record keeping of authorised subject in accordance with law on packages;
- for use of mining space area;
- for mineral extraction from reserve deposits or reserve minerals following treatment and improvement;
- for removal of land from agricultural land fund;
- for reclassification of property designated to fulfil function of a forest.

The following text will be particularly devoted to *air pollution fees*.

3. Air pollution fees: Past, present and future

In the former Czechoslovakia, air pollution fees were introduced in 1967, and within that legislative and implementation framework, these fees had been fiscal income till 1991. Under the conditions of the centrally regulated economy of Czechoslovakia, these fees had no statistically provable positive environmental impact, either for low weight in manufacturers' prices or the enormous occurrence of externalities and exceptions to legislative and implementation regulations; their function consisted rather in the redistribution of means for financing capital expenditures connected with environmental protection [1].

In this respect their function was rather *fiscal* than *stimulative*. This fact is proved based on information from [2] stating that in 1990 the share of emission fees on total costs of 90 percent of biggest polluters sample was less than 1 percent. This fact enables to make a conclusion, that environmental fees did not influence the economic results of enterprises at any significant extent.

The first step towards the change of conventional system was law No. 389/1991 Col., on state air protection and air pollution fees existed till 2002. According to it large, medium and small pollution source operators had to pay air pollution fees. The fee rates are presented in the table 1. As one can see the law stipulated the progressive fee development in time. This was made in order to smoothen the impact on medium and large polluters of the time. The whole sum of fees was planned to be paid in 1997.

Table 1 Air pollution fee rates according to law No. 389/1991 Col., on state air protection and air pollution fees (CZK)

Pollution type	1992 - 1993 (30 % of 1997 level)	1994 - 1995 (60 % of 1997 level)	1996 (80 % of 1997 level)	1997
Solid pollutants	900	1 800	2 400	3 000
Sulphur dioxide	300	600	800	1 000
Nitrogen oxide	240	480	640	800
Carbon oxide	180	360	480	600
Hydrocarbons	600	1 200	1 600	2 000

I class pollutants	6 000	12 000	16 000	20 000
II class pollutants	3 000	6 000	8 000	10 000
III class pollutants	300	600	800	1 000

At present the air pollution protection is regulated by law No. 86/2002 Col., on air protection and several other laws. The newly established fee rates were firstly applied for pollution produced in 2003. The law has defined more precisely the types of polluters, introduced the “particularly large” polluter category, etc. In comparison with the older version the number of substances was significantly increased. The rates are provided in the table 2.

Table 2 Air pollution fee rates according to No. 86/2002 Col., on air protection (CZK)

Pollution type	Rate
Solid pollutants	3 000
Sulphur dioxide	1 000
Nitrogen oxide	800
Liquid organic matter	2 000
Heavy metals and their compounds	20 000
Carbon oxide	600
Ammonia	1 000
Methane	1 000
Polycyclic aromatic hydrocarbons	20 000
Class I	20 000
Class II	10 000

The level of fees imposed on particularly large and large stationary pollution sources is decided by the corresponding regional authority on the basis of actual emissions in the previous year. The fees are collected and enforced by a locally competent authority (as far as the pollution source is concerned), in the case of the capital city of Prague the place of collection is derived from the seat of the air protection authority. The fees are income for the State Environmental Fund of the Czech Republic. The payment of effluent fees does not relieve the polluter from compensating environmental damages: e.g. those caused by accidents, exceeded emission limits are being penalised.

Presently the Ministry of the Environment of the Czech Republic has started to think of about possible updating of the fee system. The possible scenario of air protection fees update is given in the following table 3.

Table 3 Scenario of air pollution fee rates updating till the year 2010 (CZK)

	2006 reality	2010 proposal
Solid pollutants	3 000	29 400
SO ₂	1 000	7 000
NO _x	800	13 300

Source: Ministry of the Environment of the Czech Republic

In the following text, we present the results of analytical activities focusing evaluation on impact of current and suggested air pollution fees on selected economic agents.

4. Air pollution fees impact on enterprises: Reality of 2006 vs. scenario of 2010

In 2008, the J. E. Purkyně University in cooperation with the Czech Statistical Office prepared a pilot analytical study [3] aimed at measuring the impact of environmental fees of the sphere of enterprises. The part of analysis focused at air pollution fees consisted of the following several steps.

First step was development of the methodology for identification of air pollution fees impact on the enterprises and initial data mining. The data sets were received from the Czech Statistical Office and Czech Hydrometeorological Institute. The sample consisted of 1,719 economic agents and included all enterprises registered in the Register of Emissions and Sources of Air Pollution (REZZO 1¹).

The next phase consisted in estimating the relative share of respective fees in selected economic indicators of enterprises in the year 2006. The following indicators were calculated for 2006:

- share of air pollution fee in total revenues of an enterprise;
- share of air pollution fee in consumption from operation;
- share of air pollution fee in value added.

Finally the potential impact of the updated fee rates from possible scenario on economic agents in 2010 was quantified. The set of analysed indicators remained the same. The reported amount of individual fees in the year 2006 was recalculated according to the amount corresponding with newly suggested rates for 2010. This quantification was based on the assumption that the volume of production, consumption standards and price relations remain at the level of the year 2006.

Based on the sample analysis one can make the following bottom line. In total 21 enterprises (that is less than 1 % of the sample) paid 80 % of fees in 2006. These enterprises mainly represent the following industrial sectors: manufacture and distribution of electricity, gas and thermal energy; manufacture of basic metals and metallurgical products; coal, lignite and peat extraction; manufacture of chemical substances, preparations, pharmaceuticals, and chemical fibres; manufacture of coke, nuclear fuels, crude oil refinery processing; and finally manufacture of other non-metal mineral products.

Assuming the above mentioned possible update scenario in 2010 the situation would be very similar: 80 % of fees would be also paid by 21 companies. The economic sectors structure would also remain the same. The distribution of the frequency of relative indicators calculated for enterprises in the sample is presented in the following tables 4 and 5.

Table 4 Sample variability, (%)

	(Fee) / (Revenues)		(Fee) / (Consumption from operation)		(Fee) / (Value added)	
	2006	2010	2006	2010	2006	2010
Min	0,00	0,00	0,00	0,00	-33,96	-276,21
Max	1,75	6,67	3,41	10,03	11,49	131,89
Average	0,01	0,11	0,02	0,18	0,05	0,36

Table 5 Distribution of the frequency of individual indicators (%)

Share indicator level	(Fee) / (Revenues)		(Fee) / (Consumption from operation)		(Fee) / (Value added)	
	2006	2010	2006	2010	2006	2010

¹ Sources emitting pollutants are monitored at the national level within the framework of the so-called Register of Emissions and Sources of Air Pollution (REZZO). The database REZZO 1 registers stationary "exceptionally large and large sources, combustion with thermal capacity above 5MW and particularly significant technologies".

≤0.5	99.65	95.23	99.01	93.19	97.09	88.13
0.5-1	0.29	1.80	0.76	2.79	1.75	4.48
1-5	0.06	2.79	0.23	3.32	0.99	5.00
5-10	0.00	0.17	0.00	0.64	0.06	1.63
10-50	0.00	0.00	0.00	0.06	0.12	0.64
>50	0.00	0.00	0.00	0.00	0.00	0.12

According to the table 5 the *share of fees in revenues* amounted to max. 0.5 % in nearly 99.7 % of agents in 2006. In 2010 the picture wouldn't change too much: in 97 % of the sample enterprises the share of air pollution fees in revenues would remain at max. 1 percent's level. This share would amount to 5 % only in not quite 3 % of companies under above mentioned assumptions.

Considering the *fees share in consumption from operation* it amounted on average to 0.02 %, and in nearly 100 % of respondents this share amounted to max. 1 % in the year 2006. In 2010 an increase to higher percentage levels would be observed in 4 % of respondents.

The biggest fee payers are represented by 2 industrial sectors (68 % of the total revenues): they are *manufacture and distribution of electricity, heating gas and thermal energy* and *manufacture of basic metals and metallurgical products*. In the year 2010, the share of the former would increase to a significant extent but the share of basic metals manufacture would decrease. Nevertheless, no dramatic changes would occur in any other sector as a whole.

One should mention again that these results were achieved under assumption that neither productivity nor economic results of the companies in the sample would not change in 2010, and therefore the economic indicators remain at 2006 level. This enables one to assume that the real impacts would be even smoother (lower).

In general one can assume that the possible scenario of air pollution fees update would not lead to significant increase of relative share of air pollution fees in total revenues, consumption from operation or value added of the enterprises in the sample in general. In particular cases this share after the update would exceed 50 %, of e.g. total revenues of chosen enterprises, and this of course could endanger the their competitiveness level. However, this fact would rather indicate the state of financial crisis of these agents, since the share of air pollution fees on the respective indicators is relatively low in the great majority of the rest fee-payers.

5. Conclusions

The transformation processes in progress in the Czech economy since 1989 have created new conditions for the operation of economic tools of environmental protection. As a result of development and updating of environmental legislation, the scope and structure of pollution sources have been extended, and number of pollutants, for which fees are paid, as well as corresponding fee rates have been increased. It was supposed that these fees would motivate enterprises towards environmentally friendly behaviour, and this concept has been widely popularised in media. Though the transformation processes in the Czech economy created the necessary space for more effective action of economic tools, the fees seem to be too low to achieve the environmental goals. In this respect, the fees are only *supplementary* to other tools in environmental protection, both normative and economic ones.

In particular this is evident from the above presented analysis of air pollution fees. The air pollution fee system in the Czech Republic does not have much motivation potential for economic agents as in its current shape, as well as according to scenario presented in the

paper. The obvious reason is the low impact of air pollution fees on the main indicators of enterprises.

References:

- [1] ČERNÁ A., LAMSER Z., TOŠOVSKÁ E.: Co stojí péče o životní prostředí (In Czech). Praha: Svoboda, 1987.
- [2] ČERNÁ, A., RITSCHELOVÁ, I., TOŠOVSKÁ, E.: Dopad emisních poplatků na ekonomiku podniků (In Czech). Praha: VaV Ústav stavební Praha. MŽP ČR, 1991.
- [3] RITSCHELOVÁ, I. et al.: Dopad změn environmentálních poplatků na ekonomiku podniků (In Czech). Praha, 2008. (In Press).

Contact Address:

Egor Sidorov
doc. Ing. Iva Ritschelová, CSc.
J. E. Purkyne University in Usti nad Labem
Faculty of the Environment
Kralova vyšina 3132/7
400 96 Usti nad Labem
Czech Republic
Email: sidorov@rek.ujep.cz
Email: ritschelova@rek.ujep.cz